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**INTERAFRICAN BUREAU**  
**FOR ANIMAL RESOURCES**



**REPORT ON THE**  
**VALUE CHAIN ANALYSIS AND MAPPING OF THE RED MEAT AND**  
**LIVE ANIMALS IN SOUTHERN AFRICA DEVELOPMENT COMMUNITY**  
**REGION AND ACCOMPANYING MAPPING TOOL**



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## Executive Summary

The Southern Africa Region selected the development of the red meat and live animal (beef and small ruminants) value chain as its priority regional livestock value chain. Key strategic actions necessary for the development of the chosen Livestock Value Chain, namely; improved quality, safety, production and productivity of red meat animals (cattle sheep and goats), to promote the participation of the private sector throughout the red meat value chain and develop mechanisms to promote sustainability of red meat value chains have been identified. The premise is that agriculture is the mainstay of most of Southern African region economies, and processing agricultural products is a primary regional industrial activity. The livestock sector plays a pivotal role in contributing towards, food and nutritional security as well as being the economic backbone especially for countries in the Southern Africa region. In response to the growing global and continental needs to enhance value chain efficiency, SADC member states identified the need to establish a value chain analysis and mapping tool that will enable several features to be identified, including; characterization of the Red Meat livestock value chain, value chain analysis including economic, environmental and social drivers of the chain, value chain mapping, value chain governance, risk analysis and sustainability.

In order to inform the development of the tool, the current status of the red meat and live animals value chain in the SADC was analysed through an extensive literature review. There is more readily available literature on the beef value chain and from the literature review several constraints to the beef value chain were identified as follows: lack of information, information asymmetry and inefficient price discovery systems, market segmentation and under or undeveloped niche markets, lack of technology adoption, lack of hygiene, prevalent diseases and poor disease management, the application of a beef carcass classification system which discriminates against indigenous breeds, poor infrastructure, lack of integration (both horizontal and vertical, lack of gender parity and poor governance and high cost of compliance. During the literature review, it was also established that some countries conducted periodic value chain analysis (South Africa conducts an annual value chain analysis) yet some only conducted one-time analyses. Most of the issues identified for the beef value chain also applied to the small ruminants. However, some constraints that were specific to small ruminants included very little if any disease control, low commercialisation and the absence of breeding programmes. Most of the constraints identified in the literature were validated through in-depth interviews. The following additional issues were identified through the in-depth interviews, namely, that the value chain in the SADC lacks a common vision, prevalence of livestock theft, lack of effort to use national breeding systems to improve the performance of the red meat and live animals value chain, the lack of drought management strategies like water storage and conservation and the lack of practicing environmentally sustainable production practices

In terms of the import and export regulation in the SADC, it was established that there is no compendium which summarises the regulations which apply to SADC as a region. Each country uses regulations which are enshrined in different official documents. Most countries use a Meat Act. Which

are often interpreted in conjunction with Animal Health Act while in other countries the Meat Act works in conjunction with a Veterinary Public Health Act and sometimes with Animal Diseases Act. The documents are country specific and have potential to provide conflicting guidelines. This is the case despite the very highly active cross-border trade in red meat and live animal which occurs across many SADC countries. This aspect resonates with the lack of common vision in the SADC red meat and live animals value chain which was identified during the in-depth interviews. Thus, there is need to harmonise the import and export regulations in the SADC.

A methodology for the development of the value chain analysis and mapping tool was documented. The methodology includes in-depth interviews and working groups conducted in workshop and breakaway format. The working groups form the basis of the development of the value chain analysis and mapping tool. Through a facilitated process the groups analysed the red meat and live animal value chains in their respective countries. The analysis involves; identifying and characterising red meat farming sectors/systems to be included in value chain analysis, brainstorming and listing value chain stakeholders, developing value chain flow diagram, developing meat pathways for the value chain, performing end market analysis, performing SWOT analysis, performing value chain governance analysis, determining value chain upgrading strategy and identifying and prioritising value chain performance indicators. The process was documented and will be used to develop the value chain analysis and mapping tool. A software-based tool for the analysis and mapping of the red meat and live animal value chains will be developed based on this process.

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# I. Introduction

## 1.1. Background and problem Statement

The Southern Africa Region selected the development of the red meat and live animal (beef and small ruminants) value chain as its priority regional livestock value chain and identified three key Strategic Actions necessary for the development of this chosen Livestock Value Chain, namely; improved quality, safety, production and productivity of red meat animals (cattle sheep and goats), to promote the participation of the private sector throughout the red meat value chain and develop mechanisms to promote sustainability of red meat value chains. This is premised on the fact that agriculture is the mainstay of most of southern African region economies, and processing agricultural products is a primary regional industrial activity. The livestock sector plays a pivotal role in contributing towards, food and nutritional security as well as being the economic backbone especially for countries in the Southern Africa region.

Livestock value chains are complex, comprising compound networks, relationships, and transactions, as at each stage or transaction, the animal or its product gains “value” either as its quality improves or as its delivery to the final consumer is made more efficient. Therefore, to ensure efficiency, quality and system competitiveness, value chain analysis and mapping is critical as it provides important insights into four main issues of any sector, these include macroeconomic issues; governance issues, social capital issues and dynamics of interlinkages.

In addition, value chain analysis provides a knowledge platform especially for new producers including the smallholders who are trying to penetrate global markets. It further provides an analytical tool to better understand the policy environment; identify the economic, environmental and social drivers; business linkages and global market environment and promotes systemic competitiveness. Currently, the need to drive the adoption of a market-oriented value chain approach has heightened. It has been emphasized that through this action, interventions that are demand driven and meet market requirements should be promoted. This approach will encourage greater productivity, improve supply linkages, strengthen relationships among suppliers and attract investment across the whole the value chain, ultimately leading to increased incomes for all actors.

In response to the growing global and continental needs to enhance value chain efficiency, SADC member states identified the need to establish a value chain analysis and mapping tool that will enable several features to be identified, including ; characterization of the Red Meat livestock value chain, value chain analysis including economic, environmental and social drivers of the chain. value chain mapping, value chain governance, risk analysis and sustainability.

## 1.2. Objectives of the consultancy

Under the Live2Africa global result area I (Investment in Livestock Value Chains (LVCs) increased) the overarching goal is to develop mechanisms to enhance market access at local, regional and international levels. This can be done through enhancing the capacity of member states to conduct value chain analyses through mapping and identification of bottlenecks and removing trading barriers in the region. The specific objectives of the consultancy are:

- a. To interrogate the research conducted in the selected value chain by all key stakeholders including universities, public and private researchers, NGOs and development partners at national and regional level.
- b. To synthesize available value chain analyses reports for red meat and live animals in SADC Member States with a focus on informing the development of the value analysis and mapping tool.
- c. To compile a compendium of import and export regulations of SADC markets
- d. To develop an instrument for value chain analysis and mapping the red meat and live animal in the SADC region
- e. To draft appropriate training manuals for the developed value chain analysis and mapping tool
- f. To facilitate validation of value chain analysis and mapping tool

## 1.3. Methodology

The process of executing the project was guided by the respective RECs consultative process of developing policy and legal instruments. Briefly, this involves national and regional bench reviews and consultations, interviews and validation workshop. The strategy had a vision and a mission to guide the regional and national strategic aspirations for the Livestock Genetic Resources

The consultant used a variety of approaches, namely;

- i. Desktop studies for review, collation and analysis of red meat and live animals red meat and live animals livestock value chain at national level. These are summarised under the literature review.
- ii. Analysis and synthesis of available value chain analyses reports for red meat and live animals in SADC Member States with a focus on informing the development of the value analysis and mapping tool
- iii. In depth interviews with stakeholders from public and private sectors in selected representative REC Member States; namely Mozambique, Madagascar, Eswatini, Namibia, Malawi and Tanzania. These were used to validate the observations made from the literature review and to gain more insights into issues related to the red meat and live animals value chain that were not included in the literature review.
- iv. Collection, collation and analysis of national policies, strategies, laws and regulation amongst other policy instruments related to the red meat and live animals value chain in the region
- v. Development of a red meat and live animals value chain analysis and mapping tool
- vi. Facilitate validation meeting(s) for the value chain analysis and mapping tool.

## 1.4. *Expected outputs*

It is expected that the following will be achieved under this assignment:

- a. An Inception report with clear proposed methodology, detailed activity work plan, time scale, and validation plan for the delivery of the consultative workshop, as well as an outline for the consultancy report submitted
- b. In-depth desk review of the red meat and live animal value chain in SADC member states conducted.
- c. Compendium of import and export regulations for the red meat and live animal value chain availed
- d. A validated value chain mapping tool based on the priority needs of the red meat and live animal value chain available
- e. Appropriate training manuals for value chain analyses and mapping tool produced
- f. Validated red meat and live animal value chain mapping and analysis tool available

## 2. An Overview of the Status and Constraints of the Red Meat and Live Animals Value Chain in the SADC

### 2.1. Brief background to the red meat and animals value chain in the SADC

World food production needs to meet world food demand. An increase of 50 to 70% in food productivity is needed to feed the projected 9 billion people by 2050 (UN, 2019). Estimates show that livestock provides 13% of total calories and about 26% of protein for human consumption. Estimates indicate that, as a result of economic growth, urbanisation, and changes in consumption patterns in developing countries, demand for livestock products is likely to more than double in the next 20 years. With the appropriate strategic actions, the contribution of the SADC region to this expanding livestock products demand can be high. For instance, Beef2live (2021) indicates that of the 46 top beef producing countries, the only SADC country which appears on that list is South Africa, ranked 12th. The livestock sector in developing countries supports the incomes of more than 1 billion smallholder livestock producers and contributes 40% of agricultural GDP (Louw, Louw and Flandorp, 2018). Livestock production has been criticized for contributing to climate change through the emission of greenhouse gases. As a result, there is a growing belief, especially in developed countries, where the overconsumption of animal products is a common phenomenon, that reduction of the consumption of animal source foods (ASF) contributes positively to the environment. However, as noted by Paul et al. (2021:1) these narratives: "...overshadow the various complex and often positive roles livestock plays in low- and middle-income countries (LMICs) in Africa, South America and South(-East) Asia. A singular focus on livestock associated environmental impacts ignores livestock's crucial livelihood functions in smallholder systems such as nutrition, income, asset provision, insurance, and nutrient cycling." Bennett et al. (2019) indicate that rural households without cattle are the most vulnerable to food insecurity and poverty and that cattle ownership is positively correlated to maize yields. Cattle are important for social capital and status, risk management, savings, milk production, and draft power (Vernooij, dos Anjos and van Mierlo, 2016, Wane et al, 2018, Wilson, 2018, Bennett et al, 2019, Government of South Africa, 2019). Livestock are, therefore, essential to coping and resilience strategies in the SADC. Furthermore, "... the cereal-based diets of poor people in LMICs regularly lack bioavailable (micro)nutrients, which are highly concentrated in livestock products. Vulnerable groups in LMICs, such as pregnant and lactating women, and children, would benefit from more, and not less, ASF consumption to improve physical and cognitive health, and reduce stunting." For instance, in Malawi the consumption of ASF is low when compared to regional and international standards (Dzanja, Kapondamgaga and Tchale, 2013).

### 2.2. A Synopsis of the livestock value chain in the SADC region

In 2018 the GDP of the SADC was estimated at USD \$721.3 Billion with an annual growth rate of 1.8%. Services and industry contributed just above 59% and just above 20%, respectively, of GDP in the SADC in 2018. Agriculture is of major economic and social importance in the SADC region. In different member states it contributes between 4% and 27% of GDP averaging just over 20% in 2018. Agriculture accounts for approximately 13% of overall export earnings. Livelihoods in the SADC are based on agriculture with seventy percent of the SADC population depending on agriculture for food, income and

employment (SADC, 2022). Livestock is a key resource in the SADC contributing to different degrees to the economies of SADC member states. For instance, in South Africa livestock foods account for 27% of the consumer food basket by weight and meat consumption ranges between 50 - 90 g/capita/day. SADC countries are endowed with a highly diverse animal resource base comprising an estimated 64 million cattle, 39 million sheep, 38 million goats, 7 million pigs, 1 million horses and 380 million poultry. Over 60 % of the SADC total land area is suitable for livestock production (SADC, 2022). Table 1 shows the populations of cattle, goats and sheep in selected SADC countries. Tanzania has the largest animal resource base in the SADC.

**Table 1:** Cattle, goats and sheep populations in selected SADC countries

SN	Country	Cattle	Goats	Sheep
1	Botswana	1 596 605	1 605 642	227 247
2	Eswatini	527 183	506 998	17 264
3	Lesotho	461 573	972 701	2,041 479
4	Madagascar	6 000 000	1 500 000	9 000
5	Malawi	1 959 101	11 104 382	373 716
6	Mauritius	3484	25831	4671
7	Mozambique	2.219.635	4.898.306 *	
8	Namibia	2 513 116	1 922 042	1 556 112
9	Tanzania	35 300 000	25 600 000	8 800 000
10	South Africa	12 234 000	5 150 000	21 464 000
11	Zambia	3,714,667	3,583,696	170,262
12	Zimbabwe	5 509 983	4 259 176	710 226

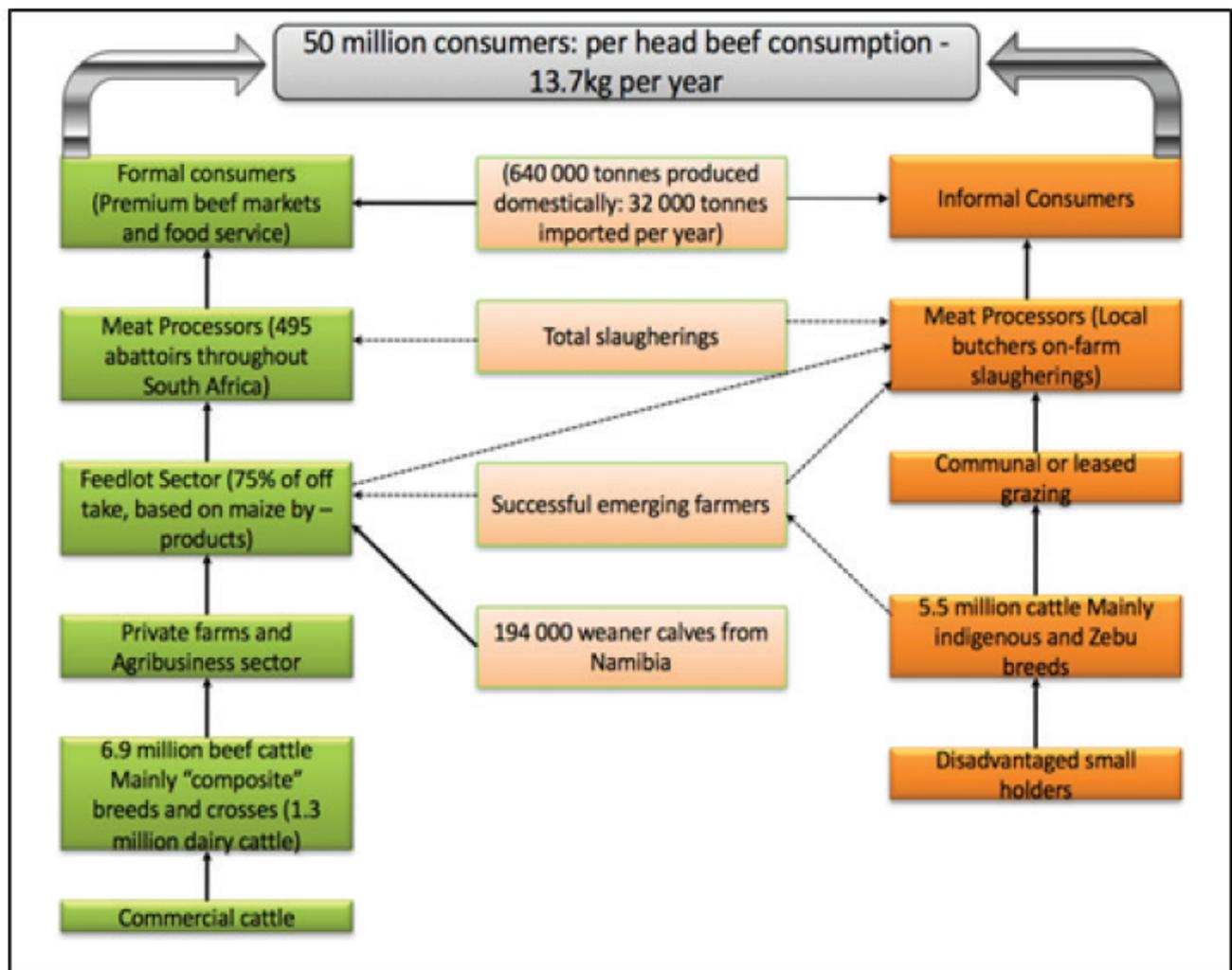
\* Includes sheep and goats. From 2022 onwards the estimates of goats and sheep will be separated.

A dual farming system comprising a commercial sector and a smallholder sector characterises livestock production in all the SADC countries (Kamugisha, Mdoe and Mtenga, 2017, Mapiye, 2017, Nkadimeng, 2019) The smallholder sector is known by different names in different countries, for instance, in Eswatini it is called Swazi Nation Land (SNL) and in Tanzania it is called the traditional sector, in Mozambique it is called the family sector and in many SADC countries it is referred to as the communal sector. The smallholder/communal sector has a usufruct land tenure system whereas the commercial sector has title deeds. This means that the commercial sector can use land as collateral against which money can be borrowed from commercial lending institutions like banks, but the communal sector cannot. In the smallholder sector, which keeps about 75 percent of the cattle population, livestock have multiple uses including as a source of food (meat and milk) and the provision of draft power, hides, organic fertilizer and medicine (SADC, 2022).

Smallholder farmers are predominantly household based operating on small land sizes. In many countries these are less than 5 ha but in some (e.g., Eswatini) they can be as large as 300 ha. Smallholders produce under low input subsistence systems where there is no feed supplementation. Farmers usually sell surplus and have challenges accessing markets. Animals in communal areas are usually raised on free range systems that emulate organic production and there is very low investment. Smallholder farmers do not have planned breeding and vaccination programmes and management skills are usually poor resulting in low productivity.

The large-scale commercial farmers produce for profit. They usually have good infrastructure; well-structured breeding programmes and disease control systems, have established markets (e.g., major abattoirs) and sometimes produce on contract (Mapiye, 2017, Marandure, 2020). Sometimes animals are grown or finished in feedlots. The management skills are high, so this sector is usually characterized by consistently high productivity. Most commercial systems have well developed and reliable animal traceability systems. Some countries like Eswatini and Namibia have developed animal traceability systems for their smallholder sectors and can access high value markets in Europe. However, this is not common practice in the SADC, although it is a distinct and strongly advantageous possibility. In most SADC countries most of the animals are owned by the smallholder sector (World Bank, 2011, Mapiye, 2017, Nkadimeng, 2019). For instance, 98 percent of Tanzania's beef industry is made up of the traditional sector (Kamugisha, Mdoe and Mtenga, 2017). However, largely because of multiple ownership objectives of animals, offtake is lower in the smallholder sector than the commercial sector, because farmers only sell what they consider as surplus above their multiple objectives or for pressing financial need ((Mapiye et al, 2018). Some countries do not have medium scale farmers, having only communal and commercial farming sectors. Some countries like Namibia and South Africa are making efforts to commercialise smallholder communal farmers and these are referred to as emerging farmers. Therefore, in these countries there is a small sector of medium scale emerging farmers with farms which can range from greater than 5 ha to as large as 600ha. Medium scale emerging farmers produce livestock for both subsistence and profit and sell in both formal and informal markets (e.g., supplying local communities).

In the countries where the dualistic livestock production system exists, development initiatives need to pay particular attention to its implications, particularly in relation to inclusive economic growth. Figure 1 represents this duality and demonstrates how pervasive the dualism can be by permeating the value chain from production through to consumption in the South African context. Figure 1 also demonstrates some of the interactions that go on between the dual systems along the beef value chain. (Louw et al, 2018).



**Figure 1:** Dualism in the South African Beef value chain.  
**Source:** Louw et al, 2018.

Dualism also exists in the small ruminant sector. For instance, in South Africa there are about 8 000 commercial sheep farms and 5 800 communal farmers. There were about 22.3 million sheep in in 2018 mostly Merino, Karakul, other woolled and non-wooled sheep. In South Africa sheep farmers have organizations representing them like Merino SA and the Dorper Sheep Breeders’ Society of South Africa (Government of South Africa, 2019).

### 2.3. Current status and constraints of the red meat and live animals value chain in the SADC region

#### 2.3.1. The status of international and regional markets

Food markets in Africa, especially urban food markets, are rapidly changing in response to population expansion, rapid urbanization and income growth which have resulted in the emergence of an African urban middle class (Lubungu, et al., Hichaambwa, 2015, Vernooij et al, 2016). Similar changes, like income increases are phenomena being experienced in the SADC region (Paremoer, 2018). These changes are resulting in continuously increasing demand for animal proteins (Rae and Nayga 2010) and animal-based products. In Africa the annual growth rate of meat consumption is estimated at 2.8% which is anticipated

to accumulate to consumption of 34.8 million tons of meat by 2050. Poultry and beef are the preferred meat sources in Africa, and it is estimated that beef consumption will increase by 8.9 million tons by 2050 (Lubungu et al, 2015). Figure 2 shows the projected changes in different world meat markets.

	Estimated consumption 2005/07, million tonnes	Growth, million tonnes		Estimated consumption million tonnes 2050	Annual growth rate 2005/07-2050
		2005/07-2030	2030-50		
Developed	108.1	16.8	6.6	131.5	0.4%
Africa	10.5	10.3	13.9	34.8	2.8%
Near East	7.1	7.0	6.1	20.2	2.4%
Latin America	33.9	17.0	9.7	60.6	1.3%
South Asia	6.7	12.8	21.0	40.4	4.1%
East Southeast Asia	85.6	50.8	22.8	160.3	1.4%

**Figure 2:** Projections of the size of meat markets in major world regions, 2005-2007, 2030 and 2050

**Source:** Lubungu et al, 2015.

Figure 2 shows that for the 2050 projections, of the six regions compared, the annual consumption growth rate in Africa is only second to South Asia. In Zambia, Lubungu et al, (2015) reported that meat demand was projected to increase from 120,000 metric tons in 2012 to over 600,000 metric tons by 2027, an estimated increase of 400% over a period of about 15 years. These anticipated changes create both opportunities and challenges. One of the significant opportunities is that through these developments smallholder livestock producers can be linked to these markets thus including them in the mainstream economy from which they have been systematically excluded (Lei, 2012, Steinfeld et al. 2013). The challenge is that the growth in demand needs to be matched by an equal growth in supply. Therefore, whether this opportunity is realized depends on the extent to which African governments are willing and able to be strategic in effectively addressing the ever-present constraints in the livestock value chain, especially in the production and domestic marketing systems (Lubungu et al, 2015). Furthermore, in the beef value chain in South Africa, greater consumer knowledge and the changing needs of consumers are shifting the power dynamics from the lower actors in the beef value chain to consumers. For survival, profitable and sustainable operations, the value chain actors must ensure that they align their activities to deliver customer value (Labuschagne, Louw and Ndanga, 2010). This type of pressure creates a ripple effect that that can extend from the consumer end of the value chain to its beginning. Value chain actors can interpret this pressure as a constraint; however, creative value chain actors can seize it as an opportunity. It is this type of pressure from modern vegetable retail outlets who had a quality expectation that led to the upgrading of smallholder vegetable value chains in Indonesia through farmer organisations (Widadia, Bijmana and Trienekens, 2021). Thus, the changes that are occurring in the African livestock markets create opportunity for both the public and the private sectors. The changes also offer a plethora of possible public-private partnerships (PPPs) that can be seized and exploited to the benefit of the livestock value chain and its stakeholders.

### 2.3.2. The status of imports and exports

Table 2 shows that 45% of SADC exports go to the Asian Pacific Economic Cooperation with the European Union being the second largest trade block for SADC accounting for 27% of exports. Important to note is the intra-SADC and rest of Africa exports which stand at 10% and 3% respectively. These levels show high potential for development especially in light of the African Continental Free Trade Area (AfCFTA) which will create the world's largest free trade area in terms of the number of participating countries.

