INDIGENOUS BEEF CATTLE MARKET PERFORMANCE IN SELECTED VILLAGES IN SIMIYU AND DODOMA REGIONS, TANZANIA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN AGRICULTURAL AND APPLIED ECONOMICS OF SOKOINE UNIVERSITY OF AGRICULTURE, MOROGORO, TANZANIA.

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ABSTRACT

Despite the high livestock population (dominated by cattle) the contribution of subsector to the Tanzanian Gross Domestic Product (GDP) is very low. The low contribution of the livestock sector to the country's GDP can possibly be linked to poor market performance. This study is therefore an attempt to examine the indigenous beef cattle market performance in selected villages in Simiyu and Dodoma regions in order to find out what could be done to improve beef cattle market performance. The study used cross sectional design. Data were collected from 192 indigenous beef cattle actors (beef cattle keepers, traders and butcheries) through semi-structured questionnaires and checklist. The data collected were summarized using Stata and Microsoft Excel. Moreover, the study adopted Structure- Conduct- Performance (S-C-P) model to analyze the performance of indigenous beef cattle market in the study area. The study employed gross margin analysis to measure profitability of value market actors. Furthermore, the multiple linear regression analysis were used to determine the factors affecting gross margin of beef cattle keepers. The results show that traders involved in beef cattle fattening generates the highest gross margin (54.05%) followed by the vertically integrated-butcheries (46.21%) and beef cattle keepers generated the lowest gross margin (13.66%). Further, the study findings show that herd size and herding costs had statistically significant ($p < 0.01$) influence on gross margin. In conclusion, the indigenous beef cattle market in the study area performed poorly due to inadequate extension services, difficulties in securing credit/loans, high marketing costs and information asymmetry. To improve the market performance and indigenous beef cattle subsector, it is recommended that extension workers have to organise farmers into formal groups and trains them on the use of the beef cattle fattening technique and beef quality control measures. The department of livestock development in the districts; it is recommended to make market information available, enable actors to secure credits/loans, reduction of market charges and tax so that to reduce costs.

DECLARATION

I, Kiondo Mgweno Kavuyu, do hereby declare to the Senate of the Sokoine University of Agriculture that this dissertation is my original work, done within the period of registration and that it has neither been submitted nor being concurrently submitted for a higher degree award in any other Institution.

_____   _____

Kiondo Mgweno Kavuyu   **Date**

(MSc. Candidate)

The above declaration is confirmed by;

_____   _____

Dr. DAMAS Philip   **Date**

(Supervisor)

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DEDICATION

This work is dedicated to my lovely wife, Florence Kebwe, for encouragement, patience and for taking a good care of our son, Albert, during my absence and to my entire family especially my lovely father, Elias Mgweno, for building the foundation of my career. LORD GOD bless you my father.

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LIST OF ABBREVIATIONS AND ACRONYMS

%   Percentage

≥	Greater than or equal
AERC	African Economic Research Consortium
ASDP II	Agricultural Sector Development Programme – Second Phase
B/C	Benefit-Cost
BCR	Benefit-Cost Ratio
CAPI	Computer Aided Personal Interviews
CI	Concentration Index
CMAAE	Collaborative Masters Programme of Agricultural and Applied Economics
COSTECH	Commission for Science and Technology
DED	District Executive Director
DLFDO	District Livestock and Fisheries Development Officer
DLFO	District Livestock and Fisheries Officer
EAC	East Africa Community
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GM	Gross Margin
GMA	Gross Margin Analysis
GS1	General Standard 1
ILRI	International Livestock Research Institute
IRR	Internal Rate of Return
KDC	Kongwa District Council
Kgs	Kilograms
MAFC	Ministry of Agriculture, Food and Cooperatives
MDC	Meatu District Council
MLF	Ministry of Livestock and Fisheries
MLR	Multiple Linear Regression.
MM	Market Margin
n	Number of observations/Sample size
NARCO	National Ranching Company
NBS	National Bureau of Statistics
ODK	Open Data Kit
OLS	Ordinary Least Square
ROI	Return on Investment

SADC	Southern Africa Development Community
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
SCP/S-C-P	Structure-Conduct-Performance
SNAL	Sokoine National Agricultural Library
SPSS	Statistical Package for Social Science
SRS	Systematic Random Sampling
SSA	Sub – Saharan Africa
TAEC	Tanzania Atomic Energy Commission
TBS	Tanzania Bureau of Standards
TFDA	Tanzania Food and Drugs Authority
TMB	Tanzania Meat Board
TSHZ	Tanzania Shorthorn Zebu
TVC	Total Variable Costs
TVP	Total Value Product
TZS	Tanzania shillings
URT	United Republic of Tanzania
VAD	Value Added
VEO	Village Extension Officer
VETA	Vocational Education and Training Authority
WEO	Ward Extension Officer

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Tanzania is among the leading Sub-Saharan African (SSA) countries and within the African continent at large, in livestock population. It accounts for about 11% of the SSA cattle population (Wilson, 2013). The country has about 30.5 million cattle, 5.56 million sheep and 18.9 million sheep and ranked as the first country in the Southern Africa Development Community (SADC) and Eastern Africa Community (EAC) regions with the largest number of cattle and second in the whole of Africa, after Ethiopia (NBS, 2018).

