Value Chain Analysis of Beef in Central and Southern Malawi (Case Studies of Lilongwe and Chikhwawa Districts)

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Abstract

This paper presents the results of value chain analyses for the beef sub-sectors in Malawi. The study was commissioned by the Farmers Union of Malawi (FUM) with support from the Southern African Confederation of Agricultural Unions (SACAU). The aim of the study was to identify opportunities for smallholder farmers to diversify into alternative agricultural commodities as a basis for improving their incomes. Beef is one such commodity that has lagged and was therefore targeted for this analysis. The analysis was based on sub-sector data regarding the structure and function of the beef value chains. The data were gathered through interviews with farmers and various value-chain players and stakeholders. The study results indicate that there is scope to promote the productivity and competitiveness of beef sub-sectors. However, beef profitability is being constrained by low productivity at farmers' level. Beef productivity and competitiveness increases with the fattening system than with the traditional system. In order to enhance the capacity of the farmers to improve the productivity of beef, the study identified areas within the value-chains where strategic policy and institutional reviews need to be undertaken to address specific constraints affecting the overall performance of the value-chains.

**Keywords:** Value chain analysis, beef industry, Malawi.

1. Introduction

1.1. Overview of Malawi's agricultural sector

Malawi's agriculture continues to be heavily dependent on a few commodities. This makes Malawi's economy highly vulnerable to the external shocks that affect the few commodities on which the country depends. There is a critical need for Malawi to diversify its agricultural commodity basket, primarily through implementation of strategies aimed at promoting productivity and competitiveness of the smallholder farmers who comprise over 90% of the country's farming population. Developing countries, particularly those that depend heavily on a small number of agricultural export commodities are highly vulnerable to domestic and international terms of trade shocks, and often have difficulties achieving sustained long-term economic growth. This is further worsened if primary agricultural commodities account for large shares of the total merchandise exports. Malawi is a typical country case facing such challenges.

The country earns over 60% of its foreign exchange from a single crop, tobacco. Moreover, Malawi has seen very little structural shift in terms of export commodities since the country became independent in the 1960s. The value-share of the top three principal agricultural commodities was estimated at 90% in the 1970s, and rose to 94% in the 1980s. Still up to today, these commodities: tobacco, tea and sugar constitute about 90% of the value of merchandise exports, and tobacco alone accounts for over 60% of this (see Figure 1). Analysis undertaken by United States Department of Agriculture (USDA) in 2009 showed that Malawi's Gross Domestic Product (GDP) declines sharply, almost three times greater, with a fall in tobacco exports than when exports are rising.

As such, the variability in tobacco exports leads to slower economic growth because GDP falls by a relatively large amount in response to a given decrease in exports, while recovering slowly with an upswing in exports. The study also found significant positive correlation between tobacco exports and overall economic growth.

Figure 1. Sources of exports per capita (real 1994 MK)
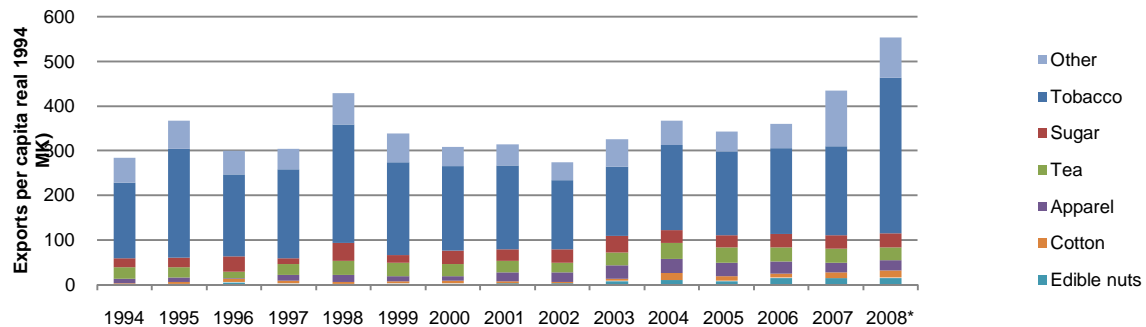
There are emerging challenges facing the tobacco sector globally. The urge to diversify Malawi's export base has recently been reinforced by uncertainties regarding the future of burley tobacco. Production and marketing of tobacco, and the burley variety in particular, is now threatened by international restrictions proposed under Articles 9 and 10 of the *Framework Convention on Tobacco Control* of the World Health Organization which may restrict use of burley tobacco as a blending ingredient in the manufacturing of cigarettes. More importantly, international production of burley has been rising while demand for blended cigarettes has been declining. As a result, Malawi faces a decline in the demand for its principal export commodity at the same time it is also experiencing stiffer competition in its production. Given the negative developments facing Malawi's "green-gold", it is imperative that Government and its cooperating partners, including the private sector and civil society should, as a matter of urgency, assess the prospects of diversifying the agricultural export base in order to avert the likely adverse effects on the country's long-term growth prospects. One of the pillars of Malawi's agricultural Development Strategy (ADP) is to improve the incomes of smallholder farmers through the promotion of commercialization, agro-processing and market development. This entails promoting commercial agriculture production involving smallholder farmers, agricultural diversification, agro-processing for import substitution and value addition. This will promote smallholder competitiveness to supply in both domestic and export markets. Furthermore, this will lead into improved incomes, thereby creating the forward and backward linkages through increased demand for both farm and nonfarm commodities. Ultimately, addressing poverty in the smallholder sector will act as a stimulus for broad-based economic growth, given that over 90% of the rural population derive their livelihood directly or indirectly from farming.

