COST INCURRED AND MARGINS SECURED ACROSS THE VALUE CHAIN FOR BEEF IN THE SOUTHERN PROVINCE OF ZAMBIA

Mafimisebi, T. E., Katewa, B. C., Yerokun, O. A. and Syampaku, E.M.

Department of Agricultural & Resource Economics

The Federal University of Technology, Akure, Nigeria

E-mail of Lead Author: temafimisebi@futa.edu.ng

[2] Agricultural Business Management Unit

School of Agriculture & Natural Resources

Mulungushi University, Kabwe, Zambia

Selected Paper prepared for presentation at the 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Annual Meeting, San Francisco, CA, July 26-28

COST INCURRED AND MARGINS SECURED ACROSS THE VALUE CHAIN FOR BEEF IN THE SOUTHERN PROVINCE OF ZAMBIA

[1]Mafimisebi, T. E., [2]Katewa, B. C., [2]Yerokun, O. A. and [2]Syampaku, E. M.

[1] Department of Agricultural & Resource Economics

The Federal University of Technology, Akure, Nigeria

E-mail of Lead Author: temafimisebi@futa.edu.ng

[2] Agricultural Business Management Unit

School of Agriculture & Natural Resources

Mulungushi University, Kabwe, Zambia

ABSTRACT

The Zambian beef industry can potentially contribute more to the nation's development if value addition is better promoted in the agricultural sector. Effective promotion of value chain (VC) activities is achievable only with in-depth understanding of economic activities embedded in the beef VC. This was the main issue for this study which analyzed cost incurred and margins secured across the value chain for smallholder beef cattle production in 4 districts of the Southern Province against the backdrop of high final consumer price of beef in Zambia. The objectives of the study were to describe the socio-economic characteristics of players, identify their value addition activities and how they influence the value chain, map the beef VC with key actors, compute the costs added to retail price at each value chain node and explain how this influences the final consumer price. Net margin accruing to VC participants and the overall cost of producing a unit of beef were also computed. Empirical results showed that the majority of VC participants were males which were below 50 years of age, married and had basic education. The cattle rearing node was found to contribute the largest proportion (38%) of the marketing margin of USD2.97/kg of beef followed by trading node and retailing node (27% apiece) while the abattoir node accounted for a paltry 8%. The net margin earned was also highest at the cattle rearing node (USD0.77/kg) followed by trading (USD0.70/kg), retailing (USD0.66/kg) and abattoir node (USD0.22/kg). Prices of steak and mixed cuts were found to be more uniform in all the four districts. However, the prices of offals tended to parity only in urban areas but were significantly higher in the largely rural Namwala District. In all the districts, the prices of offals were found to be significantly lower than those of steak and mixed cuts. It is concluded that final consumer prices are mostly determined by cost incurred and margins added at cattle rearing, trading and retailing nodes. Lastly, differentiating beef into steak and mixed cuts does not yield any corresponding price differentiation. The study recommended raising the participation of females in some value chain nodes, stopping beef differentiation into steak and mixed cuts and lowering final consumer prices by implementing policies such as elimination of double levies by councils that can lead to cost reduction at beef cattle rearing, trading and retailing nodes.

Key words: Beef, prices, margins, value chain, value addition, costs, Southern Province, Zambia.

INTRODUCTION

The beef value chain (VC) concept can be seen as sourcing of beef and the subsequent value adding steps in the supply chain (Kasumbalesa, 2010). In Zambia, the beef industry is highly dominated by few agribusiness firms (Chikazunga, *et al*., 2008) and since the 1970s, government's role has been gradually declining in beef production and marketing (Chikazunga *et al.,* 2008). Following radical market liberalization in the early 1990s, Zambia's beef sector has rapidly changed (Chikazunga, *et al.*, 2008; Ndiyoi and Mudenda 2006). This has seen the current giant companies in meat processing such as Zambia Beef Company (ZAMBEEF) Plc, Dayow Company Limited and Star Beef Company Limited taking over the beef supply role from the government. As a result, opportunities for smallholder cattle rearers to supply beef cattle have been created (Chikazunga, *et al*., 2008). These observations were in conflict with earlier studies by Dolan and Humphrey (2000) in which it was observed that reduced government role was seen to benefit only a few high capacity players in the VC who were in turn exploiting smallholder farmers/rearers.

Stabbs (2011) argues that the beef VC is still under-developed in various parts of Zambia and this inevitably points to poor marketing infrastructure and weak marketing system. Moreover, Kasumbalesa (2010) further observed that smallholder beef cattle farmers thrive on the need to raise money to solve a particular problem rather doing so as a planned business. This arises from the perception that cattle are wealth holding assets whose value appreciates with time (Kasumbalesa, 2010). This perception ultimately restricts the number beef cattle entering the beef VC. The number of beef cattle entering the VC is further restricted with the need for drought power and supply of manure for crop production (Mulale, 2001). Furthermore, Kasumbalesa (2010) observed that transactions in the informal sector spread along the VC in a collaborative manner from rural farms through transporters, abattoirs and butcheries to consumers especially that the VC itself is largely informal and farmers produce cattle outside the formal system (Chilonda, *et al*., 2000).