**Table 2:** Exports in SADC countries

Regional Economic Community/Continent	Asian Pacific Economic Cooperation (APEC)	European Union (EU)	Rest of the World	Intra - SADC	Rest of Africa
% Export	45	27	15	10	3

Source: SADC (2022)

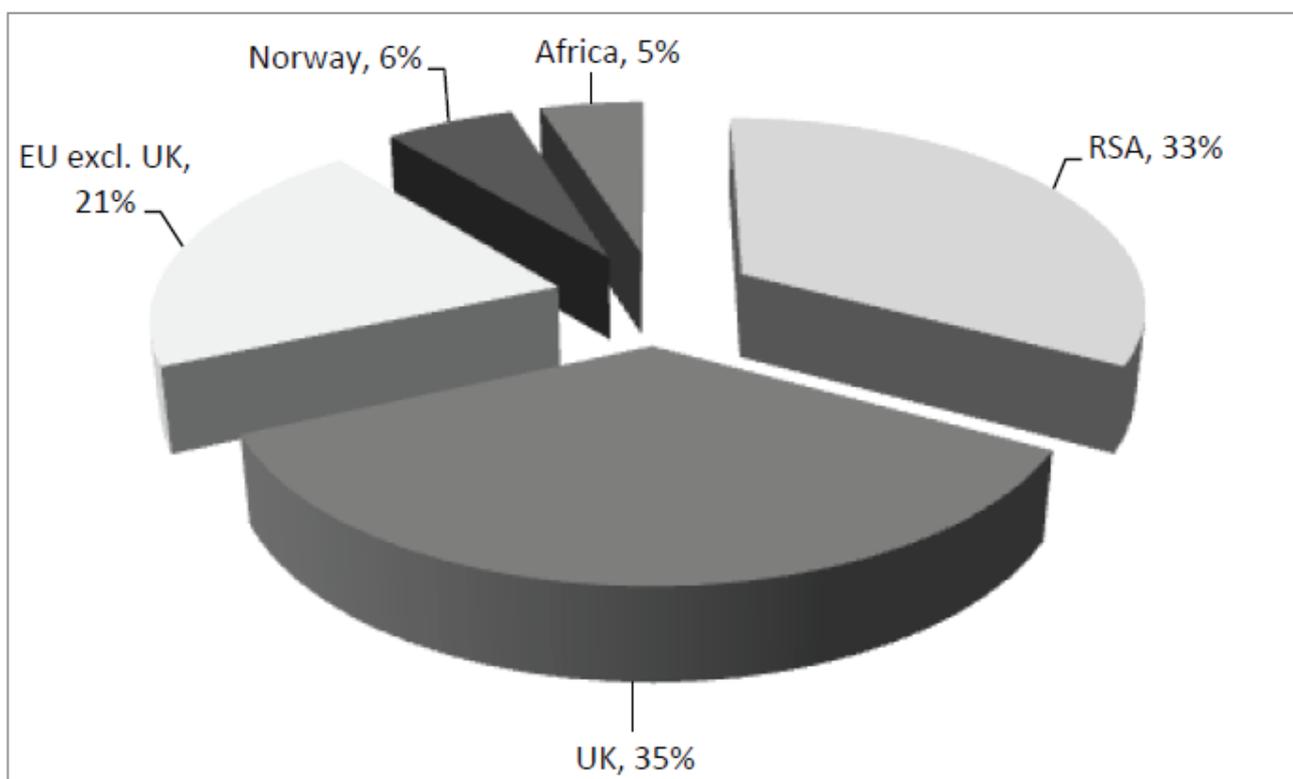
In the SADC region, table 3 shows that 45% of imports originate from the Asian Pacific Economic Cooperation with the European Union accounting for 27%. Again, it is important to note the opportunity which can be exploited through AfCFTA given that the rest of Africa accounts for only 13% of SADC imports. The large share of imports from Asian Pacific Economic Cooperation offer an opportunity for import substitution.

**Table 3:** Imports in SADC countries

Regional Economic Community/Continent	Asian Pacific Economic Cooperation (APEC)	European Union (EU)	Rest of the World	Rest of Africa
% Import	45	27	15	13

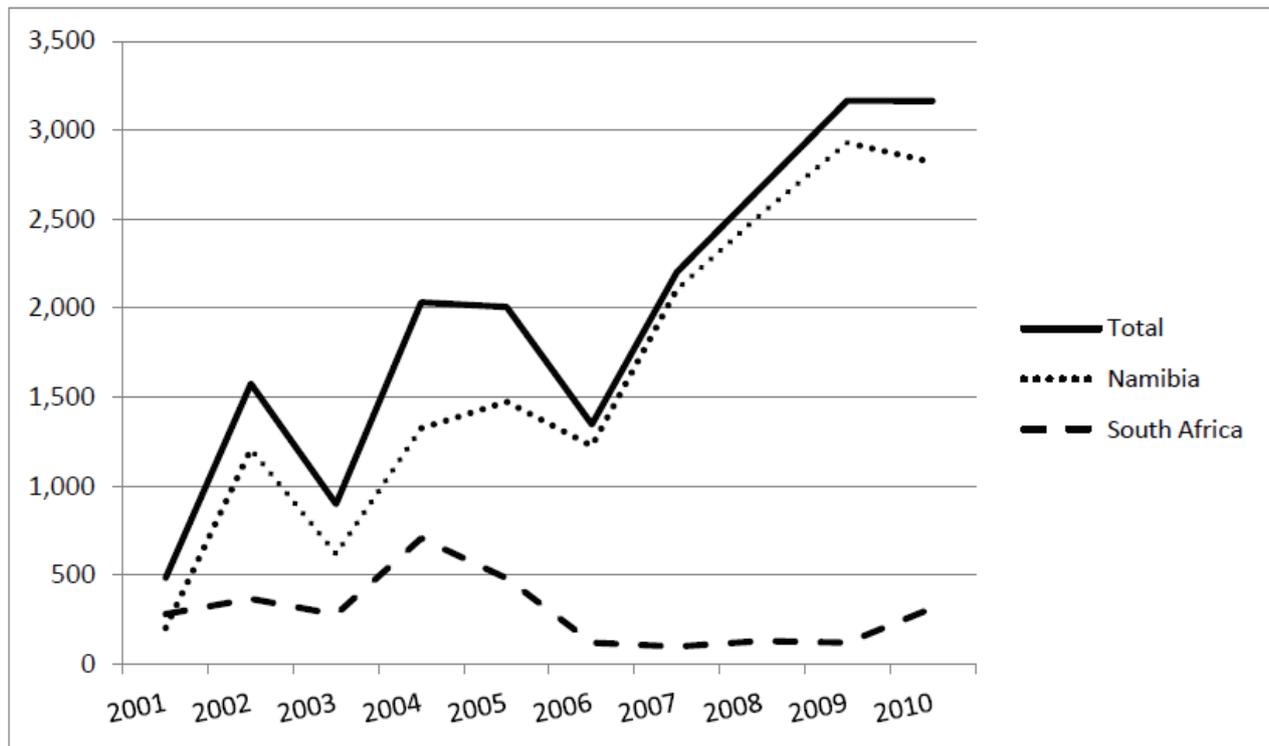
Source: SADC (2022)

The red meat and live animals value chain should directly benefit from the AfCFTA initiative. There is regional trade in meat, largely in beef that goes on currently in SADC, however, it is limited but with great scope for development. For instance, Figure 3 shows that after South Africa, which accounts for about 33 percent of exports by the Botswana Meat Commission, the rest of Africa accounts for only 5%. This suggests huge potential that could be exploited, especially given the population (UN, 2019) and income (Labuschagne et al, 2010) increases anticipated in Africa in the near future.



**Figure 3:** Distribution of exports for Botswana Meat Commission  
**Source:** van Englen, 2013.

SADC countries need to seriously consider market diversification in terms of end markets,. For instance, for Botswana, one of the highest exporters of beef in Africa, South Africa and the EU markets account for 80% of its beef exports while other markets, like the halal markets in the Middle East and expanding, nearby markets in sub-Saharan Africa, which could be potentially exploited remain unexplored. Diversification could also mean moving some of the exports to a higher value product than raw meat through processing (van Engelen et al, 2013). Figure 4 shows that agro-processing offers SADC countries with similar circumstances like Namibia and Botswana, where imports of processed beef products have been on a steady increase, great scope for direct import substitution thus preventing the exporting of local job opportunities to the import markets but instead importing jobs from the export markets.

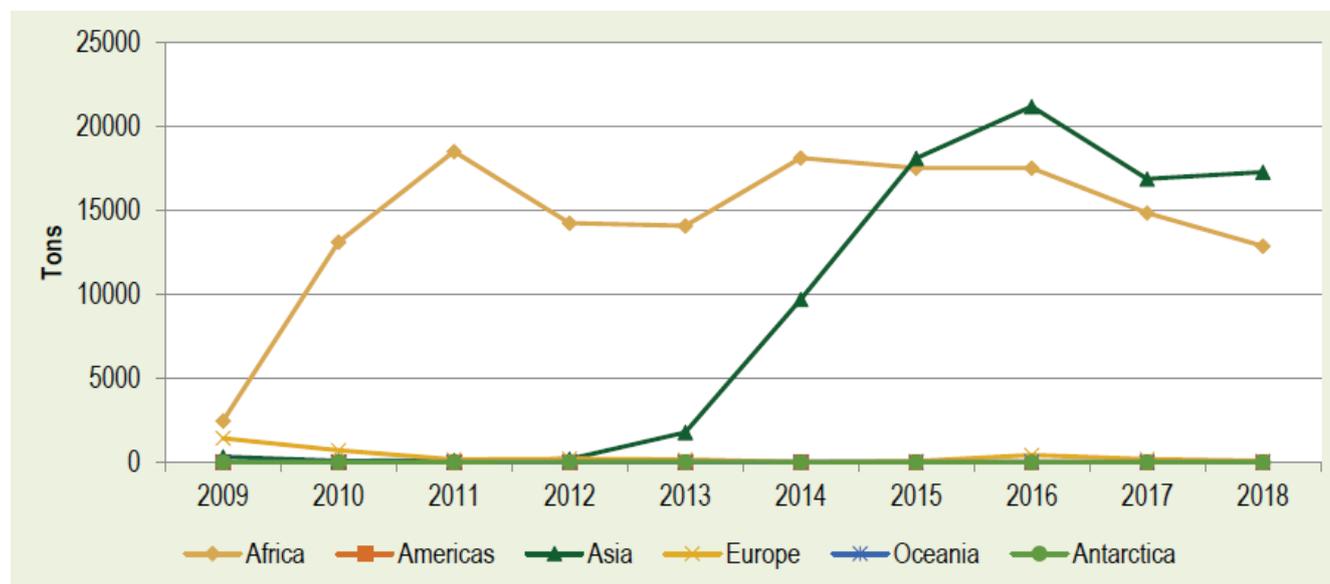


**Figure 4:** Botswana, Namibia, and South Africa imports of beef products, USD :000  
**Source:** van Englen, 2013.

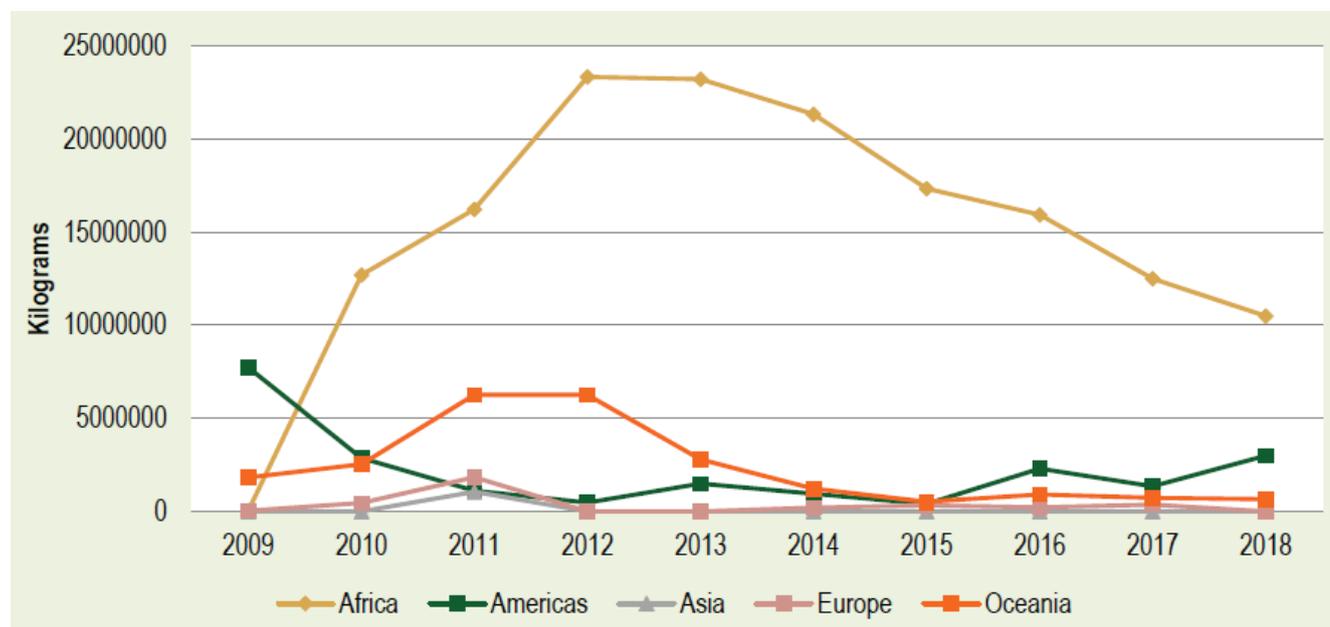
Such opportunity, however, needs to be explored with the caveat that agro-processing, even after accounting for all its benefits like employment creation and its multiplier effects, does not necessarily result in better value addition where key high-price end niche markets are available for the unprocessed product. This aspect needs to be carefully analysed when exploring market diversification. Generally, four types of end markets can be identified along the beef value chain namely, the export channel, which accounted for 50% of Botswana’s offtake in 2010, the expanding and modernizing domestic channel which accounted for 10% of Botswana’s 2010 offtake, the domestic butchery channel, which accounted for 30% of Botswana’s 2010 offtake, and direct consumption by producers, which accounted for 10 percent of 2010 offtake. In many countries the last market is largely ignored and not included in national statistics, but it can account for a significant amount of offtake (van Engelen et al, 2013). Although it may not be included in a market development strategy, when its starts to account for a higher proportion of the offtake, this signifies some problem e.g., contraction in the other three markets. Of course, to the list, the niche markets which can be identified potentially within all of the first three market outlets, should be added. When growth in the end markets is observed, the identification of the sources of supply growth can assist in the identification of both the short- and long-term drivers of the red meat and live animals value chain within a country or regionally (van Engelen et al, 2013).

The South African beef industry produces around 1 million tons of meat and imports around 14 million kilograms while exporting 30 million kilograms. Per capita consumption is around 18.02 kg and number of consumers is around 57 million. Figure 5 shows the main importing continents for South African beef. It shows that most of the South African beef exports went to Asian and Africa. All indications show that the African market is not yet exhausted, so there is scope for South Africa to develop more regional

trade in beef. Mozambique is the highest importer of South African beef. Other regional markets could also be developed. Figure 6 shows that beef imports from South Africa peaked in 2012 then started to decline which might suggest signs of import substitution. Botswana and Namibia are the highest exporters of beef to South Africa. In fact, Botswana and Namibia account for about 73% of all exports to South Africa. This again shows the scope to which regional trade can be developed especially within the framework and spirit of the AfCFTA.



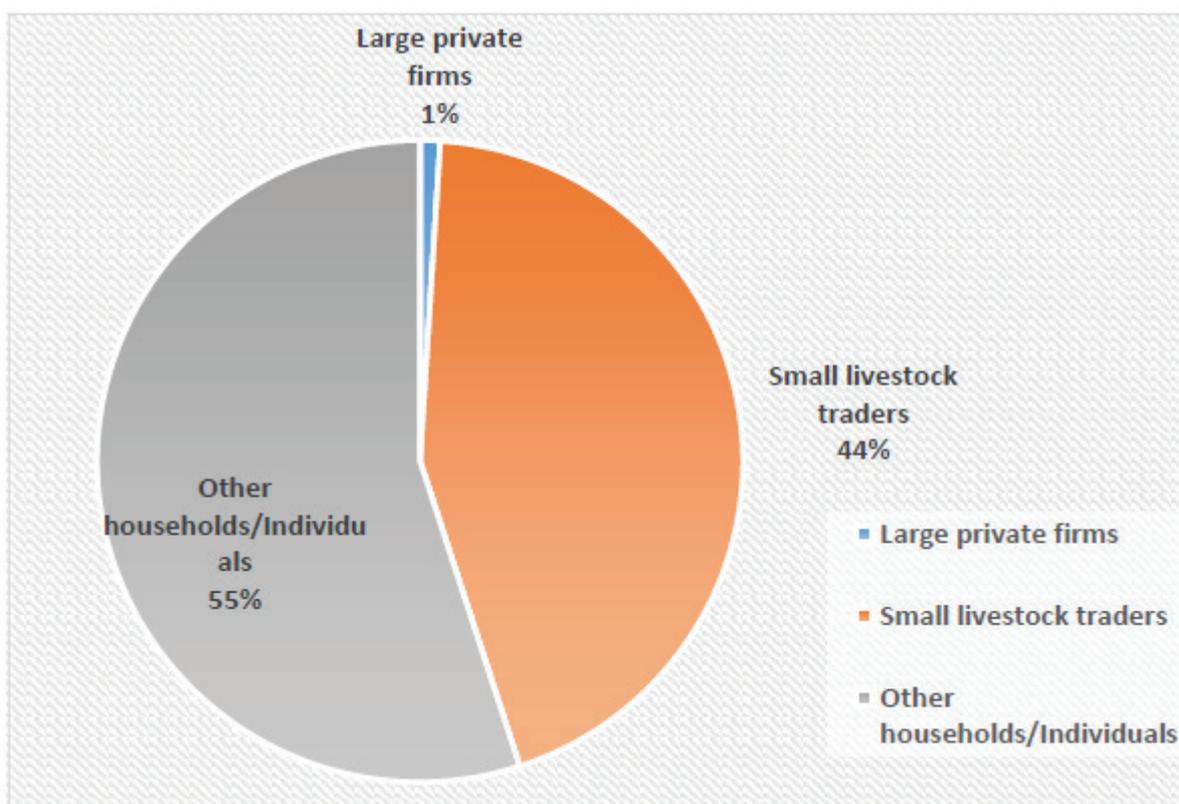
**Figure 5:** South African beef exports to the continents 2009-2018.  
**Source:** Government of South Africa, 2019.



**Figure 6:** South Africa's beef imports, 2008-2018.  
**Source:** Government of the republic of South Africa, 2019.

The market analysis presented is based on the beef value chain. In the SADC the beef value chain is important because it offers attractive market opportunities locally (within countries), regionally (in the SADC) and internationally (World Bank, 2011). However, markets for small ruminants (goats and sheep) can also be developed and benefit through the AfCFTA initiative. Roets and Kirsten (2005) mention

that in South Africa, dualism exists in goat production. Commercial goat farmers have access to well organised markets, have access to capital resources, good infrastructure, institutions, a legal frameworks and markets. Whereas the system for smallholders is informal. In Mozambique, Swaans, et al (2013) report that in one district, 43% of goat buyers were individual traders and 22% were other smallholder goat keepers. Sales largely took place at the trader’s house constituting 79% of sales and payment was in cash at the time of the transaction. This shows the informal nature of the goat sector; however, there are attempts to commercialise the smallholders’ goat production sector. In a study in Zambia, Namonje-Kapembwa et al, (2019) showed that goats can be commercialised and yield positive net income. Figure 7 shows the informal nature of markets in Zambia. The same trend is also observed by Togarepi, Thomas and Mika (2018), in Namibia where they mention that goat products are not found in supermarkets yet at smallholder household level, goat meat is considered a delicacy.



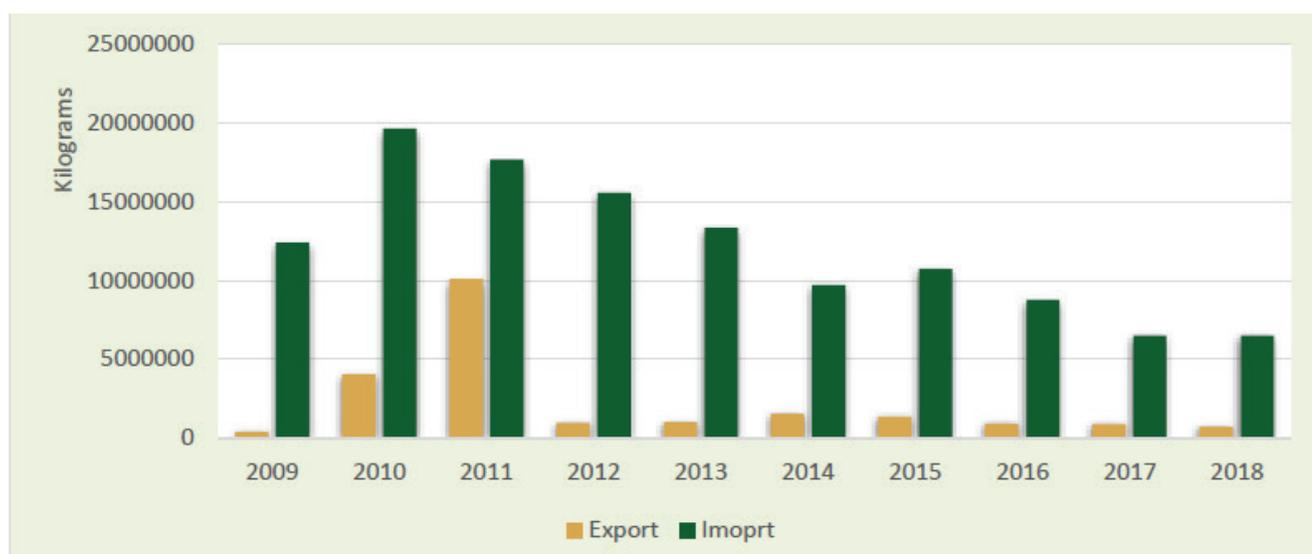
**Figure 7:** Goat markets in Zambia.  
**Source:** Namonje-Kapembwa et al, 2019.

In many countries most goats are in the smallholder sector, so improvements must address smallholder constraints such as capital constraints, underdeveloped or non-existent goat (formal) markets, low market participation and cultural orientations that do not treat goats as a commercial enterprise (Dube, et al, 2017). Dube et al (2017) and Namonje-Kapembwa et al (2019) show that goats are sold either as live animals or raw meat, without any processing taking place. This could be an opportunity waiting to be exploited.

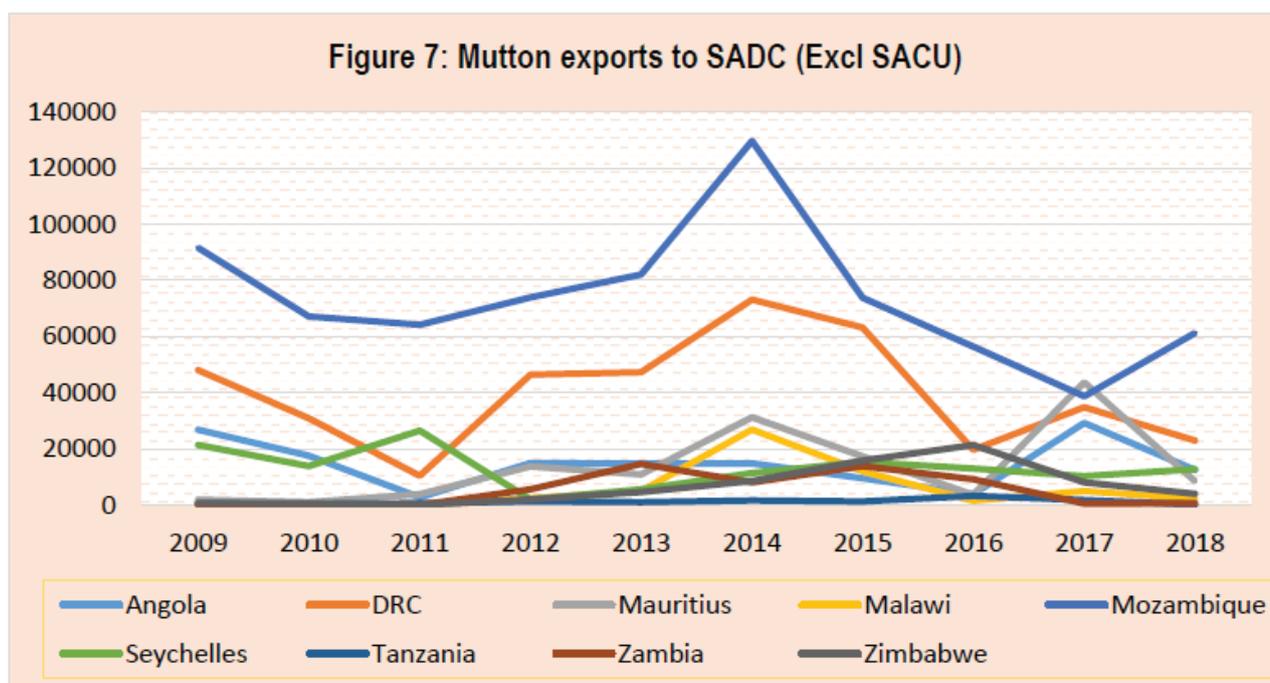
The marketing of sheep is more formal than that of goats and some of the value addition along the value chain involves processing, unlike the goat value chain. Venter and Horsthemke (1999) used Porter’s Diamond Framework to analyse the competitiveness of the Southern African sheep meat industry

against one of its significant competitors, Australia. They found that lamb producers were competitive, but mutton producers were not. They concluded that the formation of strategic alliances along the value chain will increase market competitiveness. They also recommended targeting high income niche markets based on convenience, branding, health, food safety, quality, good packaging, and natural production.

Figure 8 shows that South Africa is a net importer of mutton, showing great potential for production so as to satisfy the local market demand through import substitution.



**Figure 8:** South Africa's mutton imports and exports  
**Source:** Government of South Africa (2019).



**Figure 9:** South Africa's mutton imports to SADC countries  
**Source:** Government of South Africa (2019).

Figure 9 shows that Mozambique (accounting for 43%) and DRC (accounting for 23%) were the highest importers of mutton from South Africa (Government of South Africa, 2019). There appears to be a declining trend in South African mutton exports to the SADC region which needs explanation. The extant literature indicates that there is potential to increase both goat meat and mutton in order to satisfy both domestic and exports markets.

### 2.3.3. Market segmentation

Some market segmentation exists within the SADC region's red meat and live animals marketing structure. For instance, Lubungu et al (2015) and Sikamwaya and Guiyu (2020) describe the Zambian beef market as segmented between choice beef which is produced mostly by commercial farmers through feedlots and standard beef largely produced by smallholder livestock farmers who use a low intensity production system. In 2015 the standard beef market accounted for 80% of total beef demand. Whereas prices are stable for the choice beef market, the standard beef market experiences high levels of seasonal supply fluctuations. These lead to high seasonal variations in consumer prices. Lubungu et al (2015) show that the standard beef seasonal price index peaks in December and sharply drops off in January. These fluctuations affect the price realized by smallholder farmers more than commercial farmers. Lubungu et al (2015:2) state that, "Drastic seasonal supply variations in the standard beef market are considered by industry experts to be the greatest obstacle to improving the performance of the beef market. Erratic seasonal supplies stymie investments in the smallholder beef sector and, therefore, limit the potential of the sector to act as an engine of growth for smallholder producers." This demonstrates how much this segmentation is a hinderance to the development of the value chain, particularly for smallholder livestock producers. However, this disadvantage for smallholders could be turned around if they can brand themselves as producers of organic beef raised and finished off grass.