Research has shown that the most effective way of addressing poverty is to develop the smallholder sector which comprises the majority of the rural poor. Without addressing rural poverty, through improving the market orientation of the smallholder farmers, any attempts aimed at poverty reduction are bound to be unsustainable. The Malawi Growth and Development Strategy also places high priority on agriculture as a basis for sustained economic growth.

1.2. Aim and Objectives of the Study

In order to raise smallholder incomes in Malawi, there is need to come up with strategies that would help farmers become more productive and competitive in other agricultural commodities other than the traditional tobacco, whose prospects are now threatened globally. This study therefore aims at understanding the performance of the beef value chains in which smallholder farmers mostly participate as providers of the primary commodities. The study aims at understanding how the value chain works, and what should be done by farmer organizations in order to promote incomes of smallholder farmers, through the improvement of the overall performance of the Beef sub-sector in Malawi. In particular, the objective of this study was to understand the performance of the beef value chain so as to identify a better strategy for facilitating the performance of the National Livestock Association of Malawi.

2. Beef production and consumption in Malawi

Most of Malawi's beef production comes from the smallholder cattle population estimated about 900,000 in 2008. According to the statistics from the Department of Animal Health and Industry (DAHI), the trend in most livestock classes, including cattle have been increasing overtime, though, on a per capita basis.

Malawi's consumption of beef and other livestock-based commodities is low compared to regional and international standards. The share of beef on the total meat supply has declined from 45% in 1996 to about 20% in 2007, being surpassed by the proportion of chicken and pig meat. The drop of beef could not only be due to decreasing numbers of cattle (against increasing human population), but also due to the substitution of beef in favour of chicken and pig meat (Kaumbata, 2009). Although the share of goat meat in total meat supply has declined after 2002, it is still higher than in 1996. It is interesting to note that the meat production from ruminant species (cattle, goats and sheep) has declined in favor of chicken and pig meat. The off take rate in chickens and pigs are now estimated at over 60% compared to below 15% in ruminant livestock. Table 1 below shows the domestic meet supply changes between 1997 and 2007.

Table 1. Estimated domestic meat supply changes between 1997 and 2007

	1997	% share of	2007	
	Total	total meat	Total	% share of total meat
Human Pop (000)	10000		13,292	
Beef (t)	6,432		27,121	21.6
Goat meat (t)	1,446		19,557	
Sheep meat (t)	170		926	
Pig meat (t)	2,000		33,455	
Total Red Meat (t)	10,048	70.5	81,059	64.5
Chicken meat (t)	4,200		44,604	
Total meat (t)	14,248	100.0	125,663	100.0
Per Capita (kg)	1.42		9.45	

Source: Kaumbata (2009)

Stagnation in the livestock sector is attributed to a number of factors including: (i) inadequate emphasis in the agricultural strategies and policies towards the livestock sector; (ii) poor performance of the cropping sector – as the demands for cropping land increase, So farmers move more into traditional grazing areas and cropping displaces livestock i.e. thus increases in grazing livestock in Malawi will depend on improved productivity in arable agriculture. Livestock serve as security assets especially for the poorest households; in times of crisis, animals are sold to raise cash for food and other needs. Further, the livestock sector in general and cattle in particular suffer from several capacity constraints including lack of financial resources to purchase cows, poor livestock management, inadequate capacity and/or slaughter houses or abattoirs to support processing of cattle into beef products. Overall growth of the economy is also a major factor in terms of lack of purchasing power to create adequate domestic demand that would spur increased beef production.