In recent times, Ndiyoi and Mudenda (2006) observed improvements in the beef supply chain in Zambia which is actively integrating smallholder cattle into the formal sector at abattoir stage of the VC. The formal sector consists of large beef processors that manage entire value chains through high levels of forward and backward integration. Most of the beef processing plants are located in urban areas like Lusaka and on the Copperbelt where demand is highly concentrated (Ndiyoi and Mudenda, 2006). The costs of cutting and sorting meat and packaging are usually borne by the butcheries (Ndiyoi and Mudenda, 2006).

The trading function dominates the beef VC in the informal sector. Traders procure beef cattle from farmers and transport them to abattoirs. Informal trading, in many cases, uses vessels for goods and passengers to transport animals to abattoirs (Chikazunga, *et al*., 2008). Moreover, some abattoirs and retail shops are so informal that they lack regulatory frameworks which reduce customers' confidence in consuming animals slaughtered in them (Labuschagne, *et al.,* 2010). Labuschagne, *et al*., (2010), argues that increase in abattoir standards which raises consumers' confidence in hygienic management practices of animals and beef derived from them attracts a reasonable premium while promoting corporate image of companies slaughtering their animals in such abattoirs.

Sidahmed (2010) identified four basic stages which every agricultural product, including beef, goes through from point of production to point of consumption. These are namely, input supply, farm production, processing and distribution and marketing. These basic stages were further identified as comprising business activities by

which incomes are transmitted to VC participants (Syampaku and Mafimisebi, 2012). Like other agricultural products, the beef VC is known to provide a major source of income and livelihood for many actors in Southern Zambia. Since many business activities are required to bring a product or service from conception through different production stages to the end consumers and final disposal (Spies, 2011), identifying value created and cost incurred at each node of the production process (Sidahmed, 2012) becomes germane in determining the distribution of benefits to different participants. Since the average per *capita* beef consumption of 2.4kg per annum in Zambia (Aregheore, 2009) have been reported to be lower than the recommended minimum consumption standard set by the World Health Organization [WHO] (World Bank, 2011; Sinha, 2011), this study was conducted to compute the cost of value chain activities in order to identify different costs generated at each stage and how they are passed on to final consumers. Arguments that the low per *capita* beef consumption in Zambia are due to high final consumer prices have been advanced by Mwewa (2012) who further argued that the situation has been compounded because majority of Zambians fall in the low and average income levels and are therefore easily priced out of the market for beef. However, having too many VC nodes may also contribute to high beef prices (Laura, 2011; Antonio, 2012). Since beef is a major source of high quality protein (Laura, 2011; Antonio, 2012), it is desired that it becomes accessible to majority of Zambians in appropriate quantities.

The study sought to answer the following research questions.

(a) Who are the major actors in the beef VC in the Southern Province of Zambia?

(b) What are the socio-economic characteristics of VC actors in the Southern Province?

(c) What margins are added at each node of the VC for beef in the Southern Province?

(d) Are there significant differences in prices and margins made for different beef types in the districts studied?

(e) What is the perception of beef consumers on beef quality, prices and consumption adequacy?

The general objective of the study was to analyze players in the beef VC in terms of their roles and what proportion of the final consumer price accrue to them in the Southern Province of Zambia. To address this general objective, the following specific objectives were set. They are to:

(a) identify the beef VC in the Southern Province of Zambia;

(b) describe the socio-economic characteristics of VC players;

(c) map the beef VC with key actors and activities performed;

(d) outline the cost of value addition at each VC node and explain how this influences the final consumer price;

(e) compute and compare prices and net margins accruing to VC participants across districts;

(f) obtain the perception of beef consumers on beef quality, prices and consumption adequacy.

STUDY METHODOLOGY

Study Area, Sampling, Data and Data Collection

The study was conducted in the Southern Province of Zambia. Southern Province was chosen for the study because it produces approximately one third of Zambia's beef cattle. This makes it an excellent area for studying the beef VC in the country. The study was confined to four (4) out of the eleven (11) districts of Southern Province, namely, Choma, Namwala, Monze and Mazabuka. These districts were purposively selected for being the major beef cattle producers (Zambia National Farmers Union, 2012). According to the National Assembly of Zambia (2012) and Government of Zambia (2012), the four districts account for 56% of the beef cattle found in the province while the remaining 7 districts account for the balance of 44%. Nationally, however, the Southern Province accounts for about 30% of the entire cattle population. Of the 1,009,000 beef cattle in the Southern Province, Choma accounts for 12.7%, Namwala, 16.7%, Monze 18.5% and Mazabuka 8.2% (CSO, 2012). Whereas Choma, Monze and Mazabuka are essentially urban districts because they are located along the line of rail, Namwala is largely a rural district.

From each district, ten (10) cattle suppliers who were either farmers or traders were randomly selected as they brought cattle to abattoirs. Thus, there were 40 respondents in this category. On the other hand, all the 11 abattoirs found in the four districts were selected and interviewed using snowball sampling method. Three (3) abattoirs were found in Choma, 2 in Namwala, 4 in Monze and 2 in Mazabuka. Furthermore, 16 owners of butcheries were interviewed in the market place. Of these butcheries, 5 were in Choma, 4 in Namwala, 4 in Monze and 3 in Mazabuka. Finally, ten (10) consumers from each district were selected through accidental sampling and interviewed as they came to purchase beef at the butcheries. Thus, this category had 40 respondents. Altogether, 107 respondents were interviewed for this study.