### 2.3.4. Niche markets

Niche market analysis is an important part of end market analysis. van Engelen et al (2013) note that the global supply of beef is still not yet satisfying demand. Therefore, there is scope for the development of all types of markets including niche markets. van Engelen et al (2013) also note that robust animal traceability systems within countries are necessary because they can promote the accessing of export markets in general and niche markets in particular. When traceability systems fail, this can lead to the temporary or permanent blocking of export markets such as happened to Botswana in 2011 when a failing Livestock Identification and Trace-back System resulted in a block to accessing European Union (EU) export markets for a period of 19 months, a situation which was further aggravated by a cattle disease outbreak. This can lead to great loss of income to the red meat and live animals value chain actors. Smallholders experience severe constraints regarding traceability of animals. This is one major challenge faced in developing inclusive value chains for red meat and live animals in the SADC. It also limits their access to many niche markets.

In Eswatini there is limited use of agricultural machineries or agrochemicals under extensive production in the beef value chain, rather naturally grown grasslands are prominently used. Grass finished beef is common in other SADC countries like Zimbabwe. Grass finished beef can enjoy niche markets (van

Engelen et al, 2013). Producing and finishing beef cattle off grass can also be done using environmentally friendly practices like carbon sequestration which lead to increased red meat and live animals value chain environmental sustainability. Some farmers in South Africa are already using regenerative agriculture management practices to produce beef cattle and other environmentally friendly products (Coetzee, 2021, Farmer Angus, 2021). Consumers are willing to pay a premium for pasture raised beef. As noted by Stampa et al (2020:1) “Pasture-raised livestock products represent a premium niche with an extra value through a cleaner environmental footprint and care for animal welfare, including wildlife.....There are a variety of consumer groups willing to pay a premium for a pasture-raised attribute even on top of an organic price premium.”. The pasture attributes can be attained by commercial farmers through changes of management. However, for smallholder farmers whose production systems are already low input systems (Marandure, 2020) certification for organic and or pasture production does not need a lot of management adjustments. Marandure et al (2016) also investigated the willingness of traders and consumers to support the development of a natural pasture-fed beef brand (NPB) by smallholder cattle producers in South Africa. Marandure et al (2016:207) concluded that, “Overall, beef traders and consumers held positive impressions regarding the development of a NPB brand by smallholder cattle producers but were not willing to support its development.” This gives an indication of potential which could be exploited in the development of beef value chains in the SADC region, but with the caveat that the development needs to be initially supported by government. The Farm Assured Namibian Meat (FAN Meat) scheme which markets free-range, hormone-free beef with guaranteed animal welfare and veterinary standards is a good example of such possible effort (Scoones et al. 2010).

Some countries such as South Africa note that the organically raised beef market is a small market and advocate of the development of local markets (Labuschagne et al, 2010), however, the pasture fed beef market demand is strong enough to warrant its development in the SADC, or the to warrant the development of policies that target it (Marandure et al. 2016). Branding is being increasingly used as a marketing tool and in South Africa some suppliers have been successful at the development of niche markets for the branded beef and beef products. In their World bank report, van Engelen et al (2013:20) conclude that, “Although price will always be a factor, Botswana will likely have more opportunities in differentiated high-value niche markets, such as branded quality cuts for top-end retailers or restaurants, or in the fast growing or newly emerging markets of smaller beef importing countries where it can exploit its location and/or product qualities as competitive advantages.” van Engelen et al (2013) further note that the existing opportunities in international, regional and local niche markets are not well exploited. Given this, SADC needs to put together a concerted strategy for exploiting regional and international niche markets for the red meat and live animals. Such opportunities can be identified by analysing the regional red meat and live animals value chain.

### 2.3.5. *The status of information, information asymmetry and price discovery systems*

Government of South Africa (2019) mentions that there is need for developing market intelligence along the beef value chain because the current situation of low market intelligence can deter the development of the value chain. An important component of market intelligence is price discovery. The availability of information, especially the information necessary for price discovery is important in any

value chain. In depth interviews revealed that the Meat Board of Namibia collects and disseminates information on prices weekly. However, there are differences in information access between registered and unregistered abattoirs. There is also a gap in information dissemination in that the Meat Board of Namibia does not have the ability to ask organisations to make information available even if it is known that the organisations have the information. The Meat Board of Namibia is looking at amendments that might allow this to happen. Formal institutions, which tend to be large ones, could also make some information available. However, the smaller institutions which tend to be informal do not provide any information. These are the institutions that tend to serve the smallholders thus reducing them to price takers. Given the lack of information dissemination, it is also not clear how producer prices are calculated. Thus, the question how an abattoir calculates producer price is a gap which makes producers price takers.

In the SADC region, access to market information along the red meat and live animals value chain is seriously limited, especially for smallholders (Mapiye et al, 2020). Lack of information is not only a smallholder problem. It affects most value chains in Africa where even the number of stakeholders along the value chain are not known. About the Tanzania red meat value chain Wilson (2018:1) writes, “The chain is fragmented, unorganized, uncontrolled (in spite of being over-regulated) and uncoordinated. It is dominated by large numbers of small holder stock owners, an unknown but undoubtedly immense number of middlemen who operate across every link and a similarly unknown number of small processors and butchers who put products on the market for the consumer but who mainly lack the technical and financial ability to run it efficiently and profitably.” The constraints reported by Dube et al (2017) to be faced by smallholder traders in Zimbabwe are, competition from large scale formal sector, high purchase prices and transport costs, limited trader skills and information and poor access to market information. Lack of information on standards, grades and prices increases the transaction costs for most market intermediaries and smallholder livestock producers. This limits their market participation (Key, Sadoulet and de Janvry 2000, Costales et al. 2006).

In many African countries, livestock market information systems do not exist. Where they do exist, they generally perform poorly and do not provide sufficient and timely information and are not transparent. Information transparency enables the development of confidence between actors and plays an important role in the reduction of information asymmetry thus improving price discovery mechanisms especially for under-resourced value chain stakeholders (Fabre, et al, 2021). Lack of information means that value chain actors, especially smallholder producers and small-scale operators along the value chain operate under conditions of asymmetric price information, which puts them in a weakened negotiating position when dealing with larger stakeholders who have the ability to collect information by themselves. Studies from Zambia (Lubungu et al, 2015), Zimbabwe (Bennett, 2019) report on asymmetric information which leads to inefficient price discovery systems. In fact, this is a systemic problem in Africa (Mapiye et al, 2020) which can be attributed to insufficient financing and inability of government institutions to collect timely and reliable market information (Gabre-Madhin 2009). Even in a well-developed meat market like the South African beef value chain, Ogundeji and Maré (2019) observe that the large difference between the producer beef carcass price and the retail prices of individual beef cuts, which beef producers always

complain about, are a result of asymmetric price information. In South Africa, the Food Price Monitoring Committee concluded that, “The Committee’s investigations into the grain market highlighted concerns regarding the lack of accurate and real-time information on actual trade in whole grain and grain products at any specific point in time. Only the big role players know what quantity of grain is being exported, imported, or planned for export or import. This situation of asymmetric information is not healthy and can create opportunities to corner the market. Inaccurate information (rumours) create instability in the commodity market, and it can be argued that it is Government’s duty to ensure that more accurate and up-to-date information is available to prevent this from happening” (Government of South Africa, 2003:31). This shows that in the SADC information asymmetry is a systemic problem which afflicts more value chain markets than just the red meat and live animals’ markets.

Inefficient price discovery does not only affect marketing decisions, but it also affects production of beef products at the different value chain levels. As mentioned by Government of South Africa (2019:6), “Price formation is one of the important forces in making decisions regarding production and marketing of beef and beef products.” Therefore, inefficient price discovery systems misinform production decisions and result in inefficient resources allocation along the value chain, especially investment (World Bank, 2011). Price discovery is deregulated in South Africa, so prices are determined by supply and demand (Government of South Africa (2019).

Figure 10 shows that prices of beef in South Africa increased significantly from 2008/09 to 2017/18. This is largely a result of population increase, increased consumption due to rising standards of living for a large number of South African consumers and consumers who are changing their diets from field crops to meat.



**Figure 10:** South African average beef prices.  
**Source:** Government of South Africa, 2019

Mapiye et al, (2020) advocate the use of ICT based solutions to address the situation of lack of information and information asymmetry. ICT based solutions offer opportunities for both private and public investments and a chance for these sectors to function synergistically in public-private partnerships (ppps) thus increasing the chances of success (Mapiye et al, 2020). Technological innovation and both public and private investments related to ITC solutions are generally inadequate and poorly coordinated in Africa (World Bank, 2011). ICTs can facilitate the efficient, rapid, and widespread generation and transmission of market information that is timely and accurate. One of the recommendations from a study by Wane et al (2018:6) was that, “An inclusive approach should be set out to develop an information system dedicated to livestock allowing knowledge-sharing, and development of sustainable livestock policies”. In a study from Zimbabwe, Bennett et al, (2019:194) recommend, “Deepening the knowledge on the VC by filling in important information gaps, e.g. technological or management diagnosis at a specific stage of the chain”. Thus, improving information flow is one strategy that could be used to upgrade the red meat and live animals value chain in the SADC region. Regarding ICTs Swaans et al (2013:1) points out that, “Innovation platforms are increasingly used as spaces for interaction between actors in value chains to overcome barriers to development.” When planned carefully innovation platforms can be used, albeit in a targeted way, at regional and continental levels in Africa to address issues of information asymmetry.

### 2.3.6. The status of technology adoption

There are readily available technologies that could be used to improve the performance of the red meat and live animals value chain in the SADC. Tables 4 and 5 show estimated potential improvements in red meat production with adoption of simple technologies. For example, vaccination/dipping against East Coast Fever and anthelmintic treatment results in cattle production improvement of more than 200%. Most of these simple technologies result in improvement of more than 20%. For instance, the improvement from strategic supplementation is 33%.

**Table 4:** Potential improvements in cattle production with adoption of simple technology

Production parameter	Current value	Intervention	Future value	Improvement (%)
Calving interval (months)	24	Strategic supplementation	18	33
Cow lifetime calf production	3	Strategic supplementation	4	33
Calf survival (%)	30	Vaccination/dipping against ECF, anthelmintic treatment	70	233
Calf growth to 7 months (g/d)	300	Supplementation	400	33
Long term growth (1-4 years)	200	Mineral/molasses/multinutrient blocks, crop residue treatment	250	25
Older animal survival (% per year)	80	Supplementation/dipping, anthelmintic treatment	90	12
Offtake rate (% per year)	10	Combination of above	12	20

Source: Wilson (2018)

Table 5 shows that for goats and sheep strategic supplementation, anthelmintic treatment results in a huge production improvement of more than 4000!

**Table 5:** Potential improvements in goats and sheep production with adoption of simple technology

Production parameter	Current value	Intervention	Future value	Improvement (%)
Reproductive rate (kids/lambs per year)	1.5/1.2	Strategic supplementation, anthelmintic treatment	1.6/1.3	41/26
Growth to 2 years (g/d)	300	Mineral/molasses/multinutrient blocks, crop residue treatment	350	16
Adult survival (% per year)	80	Mineral/molasses/multinutrient blocks, crop residue treatment	85	6
Kid/Lamb survival (%)	50	Anthelmintic treatment (Including Tapeworm), tender loving care	70	40
Death from Peste des Petits Ruminants/Rift Valley Fever (%)	15	Vaccination	2	750
Offtake rate (% per year)	20	Combinations of above	25	20

Source: Wilson (2018)

This is evidence that small technological investments yield high returns. In fact, World Bank (2011) notes that investments in such technology adoption pay for themselves many times over. Coupled with education, this message needs to be aggressively disseminated to stakeholders along the red meat and live animals value chain in the SADC region, especially smallholders. However, as mentioned earlier, poor information dissemination systems along the red meat and live animals value chain, and lack of management skills for smallholders pose severe constraints to the adoption of many tried, tested and highly profitable technologies (Wilson, 2018). Thus, the lack of technology adoption features as a prominent constraint along the red meat and live animals value chain in the SADC.

### 2.3.7. The status of diseases and disease management

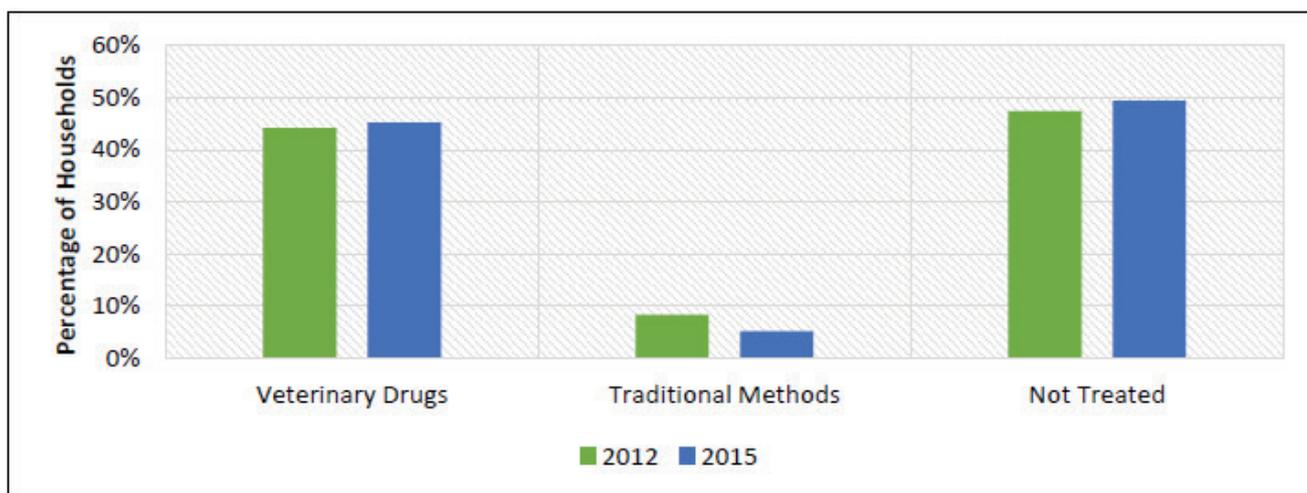
The prevalence of diseases poses a serious threat to the performance of the red meat and live animals value chain. Wilson (2018) points out that in Tanzania most cattle do not receive animal health treatments such as vaccination. Only 29 percent of cattle in Tanzania receive regular vaccination. The control of internal helminth parasites and the protection of animals from ticks and tick-borne diseases is hardly practiced. Partly as a result of poor disease control, animals die, the death rates in calves may be as high as 70% of those infected by East Coast Fever (ECF) a disease that can be reduced to less than 30% with dipping only. The reproductive rates in cattle are 50% or less with heifers only calving first at 4 years of age and then producing a calf only every 2 years. The growth rates are low. This reduces overall output greatly. Offtakes could reach 12% but they are more likely to be around 10%. The meat resulting from this poor health of animals is of very poor quality. This bleak animal health picture painted by Wilson (2018) is not only found in Tanzania. Many SADC countries experience this cycle. Benett et al (2019) point out that lack of resources for basic disease and parasite management is a constraint for the beef value chain in Zimbabwe. Foot and mouth disease (FMD) affects exports from Zimbabwe to FMD free countries. In Zimbabwe, tick borne diseases are attributed to insufficient dipping and Babesiosis, Anaplasmosis, Heartwater and Theileriosis cause 55-65% of cattle mortalities. Lubungu et al (2015) mention that in Zambia, outbreaks of the diseases FMD, Contagious Bovine Pleura Pneumonia (CBPP),

corrido and anthrax negatively affect the inter-provincial trade of live animals, thus limiting market options especially for smallholders who end up selling at low prices in local markets. In a study conducted in the Zambezi region of Namibia, Madzingira and Simasiku (2020) identified that challenges to using veterinary medicines by smallholders included, self-diagnosis, sourcing medicines from unregistered veterinary medicine agents, under dosing of medicines which results in antibiotic-resistant bacteria in animals, and a break in the cold chain due to lack of access to refrigeration. Madzingira and Simasiku (2020:61) recommend, “The training of all stakeholders along the veterinary medicine value chain in the region...” Wilson (2018) points out that disease control is one of those areas where the technologies exist and are accessible. Only knowledge on how to use them is needed. Wilson (2018) also points out that this is an area where small technological investments, yield high returns as shown in Tables 4 and 5. For disease control Figure 11 shows that basic, cheaply constructed infrastructure can deliver the necessary treatments to animals. Disease control and the provision of necessary infrastructure is also an area where public-private partnerships (PPPs) could be formed. Governments could provide infrastructure while the provision of veterinary medicines could be privatized.



**Figure 11:** Cattle crush used for restraining animals for treatment and dipping in Africa  
**Source:** [https://twitter.com/snv\\_uganda/status/1470347878791094277/photo/1](https://twitter.com/snv_uganda/status/1470347878791094277/photo/1)

In terms of the small ruminants, Figure 12 shows that in a study from Zambia, most goats (slightly under 50%) were not treated for diseases in 2012 and 2015. Lysholm et al, (2020) mention that live animals trade in small ruminants is a significant link in the transmission of diseases.



**Figure 12:** Goats disease treatment in Zambia, 2012 and 2015.

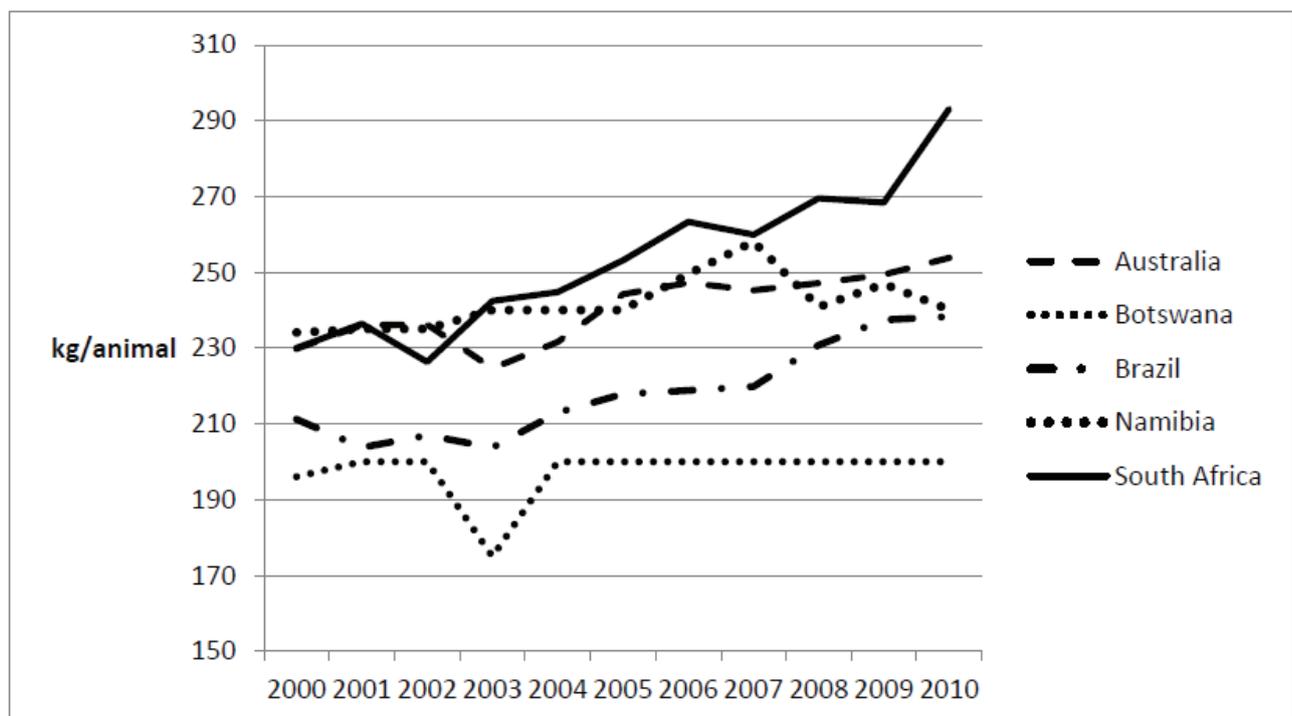
**Source:** Lysholm et al, (2020)

In Zambia, goats are largely produced by smallholders under low input extensive systems (Namonje-Kapembwa, 2019). This might give smallholders a competitive edge for organic markets over their commercial counterparts. Unlike cattle, the main purpose of keeping goats by smallholders is to generate income so offtake is much higher than that of cattle. Besides the disease burden, the constraints to goat production also include inadequate livestock extension services, poorly managed grazing lands, inadequate disease control, poor feeds and feeding, thefts, poor access to water, lack of access to quality breeding stock, long distances to dipping facilities, poor record keeping, and limited access to credit and markets. The performance of local breeds is low, however, there are efforts to improve the performance of the local breeds through the introduction of exotic breeds, although such programs are indiscriminately carried out leading to possible local genetic resources erosion over time. Local breeds are adapted to local conditions, and they are resilient to unfavorable climatic conditions such as drought, they are disease tolerant, they can survive on poor vegetation which is not suitable for other livestock species, and they utilize a broad range of feed resources (Namonje-Kapembwa et al, 2019, Odubote, 2020). In Zimbabwe, Dube, et al (2017) identified constraints for the goat value chain as including high mortality, low feed supplies during the dry season, and lack of supplemental feed due to capital constraints in the smallholder sector where most goats are produced.

### 2.3.8. The status of beef classification

In some SADC countries, one of the contentious aspects for the beef value chain is the carcass classification system. In Zimbabwe (Bennett et al, 2019) and in South Africa (Mapiye, 2017) the government development strategies are leading to the introduction of indigenous breeds that are leaner but smaller than exotic breeds. The carcass grading systems in Zimbabwe and South Africa favour carcasses from exotic, large, breeds which produce meat for high value export markets, and which are slaughtered at a younger age than the off take from smallholders (Strydom et al, 2015, Chingala et al, 2017). The carcass classification systems under-value animals from smallholder farmers who, ironically, are being encouraged by the governments to participate more in the beef value chain. The genetic resources of indigenous animal breeds, especially cattle are important on the red meat and live animals value chain because they provide livelihoods for rural societies (Ramsay et al. 1998) and enable them to meet

socio-cultural, economic and nutritional requirements (Zulu, 2009). Indigenous cattle are genetically adapted to poor-quality forages, have resistance to parasites (Mapholi et al. 2016) and diseases (Marufu et al., 2014) and can withstand harsh climatic conditions (Thornton et al. 2009). The indigenous breeds are therefore suitable for the environmental conditions in which they are kept by smallholders as well as the multiple purposes for which smallholders keep them (Wane et al, 2018). Mamogobo et al (2021:85) note that, “The genetic status of cattle populations existing in communal areas of South Africa is unknown and implementation of appropriate conservation measures must be considered to ensure the effective management of indigenous-animal genetic resources.” Even if the smallholders’ herds comprise poorly performing animals of nondescript genetic material (Chingala, et al, 2017), the facilitation, through government programmes, of smallholder producers’ access to improved animal genetics and nutrition can improve performance (World Bank, 2011). Such programmes would enable the inclusion of smallholders in the mainstream economy through better performance in the red meat and live animals value chain. However, the success of such inclusion, depends, to a large extent, on the revision of the beef carcass classification systems. There are some serious questions that need to be asked about the beef carcass classification system e.g., when meat is deboned, does it matter to the end market which size carcass frame it came from or does quality then depend on other parameters independent of carcass size? On the other hand, Figure 13 shows that carcass weights from some of the SADC countries e.g., South Africa, compare favourably with other beef exporting countries albeit with carcasses from the commercial sector. This shows that the commercial sector from SADC countries can be competitive under the current beef carcass classification system.



**Figure 13:** Carcass weights for selected beef exporting countries, 2000-2010.  
**Source :** van Engelen et al., (2013)

The extant literature points to the fact that the carcass classification system needs to be revisited and reformed to reflect current regional government efforts. Chingala et al (2017:420) observe that, “Certainly, the development of a unified carcass valuation system for the region could be a long and costly process for the beef industry. It could therefore be important to estimate the costs and benefits associated with development and implementation of the new system before a decision is made. That would give the beef industry an opportunity to establish a more flexible and less costly classification system.” Given the current government efforts for the inclusion of smallholders in the red meat and live animals value chain, such a study evaluating the costs and benefits of developing a new and regional carcass classification system is long overdue.

### 2.3.9. *The status of infrastructure*

Infrastructure is a critical component for the performance of the red meat and live animals value chain. In some SADC countries there is poor and inadequate infrastructure, including marketing infrastructure and road networks. In the cases of poor infrastructure, the marketing of live animals could benefit from the construction of physical open-air markets. These could be strategically constructed near dipping tanks so as to use the available infrastructure (World Bank, 2011). This is also an area where public private partnerships (PPPs) could be established with government providing facilities for water supply, fencing and sanitation while the management is left to private companies. An important condition is that such open-air markets should be able to provide adequate information (World Bank, 2011) to circumvent the problems associated with information asymmetry. In Tanzania, traditional primary cattle producers sell animals to primary meat markets established and managed by local government authorities and located close to livestock farms. Secondary markets are administered by the government and located close to consumption points like urban areas. Both primary and secondary markets lack basic infrastructure like weighbridges, loading and off-loading ramps, pens, fences and sanitation facilities (UNIDO, 2012). Poor infrastructure increases transactions costs, especially for smallholders, leading to reduced market participation (Lubungu et al, 2015).