In terms of spatial distribution of livestock in general and beef cattle in particular, cattle numbers are quite high in Karonga, Mzuzu, Kasungu, Lilongwe and Shire Valley agricultural development Divisions (ADDs) – see Annex 2. In general, the numbers of livestock, including cattle have been increasing (by about 5%) since 2006, however, the majority of the increase has occurred in the small ruminants and poultry. Cattle numbers have either remained stagnant or decreased in some areas. There is thus the need for deliberate efforts to reverse the trend and improve the domestic supply for meat, and reduce the amount of meat imports, in order to off-set the increasing import bill as a result of the increasing beef prices (see Figure 2).

Figure 2. International beef prices (monthly: 1990 – 2011)
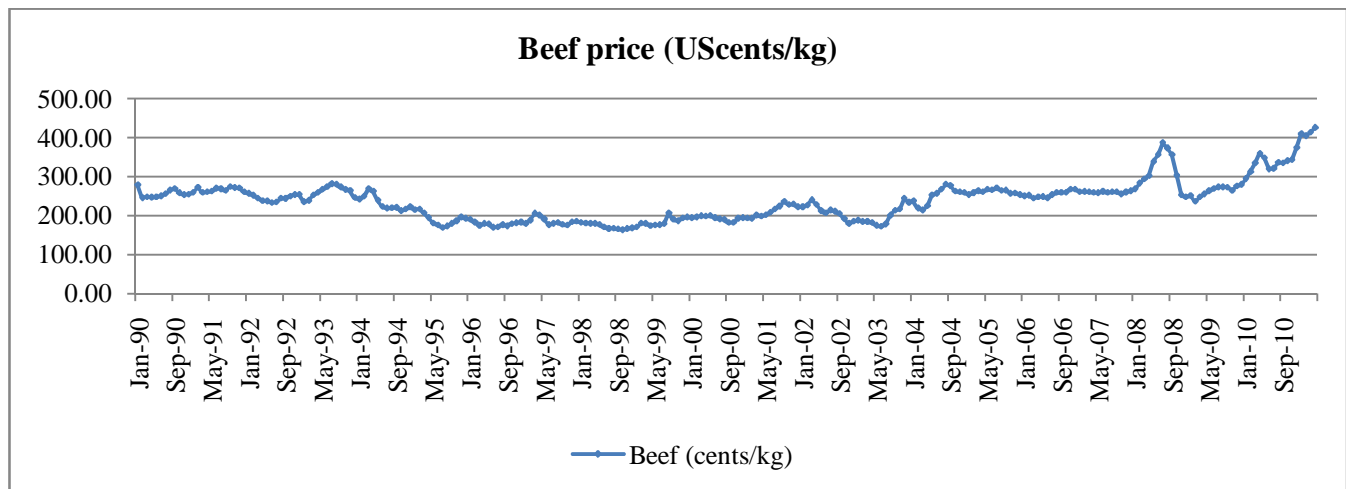
Source: World Bank International Commodity Prices Database

3. Methodology and Data

The value chain framework used in this study followed a two-tier approach. The first constituted a detailed quantitative value chain analysis which examined the cost structure along the beef value chains. Following the detailed cost structure analysis, the analysis focused on estimating the profitability and competitiveness of the various stages of the value chain as well as that of the overall chain. The profitability and competitiveness analysis was undertaken based on relevant benchmarks. The second part of the analysis examined in detail specific segments of the chain that show strong potential to improve the overall performance, based on the quantitative indicators. Qualitative assessment of the institutional and policy aspects to address specific identified challenges along the value chain was undertaken as a basis for developing crop specific strategies for promoting incomes that accrue to smallholder farmers.