The first data set was on socio-economic characteristics of the VC participants. At the farmer/cattle rearer node, data collected included number of cattle owned, cost of feed per year, cost of veterinary services and medications per year, cost of labour to look after cattle, duration of raising animals for slaughter, and farm gate prices. At the trader node, data were collected on purchase price, cost of transportation, cost of labour, levies, abattoir costs and selling prices. For operators of abattoirs, data collected included live and carcass weights, purchase and selling prices and inspection costs. At the butchery level, data collected included purchase and selling prices, transportation costs, labour costs, and electricity costs. Finally, in the consumer node, data were collected on quantity of beef bought in a month, perception on beef quality, prices and consumption. Prices were converted to US dollars at an exchange rate of ZMW6.00/USD.

Data Analysis

Firstly, all data on prices and costs were converted to per kg basis of dressed weight of an animal. The dressed weight was computed based on the finding that the carcass constitutes 50% of live weight while that of viscera is 9% (Gillepsie, 2004 and McKiernan, *et al*, 2007). Since the live weights of cattle will necessarily differ, average weight of a beef animal was adopted in this study. This principle was applied to determine duration of raising a beef animal for slaughter as well.

Gross margins at each node were computed as differences between selling prices and variable costs per kg of dressed weight. Descriptive statistics were used to summarize the socio-economic and operational characteristics of operators on the beef VC. Also, a t-test was used to compare prices and gross margins among the districts for the various beef types.

RESULTS AND DISCUSSION

Stages and Actors in the Beef Value Chain

The stages and actors in the VC in the study area are given in the Flow Chart presented in Figure 1. Information shown on the chart revealed that the beef VC comprised the traditional functional stages of the agribusiness sector outlined by Downy and Erickson (1987) and Seperich, *et al.,* (2002) and which was confirmed for Tilapia in Zambia by Syampaku and Mafimisebi, (2013). These are, namely, farm input supply, farm production and output marketing sub-sectors. Basically, the main stages observed for the study area by function were acquisition of breeding stock and rearing, trading, slaughtering and sorting, wholesaling, butchering and processing, and retailing. It was noted that 95% of animals sold out for slaughter were matured males not used for breeding purposes. The entire VC was found to generate a total margin of USD2.97/kg of carcass.