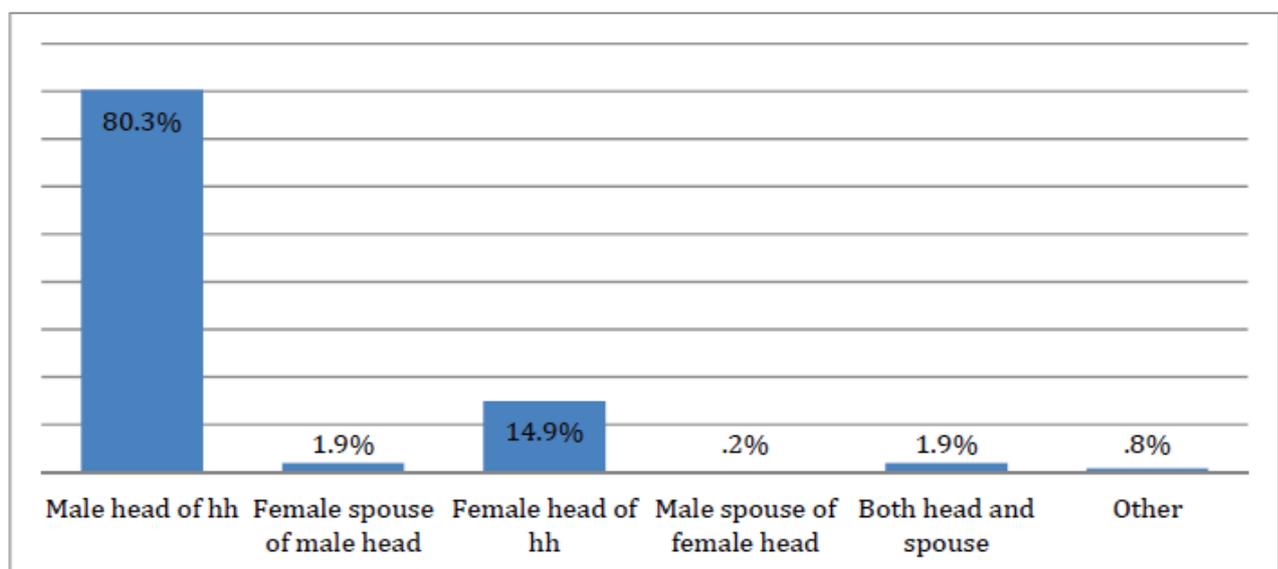
### 2.3.10. *Integration (horizontal and vertical)*

All over the world poor smallholder farmers lack access to finance, extension services, market information and quality control. They also lack organisations that can support them to profitably integrate into their product value chains. The development of farmer organisations and associations can be achieved through horizontal integration. Empirical evidence shows that producer organisations can be used to upgrade value chains. They have been successfully used in Indonesia to upgrade vegetable value chains for smallholder producers resulting in their better linkage with modern vegetable retail markets (Widadiea, Bijmana and Trienekens, 2021). The replicability of such efforts along the red meat and live animals value chain needs to be investigated, at country level, but particularly at SADC regional level. This can lead to better competitiveness in international markets. Examples of successful horizontal integration can be found in Zimbabwe, where the Zimbabwe Farmers Union is a powerful actor in most agri-value chains in Zimbabwe and where the government uses cooperatives to organize smallholder agricultural producers including cattle producers (Bennett et al, 2019). Vertical integration can also occur along the red meat and live animals value chain. Bennett et al (2019) report that in Zimbabwe vertical integration

occurs at trader/middleman to abattoir to meat processor to wholesaler. Zimbabwean abattoirs are reported to be very active in vertical integration. Bennett et al (2019) note that vertical integration usually leads to tight control of products to end markets. This can be a result of the fact that vertical integration can lead to the concentration of the value chain to a few companies/organisations, thus stifling competition.

### 2.3.11. The status of gender parity

Gender is an issue that needs to be addressed in most African countries. More inclusive gender participation could improve the performance of the red meat and live animals value chain. An important dimension of this phenomenon is that in matrilineal societies, such as the Tonga of Southern Province of Zambia, women can own cattle independently of their husbands. However, despite having their own cattle, women are rarely able to sell animals without being granted permission from their husbands or brothers (Lubungu et al, 2015). As shown in Figure 14., about 80% of male household heads are the primary decision makers about whether an animal should be kept or can be sold. This is, in part, because women are believed to be holding the animals for future use by their children.



**Figure 14:** Decision making about whether to sell cattle.  
**Source:** Lubungu et al, 2015.

In Zambia Mafimisebi et al (2015) found that along the beef value chain in the Southern Province, 97.5% of those who practiced cattle rearing were males, all the abattoirs were run by males, 75% of processors and retailers were males and that 55% of beef consumers were male while 45% were female. This demonstrates that only at the consumption stage is gender balance close to being achieved.

The development of the red meat and live animals value chain requires, "... the increased and sustained public sector investment to support smallholder cattle production and marketing, including investments in physical infrastructure, knowledge creation through research and development, and knowledge dissemination through improve extension service delivery." (Lubungu et al, 2015:28). Such investments in the SADC and in Africa, in general, need to pay particular attention to encouraging the financing of programmes that lead to an increase in the participation of women along the red meat and live animals

value chain so as to achieve a better and more inclusive gender balance. Similar but more directed strategies as those used for the inclusion of smallholders in the red meat and live animals value chain could also be used for women inclusion. In their review of inclusive value chains in developing countries, Devaux et al (2018:119) conclude that “More applied research and systematic evaluation is needed to offer donors, researchers, and development professionals with practical and effective methods and tools for designing and implementing intervention strategies that enhance the benefits realized by women who participate in value chains.”

### 2.3.12. *The status of governance*

#### 2.3.12.1. *The cost of compliance with governance requirements*

According to Fabre et al (2021) governance comprises formal and informal rules that are applied at various stages of the value chain. Analysing governance mechanisms along the value chain and their social relations can reveal the major negative and or positive value chain drivers. Generally, governance is associated with the costs of compliance for stakeholders along the value chain. In order to give an idea of the costs of compliance the case of Zimbabwe is used. Chamboko and Erasmus (2014) report that the costs of compliance that are incurred along the beef value chain in Zimbabwe.

In Zimbabwe there are several costs associated with governance compliance along the red meat and live animals value chain. There is a rural district levy which varies between 5 and 40 USD per animal sold, some rural districts councils require the buyers of cattle to purchase a license at \$250 per quarter in order for them to be allowed to buy animals in the district. Cattle buyers are also required to register with the Agricultural Marketing Authority at 150USD per annum. Moving cattle requires a permit which costs 10 USD and a police anti-stock theft clearance which is supposed to be free but for which police charge an unofficial facilitation fee of 5 USD. Producers who want to sell animals have to provide transport to veterinary and police officers to and from the farm. Farmers allocate two days to obtain the necessary permits and police clearance. For farmers these days come at a very high opportunity cost. Abattoirs have to be registered with Veterinary Public Health, Agricultural Marketing Authority and Environmental Management Agency. Some local authorities charge double meat inspection charges, for instance in Masvingo Veterinary Public Health and Masvingo Municipality charges \$2 and \$3 per head slaughtered, respectively. Under the harmonised model By-Law the total cost of regulatory compliance in the beef value chain in Zimbabwe is \$110 and \$112 per animal sold in the small- and large-scale beef value chains, respectively. Under this scenario, producers will incur losses of \$7 per head sold (\$0.04/kg dressed weight) and \$17 (\$0.09/kg dressed weight) in the small- and large-scale sectors, respectively.

The regulatory charges vary by country but in Zimbabwe they are much higher compared with regional countries. They are also not used to benefit the industry. An example of levies that are used to benefit the industry are those in Namibia that are used in development activities jointly identified by producers and government, such as improving market access for producers north of the veterinary cordon fence. Whereas Zimbabwe, with these costs of compliance is not representative of the SADC region, this shows a case where the high costs of compliance can encourage non-compliance.

### 2.3.12.2. Meat inspection and hygiene along the red meat and live animals value chain in the SADC region

Meat inspection is used to ensure that consumers have access to hygienic meat along the red meat and live animals value chain. However, the supply of quality hygienic beef is a challenge in most rural areas in Africa because the maintenance of hygienic conditions poses great challenges under African rural conditions. In some countries, like Tanzania, this is a challenge throughout the whole beef value chain. The livestock resource base in Tanzania is huge as shown in table 1. However, irrespective of its potential to contribute to Tanzania’s economic development the sector is sub-optimally used (Kamugisha, 2019). Like in many sub-Saharan countries, the Tanzanian traditional beef production sector is underdeveloped and faces challenges in observing the hygienic conditions required to supply quality beef. In fact, in Tanzania this is such a constraint that quality beef is supplied to “niche” market where consumers are prepared to pay a premium for the improvement in hygiene and beef quality. This is so because the production of quality beef costs more than that of traditional beef. In a study in Tanzania, Kamugisha (2017) found that the cost along the quality beef value chain were 233Tsh/kg for production, 2,075Tsh/kg for processing and 1,487Tsh/kg for distribution. These costs are higher than those experienced in the traditional beef value chain (Mlote et al 2012, Mwilawa 2012). Some of the increased costs are associated with complying with governance requirements like meat inspection.

Figure 15 depicts poor hygienic conditions in the processing of meat in Zimbabwe. This meat was being prepared for export to Mozambique through the informal channel. The figure also suggests that the slaughter conditions could not have been hygienic. Figure 16 shows the unhygienic conditions in which the beef carcasses are transported by a local butcher in the smallholder sector in Zambia. These conditions are not compliant with the governance requirements for inspection.



**Figure 15:** Meat processing in Zimbabwe for informal export to Mozambique.  
**Source:** Bennett et al, 2019.



**Figure 16:** Transporting cattle carcass by a local butcher.  
**Source:** Lubungu et al, 2015.

In Mozambique, Vernooij et al (2016) report that the Colectânea de Legislação no Âmbito da Higiene Alimentar comprise the main food laws from 1994. Under the law meat must always display a stamp of inspection from a certified inspector. The meat from the abattoir almost always carries this stamp, however, this meat is less than 10% of the meat consumed in Mozambique. Most of the meat is slaughtered and sold informally. In the butcheries the meat from abattoirs is estimated to be around 60% more expensive than that from informal markets, where there is no inspection. Even though the inspection requirement results in more hygienic meat, the cost of compliance seems to cause noncompliance leading to reliance on the meat from the less hygienic and uninspected informal sector. UNIDO (2012) mentions that in Tanzania, it is a requirement that there should be a veterinary inspector posted at every slaughter point, however, this is not always the case and not possible for informal slaughter by smallholders. There is no carcass grading in Tanzania but there are set food hygiene standards which are not always implemented (UNIDO, 2012).

### 3. Synthesis of Country Value Chain Reports

There are several methodologies of performing value chain analyses that have been described in the literature. These include methodologies by the International Development Research Centre (IDRC) (Kaplinsky and Morris, 2001), World Bank (2011), FAO (FAO, 2019), University of Hannover (Anja, Ulrike and Etti, 2009) and the Agrinatura/EU methodology which is used under the Value Chain Analysis for Development (VCA4D) project ( Fabre, Dabat, and Orlandoni, 2021). In South Africa the Department of Agriculture, Forestry and Fisheries (DAFF) uses its own self styled methodology to annually perform value chain analysis for beef, mutton and goats. Because this methodology does not cover other aspects like describing the whole value chain or establishing the value of the chain at different stages of the value chain, it is appropriately titled, “ A profile of the South African Beef Market Value Chain” for the beef value chain. The mutton and goats’ value chains are similarly titled.

Most of the methodologies use systematic methodological frameworks which largely apply data triangulation to establish the length, width and depth of a value chain. They also generally establish the value of the chain at different stages and at the end market/s. The difference in value between subsequent stages in the value chain is attributed to value adding processes. Some of the processes, such as processing, are product transformative whereas some of them, like transportation, simply add value by making the product more accessible to consumers. The end market value of a value chain is referred to as the value of the value chain.

The methodologies have different objectives. However, the general objective of the Agrinatura/EU methodology is to use a holistic value chain analysis which links the economic, social and environmental issues and meets the needs of policymakers. Some of the methodologies described above have been used in the country reports that are reviewed in this section. Table 6 summarises the synthesis of 8 country reports by highlighting some observations and providing recommendations.

**Table 6: Synthesis of country reports**

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
1	Mozambique	Pro-poor Value Chain Development in the Maputo and Limpopo corridors project (PROSUL) Vernooij, A., dos Anjos, M. and van Mierlo, J., 2016: Livestock Development in the Zambezi Valley, Mozambique: Poultry, Dairy and Beef Production.	<p>Completion report of the PROSUL project (2020)</p> <p>Describing the situation in the poultry, dairy and intensive beef value chains in Mozambique and especially in the Zambezi Valley and identifying opportunities for investments in this sector in the Zambezi Valley area.</p>	Wageningen University	<p><b>Observations:</b></p> <ol style="list-style-type: none"> <li>The smallholder sector (in Mozambique called the family sector) owns around 90% of the livestock which are mostly the Landim breed (Nguni ecotype).</li> <li>The distribution of the cattle population is not uniform throughout the country. There are more animals in the central and southern region, where there is a long tradition of livestock keeping because of favourable conditions. In the north the main limiting factor is the presence of Tse-tse flies.</li> <li>Animals usually drink from rivers and streams. The distance travelled to watering points is between 1 and 4 km and animals will drink once a day. With the objective of addressing this constraint, the Pro-poor Value Chain Development in the Maputo and Limpopo corridors project (PROSUL) has opened 52 multifunctional boreholes, resulting in reduction of the distance to 2.5 km. Besides the boreholes, PROSUL established 15 cattle fairs, 8 meat trade organizations and 104 conventional crush pens.</li> <li>The beef sector in Mozambique is characterized as a low input extensive management system with low offtake. Therefore, there is a substantial import of beef into the country. Farmers were trained to produce hay bales, mineral salt blocks and fodder banks. As a result, the average live weight of cattle for sale at fairs increased from 215 to 330 kg.</li> <li>In order to accelerate dissemination of technologies and technical assistance there were hired 1,130 extension officers and equipped with kits and motorbikes. 188 Community based animal agents/paravets were also trained and equipped with basic kits.</li> </ol> <p><b>Recommendations</b></p> <ol style="list-style-type: none"> <li>Need for alternatives for strategic supplementation to compensate the natural rangeland feed deficiencies particularly during dry season.</li> <li>There is a clear need for more slaughterhouses to improve commercial off take and quality of the product. This need will only be realized with investments in intensified beef production.</li> <li>Need to develop and implement a beef grading system as well as price information system.</li> <li>Need to improve the coordination between different stakeholders within the value chain.</li> <li>Need for more enforcement of regulations, especially food safety. There are 13 institutions involved in one or more aspects of food safety regulation in Mozambique but implementation and enforcement is poor due to the lack of a lead agency. There is need for a lead institution in food safety regulation.</li> </ol> <p><b>Comment:</b> <i>Many of the constraints raised are covered under section 2.</i></p>

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
2	Tanzania	Government representatives at Red Value Chain Meeting held in Arusha, July, 2022	To improve the performance of the red meat and live animals value chain in Tanzania	Discussion and Review of Government Publications	<p><b>Observations:</b></p> <ol style="list-style-type: none"> <li><b>Animal breeds with low productivity</b> The main breeds of beef cattle in the country include Tanzania Shorthorn Zebu (TSHZ), Ankole and Boran which attain the slaughter weight of 200 – 350 kg at an average of 4 years,</li> <li><b>Presence of livestock diseases;</b> Livestock diseases continue to impose huge operation costs on farmers and it is estimated that total cost from treating Foot and Mouth Disease (FMD), Peste des Petits Ruminants (PPR) and Newcastle Disease (ND) in the country stands at 101.8 Billion Shillings per year. Meanwhile, the loss estimates from Tick-borne diseases is estimated at 150 billion shillings per annum.</li> <li><b>Shortage of water infrastructure and pasture;</b> During dry seasons due to climate change meat production comes to minimum thus, hampering value chain. Also, search the for water and pasture leads to conflicts between pastoralists and other users of land resources.</li> <li>2021/22 there are <b>1,384</b> charcoal dams comparing to actual demand of <b>1,843</b> charcoal dams, thus creating a gap of <b>456</b> charcoal dams. Likewise, the existing bore holes are 104 while the actual demand stands at <b>225</b></li> <li><b>Inadequate markets and value addition of livestock and livestock products;</b> Livestock auctions are conducted in accordance with the Meat Act No. 10 of 2006 and the Animal Diseases Act No.17 of 2003 and its regulations. In addition, there are three types of livestock markets which are primary (<b>504</b>), secondary (<b>14</b>) and border (<b>12</b>) markets. In order to enable the livestock trade to be successful in livestock market, there is a need to build appropriate infrastructure as well as rehabilitate existing infrastructure to bring it to the required standards by the country's meat processing industry as well as the export markets. Also <b>35</b> abattoirs and processing plant. About 2% of the red meat produce in the country processed. In 2021/22 Meat export is <b>8877</b> tons compared to <b>1774</b> tons in 2020/21</li> <li><b>Inadequate extension services;</b> shortage of extension officers at the village, ward and district council levels as well as inadequate working tools and facilities including transport and extension tool kits remains a matter of concern in the livestock sector. The extension staff also do not undertake regular refresher training courses to acquire updated knowledge according to technological and economical changes. By 2021/22 there are <b>3,642</b> livestock extension officers. Some strategic improvements             <ul style="list-style-type: none"> <li>Improve livestock breeds in order to increase livestock productivity.</li> <li>Improve access to pasture and water for livestock.</li> <li>Strengthen animal health systems, veterinary public health, quality control of livestock inputs and facilitate achievement of safety standards for livestock products for domestic and foreign trade.</li> <li>Enhance provision of extension services for commercialization of livestock farming.</li> <li>Strengthen provision of research and training services.</li> <li>Promote value addition of livestock products; and</li> <li>Create enabling environment for business and investment in the livestock sector.</li> </ul> </li> </ol>

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
3	Lesotho	<p>AgriMentor (2019) Red Meat Production Feasibility Study in Lesotho</p> <p>Global Engineering Consultants (2019/2020) Feasibility Study on Red Meat production Enquiry NO 5 of 2019/2020</p>	To determine whether it would be both financially and economically viable for the Government of Lesotho to invest public funding into the development of a red meat value chain	Government of Lesotho	<p><b>Findings:</b></p> <ol style="list-style-type: none"> <li>The study found out that it will be both financially and economically viable for the Government of Lesotho to invest public funding into the proposed development of a red meat value chain.</li> </ol> <p><b>Challenges:</b></p> <p><b>Primary production level</b> (Low red meat production)</p> <ol style="list-style-type: none"> <li>Lack of business orientation by farmers</li> <li>Poor state of natural resources; soil, water and natural grazing (climate change and degradation of rangelands and its caring capacity; over stocking and over grazing are prevalent</li> <li>Poor genetic material (poor breeds)</li> <li>Lack of locally produced animal feed</li> <li>Low levels of productivity, poor animal husbandry practices and poor animal nutrition</li> <li>Lack of farm and on-farm investments</li> </ol> <p><b>Secondary level</b></p> <ol style="list-style-type: none"> <li>Poor processing infrastructure and equipment</li> <li>Absence of meat processing companies</li> <li>Weak tannery establishments</li> <li>Weak application of SPS Measures, Food Safety and related Standards</li> <li>Weak level of service delivery across the red meat value chain: lack of excellence</li> <li>Limited by-products utilization</li> <li>Limited feed processing and manufacturing enterprises</li> </ol> <p><b>Government institutions:</b></p> <ol style="list-style-type: none"> <li>Lack of partnership between Government and private sector</li> <li>Limited Government investments (funding)</li> <li>Outdated and fragmented policies and legal frameworks</li> <li>Weak training and research institutions</li> <li>Lack of technical quality infrastructure</li> <li>Weak regional collaboration</li> <li>No breeding policy and strategy for livestock genetic improvement</li> </ol> <p><b>Access to finance:</b></p> <ol style="list-style-type: none"> <li>Limited access to finance</li> <li>High cost of inputs</li> <li>Lack of uniform of payment system</li> </ol> <p><b>Market access:</b></p> <ol style="list-style-type: none"> <li>Limited market access and information</li> <li>Weak differentiated product pricing system</li> <li>Absence of well-developed supply chain (fragmented and poorly developed)</li> <li>Poor quality livestock supply to markets</li> <li>Limited access to inputs markets</li> <li>Poor quality products that do not meet the international standards</li> </ol> <p><b>Human Resource requirements:</b></p> <ol style="list-style-type: none"> <li>Poor socio-economic conditions of the rural population</li> <li>Lack of management and financial literacy</li> <li>Poor governance in terms of stock theft and smuggling</li> <li>Brain-drain of skilled and trained workers</li> <li>Limited specialized expertise (Animal breeders, Veterinarians, Animal production specialists, Laboratory Technologists, Animal Health specialists)</li> </ol>

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
					<p><b>Recommendations:</b></p> <p><b>Under Primary production level</b></p> <ol style="list-style-type: none"> <li>1. Farmers should be capacitated through various approaches such as training, awareness using different mediums</li> <li>2. Reevaluate the carrying capacity of the rangelands in Lesotho with satellite technology and expert advisory services off grazing specialists and regenerate the rangelands</li> <li>3. Develop a sound breeding policy, strategy, and programs</li> <li>4. Promote grazing and fodder production (develop irrigation infrastructure)</li> <li>5. Building capacity of farmers and extension agents in good animal health husbandry practices.</li> </ol> <p><b>Under Secondary level:</b></p> <ol style="list-style-type: none"> <li>1. Upgrading of existing infrastructure and construction of new slaughter facilities</li> <li>2. Promote value addition activities</li> <li>3. Support the creation of central tannery to Government incentives</li> <li>4. Capacity building on meat handling along the value chain (human and infrastructure)</li> <li>5. Encourage and support the development of private sector to invest in processing plant for meat by-products</li> </ol> <p><b>Government institutions:</b></p> <ol style="list-style-type: none"> <li>1. Government to mobilize funding and work closely with the private sector (create smart partnership)</li> <li>2. Government to enact legislation that addresses red meat value chain and strengthening law enforcement</li> <li>3. Develop responsive academic programs and strengthen research institutions</li> <li>4. Strengthen quality assurance and standard along red meat value chain</li> </ol> <p><b>Access to finance</b></p> <ol style="list-style-type: none"> <li>1. Provide and facilitate access to finance</li> </ol> <p><b>Market access:</b></p> <ol style="list-style-type: none"> <li>1. Develop market access facilitation</li> </ol> <p><b>Human resource requirements”</b></p> <ol style="list-style-type: none"> <li>1. Create enabling environment for retention of skilled personnel including the rural poor .</li> </ol>
4	Mauritius	<p>Livestock contribute about 0.61% in the national economy and represent around 21 % of the share of agriculture in the GDP</p> <p>According to official statistics, the value added of the livestock sector stood at some Rs 2.9 billion in 2020</p>	.A sustainable and productive livestock sector that enhances food security and promotes resilience of farmers and supports economic growth		<ul style="list-style-type: none"> <li>• The self-sufficiency rates for milk and dairy products is 1.4% (52% for fresh milk only), beef 1% (2.6 % fresh/chilled beef only), goat meat 32% (46% fresh goat meat), mutton 0.15% (4.6% fresh/chill) and pork and pork products 27% (68% for fresh/ chilled only). Deer (venison is 100 % self-sufficient)</li> <li>• Need to establish a value chain forum to overcome lack of trust within the value chain</li> <li>• Develop appropriate infrastructure</li> <li>• Improve access to feed/fodder</li> <li>• Develop/promote alternative feeding systems with cheaper and locally available resources to make fattening accessible for small farmers.</li> <li>• Optimise genetic resources and breed utilization</li> <li>• Improve animal health and welfare</li> <li>• Promote Entrepreneurship and Agro-processing Partnerships and institutional change</li> <li>• Training/professionalization of farmers</li> <li>• Review of existing Legislations</li> <li>• An inclusive approach to building information production, knowledge sharing and investment through innovation platforms.</li> </ul>

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
					<ul style="list-style-type: none"> <li>Develop carcass grading system</li> <li>Value addition of meat products</li> <li>Set up food safety monitoring system</li> <li>Develop market structure: Combat Illegal slaughter (small ruminants) , meat inspection</li> <li>Governance/Institutional arrangements: policy reforms</li> <li>Weak vertical and horizontal linkages</li> <li>Poor Veterinary service/ lack of veterinarian</li> <li>Investment in agro-processing /valorisation of local products “Made in Maurice” concept</li> <li>Facilitation of access to finance and credit including links to capital and short-term markets and introducing insurance</li> <li>Mitigation and adaption to climate change effects (research programmes to improve existing and develop new technologies)</li> <li>Implement a Livestock Master Plan: to characterize the current demand and supply situation for livestock products</li> <li>Livestock waste management (small island country)</li> <li>Low adoption rate of GAHP/ new technologies</li> <li>Cheap import meat and meat products:WTO</li> <li>Lack of breeding policy (cattle)</li> <li>Social/cultural: consumption of meat ( beef and pork)</li> </ul>
5	Zambia	<p>Dr Muuka Geoffrey, Director Veterinary Services geoffreymuuka@yahoo.co.uk</p> <p>Dr. Kola Odubote, Consultant Livestock Breeding and Genetics. kola.odubote@gmail.com</p> <p>Mr. Musimuko Ellison- Principal Livestock Production officer emusimuko8@gmail.com</p>	Characterization of production systems of livestock (Beef Value chain) in order improve the value chain for red meat in Zambia	Review of 2017/18 livestock and aquaculture census report ministry of fisheries and livestock central statistical office republic of Zambia summary report	<p><b>Observations</b></p> <ol style="list-style-type: none"> <li>The production systems mainly extensive about 90% and livestock distribution is unevenly</li> <li>The main purpose of raising Cattle is draught power (75.4 %) followed by 27% for income and only 1.5 % for consumption.</li> <li>Gender: 74% of cattle is owned by Men while 26 % is owned by women.This may have been achieved by restocking and stocking program being implemented by the Ministry.</li> <li>Feeds and feeding: the majority of red meat value chain is affected with inadequate feeds supply.The majority (95%) of the herd are on natural pastures.</li> <li>The major constraints include animal health diseases (50.1%) that cause high mortality (ECF), and other restricting cattle movement (CBPP and FMD).</li> <li>The marketing of RED MEAT VC is characterized by on farm sales where the farmer does not determine price, the middle men who buy and sale to neighboring countries and established commercial buyers who run multi-national abattoirs located in different locations.</li> <li>Security is also a key problem as most small ruminants and large cattle are stolen.</li> </ol> <p><b>Strategic actions</b></p> <ol style="list-style-type: none"> <li>The government is implementing restocking and stocking program to ensure that Livestock is evenly distribution and gender parity</li> <li>The government is facilitating the implementation of Livestock weather index and animal health insurances to cushion the effects of weather and disease</li> <li>Development and implementation of traceability mechanizes from farm level to folk level to enhance trade and security.</li> <li>The implementation of rangeland and fodder production to improve feed supply</li> </ol>