Based on the 2017/18 livestock subsector analysis baseline, the dominant livestock species in Tanzania is cattle (30.5 million) which is about 90% of the livestock population. Tanzanian Beef sector is composed predominantly of indigenous cattle which is Tanzania Short Horn Zebu (TSHZ) (Figure 1). The beef cattle production system is divided into three main categories: the agro-pastoralist, pastoralist and commercial ranches systems. The agro-pastoral system contributes 80%, and the pastoral system contributes 14%, of beef cattle production; the remaining 6% comes from commercial ranches (URT- MLF and ILRI., 2018).
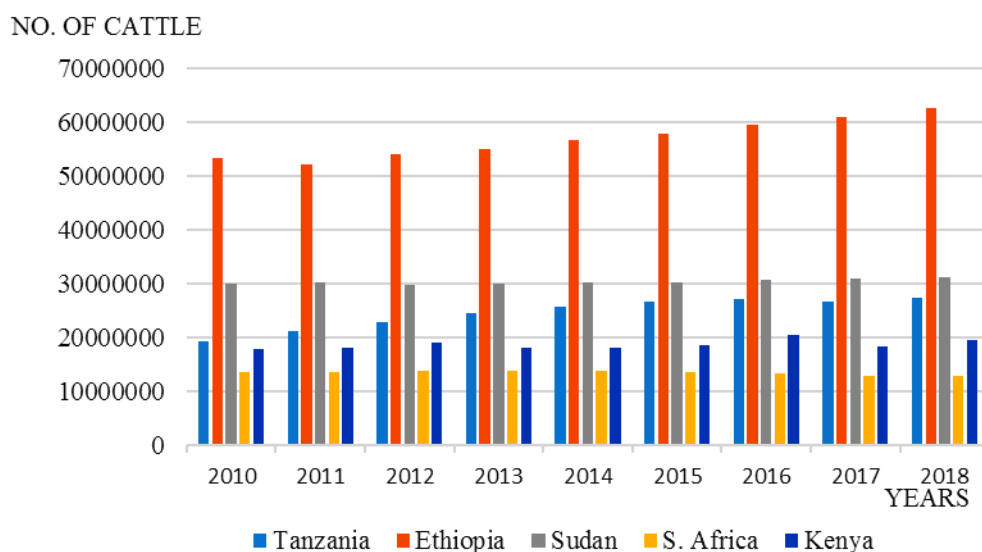
NO. OF CATTLE

Figure 1: **The grouped bar graph to show main cattle producer countries in SSA for the year 2010-2018**

Source: **FAOSTAT (2019)**

Indigenous beef cattle keeping is one among the key factor contributed for economic welfare of cattle keepers. Beef cattle production activities contributes directly to income and employment of 3.9 million people in Tanzania. About three out of five rural households report some income from livestock activities (mainly beef cattle keeping), earning an average 22 percent of total household income from cattle rearing (Covarrubias *et al., 2012).* Therefore, beef cattle activity should be seen as one among the means of alleviating poverty and an economic activity to be supported, because of the contribution it makes to provide food and means of income in society (Mlote *et al., 2013).*

Simiyu and Dodoma regions are among the areas with highest number of indigenous beef cattle in Tanzania mainland. The regions are endowed with about 11.7% of the total cattle population in the country (NBS, 2017). They constitute the major sources of indigenous beef cattle in Tanzania particularly in Meatu and Kongwa districts, in Simiyu and Dodoma regions respectively. Overall, beef cattle keeping, trading and retailing/butchers of beef

products are important economic activities undertaken by many residents in these districts and the respective regions at large.

The available evidences indicating the production and marketing of cattle products is below potential. The indigenous beef cattle contributes only 4.8% of 28.7% of the overall contribution from agriculture sector to the real national Gross Domestic Product (GDP)

The relatively small contribution calls for some interventions at different levels of the subsector. The current emphasis in the country is to commercialize the indigenous beef production and increase competitiveness for the sector in order to enable it to contribute more effectively to household wellbeing and income as well as to the nation's economy (SAGCOT, 2011; URT, 2016).

There are various efforts under different government programs such as the Agricultural Sector Development Program (ASDP II) 2015/16-2024/25 which aim at developing inventions and innovations providing opportunities to discover and/or validate technologies. Other programs include but not limited to: The National Growth and Reduction of Poverty, the Rural Development Strategy and Livestock policy and various acts, to commercialize the beef cattle that produced by local farmers (URT- MLF and ILRI, 2018).

Of utmost importance is perhaps the emergence of evidence which indicates a strive for some local actors in the indigenous beef cattle value chain trying to shift from subsistence to more commercialized businesses through improving technology and accessing of better market (Kadigi *et a*l., 2013). Essentially, it is within marketing systems that prices are generated and the allocation of resources, income distribution and capital accumulation are

determined. Market constraints to smallholder development are as important for indigenous beef cattle as they are for crop products and attract different forms of interventions to improve market access (Covarrubias *et al.*, 2012).

In 2019, the Tanzania Commission for Science and Technology (COSTECH) implemented a project titled, "Enhancing the competitiveness of indigenous beef cattle production in Tanzania". Some villages in Simiyu and Dodoma regions (Meatu and Kongwa districts respectively- the study areas) and in Mwanza and Dar es Salaam regions were selected as study areas. The project aimed to address bottlenecks in the indigenous beef cattle value chain leading to enough quantity and nutritious food needed to meet the increasing demand of the growing population making it market-oriented. As part of this project implementation activities, this study was commissioned to contribute to the general objective of the project.

The indigenous marketing systems in SSA developing countries including Tanzania are generally exploitative, collusive and economically inefficient (SAGCOT, 2011). However, the extent to which this assertion is true for indigenous beef cattle marketing in Tanzania is uncertain. The uncertainty rises due to inadequate literature on indigenous beef cattle marketing. Therefore, study on indigenous beef cattle marketing performance is essential for providing detailed information in order to improve marketing strategies to the benefit of indigenous beef cattle keepers, traders, and butcheries as well as transforming the traditional beef cattle into market-oriented. The aim of this study therefore is to examine the indigenous beef cattle market performance in selected villages in Simiyu and Dodoma regions and suggest the way forward to enhancing the performance and competitiveness of indigenous cattle beef production in Tanzania at large.

1.2 Problem Statement and Justification

Despite the high livestock population (dominated by cattle) the contribution of indigenous beef cattle to the Tanzanian Gross Domestic Product (GDP) is very low. The indigenous beef cattle contributes only 4.8% out of 28.7% of the overall contribution from agriculture sector to the real national Gross Domestic Product (GDP) Tanzania produces annually an average 679 992 tonnes of meat (beef, goat, sheep, pork and chicken) in which beef cattle represent almost 70% of total tonnes of meat produced (URT, 2016). In terms of marketing, beef makes 53% of the meat market in Tanzania followed by chicken (25%) and goat, sheep, pork accounting the remaining 22%.