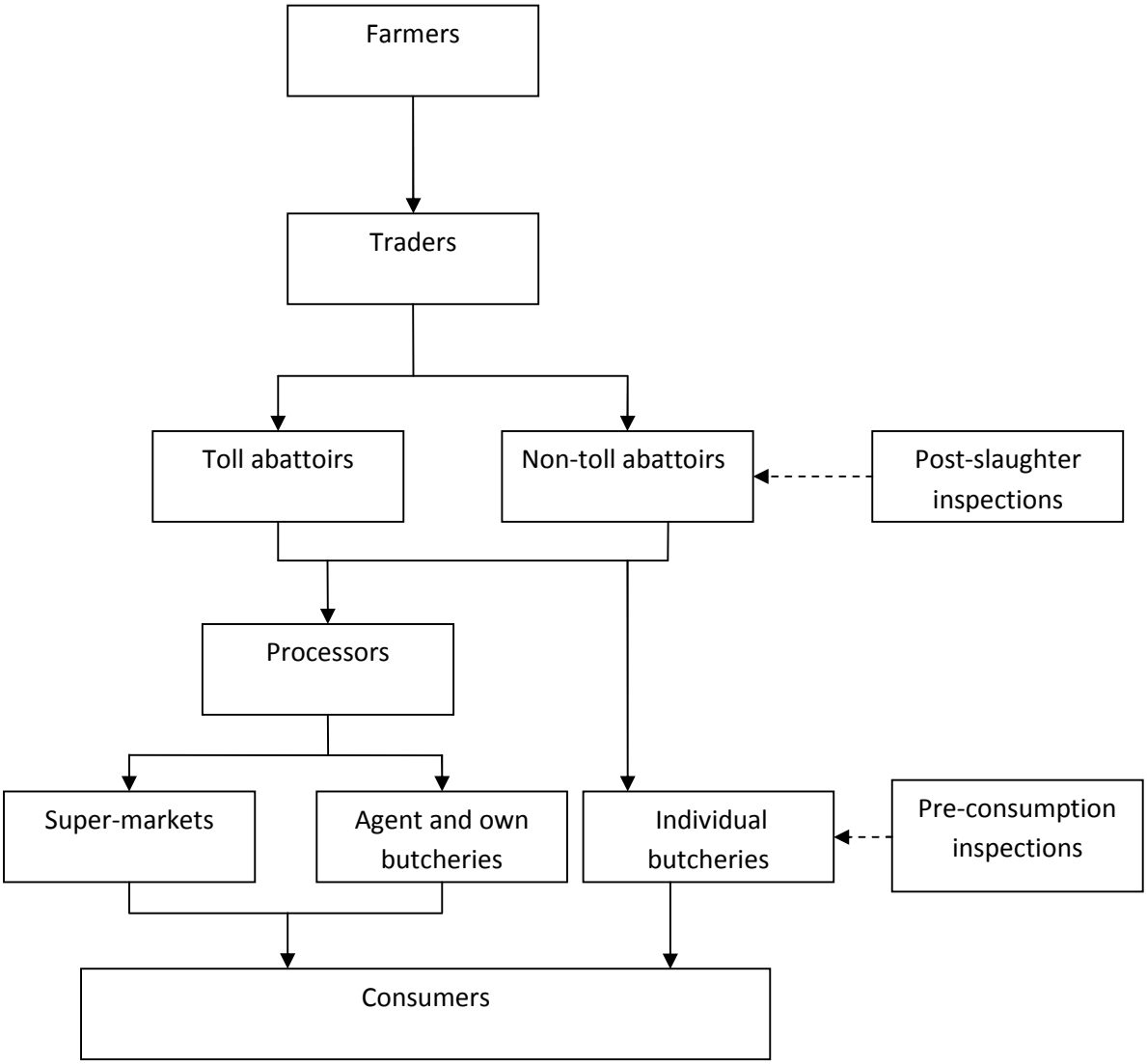

Figure 1: Components of the beef value chain

Cattle Rearing /Farm Production Node

The farm production sub-sector comprised activities involving acquisition of foundation/breeding stocks and raising the bullocks to marketable weight. The data collected revealed that farmers acquired their breeding stock from three main sources, namely, inheritance from family stock, gifts from other cattle rearers/farmers and purchase from fellow rearers/farmers. Approximately, 40% of respondents reported that they acquired breeding stock as gifts from other farmers, 37.5% obtained them by inheritance and 22.5% acquired them through purchase. Thus, gift from other farmers was the dominant method of acquiring breeding stock by farmers. Labour for rearing the animals was dominantly supplied by family members (85%) whereas only 15% of farmers used hired labour. Approximately, 60% of farmers raised their beef cattle on cultivated or wild pasture without feed supplementation whereas 40% practiced feed supplementation.

Socio-economic Characteristics of Value Chain Actors

The socio-economic characteristics of actors in the beef VC are provided in Table 1. The table showed that males dominated beef cattle rearing (97.5%). Moreover, majority of respondents (52.5%) was between 31 and 40 years. Thus, beef cattle rearing or farm production was found to be mostly done by middle aged farmers who are still at the prime of their life and are therefore energetic enough to cope with the demands of cattle rearing. Married farmers constituted the majority of respondents (87.5%). On level of formal education, majority of rearers/farmers (47.5%) attained secondary school education followed by those with primary school education (37.5%). Lastly, majority of farmers (97.5%) reported being Christians compared to 2.5% who said their religion was Islam.

Table 1: Socio-economic Characteristics of Farmers Rearing Beef Cattle (%)

Sex		Age (years)				Marital status			Level of education				Religion	
Male	Female	<30	31 - 40	41-50	>50	Single	Married	Widowed	None	Primary	Secondary	Tertiary	Christianity	Islam
97.5	2.5	15.0	52.5	22.5	10.0	7.5	87.5	5.0	10	37.5	47.5	5.0	97.5	2.5

The average gross margin at farm production/ cattle rearing is presented in Table 2. Table 2 indicated that the average cost and selling prices were USD1.04/kg and USD2.17/kg of carcass, respectively. For those rearers/farmers who purchased animals from other farmers, the biggest cost item was cost of purchase of bullocks. Bullock purchase cost constituted 47.9% of the selling price followed by labour cost which accounted for 11.5% of the selling price. The gross margin was 36.4% of the selling price and its absolute value of USD0.79 was found to be the highest gross margin ever made along in the beef VC. However, the gross margin was found to be realized after 4 years which is a relatively long period compared to the time spent in accomplishing other VC functions. The variable cost was found to be 63.4% of the selling price. The costs plus gross margin at this stage accounted for 38% of the difference between the final consumer price and bullocks purchase cost. Thus, farmers took the largest share of the final consumer price. These findings are consistent with what was reported by Syampaku and Mafimisebi (2013) that fisher-folks/ fish hunters had the highest gross margins in the tilapia VC although their incomes were found to be low compared to other VC actors due to the small volumes marketed by individual fishers. These finding were also confirmed for livestock by Chiloda, *et al.*, (2000) who reported that although, smallholder farmers generate the highest gross margins in the value chains for various livestock, the few number of animals sold per farmer made incomes realized very low in comparison to other nodes of the value chains.

Table 2: Gross Margin Analysis at Cattle Rearing/Farm Production Node

No	Item	Value in USD/kg
1	Purchase price	1.04
2	Labour	0.25
3	Feed	0.03
4	Veterinary services	0.03
5	Veterinary drugs	0.03
6	**Gross margin**	**0.79**
7	Selling price	2.17

Trading Node

In this study, the trading function was found to be performed by farmers who either supplied their own marketable stock or supplemented own farm stock with purchased stock. Sometimes, these farmers/rearers purchased all the stock sold to abattoirs from other farmers. Thus, the constitution of this group, in terms of socio-economic characteristics, remains the same as that of beef cattle rearers/farm producers.