Value chain is a type of supply chain but the only difference is that with supply chain, there are no binding or sought after formal or informal relationships except where goods, services or financial agreements are transacted (Kit *et al.,* 2006). Kaplinsky and Morris (2000) define value chain as '*a full range of activities that are required to bring a product or service from conception, through different phases of production, delivery to final consumers and final disposal after use*'. Ahmed (2007) refers to it as '*a structure of physical, economic and social transactions between individuals and organizations engaged in raw material transformation into end products*'. Kaplinsky and Morris only mentions about the product going through different phases of production and delivery to final consumers, these processes cannot take place without physical, economic and social transactions as defined by Ahmed. Hence these two definitions refer to the same process. In Malawi, much attention has always been geared towards increasing volume of output whilst there have been few attempts by policy makers to change the terms of inclusion in downstream value chains. Value chain studies in Malawi have been conducted in agriculture in crops like soy bean, cotton whose main objective was to describe the industry's functioning and the established trade structures (Rates, 2003) and tobacco which aimed at reviewing and analyzing the current structure of tobacco markets in Malawi and characterize the level of competition (and possible collusion) in the industry.

The study also examined the differences in the marketing costs of tobacco produced in different regions of Malawi and between estate and smallholder farmers (Koester et al, 2005). Tchale and Keyser (2010) also did value chain studies for burley tobacco, maize, rice and cotton and the main objectives of these studies were similar which were to determine the private costs and profitability of different stages in the value chain, to understand the cost composition and to measure trade competitiveness. Value Chain Analysis (VCA) is a tool for analyzing the nature and source of value within a supply chain and the potential for reducing waste therein (Simmons *et al.,* 2003). In the value chain analysis, all inputs and outputs carry forward their inherited value from the previous stage.

This concept is important to stress in value chain analysis where the focus is on accumulated costs at different stages as a key determinant of trade competitiveness. The competitiveness of any domestic product depends on the efficiency of input supply, farm production, assembly, processing, and logistics up to final delivery point where the good competes internationally as an export or import substitute. By looking at the cost composition at each stage of the value chain and comparing these costs with world standards, the methodology not only shows if the country is internationally competitive, but also helps identify key stages where costs could most effectively be reduced as a strategy for sector growth.

3.1. Analytical Framework

The analysis of Malawi's agriculture competitiveness was prepared using a specific methodology developed for a recent World Bank study on Competitive Commercial Agriculture in Africa (CCAA). The analytical Value-chain approach built through the CCAA is comprised of a set of interlinked Excel templates which are designed to calculate standard indicators of costs and profitability at each major stage of the production cycle. By filling in the elements of each template for individual commodities and farm systems, the methodology offers a practical way to establish benchmark prices that can be compared with international standards and identify specific areas where costs can most effectively be reduced through policy change or other types of investments.

In the analytical approach, total costs are measured in terms of Domestic Value Added (DVA) and Shipment Value (SV), which constitute the main value chain indicators as follows.

$$DVA = X + Y + Z \qquad\qquad (1)$$

DVA is the domestic value-added expressed in domestic or international currency units; X is the sum total of domestic costs and mark-ups by various players along the value-chain; Y is the sum total of domestic duties and taxes; and Z is the sum total of all unofficial charges and extra costs incurred along the value-chain.

$$SV = DVA + FC \qquad\qquad (2)$$

where SV is the shipment value, representing the total cost of producing and shipping the commodity to a foreign market; and FC is the sum total of all foreign costs incurred in the process of shipping a commodity to a foreign market, including any duties and taxes.

3.2 .Data Collection

Data collection mainly relied on primary industry sources as well as official statistics and commodity specific budgets from Malawi's Ministry of Agriculture estimates as well data from specialized institutions such as the Department of Animal Health and Industry (DAHI). Information was also collected through focus group discussions from farmers and traders who participate in primary commodity assembly to sell to abattoirs or meat selling institutions such as Cold Storage. Subsequent to the data collection and preliminary analysis, agricultural experts were consulted to validate the draft results and seek feedback on major bottlenecks and recommendations for improvement. Table 2 below show the categories of data requirements.