The TMB (2019) report indicated that regardless of high population of cattle, the beef production subsector is not performing well at a growth rate below 2.6% per annum and the country still is imported large amount of beef products from other countries. Overall, Tanzania produced annually an average 679 992 tonnes of meat and imported an average 1 401.96 tonnes of meat mainly from Kenya and South Africa in the period 2017/2018 (Figure 2).
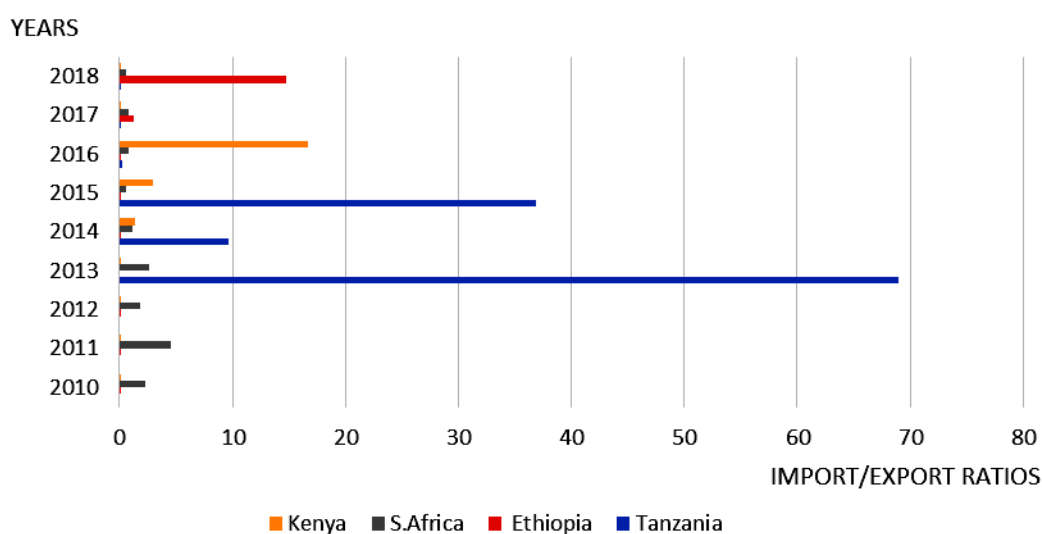
Figure 2: **The grouped bar graph to show the import and export trend of beef cattle among the main producer countries in SSA for the year 2010-2018**

Source: **FAOSTAT (2019)**

For a country that accounts for about 1.4% of the global cattle population and 11% of African cattle population (FAO, 2016) to import many tonnes of meat annually just to meet domestic demand, doesn't make sense and is an indication of marginally utilization of local cattle resources. The underutilization of indigenous cattle can possibly be linked to poor market performance of indigenous beef cattle produced in Tanzania which led to inadequate incentives to beef cattle actors to improve the subsector and being commercial oriented. However, the extent to which this assertion is true for indigenous beef cattle marketing in Tanzania is uncertain.

Therefore, this study is designed to address the prevailing information gap on the indigenous beef cattle market performance, determinants that affect the performance under the study areas and to provide information that will be used to devise interventions aimed at enhancing the competitiveness of indigenous beef cattle production in Tanzania at large. This research will also serve as a reference for researchers to embark on similar or related work in other parts of the country.

1.3 Objectives of the Study

1.3.1 Overall objective

The overall objective of this study is to examine the indigenous beef cattle market performance in selected villages in Simiyu and Dodoma regions, Tanzania.

1.3.2 Specific objectives

The study has the following specific objectives:

i. To determine the indigenous beef cattle's market structure and conduct in Meatu and Kongwa districts.

ii. To compute the gross margin of indigenous beef cattle keepers, traders and

butcheries (retailers) along the indigenous beef cattle value chain nodes.

iii. To analyse the determinants of gross margin of the indigenous beef cattle value

chain actors in the study area.

iv. To determine challenges facing indigenous beef cattle keepers, traders and

butcheries marketing under a study area.

1.4 Research Questions

In correspondence with the specific objectives, the present study is designed to answer the

following questions:

i. What are the market structure and conduct of indigenous beef cattle in Meatu and

Kongwa districts?

ii. What is the gross margin accrued by indigenous beef cattle keepers, traders and

butcheries (retailers) actors in primary market?

iii. What are the determinants of the gross margin of the indigenous beef cattle keepers?

iv. What are the challenges facing indigenous beef cattle keepers, traders and butcherers

marketing under the study area?

1.5 Significance of the Study

This study gives detailed information on how market of indigenous beef cattle is currently

performing particularly in Meatu and Kongwa districts and challenges that constrain

indigenous beef cattle production. The study also generates information that will guide

indigenous beef cattle marketing development programs, areas for interventions that

would enhance the competitiveness of indigenous cattle production in Tanzania and to

commercialize of the beef subsector in the study districts and Tanzania at large.

1.6 Organization of the Dissertation

This dissertation is divided into five chapters. The first chapter provides a general

background to the study, problem statement, study objectives and research questions. In

the second chapter, a review of relevant literature with emphasis on the SSA has been made. The chapter is categorized into operationalization of key terms, theoretical and conceptual framework, review of the indigenous beef cattle production and marketing in Tanzania, review of empirical studies, and review of empirical methods.

The third chapter provides a detailed description of the design and methods employed by the study. The chapter specifies the study area, sampling design, methods of data collection, and data analysis techniques. The fourth chapter presents and discusses results of the present study. It includes respondent characteristics, livestock market structure, livestock market conduct, economic benefits generated by key value chain actors and the determinants of the gross margin of the indigenous beef cattle keepers and challenges facing the value chain actors under the study area. The lastly, chapter fifth provides a summary, conclusions, recommendations and policy implications of the study based on the results presented. Moreover, in the last, a list of references cited in this study and appendices are provided.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Theoretical and Conceptualization of Key Terms

The economic theory underlying this study is market theory through structure, conduct and performance framework. The market theory distinguishes between the types of market by reference to differences in their market structure. The theory examines the way in which market structure interacts with market conduct to produce particular patterns of market (Mdoe *et al.,* 2019).

2.1.1 Market and marketing concept

Market is broad term which has got a variety of meanings. Meshack (2015), defined market as specific geographical area where buyers and sellers meet for exchange of goods and services. On the other hand, Kotler (2000), defined market as an institution within which the forces of demand and supply operate; sellers, and consumers are in constant communication, and there is a change of title to goods and/or services. Potential consumers make up a market, which is people with the desire and with the ability to buy a specific product. Mdoe *et al.* (2019) described market as a way in which buyers and sellers conduct transactions resulting in mutual net gains that otherwise would not be possible.