The gross margin at this node is presented in Table 3. Table 3 showed that the gross margin at the trading node was 23.6% of the selling price with its absolute value of USD0.70/kg being the second highest in the beef VC. It was found to be realized within a short period of between 4 days to 3 weeks. The average variable cost accounted for 76.4% of the selling price. Farmers who vertically integrated cattle rearing/farm production with trading had a much higher gross margin. The inspection costs were also relatively higher than other transit costs. Trading contributed 27% of the total margins added between bullock cattle purchase point and final consumer price. Thus, integrating rearing with trading accounted for 65% of the total margin secured in the entire beef VC. This finding is expected as cattle rearing/farming has already been established as securing the highest share of gross margin in the final consumer price.

Two regulatory activities were found to take place at the trading node. Firstly, the beef animal needed to be presented to police for information on details of origin and ownership to ascertain whether it is stolen or not. A fee of USD0.01/kg of carcass weight was found to be levied for this role. Secondly, the carcass and viscera were required to be inspected before being declared fit for consumption. A fee of USD0.05/kg of carcass weight was being charged for this. Although the latter had to do with use of the abattoir, it was found to be levied on the trader rather than the abattoir. The council levy at this node, rather than having to do with abattoir services, was for the purpose being allowed to conduct business within the district.

Table 3: Gross Margin at the Trading Node

No	Item	**Value in USD/kg**
1	Purchase price	2.17
2	Transport	0.02
3	Council levy	0.01
4	Police levy	0.01
5	Inspection fee	0.05
6	Labour	0.01
7	**Gross Margin**	**0.70**
8	Selling price	2.97

Abattoir Node

This node comprised a few companies and local council facilities that received beef animal for slaughter. Two types of abattoirs were observed, namely, toll abattoirs and non-toll abattoirs. Toll abattoirs did not take any title to supplied stock but instead provided services for slaughter of beef cattle at a fee. Such abattoirs were found to be owned by the local council. The traders owned all the animals which they supplied to butcheries. Contrariwise, non-toll abattoirs bought the live animals and took title to them. These companies were found to be intermediaries who, in turn, supplied stock to formal beef market channels (Chikazunga *et al.,* 2008a). The emergence of private abattoirs in the four districts under study has brought the need for value addition through processing of raw meat into several by-products such as mince meat and sausage among others (Chikazunga *et al.,* 2008b). However, these abattoirs still transferred the abattoir fees to suppliers of slaughtered beef cattle. These abattoirs were run by meat supplying companies.

The socio-economic characteristics of abattoirs operators are presented in Table 4. The table showed that all the abattoirs were run by married males, and all of them (100%) were aged below 50 years. Thus, abattoirs were found to be a business run by middle aged males in the study area. Interestingly, the proportion of respondents who followed Islam as religion was higher in abattoirs operation than in beef cattle rearing/farm production. This implied that abattoirs can be segmented on religious grounds. Whereas cattle rearing/farm production and trading may not matter for followers of Islam, cattle slaughter matters as indicated by the rise in their participation. Regarding formal education, 63.6% of respondents were found to have attained either primary or secondary school education and 27.3% were found to have attained education at the tertiary level. Thus, most of the abattoirs were run by people with at least, basic education. Only 9.1% of abattoir operators did not have formal education. To ease data collection and inspection and ascertain hygiene of the carcass, the abattoirs were certified by the local councils and veterinary services of each district. A council fee of USD0.01/kg of carcass weight was levied for use of these facilities.

Table 4: Socio-economic Characteristics of Abattoirs Operators (%)

Sex		Age (years)				Marital status			Level of education				Religion	
Male	Female	<30	31- 40	41-50	>50	Single	Married	Widowed	None	Primary	Secondary	Tertiary	Christianity	Islam
100	0	27.3	54.5	18.2	27.3	0	100	0	63.6	36.3	9.1	27.3	81.8	18.2

The gross margin analysis at the abattoir was found as presented in Table 5. Data on Table 5 revealed that the gross margin was 6.9% of the selling price and its absolute value of USD0.33, realized within a short period one to three days, was the lowest in the entire beef VC. Income generated at this node depended heavily on the number of animals slaughtered. The average variable cost accounted for 93.1% of the selling price. Farmers who vertically integrated cattle rearing/farm production with trading received much higher gross margin. The abattoir node was found to add only 8% of the total VC margin. Thus, actors who took title to the carcass added the smallest contribution to the final retail price.

Table 5: Gross Margin at the Abattoir Node

No	Item	Value in USD/kg
1	Purchase price	2.97
2	Council levy	0.01
3	**Gross margin**	**0.22**
4	Selling price	3.20

Processing and Retail Node

The processing and retailing node supplied beef directly to the final consumers. This node comprised butcheries of various sizes. Butcheries were found to perform various marketing functions including sorting, processing, storage, packaging and final exchange. Beef was found to be in three categories, namely, steak, mixed cuts and offals. Processing activities differed by butchery but basic activities were found to be chopping beef into smaller sizes and making minced meat and sausages. Storage was found to be through the means of refrigerators. Packaging was found to be of two types, pre-sale packaging and post-sale packaging. Pre-sale packaging involved putting meat in predetermined quantities and storing the meat in those packages whereas post-sale packaging involved packaging the meat bought by the customer. Final exchange was found to be conducted mainly on cash basis with very limited proportion (about 5%) taking place on credit basis.