Table 2. Description of data requirements for the study

	Beef
Input supply	Yes
Production budgets	Yes
Commodity assembly	Yes
Processing	Yes
Final distribution	Yes

In order to undertake the value-chain analysis using the quantitative methodology, a number of assumptions were made based on the findings from the sub-sector studies. Some of the assumed levels, based on the sub-sector analysis are shown in Table 3 below:

Table 3. Main assumptions used in the analysis

Key assumptions	Beef
Yield (Kg/ha) – low management/conventional system	200
Yield (Kg/ha) – high management/fattening system	300
Input costs (US$/ha) – low management/conventional system	217
Input costs (US$/ha) – high management/fattening systems	241
Output prices (MK/kg)	600
Net profit (US$/ton) - low management/conventional system	79
Net profit (US$/ton) - high management/fattening system	680

4. Results and Discussions

4.1. Beef Value Chain Performance

Malawi's beef value chain comprises a number of key stakeholders such as breeding, veterinary, feed manufacturers and input suppliers that form the primary layer of stakeholders (see the schematic view of the beef value chain in Annex 1). This chain pretty much mirrors the Malawian scenario.

These supply inputs to cattle farmers (of various sizes) who in turn sell either live or slaughtered animals to feedlots and local butchers, respectively. The feedlots normally fatten the animals and sell them to processors such as Cold Storage, Kapani and other meat processors. The processors normally perform a number of functions including packing, grading, wholesaling and in some cases direct retailing. However, many processors supply processed meat products to final distributors such as for example, supermarkets, restaurants and institutions such as schools, hospitals etc. In Malawi, all these layers of stakeholders are available, although at the input supply level, including veterinary services there are fewer stakeholders outside of the public system. There are many smallholder farmers who supply to only a few feedlots and this generated power asymmetry between the smallholder farmers and the feedlot owners. There is also a thin structure at the processing and final distribution levels.

Beef Marketing Channels in Malawi

It is clear from the above passage that in Malawi, cattle are marketed through a number of channels and these are broadly divided into *informal* and *formal* markets. The former consists of individuals buying cattle from farmers for different reasons which include slaughter, as an investment or for social functions such as funerals, customary celebrations, weddings and religious celebrations. Usually sales for such purposes are conducted right at the farmer's kraal and this has the advantage that there are no transportation costs incurred for the farmer. Sometimes, the farmers slaughter the animals themselves and sell the meet to fellow villagers. This market channel is however not very reliable due to its unorganized and thus unpredictable availability of buyers.

Besides, such a marketing channel forces small scale farmers to sell their cattle to people that have low purchasing power, at relatively low prices for their animals. The informal channels present farmers with significant challenges. As Benson *et al.* (2001) points out, the challenge to livestock farming in communal areas is making use of marketing channels that offers the best cattle prices and hence highest returns. Such decisions require reliable information about cattle prices, the right selling time, the channels available, cattle breeds and the age of cattle that give the highest returns. The formal channel is when farmers sell cattle directly to **butcheries**, **auctions**, **feedlot owners** and **abattoirs**. Butchers are relatively in large numbers and are mainly located in trading and urban centres. They venture out into the rural areas to identify and buy animals that may be available for sale and then transport these animals to slaughter areas. Sometimes, they buy the animals from middlemen whose main activity is to buy from farmers for sale to the butchers. It was observed that most butchers in these trading and urban centres do not have the required equipment for cutting the meet –mainly using pangas, small knives and axes. In so doing there is not much price differentiation among different parts of the carcasses. Unlike in large retail shops where meat is neatly cut and graded with each quality grade attracting a higher or lower price per Kilogram.

Such presentation of beef tends to be attractive to consumers and represents a form of **value addition** which enhances income to the farmers and other actors in the beef supply chain. Some of the ordinary butchers do not even have cold room facilities for long storage periods and tend to incur losses through putrefaction. ***This danger represents a health risk to consumers as well.*** Needless to say this undermines consumer loyalty. In the analysis of the beef value-chain, separate assumptions were made between *non-fattening* and *fattening or stall-feeding* systems because of the very significant differences in terms of cost structure, profit margins and value-chain performance indicators. We compared value-chain performance for Lilongwe and Lower Shire mainly due to the availability of adequate data against which to make reasonable comparisons. First the profit margins (controlled for live weight) seem to be better for Lower Shire beef farmers, on average than Lilongwe farmers. Even the value-chain indicators (domestic value-added) is lower in the Lower Shire compared to Lilongwe, implying that the cost of producing beef cattle is lower in the Lower Shire, thereby making the region more competitive. This is not as a result of a cost advantage, but is mainly due to the high live weight of animals in the Lower Shire, regardless of the system of production. See Tables 4 and 5.