The most observable features of a market are its pricing and exchange processes. In this regard, a market is more than a physical place and entails mechanism or an institution through which buyers and sellers exchange information and transact. Market therefore, is an actual or nominal place where forces of demand and supply operate, and where buyers and sellers interact to trade goods, services, or contracts or instruments, for money or barter. Market also can be visualized as a process in which ownership of goods is

transferred from sellers to buyers who may be final consumers or intermediaries (Nkullo, 2013).

Under this study, the term 'market for indigenous beef cattle' means any location where indigenous beef cattle is assembled and sold at public auction or on a commission basis during regularly scheduled or special sales (Covarrubias *et al.*, 2012). The term shall not include private farms or ranches or sales made at livestock exhibitions, or special breed association sales.

Another basic concept that is closely related to market is marketing. Kotler (2000) defined the term marketing into two perspectives: social and a managerial definition for marketing. According to a social definition, marketing is a societal process by which individuals and groups obtain what they need and want through creating, offering, and exchanging products and services of value freely with others (Kotler, 2000). In managerial perspective, marketing is the process of planning and executing the conception, pricing, promotion, and distribution of ideas, goods, and services to create exchanges that satisfy individual and organizational goals. On the other hand, Bartels (1944) defined marketing as an activity, set of institutions, and processes of creating, communicating, delivering, and exchanging goods and services that have value for customers, clients, partners, and society at large.

Marketing provides the mechanism whereby the pastoralists and agro-pastoralists exchange their beef cattle and other cattle products for cash to earn their livelihood. In his article Sustainable Agriculture and Rural Livelihoods, Kumar *et al*. (2006) described that one among the principal ways of acquiring livelihoods by the rural households is through the exchange or market based livelihood. Those rural households which produce surplus

food and non-food agricultural products or non-farm goods earn their livelihoods by selling these surpluses in the market. The marketing system for these products and relative prices of what they sell and what they buy, affect their livelihoods.

In SSA most of the smallholder farmers (includes indigenous beef cattle keepers) have inadequate bargaining power when selling their produce. This scenario is mainly a result of the tendency of smallholder farmers to rely on informal networks (traders, friends and relatives) for market information as a result of weak public information systems (FAO, 2012). Therefore, marketing of agricultural products needs a proper marketing management approach that focuses on the analysis of decisions related to the marketing mix (product, price, place of selling and promotion).

2.1.2 Market structure

Market structure can be defined as those characteristics of the organization of a market which seem to influence strategically the nature of competition and pricing within the market (Adesehinwa and Ajala, 2008). Among the parameters considered important in determining market structure are: the number, and relative size of buyers and sellers; the degree of product differentiation (that is, nature of product whether products are standardized-homogenous or differentiated); the ease of entry and exit of buyers and sellers into and out of the market (entry and exit conditions); factors that may influence entry or exit include absolute cost advantages held by existing participants (firms) or absolute entry costs that are prohibitive. An example of the latter is the substantial capital requirements associated with entry into some business ventures that is size of operating capital. Status of knowledge about costs, prices and conditions among the participants in the market that is, market information.

The common measures of efficiency of the component are the degree of concentration, market transparency, information barrier to market entry and product differentiation (Kabungo, 2008). Market performance is expected to be satisfactory under the following conditions: If sufficient number of buyers and sellers exist to provide alternative outlet without one of them having the market power to dominate others. If market transparency with regard to product quality, variety, grades and prices is given and no serious barriers to market entry and exit (Levy *et al.*, 2013).

2.1.3 Market conduct

Market conduct refers to the patterns of behaviour which a participant follows in adapting to the markets in which they sell or buy (Mdoe *et al.*, 2019). For instance, pricing and selling tactics, producers' cooperation, and research and development activities (Mmasa *et al.*, 2013). The most important parameters used in assessing market conduct in this study are: exchange functions; methods of determining price (price determination); and product differentiation. Market conduct is heavily influenced by market structure and is the link between market structure and performance (Adesehinwa and Ajala, 2008).

2.1.4 Market performance

This concept is related to structure and conduct. It has been reported by Mmasa *et al*. (2013), that market performance is the way in which market and marketing contribute to various aspects of economic performance. Hence, it is the appraisal of the extent to which the interactions of buyers and sellers in a market stimulate results that are consistent with social purposes (Levy *et al.*, 2013). The parameters used in assessing market performance in this study are: the marketing margin; level of profits; and marketing costs.

According to Kotler (2000) common indicators of performance are trends in retail prices, level of stability of firm prices and income spread of marketing margins, marginal propensity to consume and farmers' share of consumers shilling spent on agricultural product, middlemen profitability and parity farm price.

Adesehinwa and Ajala (2008) used the market margin, levels of profit, marketing costs and market efficiency to assess market performance. They point out that marketing margin shows the fraction of the consumer expenditure as a commodity that is received by the producer and each of the marketing agents. The marketing margin is used to give close approximation of the market performance.

2.1.5   Relationship between structure, conduct and performance framework

Bain (1959) formulated a framework for empirical analysis of the effect of market structure on industry performance called the Structure-Conduct-Performance (S-C-P) model. The central hypothesis of the framework is that observable structural characteristics of a market determine the behaviour of firms within that market, and the behavior of firms within a market determines measurable market performance (Lelissa and Kuhil, 2018). In short, S-C-P paradigm assumes that market structure would determine firm conduct which would determine performance (Raible, 2013). The SCP approach postulates that when a market structure deviates from the paradigm of perfect competition, the degree of competitive conduct will decline and there will be a consequent decrease in output (supply), allocative efficiency and an increase in prices. This implies that according to the SCP approach; the performance of markets can be assessed based on the level of competition and efficiency in those markets (Ruhangawebare, 2010).

According to Adesehinwa and Ajala (2008), the S-C-P approach postulates that as market structure deviates from the paradigm of a perfect competition, the degree of competitive conduct will decline and there will be a consequent decrease in output (supply) and allocative efficiency, and an increase in prices. This implies that the performance of markets can be assessed based on the level of competition and efficiency in those markets. The S-C-P framework posits a stable relationship and a line of causality that runs from structure through conduct to performance (Levy *et al.*, 2013) under perfect competitive market. Consequently, the original S-C-P paradigm assumes a one-way relationship between structure, conduct and performance. This is the assumption that market structure determines market conduct and thereby affecting market performance (Lelissa and Kuhil., 2018).