The socio-economic characteristics of processors and retailers are presented in Table 6. The table indicated that majority (75%) of processors and retailers were found to be males under the age of 40 years. Half (50%) of processors and retailers were found to be married while the other half were single. Of those who were found to

be single, 31.2% had not been married before and the remaining 18.8% were found to have lost or divorced spouses. In terms of formal education, participants with some secondary school education were found to constitute 68.8% of the participants at processing and retailing nodes.

Retail shops were found to be of two types, namely, those that dealt in strictly final products and those that integrated processing with retailing. Commercial entities sold final products with further processing whereas smallholder butcheries combined functions. Moreover, commercial entities were not found to process within the four districts but had separate processing units outside these districts. However, with small and medium scale butcheries, functions were combined. The Local Council was the regulatory agency at this node through intrusive inspections and licensing. In addition to this, a market levy was collected by the Local Council.

Table 6: Socio-economic Characteristics of Processors and Retailers (%)

Sex		Age (years)				Marital status			Level of education				Religion	
Male	Female	<30	31- 40	41-50	>50	Single	Married	Widowed	None	Primary	Secondary	Tertiary	Christianity	Islam
75.0	25.0	37.5	43.8	12.5	6.2	31.2	50.0	18.8	12.5	12.5	68.8	18.8	100.0	0

The gross margin analysis at the processing and retail node is presented in Table 7. The table showed a margin of USD0.66/kg of carcass weight which accounted for 16.5% of the selling price. The most substantial cost at the node was labour which constituted 2.1% of the total variable cost (TVC). This was followed by transport which accounted for 1.5%. These findings contradicted those by Anderson and Hanselka (2009) who found retailers adding the highest margin in the beef VC. Moreover, this node was found to contribute 27% of the total margin secured along the VC.

Table 7: Gross Margin at Processing and Retail Node

No	Item	Value in USD/kg
1	Purchase price	3.20
2	Market levy	0.01
3	Labour	0.07
4	Electricity	0.02
5	Transport	0.05
6	**Gross margin**	**0.66**
7	Selling price	4.00

Retail Price Comparison between Districts

The final consumer price and results of significance tests for various beef products for the four districts of the study area are indicated in Table 8. The table indicated that price differences for steak and mixed cuts were largely not significantly different across the four districts. Thus, prices for these products were found to be uniform in the four districts. However, results for offals indicated that prices in Namwala were significantly different from those obtained in Mazabuka, Monze and Choma at 10% level of significance.

Table 8: Retail Price Comparisons for Beef Products across Districts

Commodity	Districts		Average price difference (USD)	Df	t-prob	Observation
Steak	Choma	Monze	0.39	7	0.188	ns
	Choma	Namwala	0.43	7	0.151	ns
	Choma	Mazabuka	0.43	6	0.313	ns
	Monze	Namwala	0.04	5	0.964	ns
	Namwala	Mazabuka	0.00	5	1.000	ns
	Mazabuka	Monze	0.04	5	0.772	ns
Mixed cut	Choma	Monze	0.30	7	0.301	ns
	Choma	Namwala	0.30	7	0.144	ns
	Choma	Mazabuka	0.52	6	0.210	ns
	Monze	Namwala	0.00	5	0.829	ns
	Namwala	Mazabuka	0.22	5	0.535	ns
	Mazabuka	Monze	0.22	5	0.709	ns
Offals	Choma	Monze	0.04	7	0.860	ns
	Choma	Namwala	1.25	7	0.064	*
	Choma	Mazabuka	0.08	6	0.473	ns
	Monze	Namwala	1.21	5	0.079	*
	Namwala	Mazabuka	1.17	5	0.079	*
	Mazabuka	Monze	0.04	5	0.840	ns

Note: * means significant at 10%; ns means not significant

Gross margin comparisons between different types of beef are presented in Table 9. Interestingly, the average gross margin for steak was not significantly higher than those of mixed cuts in all districts. Thus, we conclude that the average gross margin of mixed cuts and steak were not significantly different. However, the average gross margin of both steak and mixed cuts were found to be significantly higher than those of offals in all the districts at 1% level of significance except for Namwala where significant difference was exhibited at the 10% level.

Table 9: Gross Margin Comparisons for Different Beef Types across Districts

Type of Beef	Variable	Choma	Mazabuka	Monze	Namwala
Steak vs mixed cut	Mean difference	0.03	0.06	0.13	0.17
	Df	8	4	6	6
	t-probability	0.450	0.440	0.364	0.133
	Observation	Ns	ns	Ns	Ns
Steak cut vs offals	Mean difference	1.82	2.17	2.17	1.00
	Df	8	4	6	6
	t-probability	0.000	0.003	0.000	0.054
	Observation	***	***	***	*
Mixed cut vs offals	Mean difference	2.00	2.67	2.83	0.17
	Df	8	4	6	6
	t-probability	0.000	0.009	0.000	0.078
	Observation	***	***	***	*

Note: *** means significant at 1%; ** means significant at 5%; * means significant at 10%; ns means not significant

Final Consumers

The socio-economic characteristics of beef consumers as captured at points of purchase (retail shops) are presented in Table 10. It was found that 55% of beef consumers was male while 45% was female. Thus, majority of beef purchasers came from the male folk. Majority (95%) of the consumers were below the age of 50 years. This implied that youths and middle aged adults constitute the bulk of beef consumers. The table further revealed that consumers who were married constituted the majority (70%) of consumers. Moreover, consumers with either primary school education or secondary school education (77.5%) were found to dominate beef consumption. Respondents with no formal education were very few (5%) among the beef consumers. This findings seemed to suggest that there is the likelihood of a positive relationship between level of education and consumption of beef in the study area. Lastly, majority (95%) of consumers were found to follow Christianity whereas only 5% followed Islam.