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
					<p><b>Recommendations</b></p> <ol style="list-style-type: none"> <li>1. Quickly characterize all the nodes of the REDMEAT VC</li> <li>2. Develop mechanism for Price discovery system</li> <li>3. Conduct capacity building along the Value chain Promote PPP that include animal health.</li> </ol> <p><b>Comment:</b> Addressing the same or similar constraints would increase the beef value chain participation of smallholder farmers in many SADC countries. The aspect of breeding is particularly ignored under smallholder production in most SADC countries, yet it is a source of affordable and profitable production gains.</p>
6	eSwatini	Wane et al (2018)	<p>To provide answers to the questions:</p> <p>(a).What is the contribution of the beef value chain to economic growth?</p> <p>(b) Is this economic growth inclusive? (c) Is the value chain socially sustainable? (d) Is the value chain environmentally sustainable?</p> <p>The goal is to provide decision-makers with a range of information that relates to sustainable development strategies arrived at using a holistic value chain analysis linking the economic, social and environmental issues and meeting the needs of policymakers</p>	Agriatura/EU VCA4D	<p><b>Observations:</b></p> <ol style="list-style-type: none"> <li>1. 80% of rural households in eSwatini own livestock</li> <li>2. The Swazi National Land (SNL) (communal land) occupies 60% of the country</li> <li>3. eSwatini's red meat sector is dominated by cattle.</li> <li>4. The amount of beef produced from commercial cattle was about 33% in 2017, from home slaughtered at 57% and 10% from the only export abattoir ( Eswatini Meat Industry).</li> </ol> <p><b>Conclusions</b></p> <ol style="list-style-type: none"> <li>1. The total annual value of the beef value chain is E' 1.204 billion. It contributes 32% to the overall agricultural GDP.</li> <li>2. The beef chain contributes negatively to the balance of trade with a deficit of E' 329.8 million.</li> <li>3. The value chain is not globally viable.</li> <li>4. The Domestic Resource Cost (DRC) of 1.660 indicates an inefficient use of local resources.</li> <li>5. The tabulated Gini index (which measures income inequality) for the beef value chain is largely higher than 50%. Income is unequally distributed. This signifies lack of inclusiveness.</li> <li>6. The lack of inclusiveness of the value chain could be explained by the strong dualism in the whole system</li> <li>7. The beef value chain in eSwatini shows great potential in job creation.</li> <li>8. In terms of gender equality, there are significant challenges of continued less number of women interested in the beef value chain.</li> <li>9. For environmental sustainability alternative feeding systems (developed by the University of eSwatini) could help reduce the impacts of the title deed land system on climate, human health and resource depletion by respectively 13%, 19% and 81%.</li> </ol> <p><b>Recommendations</b></p> <ol style="list-style-type: none"> <li>1. Enhanced baseline studies are needed to fill several fundamental knowledge gaps on the economic, social and environmental context of cattle production in the Swazi National Land.</li> <li>2. Need a study on seasonality in cattle marketing.</li> <li>3. Need to establish a value chain forum to overcome lack of trust within the value chain actors</li> <li>4. Need to implement an inclusive approach to building information production, knowledge sharing and investment through innovation platforms.</li> <li>5. Develop and implement a sustainable Livestock Master Plan for eSwatini to characterize the current demand and supply situation for livestock products.</li> <li>6. Need to measure post-production losses in livestock value chains and improving value chain performance.</li> </ol>

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
					<p>7. Need to design adopt improved technologies and best practices, complemented with indigenous knowledge to address technical and institutional constraints that limit productivity and market access</p> <p>8. Need to develop alternative feeding systems with cheaper and locally available resources to make fattening accessible for small holder farmers.</p> <p>9. Need to develop contingent markets that support livestock value chain stakeholders to cover some category of risks related to climate variability that could be direct factor and/or aggravating factor of other risks (conflicts, land competition, economic, social, etc</p> <p><b>Comment:</b>  <i>The University of eSwatini is contributing to the performance of the beef value chain. Regional universities in the SADC could do the same. Universities can research regional issues and not only those directly related to their countries.</i></p>
7	Zimbabwe	Bennett et al (2019)	Addressing the questions: What is the contribution of the value chain to economic growth? Is the economic growth generated by the value chain inclusive? Is the value chain socially sustainable? and, Is the value chain environmentally sustainable? This achieved through a holistic value chain analysis linking the economic, social and environmental issues and meeting the needs of policymakers	Agrinatura/EU VCA4D	<p><b>Observations:</b></p> <ol style="list-style-type: none"> <li>There is a general undervaluation of animal benefits where economic benefits are normally ascribed more than other social, cultural and environmental benefits which potentially distorts contribution of red meat value chain to GDP and national development.</li> <li>Grading practices favour improved animals and commercial farmers. (Government is doing some work to redress the carcass grading system)</li> <li>There is need to improve on drought management while adopting new drought management technologies, particularly water harvesting techniques, adopting appropriate stocking rates, supplementary feeding and grazing management and strengthening and modernising early warning systems (Index based Livestock Insurance)</li> <li>An improvement in the macro-economic conditions in Zimbabwe would significantly improve the performance of the Zimbabwe beef value chain</li> <li>Improvement of animal health management, production, research and extension.</li> <li>There is need to rollout the Animal Identification and Traceability System countrywide piloted 2018</li> <li>There is limited financing mechanism- for the livestock sector. There is limited financing mechanism- for the livestock sector (livestock is a long-term investment and requires innovative financing mechanisms that suits the sector)</li> </ol> <p><b>Conclusions:</b></p> <ol style="list-style-type: none"> <li>The total value added from the beef value chain is US\$427,363,320 which represents about 27 percent of total agricultural GDP in Zimbabwe.</li> <li>Social analysis: the value chain is more inclusive than it was in the past. In the present context (cattle farmers with low bargaining power, lack of stakeholders' consultation, current policies and discourses contributing to discredit cattle multi-functionality and farmers' rationalities) and non-intervention could jeopardize the inclusiveness.</li> <li>Environmental sustainability: The impacts of Zimbabwean beef value chain on the environment seem to be low compared to a large part of beef value chain investigated around the world. These low impacts are partly related to extensive and low-input management of communal production systems.</li> <li>The Zimbabwe beef value chain is viable in the global economy.,</li> </ol>

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
					<p><b>Recommendations</b></p> <ol style="list-style-type: none"> <li>1. Systematically adjusting the beef sector policies and its support mechanisms to reflect the majority of beef farmers (e.g., communal farmers) would be the recommended departure point for improving the performance of the beef value chain.</li> <li>2. Policies could be weighted to encourage greater inclusion and the considerations of the indigenous small-scale production norms</li> <li>3. Zimbabwe has comparative advantage in beef production and should take advantage of it. Measures to enhance market access can release significant comparative advantage.</li> <li>4. The low bargaining power of farmers can be addressed by supporting cattle producers' associations, at local and national levels and need to improve on market intelligence.</li> <li>5. There is need to develop innovative financing models for the red meat value chain</li> <li>6. There is a need to support and enhance extension services</li> <li>7. Rural women and youth should be motivated and supported to participate in the beef value chain.</li> <li>8. The impact of water deprivation in cattle producing areas of Zimbabwe is not documented and therefore it is recommended that this knowledge gap be filled, particularly in the light of the drive for increased cattle ownership and the expected impacts of climate change.</li> </ol>
8	Botswana	van Engelen, A., Malope, P., Keyser, J. and Neven, D. (2013). Botswana Agrifood Value Chain Project Beef Value Chain Study. The Food and Agriculture Organization of the United Nations and the Ministry of Agriculture, Botswana.	To provide practical and actionable recommendations for a sustainable and inclusive competitiveness strategy that will lead to development and growth in the beef subsector. To create a template for the analyses of additional chains in Botswana.	FAO	<p><b>Observations:</b></p> <ol style="list-style-type: none"> <li>1. Four main market channels can be identified in the Botswana beef sector; namely; the export channel (50 percent of 2010 offtake), the modern domestic channel (10 percent of 2010 offtake), the domestic butchery channel (30 percent of 2010 offtake), direct consumption by producers (10 percent of 2010 offtake).</li> <li>2. The two key drivers in the Botswana beef value chain dynamics are demographic changes (growth, urbanization, income and preferences) and the procurement and marketing strategies of the more modern processors.</li> </ol> <p><b>Recommendations</b></p> <p>Three pillars should be used to support the support the core strategy for improving the beef value chain performance in Botswana.</p> <ol style="list-style-type: none"> <li>1. <b>Pillar 1: Partnerships and institutional change;</b> The high degree of direct government involvement in Botswana's beef value chain has proven to be both ineffective and costly. Greater involvement of the private sector, largely through public-private partnerships, and new, performance-driven institutions can bring about a potent collaboration that can provide the foundation for a stronger and more profitable beef value chain.</li> <li>2. <b>Pillar 2: Trade and market liberalization;</b> Where there is insufficient competitive pressure, the beef value chain will not operate efficiently, will not upgrade and will not innovate to the degree that is necessary to achieve competitiveness in the market place. There has to be a competitive structure in place that can generate benefits before efforts are made to assure that the distribution of benefits is in line with social objectives. In Botswana, the thinking needs to be reversed, from trying to make a socio-political objective economically efficient to making an economic objective socio-politically effective.</li> </ol>

SN	Country	Citation and title	Objectives	Methodology	Observations, conclusions and insights
					<p><b>3. Pillar 3: Knowledge-driven development;</b> A competitive value chain is a knowledge-driven value chain, i.e. quality data are present, and stakeholders are able to use them effectively. One important current weakness in the Botswana beef value chain is the dearth of quality data throughout the value chain. Unless stakeholders know the quantitative economic, social and environmental impacts of their actions, and or a change in policy, business practice or technology, they are operating in the dark.</p> <p><b>Comment:</b> <i>Since one of the objectives of the value chain analysis study in Botswana was to, “... create a template for the analyses of additional chains in Botswana” it is important to follow up and find out if this template was developed and how Botswana is using it. This template is likely to have many characteristics that could be adapted in the development of the red meat and live animals value chain analysis and mapping tool.</i></p>

## 4. Compendium of Import and Export Regulations of SADC Markets

There is no (existing) compendium of import and export regulations of SADC markets. Trade, in general, within the SADC is guided by the Protocol on Trade in the Southern African Development Community (SADC) Region of 1996 (Annex 1) together with the two amendments Technical Barriers to Trade (TBT) Annex to the SADC Protocol on Trade (Annex 2) and the Agreement Amending Article 3 of the Southern African Development Community Protocol on Trade (Annex 3). The SADC Protocol on Trade works in combination with the Sanitary and Phytosanitary (SPS) Annex VIII to the SADC Protocol on Trade (Annex 4) and the Regional Guidelines for the Regulation of Veterinary Drugs in SADC Member States (Annex 5) which directly impacts trade in red meat.

In terms of trade in red meat, each member state uses regulations which are enshrined in different official documents. Some countries use Meat Acts. However, it is not every country which has a Meat Act in the SADC and where they exist, they are titled and worded slightly differently as guided by the respective member state constitutions. Examples of complete sets of combinations of regulatory mechanisms used to regulate the import and export of red met are provided for Zimbabwe, Tanzania and Malawi below:

- I. Zimbabwe:
  - i. Control of Goods Act (Chapter 14.05)
  - ii. Agricultural Marketing Authority Act (Chapter 18.24)
  - iii. Animal Health Act (Chapter 19.01)
  - iv. Public Health Act (SI 50 of 1995)
  - v. Farm Feeds and Remedies Act (1961/1996)

- vi. Food and Food Standards Act (Chapter 15.04)
- vii. Environmental Management Act (Chapter 20.27)
- viii. Stock Theft Prevention Act (Chapter 19.18)

Noticeably in this suite of regulatory instruments, there is no Meat Act.

## 2. Tanzania

- i. The Meat Industry Act, 2006- Import and Export of Livestock, Meat and Meat Products Regulations, 2014 (Annex 6)
- ii. Animal Diseases Act, 2003- Animal and Animal Products Movement Control regulations, 2007
- iii. The Livestock Identification, Registration and Traceability Act, 2010- Livestock Identification, Registration and Traceability Regulations, 2011

## 3. Malawi

- i. Meat and Meat products Act, (Annex 7)
- ii. Animal Health Act final (Annex 8)
- iii. Slaughter of Cattle Act,
- iv. Protection of Animals Act,
- v. Fertilizer, Farm Feeds and Remedies Act,
- vi. Control and Diseases of Animals Act,
- vii. Veterinary Practitioners Act
- viii. Hides and Skins Act.

A sample of documents that impact the import and export of and used by SADC member states are provided for Eswatini, Malawi, Namibia and South Africa as follows:

### 1. Eswatini:

- i. Eswatini: The Animal Diseases Act 1965 (Annex 9)
- ii. Eswatini- The Livestock Identification Act (3) (Annex 10)
- iii. Eswatini- The Veterinary Public Health Act, 2013 (3) (Annex 11)

### 2. Namibia

- i. Meat Industry Act 1981 (Annex 12)
- ii. Meat Industry Amendment Act, 1992 No.466 (Annex 13)

### 3. South Africa

- i. Meat safety Act (Annex 14)

Given this situation, the following observations can be made about this status of import and export regulations of SADC markets:

- 1. The fact that each country has a different document for the regulation of imports and exports

(usually a Meat Act), implies that it is possible that each country might emphasize different areas of the regulations of imports and exports in the same SADC market thus creating potential sources of contradiction.

2. The fact that the Meat Acts are tied to unique constitutions potentially makes each Meat Act unique too suggesting there may be significant differences in the import and export regulations by country.
3. The fact that the Meat Act in each country can be associated with or makes reference to different in-country documents, e.g., Veterinary Public Health Act in combination with Animal Diseases Act in Eswatini, implies that its interpretation might require perspectives from different disciplines. In the case of Eswatini, this could be lawyers, veterinarians and animal scientists. Therefore, it is possible that a member country might misinterpret the regulations from another member country.
4. All these imply a lack of harmonization the import and export regulations in the SADC which also implies that there can be conflicting guidelines from different member states participating in the same SADC market.

Given the opportunities presented by AfCFTA, the largest free trade area in the world in terms of number of participating countries, the need to increase inter- and intra-regional trade in meat and meat products and the thriving cross-border trade in live animals in the SADC region, it is therefore imperative that import and export regulations in the SADC be harmonized so that the regulations are relevant to and serve the whole SADC market. An interdisciplinary team, comprising animal scientists, veterinarians, economists and legal experts needs to be urgently constituted to study, interpret and harmonise import and export regulations in the SADC so that they can serve a shared vision of the development of the red meat and live animals in the SADC region so as to take full advantage of opportunities presented by AfCFTA.

## 5. Summary of National Consultative Workshops

National consultative workshops were held in Eswatini, Namibia, Tanzania and Malawi. Following are the findings regarding the red meat and live animals value chain in the SADC.

### *5.1. Identification and characterization of beef farming sectors/systems to be included in VC analysis*

A dual farming system comprising a commercial sector and a communal sector (also referred to as smallholder sector) was identified as present in all the SADC countries. The communal sector is known by different names, for instance, in Eswatini it is called Swazi Nation land (SNL) and in Tanzania it is called the traditional sector. The communal sector has a usufruct land tenure system whereas the commercial sector has title deeds which means that the commercial sector can use land as collateral against which money can be borrowed from commercial lending institutions like banks, but the communal sector cannot. Smallholder farmers are predominantly household based operating on small land sizes. In many countries these are less than 5 ha but in some (e.g., Eswatini) they can be as large as 300 ha. Smallholders produce under low input subsistence systems where there is no feed supplementation. Farmers usually sell surplus and have challenges accessing markets. Animals in communal areas are usually raised on free

range systems that emulate organic production and where there is low investment. They do not have planned breeding and vaccination programmes and management skills are usually poor resulting in low productivity. Medium scale farmers can range from greater than 5 ha to as large as 600ha in countries like Eswatini. Medium scale farmers produce for subsistence or for profit depending on size. They service both formal markets and informal markets (e.g., supplying local communities).

The large-scale commercial farmers produce for profit. They usually have good infrastructure; well-structured breeding programmes and disease control systems, have established markets (e.g., major abattoirs) and sometimes produce on contract. Sometimes animals are grown or finished in feedlots. The management skills are high, so this sector is usually characterized by consistently high productivity. Most commercial systems have well developed and reliable animal traceability systems. Some countries like Eswatini have developed traceability systems for their smallholder sectors and can access high value markets in Europe. However, this is not common practice in the SADC, although it is a distinct and strongly advantageous possibility. In most countries most of the animals are owned by the smallholder sector but, largely because of multiple ownership objectives of animals, offtake is lower in the smallholder sector than the commercial sector. Some countries do not have medium scale farmers, having only communal and commercial farming sectors. Some countries like Namibia are making efforts to commercialise smallholder communal farmers and these are referred to as emerging farmers. The description of farming systems applies to cattle, goats and sheep although in all these systems it is possible that goats and sheep might be more confined than cattle, and that most countries export beef and mutton but hardly goat meat yet markets that could be developed are available. Goats are also browsers, and they tend to survive better than both cattle and sheep under drought conditions that frequently ravage SADC countries

## 5.2. Red meat and live animals Value chain stakeholders

Participants brainstormed, identified and listed the red meat and live animals value chain actors and categorized them by “Core actors” and “Service providers”. Table 7 summarises the identified SADC red meat and live animals value chain stakeholders. This list is by no means exhaustive; however, it is comprehensive enough to guide the analysis and mapping of the value chain.

**Table 7:** Beef stakeholders by farming system

Core VC actors	Service providers
<ul style="list-style-type: none"> <li>i. Farmers and unions</li> <li>ii. Butchery owners and abattoirs</li> <li>iii. Individual buyers (from communities)</li> <li>iv. Agents and traders</li> <li>v. Restaurants</li> <li>vi. Feedlots</li> <li>vii. Auctioneers</li> <li>viii. Exporters (meat and live animals)</li> <li>ix. Importers (meat and live animals)</li> <li>x. Retailers and wholesalers</li> <li>xi. Skin and hide processors</li> <li>xii. Consumers</li> </ul>	<ul style="list-style-type: none"> <li>i. Medical suppliers</li> <li>ii. Extension services</li> <li>Transportation services</li> <li>i. Input suppliers (e.g., feed, veterinary)</li> <li>ii. Meat inspectors and graders</li> <li>iii. Financial services</li> <li>iv. Research</li> <li>v. Training and education institutions</li> <li>vi. Animal handlers</li> <li>vii. Police</li> <li>viii. Farmer associations</li> <li>ix. Animal welfare organisations.</li> </ul>

In practice, this exercise needs to go further than simply identifying stakeholders. For instance, in most SADC countries the total number of stakeholders is not known. However, it is important to know the total number of stakeholders in the value chain as well as the populations and characteristics of stakeholders within the important nodes of the value chain. This is important for targeting value chain performance improvement programmes, for determining the distribution of income along the value chain and for evaluating the inclusiveness of the value chain. Although it may be neither practical nor desirable to determine the exact stakeholder numbers, especially in an active and inclusive value chain with many stakeholders, informed stakeholder populations and characteristics estimates are essential for directing some policy decisions regarding value chain performance improvements.

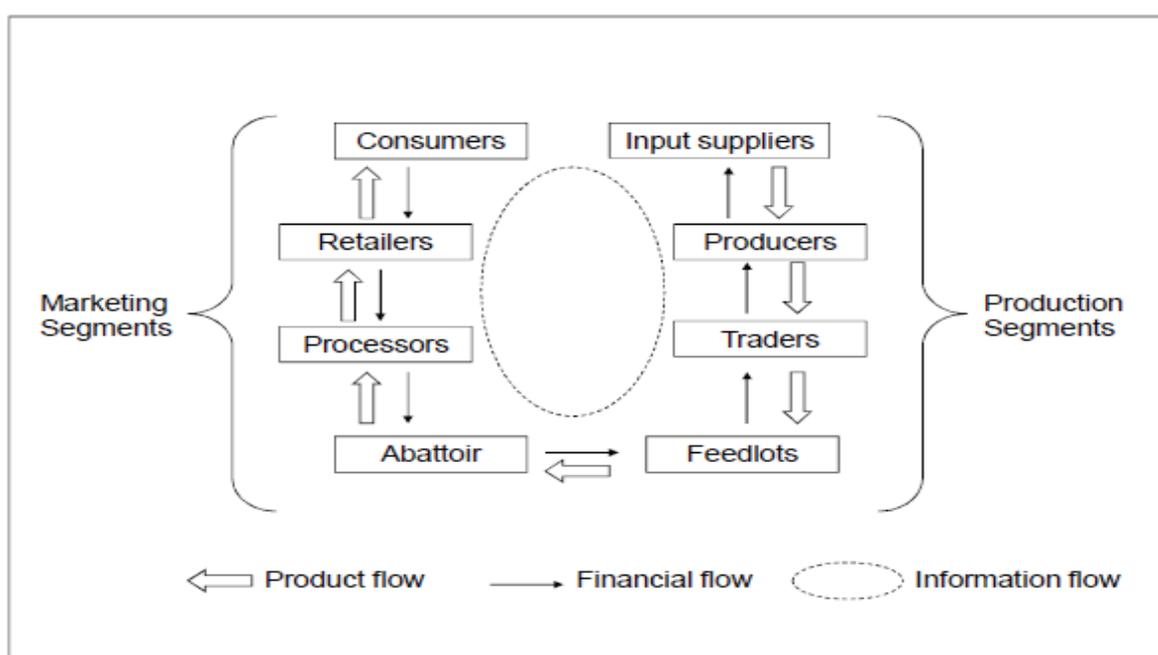
### 5.3. Meat pathways

Participants identified meat pathways in the SADC. Table 8 shows examples of meat pathways in Eswatini for the three meat production systems. The identification of the meat pathways is essential for value chain analysis. Meat pathways differ by country and product. However, one characteristic in the SADC is that, although beef and mutton are processed, goat meat usually does not have processing in the product flow.

**Table 8:** Meat pathways in Eswatini

Scale	Input suppliers	Import	Producer	Agents	Local market	Butcher	Feedlot	Abattoir	Processor	Export	Supermarket	Retailers	Consumers
Smallholder			<input type="checkbox"/>										
Feedlots						<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Medium scale			<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>						
Large scale		<input type="checkbox"/>											

A critical component of the performance of any value chain is the efficiency of information flow through the product pathways. Figure 17 shows a hypothetical example of perfect information flow.



**Figure 17:** Flow diagram based on beef value chain in South Africa

If there is imperfect information flow, then it is represented by a break in the centre oval. For instance, if there is imperfect information flow between producers and traders in figure 17 then the oval is broken between the producers and traders. In many SADC countries the flow of information through the meat pathways is less than perfect. In fact, most SADC meat pathways are characterised by information asymmetry which affects value chain performance. For example, in Tanzania there exists information asymmetry between producers and traders (especially smallholder producers), and in Namibia there exists information asymmetry between abattoirs and supermarkets. When there is information asymmetry, the party with more information (usually higher in the product flow) uses that information to gain higher profits by being in an informed price negotiating position. Information asymmetry leads to poor performance of the value chain although certain nodes can reap high profits. Addressing information asymmetry in the SADC meat pathways offers great opportunities for developing PPPs.

#### 5.4. End markets

An end market is defined as any point where the product exists the value chain in whatever form. Value chain end markets are studied from the perspective of improving their performance. In Eswatini the following end markets are prominent:

- i. Consumers (including own/home consumption)
- ii. Farmers sell their live animals to individuals (butcheries, feedlots and abattoirs) at
  - a. Rural sale yards
  - b. Auctions
  - c. Dip tanks
- iii. Commercial farmers sell to individuals, feedlots, abattoirs,
- iv. Feedlots sell to individuals, butcheries, abattoirs,
- v. Abattoirs sell carcasses to retail, restaurants, exports (regional, global).
- vi. Restaurants
- vii. Animals are also imported.
- viii. Processors sell to consumers, restaurants and supermarkets and export.
- ix. Socio-cultural values (e.g., dowry, weddings and cultural rituals)
- x. In terms of niche markets participants indicated that:
  - a. Selling to government officials on credit (small to medium scale farmers) is an important niche market.
  - b. Processed meat products (especially for abattoirs) – burger, wors, biltong, cold meat enjoy niche markets
  - c. Specialized meat cuts as required by designated customers such as hotels, restaurants, etc. (fillet steak.) constitute a niche market.

These, with slight variations and different levels of contribution in different countries, are the typical end markets in the SADC. SADC countries can greatly benefit by targeting and developing niche markets. For instance, there are markets in Europe that will pay a premium for free range and or organically raised beef. Although the organic production is a high bar to achieve, most smallholders already produce cattle, goats and sheep under low input free range systems. However, the smallholder production systems

usually lack animal traceability systems so developing reliable traceability system in smallholder systems should be a SADC priority in the effort to make the red meat and live animals value chain more inclusive.