However, the framework suffer the following criticism: Its price integration and price performance analyses are static and suffer from spatial arbitrariness; market segmentation concepts with respect to margins and transfer costs are faulty; and the model also does not explain how competition among traders may affect consumers' welfare. The approach fails to explain the causal links between structure, conduct and performance and vice versa. Despite these limitations, the S-C-P framework still remains the conventional approach for studying market institutions, Scott (1995), cited by Adesehinwa and Ajala (2008).

2.2 Estimation of gross margin function

Gross margin is used as the proxy of profit to determine the profit obtain by cattle keepers, traders and butcheries. Gross margin can be defined as the difference between the revenue (benefit) received from the sale of an output and the all costs spent in buying inputs, operating, or producing goods and services. The difference between profit and gross margin is that in computation of profit, both fixed costs and variable costs are considered

while its only variable costs which are considered in computation of gross margin (Debertin, 2012). From the gross margin (GM) criterion, profit is equal to the returns or benefits obtained by a farmer, which is the difference between the Total Value Product (TVP) and the Total Variable Costs (TVC). Thus, the gross margin can be computed directly as follows;

GM = TVP – TVC.

Where; GM = Gross margin; TVP = Total value product; TVC = Total Variable costs.

Therefore, the profit obtained by livestock keepers, traders and butchers will be evaluated.

2.3 Empirical Review

2.3.1 Indigenous beef cattle marketing studies

According to Tung *et al.* (2010), the common method of measuring market performance is to examine marketing margins; this is an attempt to evaluate economic or price efficiency but may be limited in value. Others are descriptive and organizational approaches. Another method used by Lelissa and Kuhil (2018) is structure conduct-performance (S-C-P) model.

Batamuzi *et al.* (2013), conducted a study to identify features and weak links of indigenous beef value chain in Kilosa and Gairo districts, Morogoro, Tanzania, using Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis method. The findings indicated that the chain is characterized by weak links and low production. However, the study did not venture enough to capture how the indigenous beef market is performing and identifying the main determinants of gross margin of indigenous beef cattle keepers. Therefore, this study venture to fill that gap through employing structure-conduct and performance model.

Kadigi *et al.* (2013) studied the value chain of indigenous cattle and beef products in Ilemela and Magu districts, in Lake Zone region, Tanzania using gross margin analysis

method. It was observed that there was a weak vertical and horizontal coordination along the beef cattle value chain. Furthermore, the authors contended that the largest share of GM was earned by butcheries (meat shop owners) who generated an average daily GM of TZS 306 000. These were followed by traders who fattened their beef cattle before selling who earned an average gross margin of TZS 190 700 per c ow. The study does not revealed how indigenous beef cattle market is performed and challenges faced with different actors.

According to a study done by Alemayehu (2011), assessed a value of beef cattle production and marketing in Ethiopia found that the smallholder farmers, exporters and traders are the major actors in the illegal cattle marketing system while medium to large-scale licensed exporters are dominantly operating in the legal system. The author further argued that limited access to production and market-related information such as production systems, prices, value chains, competitors, consumer preferences and lack of capital to invest in assets, equipment and inputs that would improve quality are the major challenges faced by the market value chain. The study by Alemayehu focused much on challenges faced production and distribution using value chain approach and left behind the idea of how beef cattle market performing and economic benefit obtained by indigenous beef cattle market actors.

Adesehinwa and Ajala (2008) conducted a study on analysis of pig marketing in Zango Kataf Local Government Area of Kaduna State, Nigeria used commodity chain approach which builds on the S-C-P framework. It assumes vertical as well as horizontal relationships between firms in evaluating market performance and is very dynamic in following the entire commodity flow from producer to ultimate consumer. The study found that although pig value chain actors secure economic benefit but still there was

market inefficiency. Therefore, this study used the same approach S-C-P model to examine the indigenous beef cattle market performance in selected villages in Simiyu and Dodoma regions, Tanzania.

2.3.2 The beef sub-sector in Tanzania traditional

Traditional cattle keepers are the major source of beef in Tanzania. The National Ranching Company Limited (NARCO) is the major player in commercial ranching. The livestock sector has expanded rapidly in recent years and demand of livestock and livestock products is expected to continue growing strongly by the middle of this century, this is driven by population growth, increased income and urbanization (Otte *et al.*, 2012). According to SAGCOT (2011) per capita consumption of meat in Asia and Africa, Tanzania included; is expected to double in the next few years. With growing middle class and demand from tourists and international investors, Tanzania's meat demand is growing firmly (URT- MLF and ILRI, 2018). The country currently has a population of about more than 44.9 million people (NBS, 2017) which offers a sufficient market for agricultural products and in particular livestock and livestock products (Figure 3).

Domestic trade in cattle and beef (mainly fresh beef) can be categorized into informal and formal trade (Kadigi *et al.*, 2013). Most of the informal trade in live cattle and fresh beef takes place in rural areas between households that raise cattle and butcher men and/or none cattle keeping households. There are about 360 to 400 primary markets and 12 secondary markets in the country. On the other hand, formal trade in live cattle takes place in cattle markets through auctions (TMB, 2020).

Most of the secondary livestock markets are near urban areas for easy supply of cattle to butchers, who supply fresh beef to urban areas where there is high demand for meat

compared to rural areas. For instance, Pugu livestock market is one among of the secondary livestock markets that supplies cattle for meat supplies to Dar es Salaam city, which is the largest meat consuming centre in the country. Despite seasonal/quarterly fluctuation in the number of cattle supplied to the market, the annual cattle supply has been increasing overtime, implying increasing trend in beef consumption in Dar es Salaam, Mwanza and Arusha cities overtime (Kamugisha *et al.*, 2017).

In addition to the domestic market, the East African Community comprising of Kenya, Uganda, Rwanda and Burundi plus the Islands of Comoro offers more markets for livestock and livestock products (MAFC, 2011). Many Tanzania cattle are sold in Kenyan markets as live animals. Kenyan market attracts Tanzanian traders due to better prices offered. Apart from live animals export to Kenya, Tanzania also export live animals to Comoro, Burundi and Uganda. Dressed carcasses are exported to Oman, Kuwait, United Arab Emirates, Muscat and Democratic Republic of Congo (URT- MLF and ILRI, 2018).

As the number of urban middle classes are continuing to grow and with meat be a common food for the urban households the demand is expected to grow (Nkullo, 2013). The other fast growing beef market in Tanzania is the food service and tourism industry. Tourism has been growing very fast and specialized hotels and restaurants are increasing annually (Kamugisha *et al.*, 2019).