Table 10: Socio-economic Characteristics of Consumers (%)

Sex		Age (years)				Marital status			Level of education				Religion	
Male	Female	<30	31- 40	41-50	>50	Single	Married	Widowed	None	Primary	Secondary	Tertiary	Christianity	Islam
55.0	45.0	42.5	30	22.5	5.0	20.0	70.0	10.0	5.0	27.5	50.0	17.5	95.0	5.0

Consumers' Perception on Beef Quality, Prices and Consumption Adequacy

According to the results presented in Figure 2, it can be clearly observed that out of the forty (40) consumers that were interviewed; 52.0 % maintained that prices were unfair, 25.0% stated that the prices were fair while 23.0% were uncertain about how to describe prices. When asked to suggest the price at which beef should be sold by butcheries, the 52.0% of respondents that described prices as unfair suggested a price range of 15 ZMW and ZMW 20. This means that, as far as consumers were concerned, prices were high and unfair. This confirms an earlier finding by Sidahmed (2010) that high prices are responsible for the slow growth in the demand for and consumption of beef in Zambian local markets. However, concerning the quality; 62.0% stated that it was very good while 8.0% maintained that it was excellent. On the contrary, about 28.0% stated that the quality was poor.

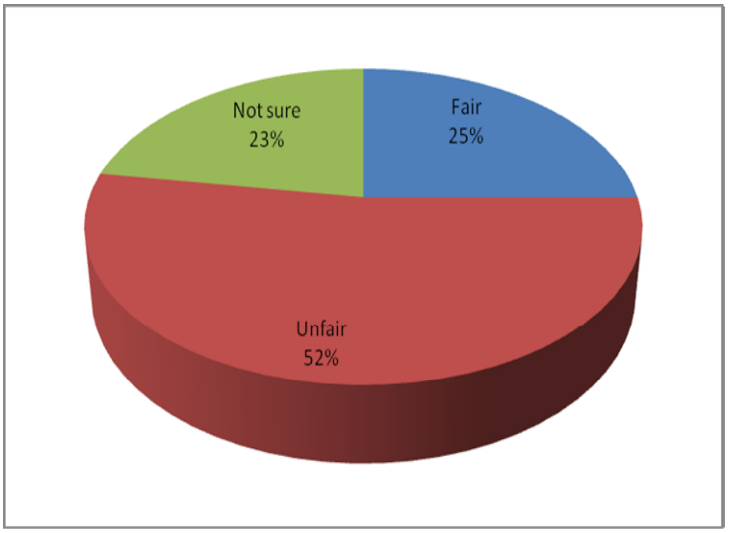

Figure 2: Consumer perception of beef prices

CONCLUSION

Virtually, all the beef VC activities from cattle rearing/farm production to retailing are dominated by married males. These males were also middle aged, Christian by religion and mostly had primary or secondary school education. However, at 45% females and 55% males, beef consumers were more gender balanced compared with gender composition at any of the value addition nodes.

Analysis of the VC for beef produced in the Southern Province revealed at least 5 nodes through which participants added value and derived income. The gross margin made depended heavily on the VC node of operation, costs incurred and margins charged for value addition. Cattle farming had the highest margin of USD0.77/kg of carcass weight followed by trading with USD0.70/kg. Retailing was in the third position with a gross margin of USD0.66/kg. Slaughtering was the least with a margin of USD0.22/kg. However, cattle rearers/farmers who integrated vertically into trading had a much higher margin of USD1.47/kg of carcass. Furthermore, cattle farming incurred the highest costs of USD0.34/kg of carcass followed by retailing with USD0.15/kg. The cost incurred at the trading node was USD0.10/kg of carcass while slaughtering had the least cost of USD0.01/kg of carcass. Thus, the cost of raising cattle and cost of retailing are the major contributors to the final retail prices in the beef VC. Time consuming business activities contribute more to raising the final consumer prices compared to activities that consume less time. Moreover, local councils impose two types of levies on the beef which resulted in jacking up of the final retail prices.

Final consumer prices for steak and mixed cuts are more or less uniform in the four districts of the study area. Thus, the geographical status of the districts, whether rural or urban, seemed not to create significant differences in the prices of steak and mixed cuts. However, the price of offals depended on status of the districts in that the price was higher in Namwala (rural district) compared to the urban districts. The price of steak was not significantly higher than that of mixed cuts in all the four districts. Thus, differentiating beef into steak and mixed cut does not result in significant price differences in the districts under study. However, differentiating into steak and mixed cuts on one hand and offals on the other hand resulted in significant price differences.