Table 4. Farm-level analysis (non-fattened), Chikhwawa (per live animal)

Beef cattle (livewt), Chikhwawa	Per Head		Per Ton	
	MWK	**USD**	**MWK**	**USD**
Gross revenue (output * price)	**44,396**	**295.98**	**177,585**	**1,183.90**
Production costs				
Variable costs	30,541	203.61	122,164	814.43
Investment costs	2,000	13.33	8,000	53.33
Total costs	**32,541**	**216.94**	**130,164**	**867.76**
Farmer income				
Gross margin (revenue – variable costs)	**13,855**	**92.37**	**55,421**	**369.47**
Net profit (gross margin – investment costs)	**11,855**	**79.04**	**47,421**	**316.14**

Table 5. Farm-level analysis (non-fattened), Lilongwe (per live animal)

Beef cattle (livewt), Lilongwe	Per Head		Per Ton	
	MWK	**USD**	**MWK**	**USD**
Gross revenue (output * price)	**44,396**	**295.98**	**177,585**	**1,183.90**
Production costs				
Variable costs	34,100	227.33	136,400	909.33
Investment costs	2,000	13.33	8,000	53.33
Total costs	**36,100**	**240.67**	**144,400**	**962.67**
Farmer income				
Gross margin (revenue - variable costs)	**10,296**	**68.64**	**41,185**	**274.57**
Net profit (gross margin – investment costs)	**8,296**	**55.31**	**33,185**	**221.23**

Secondly, the analysis shows that it is much better, in terms of farmer profitability and competitiveness to fatten animals before sale. Even the value-chain performance indicators are showing that in terms of productivity, the fattening system is much better because of the significant live weight gain, keeping the system of production constant. See Tables 6 and 7. Thirdly, the big difference in profit margin and competitiveness between fattened and non-fattened animals means that farmers can recoup high value from beef animals by fattening the animals before sale to feedlots to end up appropriating higher margins. Due to lack of good data at the feedlot level, especially on the cost structure, we are not able to get a good picture of the relative level of the profit margin at that level, however, a comparison of the price movements from the farm-gate, through to the distribution level in the supermarkets indicates that feedlot owners do make substantial margins given the volumes of beef they slaughter and sell.Some part of this margin could be recouped by farmers if they perform certain primary functions such as fattening and/or slaughter. However, this would require that they organize themselves to invest in abattoirs. Value accruing to farmers would improve if they had abattoirs and supply semi-processed beef instead of selling live animals.

Table 6. Value-chain indicators for fattened beef (Lilongwe)

| Beef cattle (livewt), Lilongwe Fattening	Per Head		Per Ton	
	MWK	USD	MWK	USD
Gross revenue (yield * price)	**150,000**	**1,000.00**	**428,572**	**2,857.15**
Production costs				
Variable costs	44,900	299.33	128,286	855.24
Investment costs	2,000	13.33	5,714	38.10
Total costs	**46,900**	**312.67**	**134,000**	**893.33**
Farmer income				
Gross margin (revenue - variable costs)	**105,100**	**700.67**	**300,286**	**2,001.91**
Net profit (gross margin - investment costs)	**103,100**	**687.33**	**294,572**	**1,963.81**

Average Livewt = less than 200 kg

Table 7. Value-chain indicators for fattened beef (Lower Shire)

| Beef cattle (livewt), Lower Shire Fattening	Per Head		Per Ton	
	MWK	USD	MWK	USD
Gross revenue (yield * price)	**159,600**	**1,064.00**	**420,000**	**2,800.00**
Production costs				
Variable costs	41,341	275.61	108,792	725.28
Investment costs	2,000	13.33	5,263	35.09
Total costs	**43,341**	**288.94**	**114,055**	**760.37**
Farmer income				
Gross margin (revenue - variable costs)	**118,259**	**788.39**	**311,208**	**2,074.72**
Net profit (gross margin - investment costs)	**116,259**	**775.06**	**305,945**	**2,039.63**

Average Livewt = more than 300 kg

As has been said earlier in the report, most abattoirs are located in the urban centres and are not readily accessible to smallholder farmers. It is therefore necessary that some feasibility studies be conducted to assess the commercial viability of small-scale abattoirs in this country. Figures 3 and 4 show the disparity between farm-gate prices and market level prices for beef, regardless of the production system. This shows that if farmers move up the value-chain they are likely to increase their margins significantly.