Usually, animals in the markets, whether primary, secondary or border markets were supposed to be weighed, graded and auctioned on site to ensure transparency in pricing, however; the situation is different in primary and secondary markets in the country. The primary and secondary markets in the country lacks the necessary infrastructures such as weighing balances, loading and offloading ramps, animal pens and fences (Nandonde *et*

al., 2017). Generally in these markets, price is determined through direct negotiation between the buyer and the seller. The buyer examines the quality and weight of the animal by visual observation, often this practice is a disadvantage to the side of the smallholder producer.

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The government has initiated and set up a livestock marketing information system to assist producers and traders with information that could help them to make good decision in trading. The information is provided through local newspapers as well as platforms provided by mobile phone companies and websites. The information provided is related to volume of produce, grades and price of animals however the initiative still facing some challenges include failing to reach the indigenous local beef producers and other value chain actors (Nkullo, 2013).
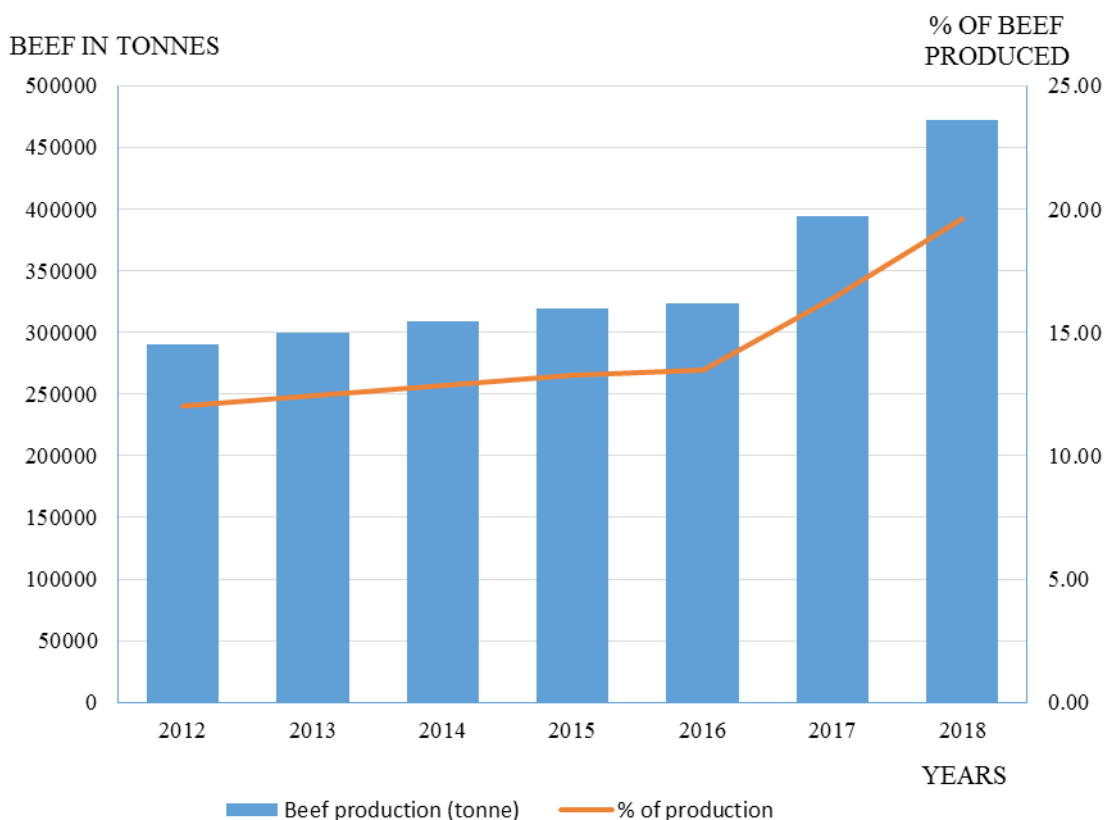
Figure 3: **Beef production trend in Tanzania: 2012-2018**
Source: **NBS (2019)**

2.3.3 Some factors that affecting indigenous beef cattle marketing

There are various factors that affect indigenous beef cattle marketing among the rural cattle keepers and traders in Tanzania, which range from production, processing up to delivery. Inadequate infrastructure imposes a serious constraint on the marketing of livestock (Kadigi *et al.,* 2013). Most livestock cattle keepers in Kongwa and Meatu districts are located in remote areas from the major markets where there is a serious lack of both physical and institutional infrastructure.

Tenga *et al.* (2008) observed that pastoralists and agro- pastoralists are the main producers of livestock in the region, located in remote areas, at times in inaccessible terrain and far from town centres. Coupled with the seasonal market supply patterns, indigenous beef

cattle keepers said tend to sell a limited number of animals; one to two cattle at a time, either to livestock collectors or by trekking to primary markets. This partly explains the poor livestock supplies to formal marketing outlets. The most important physical infrastructural weakness for rural cattle producers are related to transport and holding facilities.

Another observation by Mlote *et al.* (2013) is that most of agro pastoralists living in rural areas do not often sell their animals; they only sell when they urgently need money. This partly explains the poor livestock supplies to formal marketing outlets. In addition to the distance to formal markets, poor state of roads in rural areas affects the ability of cattle keepers to attract many buyers in their areas since bad road network is associated with very high transport costs (Kadigi *et al.*, 2013).

Lack of timely and reliable beef cattle market information (Ruhangawebare, 2010; Allegretti *et al.*, 2016) especially in rural areas has greatly contributed to limited agricultural marketing development in SSA developing countries including Tanzania. Well informed cattle keepers are able to make rational, relevant decisions and strengthen their bargaining power with buyers because well designed information systems create strong competitive advantage thus improve the efficiency in decision making. In Tanzania, market information flow to producers and buyers is sporadic and limited to personal contact as the main channel for communication. Limited price information compels producers in rural areas to accept low prices from middlemen especially when they are in dire need for cash (Kamugisha *et al.*, 2017). The status quo discourages cattle keepers from participating in the market.