## 5.5. Red meat and live animals value chain Swot Analysis

The participant performed SWOT analysis for the red meat and live animals value chain and following were mentioned as being representative of the SADC region:

### 5.5.1. Strengths

- a. A highly diverse animal resource base
- b. A large number of farmers (smallholders) who own most of the livestock and who have great potential to commercialise
- c. Rapid growth in demand as a result of both urbanization and emergence of an African middle class
- d. High-return, easy-to-use and simple technologies that can improve the performance of the red meat and live animals value chain are readily available
- e. Most SADC countries produce good quality, hormone free beef. Some SADC countries are preferred for their high-quality beef
- f. The commercial sector has good knowledge and skills
- g. Some markets are well-developed (especially commercial sector markets), and some countries have international market access.
- h. Some SADC countries have animal traceability systems that allow accessing EU market
- i. Although this can still improve, most SADC countries have dipping programs for the control tick-borne disease and there are enforceable penalties for farmers who fail to send their animals for dipping. Some countries have developed holding grounds/quarantine areas
- j. There is high availability of unskilled labour
- k. Some countries e.g., Tanzania have the presence of local and international vaccine industries
- l. There is political will to develop red meat and live animals value chain
- m. Availability of extension services
- n. Availability of livestock development policies
- o. Availability of free-range natural grazing land
- p. Readily available input suppliers
- q. Local breeds which are disease tolerant with high adaptability to tropical climate
- r. High fecundity of small ruminants
- s. Land availability for further livestock developments and for pasture and free-range management

### 5.5.2. Weaknesses

- a. Low offtake due to holding animals for prestige and due to multiple objectives in the smallholder sector.
- b. Poor market access by smallholders who are the holders of most of the livestock in the SADC region. This creates poor income distribution along the value chain with income skewed in favour of commercial sector farmers. The result is non-inclusive value chains.
- c. Capital constraint for smallholders which is exacerbated by the inability to access credit because

smallholders cannot use land as collateral.

- d. No planned disease control and vaccination programmes even though some facilities are available.
- e. No planned breeding programmes. Inbreeding reduces productivity
- f. Low education and low management skills in the smallholder sector.
- g. No animal traceability system in the smallholder sector. This limits market access by smallholders.
- h. Lack of a common vision for the development of the SADC red meat and live animals value chain.
- i. Low processing of red meat products along the red meat value chain.
- j. Very few countries e.g., South Africa carry out periodic value chain analyses. Therefore, policy makers are usually informed by outdated information. South Africa carries out annual value chain analyses for cattle, goats and sheep.
- k. Lack of accurate information about the value chain deters the development of initiatives to improve the performance of the red meat and live animals value chain. For instance, the number of stakeholders in the whole value chain and at different nodes of the value chain is not known, therefore value chain development initiatives cannot be targeted. For targeted development, informed estimates of the numbers of stakeholders are essential.
- l. Difficult access to credit for livestock production
- m. Lack of a SADC common vision for the red meat and live animals value chain.
- n. Lack of legal framework to regulate the utilization of grazing resources and poor rangeland management especially for communal areas.

### 5.5.3. Opportunities

- a. Smallholders produce animals under low input, free range production systems where there is no feed supplementation. This creates an opportunity to market meat as free range and or organic creating potential to access high value niche markets. This also creates an opportunity to brand meat. Branding creates marketing opportunities.
- b. AfCFTA creates huge market opportunity being the largest free trade area in terms of participating countries. AfCFTA creates a lot of scope to develop both inter and intra- regional markets for the SADC region.
- c. Potential for developing agro-processing given the low level of value addition along the red meat value chain.
- d. Existence of deep middle eastern markets for small ruminants.
- e. Interaction between regional policy makers and heads of regional universities to address the constraints of the red meat and live animals value chain through relevant, concerted and targeted research efforts.
- f. Innovation platforms and ICTs can be used to address information asymmetry and to develop PPPs
- g. Development of national breeding systems present opportunities for increasing production and meat quality.
- h. Environmentally sustainable production systems offer opportunity for carbon sequestration. Some farmers in South Africa already take advantage of this opportunity.
- i. Huge biomass for crop production that can be used for feed.

#### 5.5.4. Threats

- a. Disease prevalence resulting from poor diseases diagnosis and management causes low productivity.
- b. Low investment can perpetuate poverty in the smallholder sector.
- c. Absence of harmonised import and export regulations implies that regulations could possibly be conflicting and not serve a common SADC vision.
- d. Climate change
- e. Low market intelligence leading to poor price discovery systems.
- f. Information asymmetry leading to inefficient red meat and live animals value chains with skewed income distributions.
- g. Live animals trade transmits diseases.
- h. A beef classification system that discriminates against indigenous cattle.
- i. Drought
- j. Livestock theft. Besides loss of income, livestock theft can result in destruction of breeding herds.
- k. Livestock predators
- l. Land degradation reducing rangelands for grazing and browsing
- m. Negative impacts of COVID-19 outbreaks

#### 5.6. Governance for red meat and live animals value chain

Tables 9 to 16 summarise the governance issues that were identified in different member states. Because these issues differ by country, they are presented as such. It is important to note that where cost of compliance is not provided or is indicated as unknown, this means it was not known by the participants not that it is not known in the country.

Governance is an area where SADC could develop comparative advantage over other regions. For instance, if an animal traceability system could be developed regionally, then SADC could access high end and niche markets in Europe. If the animal traceability is combined with the ability of all SADC countries to produce meat under low input free range systems (e.g., finishing off grass) this could result in serious comparative and competitive advantages. Furthermore, job creation could be achieved through the local manufacture of the inputs necessary to an animal traceability system, like the manufacture of ear tags. Perhaps SADC should consider discussing the possible implementation of such initiatives at regional level.

**Table 9: Tanzania: Governance of the red meat and live animals value chain**

SN	Governance aspect	Responsible party	Cost of compliance (fee) or non-compliance (penalty)
1	Health certification and movement permit Antermoterm inspection Postmortem inspection	Directorate of Veterinary Services /Local Government Authorities	Cattle (TZS 2,500 /Cattle and 1,500 for Goat and sheep)
2	Environmental Impact Assessment	National Environmental Management Council	USD -15,000\$ For the whole process (from inspection to certification)
3	Inspection of meat vans butcher and shops	Meat Board	For 70,000 Meat van and 95,000 for butcher shops
4	Health examination of meat handlers	Ministry of Health	
5	Product certification	Tanzania Bureau of Standards	600,000 for 5 years
6	Import and export clearance and health certificates	DVS and Meat Board	Import: DVS (TZS 5000/KG), Meat Board (2% of FOB) Export: DVS (TZS 40,000 per consignment), Meat Board TZS 70,000 per consignment)
7	Weight and Measures	Weight and measure agency	WMA (Weigh 0-150kg fees TZS-20,000-40,000 per scale/year
8	Business Licenses, certificate of Origin of the products	LGAs, BRELA, TCCIA	Local government TZS 100,000 BRELA (- TZS 700,000
9	Livestock market fee (Primary/ secondary market)	Local Government Authority, Ministry of livestock and fisheries	LGA (6500 tsh / cattle, 1500 tsh/ shoats), MLF (2500 tsh / cattle, 1,000tshs/goat)
10	Unstable goods	Tanzania Roads Agency (TANROADS)	10 USD per truck
11	Occupation safety and health along the value chains	OSHA	Unknown
12	Fire prevention measures	Ministry of home affairs	Unknown
13	Radiation tests in meat and meat products	Tanzania Atomic Energy commission (TAEC)	0.1% of FOB

**Table 10: Eswatini: Governance of red meat and live animals value chain**

SN	Governance aspect	Responsible party	Cost of compliance (fee) or non-compliance (penalty)
1	Livestock Traceability System (SLITS Branding)	Ministry of Agriculture	E15 / Cow
2	Abattoir registration	Department of Veterinary Services, Ministry of Agriculture	Contravention can be up to E25,000
3	Meat Inspection at slaughter	Ministry of Health	Free
4	Animal registration	Department of Veterinary Services, Ministry of Agriculture	Contravention can be up to E25,000
5	Dipping	Ministry of Agriculture	E60/ Cow (Penalty)
6	Stock movement permit	Ministry of Agriculture	Free
7	Import and export procedures	Ministry of Agriculture	
	Free		
8	Feed regulation	Department of Veterinary Services, Ministry of Agriculture	Contravention can be up to E25,000
9	Abattoir effluent disposal	Eswatini Water and Sewage Cooperation	Subsidized but not 100%

**Table 11:** Namibia: Governance of red meat and live animals value chain

SN	Governance aspect	Responsible party	Cost of compliance (fee) or non-compliance (penalty)
1	Identification and registration of animals	DVS/ Farmer	Compliance Producer to pay a fee: sVCF :NAD25 nVCF (nVCf) (2022) Non-compliance: Unknown (check legislation)
2	Meat inspection at slaughter	DVS (Export Abattoirs) Environmental Health Inspectors (Local Abattoirs)	Compliance: NAD? Non-compliance: unknown
3	Open disposal of untreated waste from skin processing and abattoirs into river	DVS	Compliance: Cost not known Non-compliance: Unknown
4	Abattoir compliance	DVS  Local Authority  Meat Board	USD2.16 per animal (source: MBN levy survey)  Non-compliance: Unknown  0.7% slaughter levy, 0.4% classification levy
5	Veterinary Cordon Fence	DVS	USD187500
6	Export and import permits	Meat Board DVS	Exports: Free, Imports (0.8% of FOB value) USD10
7	Animal health	DVS	Vaccination programmes/animal ID:USD7 087 500
8	Disease surveillance	DVS	Cost on GRN: USD187 500
9	Municipal bylaws of raw meat entry into urban areas	Town municipalities	Compliance: Unknown Non-compliance: Unknown
10	Meat Board levy at auctions	Meat Board of Namibia	0.6% of transaction value

**Table 12:** Mauritius: Governance of red meat and live animals value chain.

SN	Governance aspect	Responsible party	Cost of compliance (fee) or non-compliance (penalty)
1	Abattoir slaughter fee	Meat Authority	0.5 US \$ per kg Lwt
2	Abattoir compliance	Various audits/inspection bodies	Cost not known
3	EIA	Ministry of Environment	Cost not known
4	Meat inspection at abattoir	Livestock and Veterinary Division (IVD)	Free
5	Import/export procedures/permit	LVD	As per law
6	Animal health	LVD	Free
7	Disease surveillance (national level)	LVD	free
8	Meat Inspection (point of sales)	Sanitary Division, Health Department	free

**Table 13:** Zimbabwe: Governance of red meat and live animals value chain.

SN	Governance aspect	Responsible party	Cost of compliance (fee) or non-compliance (penalty)
1	Animal Identification and Traceability System (Branding)	Department of Veterinary Services (DVS) , Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (MLAFWRD)	Free
2	Abattoir registration	DVS, MLAFWRD	US\$200/ Year(Grade C) US\$300/Year (Grade B) US\$400/ Year (Grade A)
3	Meat Inspection at slaughter	DVS, Ministry of Health and Child Care and Local Authority	US\$2/ bovine carcass
4	Animal registration	DVS, MLAFWRD	Free
5	Dipping	DVS, MLAFWRD	US\$2/Animal/ Year
6	Stock movement permit	DVS, MLAFWRD	US\$10/Permit
7	Veterinary Import and export Permit	DVS, MLAFWRD	US\$25/ Permit
8	Feed regulation	Department of Research & Specialist Services (DR&SS), MLAFWRD	
9	Abattoir effluent disposal	DVS, Environmental Management Authority (EMA)	
10	Agriculture Marketing Authority Registration Permit	Agriculture Marketing Authority (AMA)	US\$500/ Year
11	Veterinary Cordon Fence	DVS, MLAFWRD	Maintenance cost borne by Government
12	Disease Surveillance	DVS, MLAFWRD	Cost borne by Government
13	National Vaccination Programmes against specified animal diseases (Anthrax, FMD, Rabies)	DVS, MLAFWRD	
	Cost borne by Government		
14	Diagnostic Laboratory Tests	DVS, MLAFWRD	Cost borne by Government
15	Control of Goods Permit (import and export)	MLAFWRD	US\$50 valid for 6 months
16	Live animal grading	Livestock Production and Development, MLAFWRD	US\$2/ Animal
17	Carcass Grading	Livestock Production and Development, MLAFWRD	US\$2/ Carcass

**Table 14:** Lesotho: Governance of red meat and live animals value chain

SN	Governance aspect	Responsible party	Cost of compliance (fee) or non-compliance (penalty)
1	Livestock Marking and Registration (Tattooing, branding and microchip)	Ministry of Home Affairs	M30.00 / Cow
2	Abattoir registration	Department of Livestock Services, Ministry of Agriculture and Food Security	Free and contravention can be confirmed
3	Meat Inspection at slaughter	Ministry of Agriculture and Food Security- Department of Livestock Services	Free
4	Dipping	Ministry of Agriculture and Food Security- Department of Livestock Services (DLS)	M1.00/kg mohair M0.38/kg wool
5	Stock movement permit	Ministry of Agriculture and Food Security	Free
6	Import permit and export	Ministry of Agriculture and Food Security	Large animals M30.00/animal Small animals: M15.00/animal Products M100.00/permit
7	Abattoir effluent disposal	Municipal Authorities	M500.00
8	Environmental impact assessment	Ministry of Environment- Department of Environment	Free
9	Inspection in meat establishment (meat markets, butcheries...)	Ministry of Health, Agriculture and Municipalities	Free
10	Animal health	Ministry of Agriculture- DLS	Vaccination/ free
11	Disease surveillance	Ministry of Agriculture- DLS	Free
12	Artificial insemination Services	Ministry of Agriculture- DLS	200/cow

**Table 15:** Zambia: Governance of red meat and live animals value chain.

SN	Governance aspect	Responsible party	Cost of compliance (fee) or non-compliance (penalty)
1	Livestock Traceability System (SLITS Branding)	Ministry of Fisheries and Livestock	\$6 / Farm
2	Abattoir registration	Ministry of Fisheries and Livestock	\$15,000
3	Meat Inspection at slaughter	Ministry of local government and rural Development Ministry of Fisheries and Livestock	\$3
4	Municipal bylaws of raw meat entry into urban areas	Municipalities	Stipulated by-laws
5	Statutory Fees	Ministry of Fisheries and Livestock	Si of 2018 of the 2010 Act
6	Stock movement permit	Ministry of Fisheries and Livestock	\$3/50 Cows
7	Import and export permits	Ministry of Fisheries and Livestock	\$15
8	Feed regulation	Ministry of Fisheries and Livestock	N/A
9	Abattoir effluent disposal	Ministry of green economy and Environmental	N/A

**Table 16:** Mozambique: Governance of red meat and live animals value chain.

SN	Governance aspect	Responsible party	Cost of compliance (fee) or non-compliance (penalty)
1	Livestock Identification and branding System	Ministry of Agriculture and Rural Development	MZ 250 / farmer
2	Abattoir registration	Directorate of Livestock Development, Ministry of Agriculture and Rural Development	To provide later
3	Meat Inspection at slaughter	Directorate of Livestock Development, Ministry of Agriculture and Rural Development	To provide later
4	Animal mandatory vaccination	Directorate of Livestock Development, Ministry of Agriculture and Rural Development	Free
5	Dipping	Directorate of Livestock Development, Ministry of Agriculture and Rural Development	MZ 10 / Cow / year
6	Stock movement permit	Directorate of Livestock Development, Ministry of Agriculture and Rural Development	To provide later
7	Import and export procedures	Directorate of Livestock Development, Ministry of Agriculture and Rural Development	To provide later
8	Disease surveillance	Directorate of Livestock Development, Ministry of Agriculture and Rural Development	Cost depends on the type of sample and disease
9	Health examination of meat handlers	Ministry of Health	Cost not known

### 5.7. Value chain upgrading strategy for red meat and live animals in the SADC region

The vision guiding this strategy is: A competitive, sustainable and inclusive red meat and live animal value chain that promotes regional integration for socio-economic development of SADC

The mission is: To transform the red meat and live animal value chain through sustainable innovative climate smart technologies and harmonized regulatory frameworks for improved livelihoods and trade within SADC and beyond.

Table 17 summarises the SADC red meat and live animals value chain upgrading strategy, including the necessary actions. Table 18 presents the proposed timeframes for the development of the SADC red meat and live animals value chain upgrading strategy.

**Table 17:** Red meat and live animals value chain upgrading strategy.

Strategic Pillars	Strategic Objectives	Strategic Actions
<b>1. Regional regulatory frameworks</b>	<b>Objective 1:</b> Harmonization of non-tariff barriers	<ul style="list-style-type: none"> <li>Review of NTBs</li> </ul>
	<b>Objective 2:</b> Harmonization of tariff barriers	<ul style="list-style-type: none"> <li>Review of TBTs</li> </ul>
	<b>Objective 3:</b> Develop and update the regulation.	<ul style="list-style-type: none"> <li>Review current regulations</li> </ul>
	<b>Objective 4.:</b> Develop and harmonize a traceability system in the	<ul style="list-style-type: none"> <li>Develop and harmonize an identification regulation</li> </ul>
<b>2. Innovative climate-smart technologies</b>	<b>Objective 1:</b> Reduce carbon footprint by 20% in five years (greenhouse emissions)	<ul style="list-style-type: none"> <li>Reduce enteric methane emissions through improved feed digestibility</li> <li>Use manure to produce biogas through bio-digesters</li> <li>Use of bio-degradable material</li> <li>Inventories/List GHG, sequestration of carbon footprint</li> </ul>
	<b>Objective 2:</b> Promote sustainable land use management	<ul style="list-style-type: none"> <li>Establish improved pastures, fodder, cereal and oil seeds</li> <li>Range management (fire breaks, rotational grazing, control of bush encroachment, invader bush)</li> <li>Capacity building of farmers on effective land use management techniques</li> <li>Develop technologies to control invasive species</li> </ul>
	<b>Objective 3:</b> Conduct adaptive research to develop climate smart technology	<ul style="list-style-type: none"> <li>Build capacity on assisted reproductive technology</li> <li>Breeding selection</li> <li>Promote indigenous breeds</li> <li>Capacitate research institutions</li> </ul>
	<b>Objective 4:</b> Improve waste management and their disposables	<ul style="list-style-type: none"> <li>Develop prototypes of bio-gas digesters</li> <li>Develop technologies for waste management</li> <li>Use of renewable energy</li> </ul>
	<b>Objective 5:</b> To promote adoption and use of climate-smart technologies	<ul style="list-style-type: none"> <li>Capacity building</li> <li>Information sharing</li> <li>Establish demonstration sites</li> </ul>
	<b>Objective 6:</b> Water conservation and management technologies	<ul style="list-style-type: none"> <li>Water harvesting</li> <li>Protection of wetlands</li> <li>Drilling boreholes</li> <li>Solar borehole systems</li> </ul>
<b>3. Market access and linkages and commercialization</b>	<b>Objective 1:</b> Strengthened Farmer Organization	<ul style="list-style-type: none"> <li>Trainings, Cooperative Society Development, Mentorship, Coaching, Association Registration, and Exchange Visits</li> </ul>
	<b>Objective 2:</b> Improve Quality, Safety and Standards of Red Meat and Live Animals	<ul style="list-style-type: none"> <li>Improve Infrastructure (abattoirs, Slaughter houses, Roads,) standardization</li> </ul>
	<b>Objective 3:</b> Improve Access to Information and Information Flow	<ul style="list-style-type: none"> <li>Market Research (Branding, Traceability, market intelligence, price discovery, consumer preference)</li> </ul>
	<b>Objective 4:</b> Increase Processing and Value Addition	<ul style="list-style-type: none"> <li>Infrastructure Facilities for Processing and Value chain, Development of PPPs, Technology transfer, Capacity Building</li> </ul>

Strategic Pillars	Strategic Objectives	Strategic Actions
<b>Pillar 4: Promote production and productivity</b>	Objective 1: Enhance strategic breeding for improved productivity	<ul style="list-style-type: none"> <li>Promoting use of improved regional indigenous breeds to meet market requirements</li> <li>Facilitate formation of community-based breeding programmes for strategic selection and cross breeding</li> <li>Promote record-keeping and management</li> <li>Adoption of reproductive assisted technology</li> </ul>
	Objective 2: Improve animal nutrition and water supply	<ul style="list-style-type: none"> <li>Promote use of cost-effective feeds (including (non-conventional feeds)</li> <li>Management and conservation of natural grazing land (continuous, rotational, high-density grazing)</li> <li>Feed preservation and conservation (including national strategic feed reserves)</li> </ul>
	Objective 3: Enhance animal health delivery systems	<ul style="list-style-type: none"> <li>Disease prevention and control</li> <li>Implementation of traceability systems</li> <li>Herd health management</li> <li>Food safety and public health enhancement</li> </ul>
<b>Cross Cutting</b>	Inclusivity Inclusivity Capacity-building Knowledge management and information sharing Security Access to financial services (including insurance)	<ul style="list-style-type: none"> <li>Training and mentorship of farmers and extension officers</li> <li>Strengthening physical infrastructure and equipment (e.g. laboratories)</li> </ul>

**Table 18:** Timeline for the development of the red meat and live animals value chain upgrading strategy in the SADC region.

SN	Activity	Responsible Party	Timeline					
			July	Aug.	Sept.	Oct.	Nov	Dec.
1	Development of ToRs and recruitment consultants or team of consultants	AU-IBAR						
2	Writeshop for the upgrading strategy	AU-IBAR and Mauritius						
3	Submission of draft upgrading strategy developed	Consultant						
4	Validation workshop in the SADC region <ul style="list-style-type: none"> <li>Upgrading strategy</li> <li>Digital tool for value chain analysis and mapping</li> <li>Digital PPP tool</li> </ul>	AU-IBAR and Botswana						
5	Launch of the publication, ATiCHuB, ARSCoE plus launch of the Tuli reference herd	AU-IBAR and SADC						

## 6. The Development of Value Chain Analysis and Mapping Tool Prototype (VCAT) for the Red Meat and Live Animals in SADC Region

### 6.1. Description of the Value Chain Analysis and Mapping Tool (VCAT)- Prototype Schematic Representation

VCAT, figure 18, will be designed such that when all appropriate data are entered, a value chain report and value chain map will be produced. The output will be a detailed analysis of the red meat and live animals value chain. The analysis is data, time and money intensive but produces the results with an acceptable level of accuracy. The analysis will require substantial investment in data collection in the data formats that will be provided in the tool. It is envisaged that, VCAT will be used for two successive 5-year periods after which it will need recalibration/validation by the engagement of an external value chain analysis expert

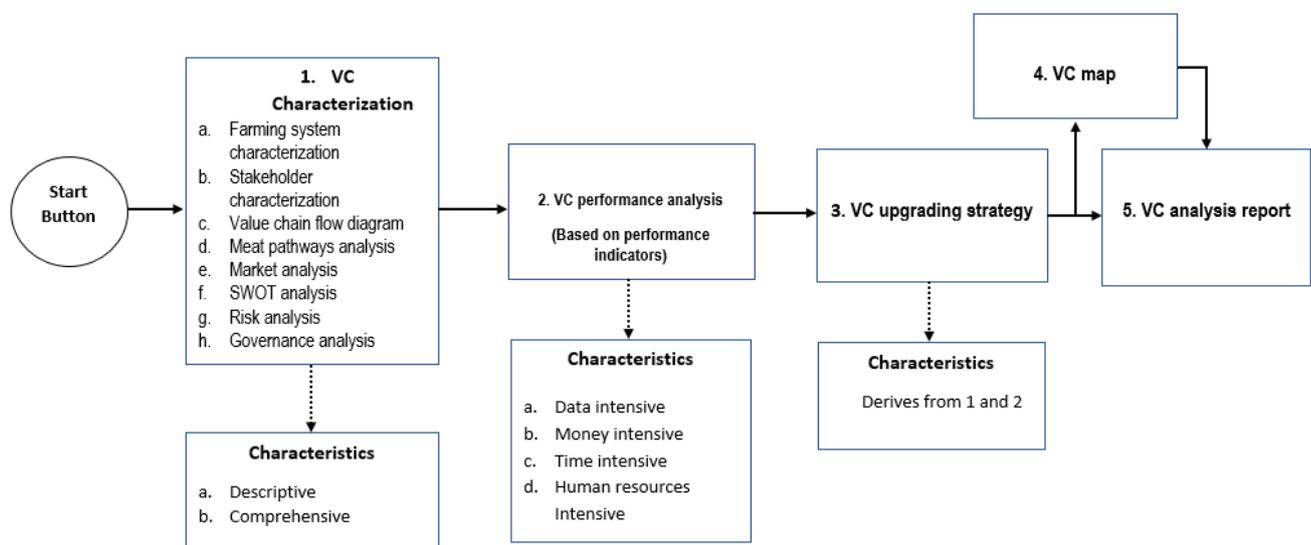


Figure 18: Red meat and live animals value chain analysis and mapping tool prototype (VCAT)

### 6.2. Instructions for developing VCAT

The procedure described below will be followed in developing VCAT.

#### 6.2.1. Characterisation of VC

To be performed separately for cattle (beef), sheep (mutton) and goats (goat meat)

##### 6.2.1.1. Identify and characterise red meat farming sectors/systems to be included in VC analysis.

Some value chains in the SADC are characterised by duality between a highly developed, sophisticated, well serviced and well financed commercial sector and a poorly developed and underfunded smallholder sector. However, in most of the countries where duality exists, the smallholder sector holds the largest livestock numbers but has low off-take rates. Many governments, post-independence, have embarked

on attempts to commercialise the smallholder sector by increasing production and off-take. Therefore, there is usually an emerging sector comprising smallholder farmer who have not fully commercialised but are in transition to commercialisation. The types of farms included in the VCAT need to be described thoroughly.

Create space where farming systems to be included in the VC can be described. Where There should be space to describe the farming by smallholder, commercial and emerging farmers. Key factors to be included in the description should include but are not limited to:

1. Number of farmers and farms in the farming system
2. The objectives of production in the farming system.
3. Average and/or range of land holdings in the farming system
4. Nature of grazing land (private, communal) in the farming system
5. Level of commercialisation in the sector e.g. is there supplementary feeding, is production free range, are there feedlots
6. Level and nature of private sector involvement in the farming system?
7. Number of animals in the farming system?
8. Average annual offtake of animals in the farming system?
9. Average age at which animals are sold from the farming system?
10. Markets where farmers sell animals
11. Satisfaction of farmer with prices

Describe the farming systems as comprehensively as possible. The more comprehensive this description is, the better the subsequent analysis will be.