Figure 3. Beef value-flows from farm-gate to distribution (non-fattening system
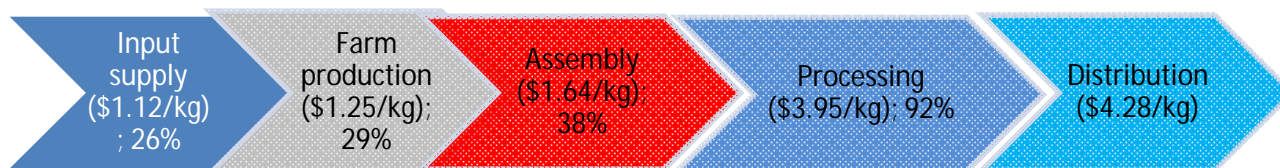
Fourthly, the price discovery mechanism for live animals (at the farm-gate) plays a significant role in determining the magnitude of profitability and competitiveness at the farm-level. Many farmers sell their live beef animals on an un-organized individual basis. In this case, they are often offered lower prices. Data from the Chikhwawa Livestock Association shows that there is a significant difference between individual spot prices and auction prices.

Figure 4. Beef value-flows from farm-gate to distribution (fattening system)
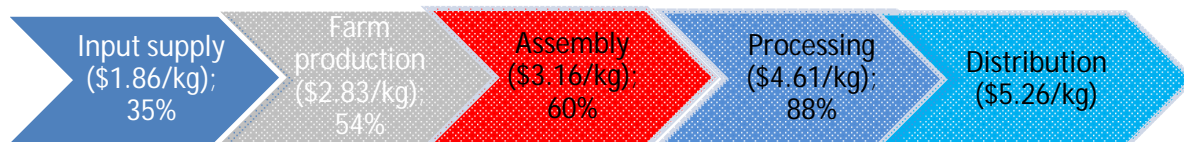
On average auction prices are MK45/kg higher than spot prices, but there are very few livestock auction markets that are organized these days. This could be due to the fact that the farmers themselves are not organized and therefore do not see the need to sell their livestock as a group or feedlots and other stakeholders are deliberately taking advantage of the situation in order to have more bargaining position against individual farmers.

5. Policy Implications

5.2. Implications for smallholder livestock producers

The average smallholder livestock farmers in Malawi have very limited stock (usually less than 1 livestock head per farming family), and operate under the traditional systems. Given the limited (and ever decreasing land holding sizes, on a per capita basis), such systems of livestock and beef production are less competitive and unsustainable. However, the fattening system seems quite promising but it requires intensive feeding and management systems which smallholder farmers would hardly afford on them. For them to be able to operate such intensive systems there is need to organize them to better access improved services i.e. better breeds, better feeding systems, veterinary services and marketing. Since the livestock sector has been highly liberalized in Malawi, such services would have to come through private-public sector partnerships, including the brokerage role that can be played by farmer' bodies such as the Farmers Union of Malawi and others. Malawi does not have many such workable models especially in the livestock sub-sector. However, through individual projects, such as the Land O' Lakes project financed by USAID for example, there has been significant improvement in the dairy industry in Malawi. Farmers have been organized in milk-bulking groups and are able to supply into organized dairy value-chains.

There is a great deal of good-will among livestock farmers (especially those in the lower shire area) that if they are organized, and supported by a conducive policy, they are willing to develop their business plans in order to attract financing and partnerships towards establishment of abattoirs which they regard as the only way to allow them to operate at a higher scale on the value-chain. Many of such farmers are even willing to engage in equity financing arrangements in order to help them establish their own abattoirs to compete effectively with other value-chain players. This is a strong recommendation that should be explored further by the farmers themselves, but these would require support from other stakeholders which include, Government, Farmers Union of Malawi (FUM) and financial institutions. Formation of cattle marketing groups is highly recommended. Cattle marketing groups tend to lower transaction costs, increase access to information and increase participation into formal markets (Musemwa *et al.,* 2007). The market and bargaining power that a farmer can receive in a small group of between two to five farmers is obviously less than that from a larger group. By aggregating into associations and cooperatives, small scale farmers have the potential to achieve even greater economies of scale in accessing services, information, infrastructure and markets.