2.4 Conceptual Framework

The study of market performance of indigenous beef cattle designed under market structure, conduct and performance concept. Based on different literatures, a certain market structure tend to influence its participants to conduct their business in a certain predictable manner (FewsNet., 2008). Then market conduct influence market performance. There is interrelation between market structure, conduct and performance. However, there are other factor(s) which affect performance such as costs, infrastructures and biological reasons. Under market structure variables such as market concentration, barrier to market entry and market information was considered. Also, in market conduct variables such as price determination (price strategies), product differentiation, buying and selling practice were observed. Then gross margin and market margin were used to show the performance. Factors which influence the gross margin like herding costs and herding size were also taken into consideration.
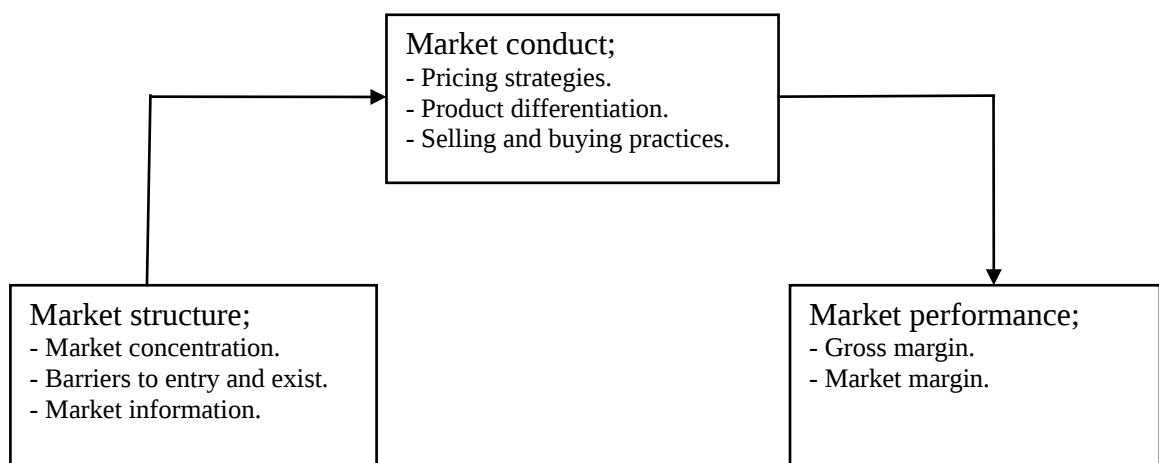
Figure 4:   Conceptual Framework

Source: Authors' conceptualization

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 The Study Area and Justification for Selection

3.1.1   Description of the study area

Meatu district is located within a semi-arid zone in Simiyu region, Tanzania. The district is one among five districts in Simiyu region. It is located between latitude 2º 57′ S and 4º 9′ S and longitudes 34º 8′ E and 34º 49′ E with an area of about 8835 km^2 (Figure 5). Its altitude (height) varies between 1400 and 1000 meters above sea level, Mwanhuzi is the administrative headquarter of Meatu district and is located about 136 kilometres from Simiyu region headquarter, Bariadi (MDC, 2016).

The district bordered with Bariadi district to the North; Ngorongoro and Karatu districts to the East; Mbulu and Iramba districts to the South and; Maswa and Kishapu district to the west. According to the national population and household census of 2012, the district has a population of 299 619 out of which 143 569 are males and 156 050 are females (URT, 2017).

Table 1:   *Meatu District administrative units and population distribution*

Meatu district	Characteristics
Area (sq. Km)	8 835
Divisions	3
Wards	19
Villages	100
Population (2012 Census)	299 619

Source: DED's Office, Meatu district (2019).
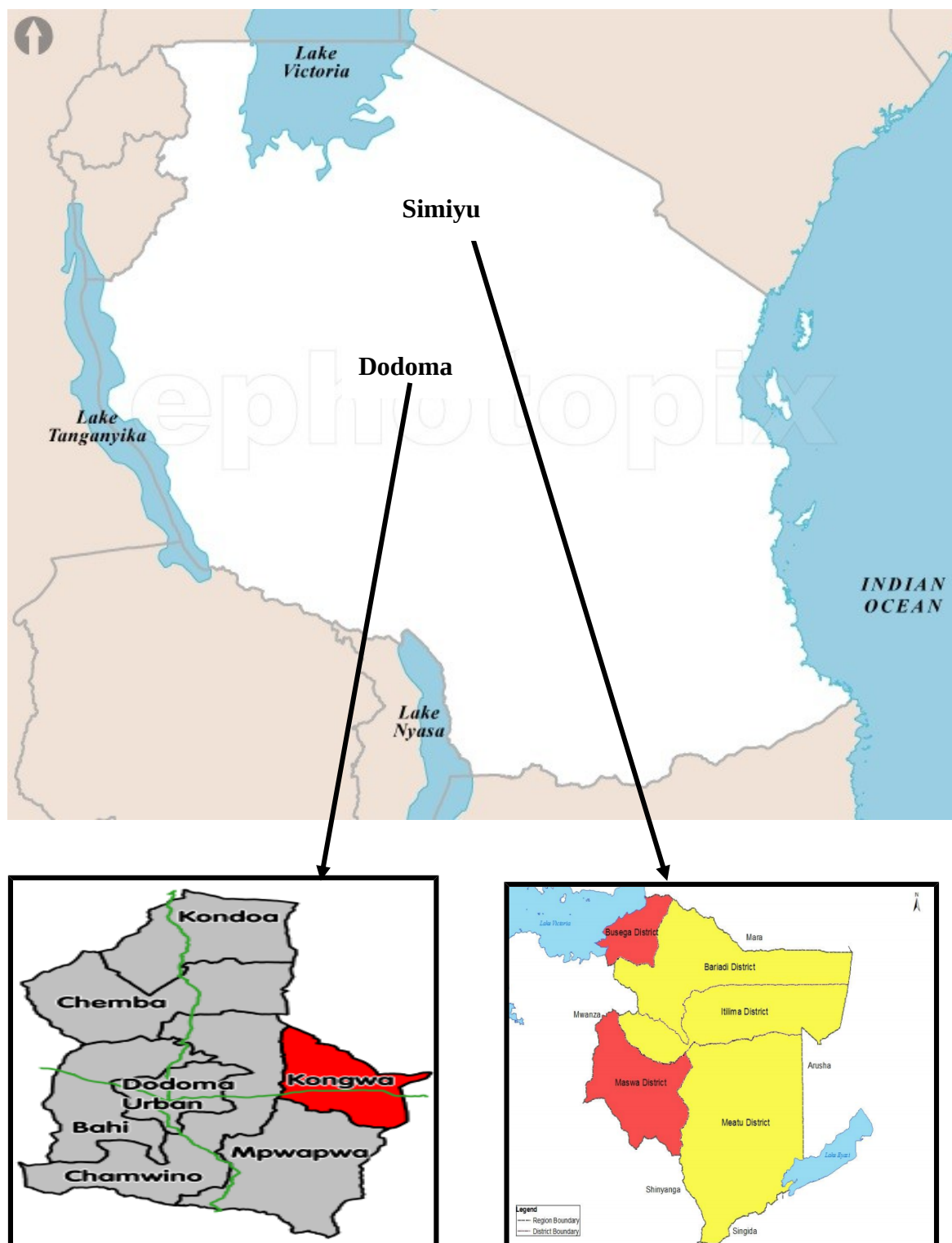
Figure 5: **A map of Tanzania showing Meatu and Kongwa district study areas.**