### 6.2.1.2. Identify and characterise VC stakeholders: Brainstorm and list value chain stakeholders.

Identify and list the participants (stakeholders) of the VC as core actors (e.g. input suppliers, traders etc. and service providers (e.g. research, extension, transport etc.). An example of a VC stakeholder list is provided in table 19 for the Tanzania red meat VC. Estimate the number of stakeholders in the VC (Total and by nodes)

**Table 19:** Tanzania: red meat stakeholders

Core actors	Service suppliers
<ul style="list-style-type: none"> <li>• Producers (Agropastoralists, Pastoralists, Dairy farmers, Commercial Ranchers)</li> <li>• Traders and agents</li> <li>• Slaughters and facilities</li> <li>• Wholesalers</li> <li>• Butchers (Rural, Urban, Quality butcheries and supermarkets)</li> <li>• Meat product retailers (Street vendors, shops, supermarkets)</li> <li>• Importers (live animals, meat and meat products)</li> <li>• Exporters (animals, meat and meat products, hides and skins)</li> </ul>	<ul style="list-style-type: none"> <li>• Input suppliers</li> <li>• Research</li> <li>• Training and Education Institutions</li> <li>• Extension service</li> <li>• Inputs (Veterinary, Feed)</li> <li>• Transport</li> <li>• Financial services</li> <li>• Meat inspectors and abattoir workers</li> <li>• Associations (Producer, Processor, Trader, Exporter)</li> <li>• Tanzania Meat Board (Some are significant players to be identified as individual organizations)</li> </ul>

Source: Wilson (2018)

Create two spaces for entry of stakeholders categorised by Core Actors and Service Providers.

Include the numbers of each stakeholder type (indicate whether the number is actual enumeration, sample projection or guestimate.)

Identify 5 key stakeholders in each category of core actors and service providers and design areas for graphical trend analysis ie for those 5 key stakeholders a graphing area pops up to be populated and or updated)

(The software could be set in such a way that the estimates of all or some key stakeholders are requirements)

6.2.1.3. Develop value chain flow diagram

A value chain flow diagram is shown in Figure 19 based on the beef value chain in South Africa. It depicts product and financial flow. Identify the major nodes in the value chain through which the products and finances flow. The centre circle shows information flow in the VC. Flow diagrams will be different by country and by value chain within a country. For instance, the goat value chain will not have processing in most countries.

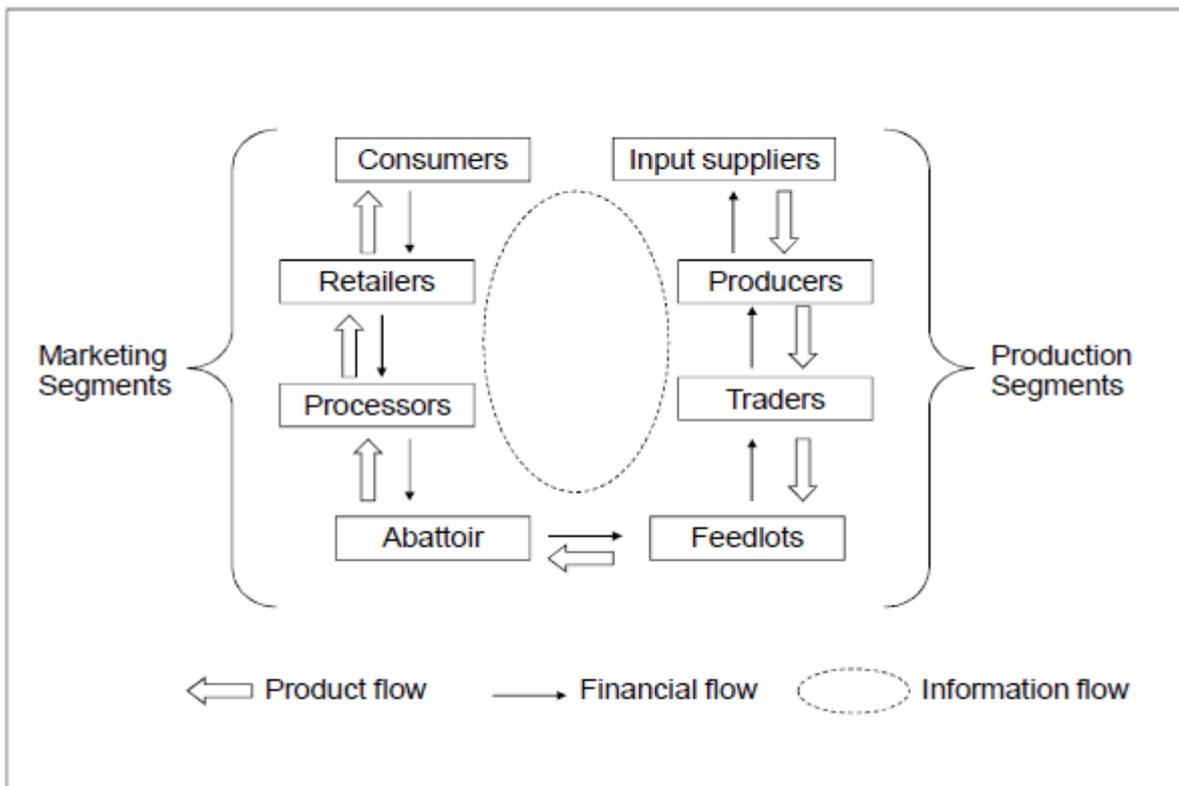


Figure 19: Flow diagram based on beef value chain in South Africa

Identify six to eight nodes along the value chain classified as Production Segment and Marketing Segment. Arrange the nodes in a flow diagram as shown in figure 19. Indicate the product flow and the financial flow. In the centre of the flow diagram draw the information flow as shown by the oval in figure 19. If information flow is perfect the oval will be as depicted in figure 19. A perfect oval figure. However, usually between some nodes there will be information asymmetry. If there is information asymmetry between feedlots and abattoirs, then this break in information should be indicated in the oval.

Develop the space for drawing the VC flow diagram. Provide examples of diagrams with information asymmetry. Provide the tools and instructions for users to easily draw the flow diagram as desired

#### 6.2.1.4. Develop meat pathways for the VC.

Brainstorm and develop a meat pathways table. The meat pathways table shows the prominent path through which meat flows. It indicates more actors who are involved in the meat flows than the VC flow diagram does. The meat pathways table begins to shape the VC map. Table 20 shows an example of a meat pathways table developed for the red meat VC in Tanzania.

#### 6.2.2. Analysis of VC key factors

The key VC factors comprise market analysis, SWOT analysis, governance analysis, social analysis, social analysis, environmental analysis, sustainability analysis, indicator analysis, VC upgrading strategy and risk analysis.

##### 6.2.2.1. Perform end market analysis

From the meat pathways, identify some end markets. Identify other end markets that have not been identified in the meat pathways analysis. End markets are defined as the markets that put the product into the hands of consumers and those that exit the borders of a country.

Also identify niche markets. (both developed and potential). A niche market is defined as a small, specialized market for a particular product or service (usually higher prices are realized in niche than in regular markets).

List all end markets and niche markets (in order of importance and identify them by developed and potential)

Design a space to put the instructions for end market analysis

##### 6.2.2.2. Perform SWOT analysis

SWOT analysis is performed by identifying and listing all strengths, weaknesses, opportunities and threats in the SWOT analysis matrix. Brainstorm, identify and list all strengths, weaknesses, opportunities and threats in the SWOT analysis matrix shown in table 21.

**Table 20: Meat pathways based on red meat value chain in Tanzania.**

SN	Production	Agent1	Primary market	Butcher	Agent2	Secondary market	Feedlot	Abattoir	Export live	Slaughter outside country	Processor	Import	Supermarkets	Consumer
1	<input type="checkbox"/>													<input type="checkbox"/>
2	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>										<input type="checkbox"/>
3	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>										<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>				<input type="checkbox"/>			<input type="checkbox"/>
5	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

Develop a space for users to represent their VC's meat pathways. Provide instructions that the users can increase or decrease the size of the table depending on the length and depth of the value chain which they are representing. In the columns they should put the prominent VC actors and the meat pathways should be placed in the rows. Provide a dummy table for users to start from as shown below..

Value chain actors	
SN	Production
1	<input type="checkbox"/>
2	<input type="checkbox"/>
3	<input type="checkbox"/>
4	<input type="checkbox"/>
etc.	

**Table 21:** Swot analysis matrix

<b>Internal</b>	<b>Strengths</b> 1... 2...etc.	<b>Weaknesses</b> 1... 2...etc.
<b>External</b>	<b>Opportunities</b> 1... 2...etc.	<b>Threats</b> 1... 2...etc.

Design the space for the SWOT Analysis matrix

Design the space for the SWOT analysis summary. In the summary the explanations for the strengths, weaknesses, opportunities and threats are mentioned. For instance, why is X a strength is explained. For example, “Many smallholder livestock farmers with many animals” might be listed as an opportunity. In the summary the information that will be included is as follows: There are many smallholder livestock farmers with many animals. This means that a small increase in production per farmer will result in a large absolute change.

### 6.2.2.3. Perform VC governance analysis

This involves focussing on the governance along and within the VC. This will include, MOUs between member states, rules and regulations available, local, regional, and international tariffs, coordination mechanisms, food safety regulations etc.- specific to the red meat and live animal VC.

Governance analysis should address these questions:

1. What is the VC’s total cost of compliance with governance requirements?
2. What is the cost of complying with the requirement of the EU or other market?
3. How many licenses are required along the VC? e.g., Import license, xport licenses, Business licenses/ Company registrations etc.
4. What is the cost of each license?
5. What is the cost of non-compliance for each license?
6. How many permits are required along the value chain e.g., animal movement permit?
7. What is the costs on non-compliance with each permit?
8. What are the fees charged along the VC e.g., abattoir registration fee, village identification fee (Tanzania), initial environment assessment fee?
9. What is the cost of non-compliance with each fee?
10. How many meat inspectors are there in the VC?
11. What is the number of export approved abattoirs B&C class abattoirs (Namibia)?
12. What are the disease control mechanisms (e.g., veterinary cordon lines)?
13. What are the trade barriers/regulations on the VC?
14. What is the requirement for animal traceability in the VC?
15. Are there quarantine facilities along the VC and what do they cost?
16. What is the number of trained veterinary officials, inspectors and analysts(?) serving the VC?
17. What is the national regulatory framework -national red meat value chain legislation/ act that has guidelines – to avoid collusion and price fixing)
18. What are the hygienic and food safety levels of red meat handling in the VC e.g., at slaughtering, processing facilities?

Examples of VC governance aspects are shown in table 22.

**Table 22:** Examples of VC governance aspects

SN	Governance aspect	Type of governance eg legislative, judicial or executive.	Responsible party	Cost of compliance (e.g. fee) or cost of noncompliance (e.g. penalty.)
1	Meat inspection at slaughter	Executive	Department of Veterinary Services, Ministry of Agriculture	Fee of R10 per slaughtered animal.
2	Open disposal of untreated waste from skin processing into river	Legislative	Department of Environment, Ministry of Water and Environment	Penalty of R5000 for first violation, R20 000 for subsequent violations.
3	etc.			

Design the space for governance analysis as a table and then spaces for the detailed analysis responding to the questions. Allow for footnotes to be entered as explanations.

#### 6.2.2.4. Perform social analysis

Describe to what extent the VC is sensitive to the following:

1. Inclusion of marginalized groups in the VC? (Discrimination based on age, race, disability etc)
2. Employment and remuneration of unskilled labour?
3. Income distribution inclusivity
4. Cultural/ethnicity issues e.g. norms and beliefs perceptions on consumption of red meat between men and women?
5. Gender (male/female, youths, LGBTQ, including inclusivity in extension)?
6. What is the number of stakeholder organisations along the VC e.g. Unions, Associations and Co-ops?
7. Are there attachment/intern opportunities for students on the VC

Design the space for social analysis

#### 6.2.2.5. Perform environmental analysis for the VC

Environmental analysis responds to the following questions:

1. How many environmental policies/guidelines/fees affect the VC and in which institution/s are they implemented?
2. What is the cost of compliance with each environmental policy/guideline/fee?
3. What is the fine or cost of non-compliance with each environmental policy/guideline/fee?
4. Which of these policies/guidelines/fees directly affect the VC?
5. Are stakeholders required to comply with environmental and social impact assessment? Do businesses conduct Environmental Impact Assessments along the VC?
6. Are there multiple violations of the same policy/guidelines/fee?
7. How do waste disposal regulation affect the VC?
8. Are there guidelines for reducing emission of greenhouse gases?
9. What is the loss of biodiversity due to land-use change along the VC?
10. How does the VC impact climate change?
11. Are there guidelines for reducing emission of greenhouse gases?

12. Do ranches practice carbon sequestration?
13. Is regenerative agriculture practiced along the VC?
14. Is there control/management of invasive/alien plant species along the VC?
15. How is packaging material used on the VC disposed of?
16. What are the health factors (intrinsic factors, zoonotic diseases, meat quality) that influence consumption of red meat in the VC?

Design the space for environmental analysis

#### 6.2.2.6. Perform sustainability analysis for the VC

Sustainability analysis responds to the following:

1. Do actors along the VC have the required capacity to satisfy demand (total and at nodes)
2. Are requisite technologies available along the value chain?
3. Which technologies most affect the VC at each node.?
4. What are the new technologies generated at each node in the VC?
5. Is there new capital available for investment in the VC at each node?
6. Does information flow affect the performance of the VC? What is the level of informative data collection along the VC? What are the gaps? What are the information sharing strategies along the VC e.g. information about export markets?
7. Are there breeding programmes in the VC and how do they affect the performance of the VC? How do value chain actors organize themselves to maintain high quality breeds of animals?
8. Are there drugs shops along the value chain?
9. What type of processed products are produced on the VC?
10. Are there producer private public partnerships in the VC? What is the role of the producer private public partnerships in the VC?
11. How does cost of production impact VC actors (e.g., processors-descriptive indicator)
12. How do fiscal policies impact value chain actors (tax, inflation)
13. How do changes in life style (urbanization) influence consumption of red meat?
14. How can the improved supply chain management contribute to reduced wastage along the VC?
15. What is the potential to scale up the operations within the VC?
16. What are the major challenges along the value chain?
17. How much information about the red meat VC is included in the education curriculum?
18. Are there trade fairs/shows (local and international) done on the VC where buyers and sellers meet?

Design the space for sustainability analysis

#### 6.2.2.7. Describe and or estimate VC performance indicators

Indicators should be estimated for a specific period, e.g., 12 months. Where appropriate design areas for graphical trend analysis where a graphing area pops up to be populated and or updated). Where appropriate, design areas where text descriptions will be entered.

#### 6.2.2.7.1. Macro-economic indicators

1. What is the value of the VC?
2. What is the VC contribution to GDP?
3. What is the Domestic Resource Cost, Nominal protection coefficient and Effective protection coefficient of the VC?
  - a. Domestic resource cost (DRC): indicates how efficiently domestic/local resources are used on the value chain.
  - b. Nominal Protection Coefficient (NPC): indicates the level of government protection of the VC through policy.
  - c. Effective Protection Coefficient (EPC): shows that the net impact of government policy on output and input relationships on the VC
4. How much red meat was consumed per capita along the VC and what are the proportions of beef, goat and mutton consumed?
5. What is the volume of meat that was produced in the VC in the past year (12 months)? (Total and by nodes)
6. Poverty indicators
  - a. What is the proportion of value chain actors who live below the international poverty line of \$1.00 per day estimated as an average for the past 12 months (At each node and for the whole value chain)
  - b. What is the proportion of value chain actors who live below the national poverty line of \$xx.00 per day estimated as an average for the past 12 months (At each node and for the whole value chain)
7. How did the VC contribute to food security in the past 12 months? What impact did the value chain have in the areas (urban or rural) where there is a lack of meat /protein?
8. Indicators for employment/wages/salaries for unskilled labour.
9. How much unskilled employment was generated along the VC in the last 12 months and what was the total wage bill for the unskilled labour in the VC (at nodes and total for the VC).
10. What proportion of VC employers who pay minimum gazetted wage for the same period?
11. What proportion of VC actors pay provident fund for the same period? (This could be Namibia specific)

#### 6.2.2.7.2. Governance indicators

1. What was the CV total cost of compliance with governance requirements in the last 12 months?
2. What was the VC cost of complying with the requirement of the EU or other market/s in the last 12 months?
3. How many licenses were issued in in the VC in the last 12 months e.g. import license, export license, business licensing/company registration
4. How many license violations were there in the VC in the last 12 months? What was the cost of the non-compliance with each license in the past 12 months?
5. How many animal movement permits were issued in the VC in the last 12 months?

6. How many of all the possible fees were charged along the VC in the last 12 months. These may include Food safety certification/standards e.g. ISO fee, Sanitary certification fee, Village identification fee (Tanzania), Communal land grazing fee (Tanzania), Clearance fee, Abattoir registration fee, Certificate of origin fee, Fire brigade registration fee., Initial environment assessment fee, etc.
7. What was the total revenue from these fees charged along the VC in the last 12 months?
8. How much revenue is generated from weighing instrument and weighing instrument calibration (??? Not sure about this)
9. How does the animal traceability in the VC ensure confidence to the end market?
10. How much revenue was derived from the use of quarantine facilities in the VC?
11. How much revenue was derived from meat inspection along the VC in the last 12 months?
12. How do consumers respond to hygienic level of red meat handling premises?

#### 6.2.2.7.3. Social indicators

1. The proportion of previously marginalized groups in the VC stakeholders in the last 12 months? (Total and at nodes).
2. The ratio of female to male unskilled labour in the VC in the VC (total and at nodes).
3. The ratio of female to male wage bill for unskilled labour in the VC (Total and at nodes)
4. The proportion of youth in unskilled employment and in the wage bill (Total and by nodes)
5. The proportion of disabled people participating in the VC.
6. The ratio of female to male in extension delivery and the ratio of female to male wage bill in extension along the VC.
7. Income distribution along the VC (to smallholders., females and to youth. (for the total VC and at nodes)
8. Impact of religion, culture e.g. norms and beliefs marriage (matrilineal/patrilineal), ethnicity, social gatherings etc. on the VC?
9. Number of stakeholder organisations on the VC in the last 12 months e.g. Unions, Associations and Co-ops and their impact on the VC
10. Number of students that have been granted attachment opportunities on the VC
11. Proportion of LGBTQI participation in the value chain

#### 6.2.2.7.4. Environmental indicators

1. How much revenue was raised from the cost of compliance with environmental policies/guidelines/ fees along the VC in the last 12 months? (By doing what is expected)
2. How does the revenue affect the performance of the VC?
3. How much revenue was raised from fines or the cost of non-compliance with environmental policies/guidelines/fees along the VC in the last 12 months? (By not doing what is expected i.e. penalty)
4. How does this revenue affect the performance of the VC?
5. How many violations were there of each environmental policy guideline in the VC for the past 12 months? Eg waste disposal guidelines. Are there multiple violations of any of the policies/guidelines/ fees along the VC? (this allows the calculation of value chain actors not complying with environmental guidelines).

6. How many environmental inspectors are there in the VC?
7. What is the volume of waste produced in the VC and how is it disposed of?. (What is the level of pollution (air, surface and ground water) along the VC). How does waste disposal affect the performance of the VC?
8. What is the carbon footprint of the VC?
9. What is the level of land degradation (overgrazing, bush encroachment, soil erosion etc.) along the VC over the past 12 months?
10. What is the level of compliance with guidelines for reducing emission of greenhouse gases along the VC?
11. What is the loss of biodiversity due to land-use change along the VC?
12. Do businesses conduct Environmental Impact Assessments along the VC?
13. How did the VC impact climate change in the past 12 months?
14. How many farmers practice regenerative agriculture along the VC?
15. How many programmes for controlling/managing invasive/alien plant species along the VC in the last 12 months and what was the cost associated with the control/management?
16. What was the cost of carbon sequestration to ranches in the past 12 months?
17. How much packaging material of each type was used on the VC in the past 12 months,

#### 6.2.2.7.5. Sustainability indicators

1. What have been the production coefficients such as calving rate, kidding rates, conception rate, carrying capacity, stocking rates and offtake along the VC for the past 12 months.
2. What is the price of beef at nodes in the VC?
3. What is the profit generated in the VC (At nodes and in the VC) in the past 12 months .and what has been the impact of profitability on the VC?
4. How much income was generated along the VC in the past 12 months and what was the income retention at different nodes? i.e. How was the income generated distributed along the VC in the past 12 months?
5. What proportion of businesses on the VC are viable (profit making)?
6. What was average is value addition along the VC in the past 12 months?  
Identify 6 sequential nodes along the VC such as 1, producers, 2. Primary market traders, 3. Feedflots, 4. Abattoirs, 5. Supermarkets and 6. Consumers. Establish the price of red meat at each node per kg. Calculate the value addition. Nodes will be different for different countries, for instance feedlots are part of the VC in South Africa but not in eSwatini or Namibia.
7. Did value chain actors have the required capacity to satisfy demand at each nodes of the VC in the past 12 months?
8. What is the level of technology adoption in the VC in the past 12 months? Which technologies most affect the VC at each node? What are the new technologies generated at each node in the VC? What was the rate of adoption of the new technologies along the VC in the past 12 months and how are the new technologies affecting the VC performance?
9. How much new capital was available for investment in the VC at each node in the last 12 months? How many financial services products e.g. loans were accessed by value chain actors in the past 12 months?

10. What was the impact of information flow on the performance of the VC in the past 12 months?
11. How many breeding programmes were there in the VC in the past 12 months? How did they affect the performance of the VC? How do value chain actors organize themselves to maintain high quality breeds of animals and high-quality product in the past 12 months?
12. How much revenue is generated from transporters?
13. How many drugs shops are there on the VC and how much revenue did they generate in the past 12 months? How many are private?
14. What was the extension worker to farmer ration in the VC in the past 12 months? What is the proportion of private extension in the VC?
15. How much processed products of each type were produced by actors along the VC in the past 12 months?
16. How many producer private public partnerships were there in the VC in the past 12 months?
17. How much tax was paid in the VC in the past 12 months.
18. What is the prevalence of diseases (Zoonotic diseases [TB, Anthrax, Rabies]) on the VC in the last 12 months and how did this affect meat consumption?
19. What is the level of informative data collection along the VC? What are the gaps?
20. How much did extension services along the VC cost in the past 12 months?
21. How many trade fairs/shows (local and international) are done on the VC where buyers and sellers meet?

Identify indicators that can be grouped together ie with similar algorithms and group them for efficiency. Include spaces that will be completed and will go directly into report. Include a section on each indicator with the question: How can this indicator be used in the VC upgrading strategy?

#### 6.2.2.7.6. Selected Indicators for the development of the red meat and live animals value chain analysis and mapping tool.

For each category of indicators, namely, macro-economic, governance, social, environmental and sustainability, five indicators were selected for the development of the red meat and live animals value chain analysis and mapping tool prototype as follows:

1. Macro-economic indicators
  - i. What is the VC contribution to GDP?
  - ii. How much red meat was consumed per capita along the VC and what are the proportions of beef, goat and mutton consumed?
  - iii. What is the volume of meat that was produced in the VC in the past year (12 months)? (Total and by nodes)
  - iv. How did the VC contribute to food security in the past 12 months? What impact did the value chain have in the areas (urban or rural) where there is a lack of meat /protein?
  - v. How much unskilled employment was generated along the VC in the last 12 months and what was the total wage bill for the unskilled labour in the VC (at nodes and total for the VC).
2. Governance indicators
  - i. What was the VC total cost of compliance with governance requirements in the last 12 months?

- ii. How many licenses were issued in in the VC in the last 12 months e.g. import license, export license, business licensing/company registration
  - iii. How many animal movement permits were issued in the VC in the last 12 months?
  - iv. What was the total revenue from these fees charged along the VC in the last 12 months?
  - v. How much revenue was derived from meat inspection along the VC in the last 12 months
3. Social indicators
- i. The ratio of female to male unskilled labour in the VC in the VC (total and at nodes).
  - ii. The proportion of youth in unskilled employment and in the wage bill (Total and by nodes)
  - iii. Income distribution along the VC (to smallholders., females and to youth. (for the total VC and at nodes)
  - iv. Impact of religion, culture e.g. norms and beliefs marriage (matrilineal/patrilineal), ethnicity, social gatherings etc. on the VC?
  - v. Number of stakeholder organisations on the VC in the last 12 months e.g. Unions, Associations and Co-ops and their impact on the VC
4. Environmental indicators
- i. How much revenue was raised from fines or the cost of non-compliance with environmental
  - ii. policies/guidelines/fees along the VC in the last 12 months? (By not doing what is expected i.e.penalty)
  - iii. How many environmental inspectors are there in the VC?
  - iv. What is the carbon footprint of the VC?
  - v. What is the level of land degradation (overgrazing, bush encroachment, soil erosion etc.) along the VC over the past 12 months?
5. Sustainability indicators
- i. What have been the production coefficients such as calving rate, kidding rates, conception rate, carrying capacity, stocking rates and offtake along the VC for the past 12 months.
  - ii. What is the profit generated in the VC (At nodes and in the VC) in the past 12 months .and what has been the impact of profitability on the VC?
  - iii. What is the level of technology adoption in the VC in the past 12 months? Which technologies most affect the VC at each node? What was the rate of adoption of the new technologies along the VC in the past 12 months and how are the new technologies affecting the VC performance?
  - iv. What was the extension worker to farmer ration in the VC in the past 12 months?
  - v. What is the prevalence of diseases on the VC in the last 12 months and how did this affect meat consumption?