5.3. Caveat

The major limitation of the study was the unwillingness of largescale beef processors to provide the much needed data such as their production volumes, prices and costs. Beef processors are key players in the beef value chain in Malawi – bu they consider their business information as too confidential to share with researchers. It was therefore difficult for the study team to analyse the performance of the beef business at that level. It is therefore recommended that future studies should engage processors with the help of Govenrment to provide such information. It was not possible to do so at this time due to limitation of time.

Acknowledgements

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Annex 1. Schematic view of the main stakeholders in the beef value-chain
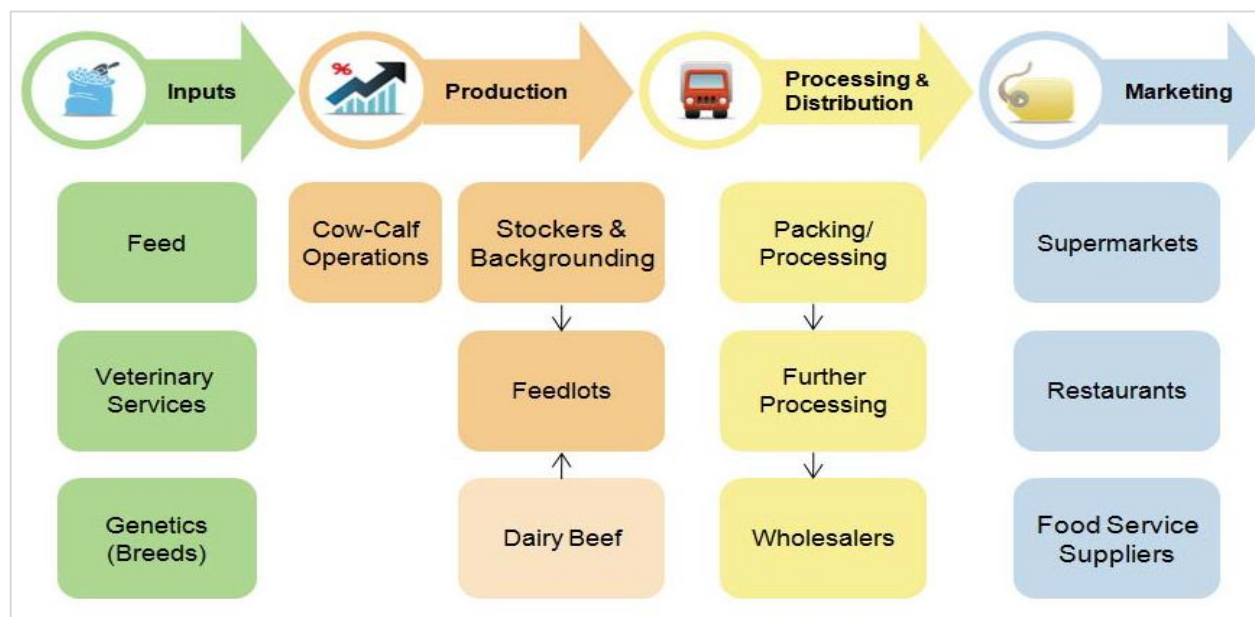
Source: Adapted from the US Beef Sector Value Chain, 2009

Annex 2. Smallholder Sector Livestock Statistics

Agricultural Development Division	Cattle	Goats	Pigs	Sheep	Chickens
Karonga	130,201	59,010	96,645	5,500	1,035,928
Mzuzu	184,257	223,160	101,958	16,707	1,594,562
Kasungu	166,064	628,735	235,600	35,395	2,831,234
Salima	23,319	141,371	25,270	15,167	738,431
Lilongwe	153,181	680,682	380,413	21,916	10,656,482
Machinga	57,754	623,580	103,934	81,190	2,395,661
Blantyre	92,899	536,823	231,351	9,204	8,286,929
Shire Valley	114,022	212,910	54,301	3,441	762,841
2008	921,697	3,106,271	2,099,472	188,520	28,302,068
2007	880,597	2,720,126	928,952	188,609	32,459,671
2006	799,017	2,301,349	636,991	175,394	25,891,568
% change over 2007 census	4.67	14.20	32.25	-0.05	-12.81

Source: **Department of Animal Health and Livestock Development.**