The study recommended stoppage of differentiation of beef into steak and mixed cuts since there was no significant price difference between them. It also recommended increased participation of females in the VC nodes through targeted incentives. Finally, elimination of the double levies charged to traders by local councils is an urgent necessity.

Acknowledgements

Our major appreciation goes to **African Network for Agriculture, Agro-forestry and Natural Resources Education** (ANAFE) that anchored the SIDA funded **Strengthening Africa's Strategic Agricultural Capacity for Impact on Development** (**SASACID**) for financial support to both the student and the supervisor to undertake this study. We also express sincere gratitude to various cattle farmers, traders, abattoir managers, butchery owners and consumers who provided the data used for this research. The comments received from the SASACID project officials in the ANAFE office in Nairobi have been very useful in improving the quality of the research report from which this paper was derived. For this, we express profound gratitude.

REFERENCES

Anderson, P, D and Hanselka, D. (2009): Adding Value to Agricultural Products. http://txspace.di.tamu.edu. [24th April, 2013].

Antonio, J. (2012): Protein power; not all protein is created equal. www.bodyforlif.com. [13th October, 2012].

Aregheore, M. E (2009): Zambia II: Country Pasture or Forage Resources Profile. School of Agriculture and Food Technology, Department of Animal Science, University of the South Pacific.

Government of Zambia, (2012): Post Harvest Survey 2010/11 Agriculture Season for Small and Medium Scale Farms. Central Statistical Office, Lusaka. Zambia.

Chilonda, P., Van Huylenbroeck, G., D'Haese, L., Musaba, E.C., Samui, K.L. and Ahmadu, B. (2000): Small-scale cattle production in Eastern province, Zambia: objectives, productivity and constraints. *Outlook on Agriculture, 29(2):109-121*.

Chikazunga, D. Ndiyoi, M and Muloongo (2008a): Restructuring Food Markets in Zambia: Dynamics in the Beef and Chicken Subsectors.www.regoverningmarkets.org. [9th April, 2013]

Chikazunga, D., Louw, A., Muloongo, O. and Haankuku, C. (2008b):Smallholder farmers 'participation in restructuring beef value Chains in Zambia: A case study of the small-scale beef Producers in Namwala district, Southern province, Zambia, Working paper. Department of Agricultural Economics, Extension and Rural Development,
University of Pretoria, South Africa.

Dolan, C.S. and Humphrey, J. (2000): Governance and Trade in Fresh Vegetables: Impact of UK Supermarkets on the African Horticulture Industry. World Development.pp.170-173.

Kasumbalesa, F. (2010): Trends on Value Chain of the Zambian Beef Industry. www.flolicskasumbalesa.worldpress.com. [20th March, 2013].

Labuschagne, A, Louw, A and Ndunga, L., (2010): A consumer Oriented Study of the South African Beef Value Chain. South Africa. Cape Town.

Laura, L. (2011): What's your beef? Red meat in the diet. www.foodfactoflife.org.uk. [26th January, 2013].

McKiernan, B., Gaden, B. and Sundstrom, B. (2007). Dressing Percentage for cattle. Primefacts, Primefact 340; http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/103992/dressing-percentages-for-cattle.pdf (accessed on 16/07/2014).

Mulela, K. (2001): The Challenges to Sustainable Beef Production in Botswana: Implication on rangeland Management; Conference Proceedings, Department of Sociology. Iowa State University

Mwewa, C. (2012): The war that Zambia must fight and win.www.lusakatimes.com. [24th February, 2013]

National Assembly of Zambia (2012): Debate-Tuesday, 30th October, 2012. www.parliament.gov.zm. [1st April, 2013]

Ndiyoi, M and Mudenda, C., (2006): Restructuring of the Beef and Poultry Sectors in Zambia, Working paper 42pp. www.regoverningmarkerts.org. [18th March, 2013]

Sidahmed, E. A. (2010): Utilization of Value Chain Analysis in Livestock Development Sector. University of California, College of Agriculture and Environmental Sciences

Sinha, S. (2011): What would it take for Zambia's Beef and Dairy Industries to achieve their Potential? Prepared for the Job, Prosperity and Competitiveness Project Supported by the World Bank, African Development Bank, and Department for International Development, pp. 1-2

Spies, C. D. (2011): Analysis and Quantification of South African Red Meet Value Chain. University of Free State (South Africa), Department of Agricultural Economics pp 24-28.

Stabbs, I. (2011): A situation and Value Chain Analysis of the Beef Industry/ Sector in Zambia. Prepared for Zambian National Farmers Union and Beef Association of Zambia.

Syampaku, E.M & T.E Mafimisebi, (2012): Gender Roles in Tilapia Capture and Marketing Supply Chain on Lake Kariba, Zambia. A paper presented at the Sixteenth Biennial Conference of the International Institute of Fisheries Economics and Trade, July 16-20, Dar es salaam, Tanzania

Syampaku, E.M and Mafimisebi, T.E. (2013): Gender Participation in the Small-scale Tilapia Fishery and Marketing Value Chain on Lake Kariba, Zambia. *Malawi journal of aquaculture and fisheries, 2(1): 36-44, September 2013*

Zambia National Farmers Union (2012): A Review of Council Fees and Charges on Livestock Sector in Zambia.www.znfu.org. [16th October, 2012]