### 6.2.3. Determine VC upgrading strategy

Determining a VC upgrading strategy involves assessment of system and product upgrading. With inputs from the “Characterisation of VC”, and from “Analysis of VC key factors” such as SWOT analysis and VC indicators systematically brainstorm and describe a VC upgrading strategy. Some of the aspects to consider in a VC upgrading strategy include but are not limited to:

1. How can smallholders red meat producers be better commercialised and included in the market?
2. How can disease control be achieved for smallholders?

3. What are and where are barriers to entry along the VC? (e.g. for smallholder farmers and small businesses.)
4. How gender inclusive is the VC?
5. How can better value be delivered to the final customer/s?
6. What aspects that are relatively unique (e.g. few competitors possess them) can be incorporated into the value chain?
7. What investment opportunities can be created along the VC?
8. Are there any niche markets that can be developed?
9. Are there investment opportunities that can be exploited?
10. What changes can be implemented to improve value chain efficiency? (Since change is path dependent, the meat pathways identified in table 20 will be useful).
11. What governance aspects can be changed/amended to improve the performance of the value chain?

Ask further questions that you have as a result of all the analysis you have done on the VC that are not included in the list above but responses to which could improve the performance of the VC. Note that the analysis of most performance indicators provides a sound basis for performing VC upgrading strategy.

Design a space for entering responses to the questions. Design a space for adding more questions and providing responses to them. Where appropriate design the spaces for calculations and include formulae

#### 6.2.4. Perform risk analysis

There are several risks that can be faced along the VC. Risks are associated with but are not limited to all the threats and some of the weaknesses. Risks can be identified at the micro, meso and or the macro level

**Micro-level risks:** Most production risks are at the micro level. For instance, drought has many micro-level impacts. Drought reduces the availability of feed and water for animals. This in turn reduces animal growth (weight gain) and compromises animal health. Thus, drought itself is NOT the risk, it's a threat which precipitates the risk of short- and long-term reduction of income for farmers. In the short-term income is lost because sales cannot be implemented as planned because of poor animal conditions or animal death. Income is lost in the long term because of poor performance of breeding stock during the drought and during the drought recovery period. Therefore, the risk is "Drought induced loss of income"

**Meso level risk:** Sometimes prices fluctuate in certain nodes of the VC. Within a node the price fluctuations can be perverse (affecting all actors in the node) or can be selective affecting only some farmers. The price fluctuations caused by demand variations caused by traders in primary livestock markets usually affect smallholders more than large scale commercial. Price fluctuations for processors may be caused by export demand variations or import substitutions that may occur in the value chain. Thus when export demand shrinks price might go down and the same might happen when the value chain is flooded by

imports of processed foods. Price variation itself is NOT a risk but the risk is “Income uncertainty induced by price variation” When this is identified it is important to identify the stimulus that is causing risk e.g. shrinking export demand, increasing import etc.

**Macro-level risks:** Macro-level risks are those that affect the overall performance of the VC. For instance, is the value chain globally competitive. Usually these are not assessed within the value chain as the micro and meso risks, but they are analysed from a bird’s eye view perspective (outside the value chain). Most VC risks will be micro or meso level.

It is very important to do detailed risk analysis because it directly informs the value chain upgrading strategy. Risk should be analysed for all the VC factors. For instance, risk could be identified in the VC upgrading strategy.

Create spaces for VC risk analysis which include the risk and its description, its impact and measures to address the risk. This can also be an iterative process because some measures to address risks can be used to improve the VC upgrading strategy. Thus, risk analysis is better performed at the end.

The reports/outputs of the in-country working groups/workshops from which these instructions derive are submitted separately.

## 7. References

1. **Anja, F., Ulrike, G. and Etti, W. (2009).** Value chain analysis methodologies in the context of environment and trade research, Diskussionsbeitrag, No. 429, Leibniz Universität Hannover, Wirtschaftswissenschaftliche Fakultät, Hannover
2. **Beef2live, 2021.** World Beef Production: Ranking of Countries. <http://beef2live.com/story-world-beef-production-ranking-countries-0-106885>. Accessed: 27 March 2021.
3. **Bennett, B., Chakoma, C., Figué, M, Vigne, M., Katic, P; 2019.** Beef Value Chain Analysis in Zimbabwe. Report for the European Union, DG-DEVCO. Value Chain Analysis for Development Project (VCA4D CTR 2016/375-804)
4. **Chamboko, T. and Erasmus, J. (2014).** Analysis of Cost of Compliance with Regulations in the
5. **Livestock Sector: Final Report.** Livestock and Meat Advisory Council, Harare.
6. **Chingala, G., Raffrenato, E., Dzama, K., Hoffman, L. C. and Mapiye, C. (2017).** Towards a regional beef carcass classification system for Southern Africa. *South African Journal of Animal Science*, 47 (4):408-423.
7. **Clarke, V. and Braun, V. (2017).** Thematic analysis. *The Journal of Positive Psychology*, 12(3),297-298. doi: 10.1080/17439760.2016.1262613.
8. **Coetzee, B. (2021).** Soil to soul. Lowerland Prieska. <https://lowerland.co.za/>. Accessed 7 March 2021.
9. **Coulibaly, O., Arinloye, D., van Melle, C., Fanou, L., Agbahey, J., Allomasso, R., Nouhoheflin, T., Koumassa, L., Adetonah, S. and Hell, K. (2010).** Value Chain Analysis: Analytical toolkit and approaches to guide the development of sustainable African Agrifood Chains. IITA and IFAD Training course. [https://www.researchgate.net/publication/294872326\\_Value\\_Chain\\_Analysis\\_Analytical\\_toolkit\\_and\\_approaches\\_to\\_guide\\_the\\_development\\_of\\_sustainable\\_African\\_Agrifood\\_Chains](https://www.researchgate.net/publication/294872326_Value_Chain_Analysis_Analytical_toolkit_and_approaches_to_guide_the_development_of_sustainable_African_Agrifood_Chains). Accessed 12 April, 2021.
10. **Dube, S., Chakoma, I. and Bahta, S. (2017).** Analysis of the goat value chain in Beitbridge district of Zimbabwe. ILRI project report. Nairobi, Kenya: International Livestock Research Institute (ILRI). <https://www.ilri.org/publications/analysis-goat-value-chain-beitbridge-district-zimbabwe>
11. **Costales, A., Delgado, C. L., Catelo, M.A., Lapar, M. et al (2006).** Scale and Access Issues Affecting Smallholder Hog Producers in an Expanding Peri-Urban Market: Southern Luzon, Philippines. IFPRI Research Report No. 151. Washington, DC: International Food Policy Research Institute.
12. **Devaux, A., Torero, M., Donovan, J. and Horton, D. (2018).** Agricultural innovation and inclusive value-chain development: a review. *Journal of Agribusiness in Developing and Emerging Economies*, 8(1):99-123, DOI 10.1108/JADEE-06-2017-0065
13. **Dzanja, J., Kapondamgaga, P. and Tchale, H. (2013).** Value Chain Analysis of Beef in Central and Southern Malawi. (Case Studies of Lilongwe and Chikhwawa Districts). *International Journal of Business and Social Science*, 4(6):92-102.
14. **Fabre, P., Dabat, M. and Orlandoni, O. (2021).** Methodological brief for agri-based value chain analysis (Version 2). VCA4D. Agrinatura EEIG, Rue Scheffer 42, Paris, France. <https://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d/wiki/1-vca4d-methodology>. Accessed 21 March 2021
15. **Farmer Angus, 2021.** <https://www.farmerangus.co.za/>. Accessed 23 March, 2021.

16. **Gabre-Madhin, E.Z. (2009).** A Market for All Farmers: Market Institutions and Smallholder Participation. CEQA Working Paper Series No. AfD-0903. Berkeley, CA: University of California Center of Evaluation for Global Action. <https://escholarship.org/uc/item/3k49r747>, Accessed 11 March 2021.
17. **FAO. 2019.** Developing sustainable value chains for small-scale livestock producers. Edited by G. Leroy & M. Fernando. FAO Animal Production and Health Guidelines No. 21. Rome.
18. **Faria, J. (2022).** Countries with the largest cattle population in Africa 2020. <https://www.statista.com/statistics/1290046/cattle-population-in-africa-by-country/>. Accessed 11 June, 2022.
19. **Government of South Africa (2003).** Food pricing monitoring committee. Department of Agriculture, Forestry and Fisheries. Government printers. Pretoria. <https://www.gov.za/documents/final-report-food-pricing-monitoring-committee#>. Accessed 27 March, 2021.
20. **Government of South Africa (2019).** A profile of the South African beef market value chain. Department of Agriculture, Forestry and Fisheries. Government printers. Pretoria. <https://www.dalrrd.gov.za/daoDev/sideMenu/Marketing/Annual%20Publications/Beef%20Market%20Value%20Chain%20Profile%202019.pdf>. Accessed 23 March 2021.
21. **Joshi, A., Kale, S., Chandel, S. and Pal, D.K. (2015).** Likert Scale: Explored and Explained. British Journal of Applied Science & Technology, 7(4): 396-403. DOI: 10.9734/BJAST/2015/14975.
22. **Kamugisha, P. P. (2015).** Quality Beef Supply Chain Efficiency and Consumption in Arusha and Dar-es-Salaam Cities, Tanzania. PhD thesis. Sokoine University of Agriculture, Tanzania.
23. **Kamugisha, P. P., Mdoe, N. S. Y. and Mtenga, L. A. (2017).** Evaluation of quality beef supply chain efficiency in Tanzania's niche markets: a case study of Arusha and Dar-es-Salam cities. Livestock Research for Rural Development. Volume 29, Article #78. Retrieved February 6, 2021, from <http://www.lrrd.org/lrrd29/4/kamu29078.html>.
24. **Kamugisha, P. P., Mdoe, N. S. Y. and Mtenga, L. A. (2019).** Commercializing Beef Sub-Sector in Arusha and Dar-es-Salaam Cities, Tanzania: Consumers' Preferences and Willingness to Pay for Quality Beef, J Ethol & Animal Sci, 2(1):1-15.
25. **Kaplinsky, R. and Morris, M. (2001).** A Handbook for Value Chain Research, IDRC. [https://www.researchgate.net/publication/42791981\\_A\\_Handbook\\_for\\_Value\\_Chain\\_Research](https://www.researchgate.net/publication/42791981_A_Handbook_for_Value_Chain_Research). Accessed 12 April, 2021
26. **Kashoma, I. P., Kassem, I. I., John, J., Kess, B. M., Gerbreyes, W., Kazwala, R. R. and Rajashekara, G. (2016).** Prevalence and Antimicrobial Resistance of Campylobacter Isolated from Dressed Beef Carcass and Raw Milk in Tanzania, Microb Drug Resist, 22 (1): 40 – 52
27. **Key, N., Sadoulet, E. and de Janvry, A. (2000).** Transactions Costs and Agricultural Household Supply Response. American Journal of Agricultural Economics 82.2: 245–259.
28. **Lamy, E. C., van Harten, S., Sales-Baptista, E., Guerra, M.M. and Almeida, A. (2012).** Factors Influencing Livestock Productivity in Sejian, V., Naqvi, S.M.K., Ezeji, T., Lakritz, J., Lal, R. (2012) (Eds). Environmental Stress and Amelioration in Livestock Production, Berlin, Heidelberg: Springer-Verlag.
29. **Labuschagne, A., Louw, A and Ndanga, L. (2010).** A Consumer-Orientated Study of the South African Beef Value Chain. Contributed Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa, September 19-23, 2010.

- 30. Lie, H., Rich, K. M., Kurwijila, L. R. and Jervell, A. M. (2012).** Improving Smallholder Livelihoods Through Local Value Chain Development: A Case Study of Goat Milk Yogurt in Tanzania, *International Food and Agribusiness Management Review*, 15(3):55-85
- 31. Louw, D., Louw, A. and Flandorp, C. (2018).** A study on the potential product development for the commercialization and value add to beef products. OABS Development (Pty) Ltd. [https://www.researchgate.net/publication/334573632\\_A\\_Study\\_on\\_the\\_potential\\_product\\_development\\_for\\_the\\_commercialization\\_and\\_value\\_add\\_to\\_beef\\_products](https://www.researchgate.net/publication/334573632_A_Study_on_the_potential_product_development_for_the_commercialization_and_value_add_to_beef_products). Accessed 26 March, 2021.
- 32. Lubungu, M., Sitko, N. J. and Hichaambwa, M. (2015).** Analysis of Beef Value Chain in Zambia: Challenges and Opportunities of Linking Smallholders to Markets. ndaba Agricultural Policy Research Institute (IAPRI). Working Paper 103, December 2015. <https://ideas.repec.org/p/ags/midcwp/229599.html>. Accessed 10 March, 2021.
- 33. Lysholm, S., Wensman, J. J., Munyeme M. and Fischer, K. (2020).** Perceptions and practices among Zambian sheep and goat traders concerning small ruminant health and disease. *PLoS ONE* 15(6): e0233611. <https://doi.org/10.1371/journal.pone.0233611>.
- 34. Madzingira, O. and Simasiku, S. (2020).** A survey of the usage and storage practices of veterinary medicines among communal cattle farmers in the Kabbe South Constituency, Zambezi region. *Welwitschia International Journal of Agricultural Sciences* Vol. 2:61-69.
- 35. Mafimisebi, T. E., Katewa, B. C., Yerokun, O. A. and Syampaku, E.M. (2015).** Cost incurred and margins secured across the value chain for beef in the Southern Province of 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. <https://ideas.repec.org/p/ags/aaea15/202759.html>. Accessed 25 March 2021.
- 36. Mahundi, E., Kurwijila, L. R., Karimuribo, E. D., Makita, K., Ngowi, H. E. and Grace, D. (2011).** Food safety risk assessment in beef in Arusha municipality, Tanzania. Paper presented at the First International Congress on Pathogens at the Human-Animal Interface (ICOPHA), Addis Ababa, Ethiopia, 15-17 September 2011. Dar es Salaam: Tanzania Food and Drugs Authority. <http://hdl.handle.net/10568/12589>.
- 37. Mamogobo, M. D., Mapholi, N. O., Nephawe, K. A., Nedambale, T. L., Mpofu, T. J., Sanarana, T. P. and Mtileni, B. J. (2021).** Genetic characterisation of non-descript cattle populations in communal areas of South Africa. *Animal Production Science*, 61:84–91. <https://doi.org/10.1071/AN20030>.
- 38. Mapholi, N. O., Maiwashe, A., Matika, O., Riggio, V., Bishop, S. C., Macneil, M. D., Banga, C. B., Taylor, J. F. and Dzama, K. (2016).** Genome-wide association study of tick resistance in South African Nguni cattle. *Ticks and Tick-Borne Diseases* 7: 487–497. doi:10.1016/j.ttbdis.2016.02.005.
- 39. Mapiye O. (2017).** Towards a management database to improve the sustainability of cattle production and its contribution to food security: A case of emerging beef farmers in Limpopo Province, South Africa, MSc Thesis, Stellenbosch university.
- 40. Mapiye O., Makombe G., Mapiye C and Dzama K. (2018).** Limitations and prospects of improving beef cattle production in the smallholder sector: a case of Limpopo Province, South Africa. *Tropical Animal Health and Production* <https://doi.org/10.1007/s11250-018-1632-5>.
- 41. Mapiye, O. O., Makombe, G., Mapiye, C. and Dzama, K. (2020).** Management information sources and communication strategies for commercially-oriented smallholder beef cattle

producers in Limpopo Province, South Africa. *Outlook on Agriculture*, 49(1) 50–56. <https://doi.org/10.1177/0030727019860273>.

42. **Marandure, T. Mapiye, C. Makombe, G. Nengovhela, B. Strydom, P. Muchenje, V & Dzama, K. (2016)**. Beef traders' and consumers' perceptions on the development of a natural pasture beef brand by smallholder cattle producers. South Africa. *African Journal of Range and Forage Science* 33(3): 207-214.
43. **Marandure, T., Dzama, K., Bennett, J., Makombe, G. and Mapiye, C. (2020)**. Application of system dynamics modelling in evaluating sustainability of low-input ruminant farming systems in Eastern Cape Province, South Africa. *Ecological Modelling*, 438:1-11. <https://doi.org/10.1016/j.ecolmodel.2020.109294>.
44. **Marufu, M.C., Qokweni, L., Chimonyo, M., and Dzama, K. (2011)**. Relationships between tick counts and coat characteristics in Nguni and Bonsmara cattle reared on semiarid rangelands in South Africa. *Ticks and Tick-Borne Diseases* 2:172–177. doi:10.1016/j.ttbdis.2011.07.001
45. **Mlote, S. N., Mdoe, N. S. Y., Isinika, A. and Mtenga, L. A. (2012)**. Value addition of beef cattle fattening in the Lake Zone in Tanzania: Challenges and opportunities. *Livestock Research for Rural Development*. Volume 24, Article #95. Retrieved March 8, 2021, from <http://www.lrrd.org/lrrd24/6/mlot24095.htm>.
46. **Mwilawa, A. J. P. (2012)**. Effects of Different Diets on Weight Gain, Carcass and Meat Quality Characteristics of two Tanzania Indigenous Cattle. PhD thesis. Sokoine University of Agriculture, Tanzania.
47. **Namonje-Kapembwa, T., Chiwawa, H. and Sitko, N. (2019)**. Value chain analysis of goats in Zambia: Challenges and opportunities of linking smallholders to markets. IAPRI Working Paper No. 117. <https://www.canr.msu.edu/resources/value-chain-analysis-of-goats-in-zambia-challenges-and-opportunities-of-linking-smallholders-to-markets>. Accessed 28 March 2021.
48. **Nkadimeng M. V. (2019)**. Determinants of Market Participation and Profitability for smallholder Nguni Livestock Farmers: Implications for Food Security and Livelihoods in the Limpopo Province. MSc Thesis. University of Limpopo.
49. **Ntanga, P.D., Mdegela, R. H. and Nonga, H. E. (2014)**. Assessment of beef microbial contamination at abattoir and retail meat shops in Morogoro Municipality, Tanzania. *Tanzania Veterinary Journal*, 29 (2): 53 – 61.
50. **Odubote, I. K. (2020)**. Characteristics and management practices of goat production systems in Zambia. *Bull. Anim. Hlth. Prod. Afr.*, 68:53-64.
51. **Ogundeji, A. and Maré, F. (2019)**. Analysis of price transmission in the beef value chain using a calculated retail carcass price, Agrekon, [doi.org/10.1080/03031853.2019.1700808](https://doi.org/10.1080/03031853.2019.1700808).
52. **Paul, B. K., Butterbach-Bahl, K., Notenbaert, A., Nderi, N. A., and Ericksen, P. (2021)**. Sustainable livestock development in low- and middle-income countries: shedding light on evidence-based solutions, *Environ. Res. Lett.* 16:1-7.
53. **Paremoer, T. (2018)**. Regional value chains: exploring linkages and opportunities in the agro-processing sector across five SADC countries. Center for Competition Regulation and Economic Development. University of Johannesburg.

- 54. Rae, A. and Nayga, R. (2010).** Trends in Consumption, Production, and Trade in Livestock and Livestock Products. In Steinfeld, H., Mooney, H.A., Schneider, F. and Neville L.E. (2010). *Livestock in a Changing Landscape, Volume I – Drivers, Consequences, and Responses*, Washington, DC: Island Press.
- 55. Ramsay, K., Harris, L., and Kotze, A. (1998).** Landrace breeds: South Africa's indigenous and locally developed farm animals. Farm Animal Conservation Trust, Irene, South Africa.
- 56. Roets, M. and Kirsten, J. F. (2005).** Commercialisation of goat production in South Africa, *Small Ruminant Research* 60: 187–196. SADC (2022). Towards a common future. <https://www.sadc.int/themes/agriculture-food-security/livestock-production/#:~:text=The%20farm%20animal%20resources%20of,horses%20and%20380%20million%20poultry>. Accessed 11 June, 2022.
- 57. Scoones, I., Bishi, A., Mapitse, N., Moerane, R., Penrith, M.L., Sibanda, R., Thomson, G. and Wolmer, W. (2010).** Access: Challenges for the beef industry in southern Africa. *Pastoralism – Research, policy and practice*, 1(2).
- 58. Sikamwaya, R. M. and Guiyu Z. (2020).** An Analysis of the Beef Production Industry and Marketing in Zambia *South Asian Journal of Social Studies and Economics*, 8(3): 46-62.
- 59. Spies, D. C. (2011).** Analysis and quantification of the South African red meat value chain. PhD Thesis. University of the Free State. South Africa.
- 60. Stampa, E., Schipmann-Schwarze, C. and Hamm, U (2020).** Consumer perceptions, preferences, and behavior regarding pasture-raised livestock products: A review, *Food Quality and Preference* 82: 1-15. <https://doi.org/10.1016/j.foodqual.2020.103872>.
- 61. Steinfeld, H., Mooney, H.A., Schneider, F. and Neville, L.E, eds. (2013).** *Livestock in a Changing Landscape, Volume I: Drivers, Consequences, and Responses, Executive Summary*. Washington, DC: Island Press.
- 62. Strydom, P.E., Frylinck, L., Van Heerden, S.M., Hope-Jones, M., Hugo, A., Webb, E., Moholisa, E., Liebenberg, B.E. and Sehoole, O.C. (2015).** Sources of variation in quality of South African beef: Case studies in relation to the Red Meat Classification System. *S. Afr. J. Anim. Sci.* 45:289-301.
- 63. Thornton, P.K., Van De Steeg, J., Notenbaert, A. and Herrero, M. (2009).** The impacts of climate change on livestock and livestock systems in developing countries: a review of what we know and what we need to know. *Agricultural Systems*, 101: 113–127. doi:10.1016/j.agsy.2009.05.002
- 64. Togarepi, C., Thomas, B. and Mika, N.H. (2018).** Why Goat Farming in Northern Communal Areas of Namibia Is not Commercialised: The Case of Ogongo Constituency *Journal of Sustainable Development*; 11(6):236-245.
- 65. UNIDO (2012).** Tanzania's Red Meat Value Chain: A diagnostic. Africa Agribusiness and Agroindustry Development Initiative (3ADI) Reports. United Nations Industrial Development Organization (UNIDO). Vienna, Austria.
- 66. van Engelen, A., Malope, P., Keyser, J. and Neven, D. (2013).** Botswana Agrifood Value Chain Project Beef Value Chain Study. The Food and Agriculture Organization of the United Nations and the Ministry of Agriculture, Botswana. <http://www.fao.org/3/i3158e/i3158e.pdf>.
- 67. Venter, R. H. and Horsthemke, O. (1999).** Analysis of the competitive nature of the Southern African sheep meat value chain, *Agrekon*, 38(4): 716-725. DOI: 10.1080/03031853.1999.9524883

- 68. Vernooij, A., dos Anjos, M. and van Mierlo, J., 2016:** Livestock Development in the Zambezi Valley, Mozambique: Poultry, Dairy and Beef Production. Wageningen UR (University and Research) Centre for Development Innovation. Report CDI-I6-027. Wageningen.
- 69. Wane, A., Boureima, F., Ndlovu, F. Morton, J. (2018).** Beef Value Chain Analysis in eSwatini. Report for the European Union, DG-DEVCO. Value Chain Analysis for Development Project (VCA4D CTR 2016/375-804). [https://web.tresorit.com/lljt7D/#jik8M\\_QADh9UrJjerfadEw](https://web.tresorit.com/lljt7D/#jik8M_QADh9UrJjerfadEw). Accessed 12 April, 2021.
- 70. Widadiea, F., Bijmana, J. and Trienekensa, J. (2021).** Value Chain Upgrading through Producer Organisations: Linking Smallholder Vegetable Farmers with Modern Retail Markets in Indonesia, Int. J. Food System Dynamics 12 (1):68-82 DOI: <http://dx.doi.org/10.18461/ijfsd.v11i5.76>.
- 71. Wilson, R. T. (2015).** The red meat value chain in Tanzania. A report from the Southern Highlands Food Systems Programme. FAO, 2015. [http://www.fao.org/fileadmin/user\\_upload/livc/PDF/SFVC/Tanzania\\_Red\\_Meat.pdf](http://www.fao.org/fileadmin/user_upload/livc/PDF/SFVC/Tanzania_Red_Meat.pdf). Accessed 24 April 2021.
- 72. Wilson, R. T. (2018).** The red meat value chain in Tanzania. Anim Husb Dairy Vet Sci, 2(1): 1-5, doi: 10.15761/AHDVS.1000127 .
- 73. World Bank (2011).** The Livestock and Horticulture Value Chains in Swaziland: Challenges and Opportunities. Swaziland Rural Sector Review, June 27, 2011. Report number: 70201-SZ. <http://documents1.worldbank.org/curated/en/417071468120839245/pdf/702010ESW0P11900PN200June0270020110.pdf>. Accessed on 15 March 2021.
- 74. Zulu, N.D. (2009).** Genetic characterization of Zambian Native Cattle Breeds. MSc Thesis, Virginia Polytechnic Institute and State University, Virginia, USA..

## Annexes

- Annex 1: Protocol on Trade in the Southern African Development Community (SADC) Region of 1996*
- Annex 2: Technical Barriers to Trade (TBT) Annex to the SADC Protocol on Trade*
- Annex 3: Agreement Amending Article 3 of the Southern African Development Community Protocol on Trade*
- Annex 4: Sanitary and Phytosanitary (SPS) Annex VIII to the SADC Protocol on Trade*
- Annex 5: Regional Guidelines for the Regulation of Veterinary Drugs in SADC Member States*
- Annex 6: Tanzania-The Meat Industry Act, 2006- Import and Export of Livestock, Meat and Meat Products Regulations, 2014*
- Annex 7: Malawi: Meat and meat products Act*
- Annex 8: Malawi: Animal Health Act final*
- Annex 9: Eswatini: The Animal Diseases Act 1965 (Annex 9)*
- Annex 10: Eswatini-The Livestock Identification Act (3) (Annex 10)*
- Annex 11: Eswatini-The Veterinary Public Health Act, 2013 (3) (Annex (11))*
- Annex 12: Namibia: Meat Industry Act 1981*
- Annex 13: Namibia: Meat Industry Amendment Act, 1992 No.466*
- Annex 14: South Africa: Meat safety Act*



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