Source: **NBS (2019) http://www.nbs.go.tz/**

Meatu district can be classified as Semi-arid with a decrease in rainfall distribution from North to South. The Southern half of the district receives a mean annual rainfall of 400mm, while the Northern half receives up to 900 mm per year. The rainfall pattern is bimodal with most rain in November-December and March-April. Minimum and Maximum temperatures vary annually from 26.8ºC to 33.6ºC, respectively. The vegetation is purely savanna, characterised by short grasses with scattered shrubs and trees that are dominated by *Acacia* spp. and *Dichrostachys* spp. (MDC, 2016).

The district is potential for agriculture and livestock-rearing activities. About 84% of the district populations are drawn in subsistence farming. The main food crops include maize, sorghum, rice and potatoes, while the main cash crop is cotton. Meatu is the largest producer of cotton in Simiyu region. Livestock keeping also form a major occupations where the current estimates of livestock population stand at about 345 890 cattle, 215 421 goats and 154 820 chicken. People are also engaged in many other non-farm activities including casual labor, petty trading, beekeeping and Charcoal burning (MDC, 2016).

Kongwa district is located in the drought prone semi-arid area of Dodoma region, which is considered to be the heart of Tanzania. It is among the seven districts of Dodoma region. Kongwa district lies between latitude 5º 30' to 6º 00'S and longitude 36º 15' to 36º 00'E with an area of about 4041 km^2. Its altitude (height) stretches between 900 and 1 000 metres above sea level, Kongwa town is the District Headquarters and is located about 86 kilometres from Dodoma town. The District borders with Chamwino District in the western front; Kiteto District (Manyara Region) in the North; Gairo District (Morogoro Region) in the East and Mpwapwa District in the southern front. According to the national population and household census of 2012, the district has a population of 309 973 out of which 149 221 are males and 160 752 are females (KDC, 2012).

Table 2:   *Kongwa District administrative units and population distribution*

Kongwa district	Characteristics
Area (sq. Km)	4 041
Divisions	3
Wards	22
Villages	74
Population (2012 Census)	309 973

Source: DED's Office, Kongwa District, (2019)

Like most places in Tanzania, the climate in Kongwa is tropical while its microclimate is largely influenced topography/altitude. The annual temperature varies from minimum of 18° C to a maximum of 34° C. The main rain season is from November - April with an average annual rainfall of 400 - 600mm. The temperatures get slightly lower in the months of May to July. The mean annual rainfall is 700mm (KDC, 2019).

Major economic activities in the district are subsistence farming and livestock keeping and to a lesser extent natural resource harvesting and trade. The cash crops are sunflower, groundnuts, sesame, castor oil seeds and cashew nuts and the major food crops include sorghum, millet and maize. Other food crops not widespread and less preferred for cultivation are leguminous crops (pigeon peas, common beans and chick peas. Livestock keeping is the second major economic activity in the district. Livestock form an important part of family wealth and savings; they provide an essential source of income for the livestock owners. The current estimates of livestock population stand at about 117 599 cattle, 73 196 goats, 33 896 sheep, 7 690 pigs and 2 680 donkeys. Other animals include; 3 744 dogs, 866 cats, 376 877 chickens and 5 627 ducks Labour force engaged in agricultural farming is 89.8% (of which farmers 85.1% and livestock keepers is 4.7%) (KDC, 2019).

3.1.2 Justification for selection

The study was conducted in Tanzania specifically, Meatu and Kongwa districts in Simiyu and Dodoma regions, respectively where a number of livestock keepers, traders and butchers were examined. The two districts are dominated by pastoralists and agro-pastoralists whose raising a livestock is among the main economic activities and a source of income. Also, there is a large number of beef cattle traders, and butchers dealing with indigenous beef cattle business (URT, 2016). Meatu and Kongwa have been selected because they possess a large number of cattle (around 345 890, out of region total 1 500 000 cattle, and 117 599 out of region total 1 812 427 cattle, respectively) mostly dominated by indigenous breeds and a number of auctions in primary market (URT, 2017).

3.2 Research Design

This study adopted a cross-sectional research design. The cross-sectional research design allows data to be collected at a single point in time and used descriptive analysis and for determination of relationships among variables (Nkullo, 2013). The design was favourable because the nature of the study objectives needed the data to be collected at a single point in one time by using a semi structured questionnaire and checklist questions.

3.3 Sampling

3.3.1 Study population, sampling frame and study units

The study covered two districts; Meatu and Kongwa. Purposive sampling technique were used to identify the regions and districts. Then multi-stage random sampling were used in selection of wards, villages and actors along the indigenous cattle beef value chain for the survey. The study population were 180 indigenous beef cattle keepers (Meatu: 89; Kongwa: 91), 14 traders (Meatu: 7; Kongwa 7), and 21 retailers/butchers (Meatu 12;

Kongwa 9) as it was obtained from wards/villages sampling frame where the heads of these households were the study units.

3.3.2 Sample size

Based on the sample size formula by Kothari (2004), the study covered 182 key actors and 14 other key informants includes Meat inspectors, tax collectors, District Livestock and Fisheries Officers (DLFO) and zonal veterinary centres (Table 3). The sample size is reasonably large especially in conformity with Agresti and Finlay (1997) argument that around 30 cases seems to be the bare minimum for studies in which statistical data analysis is to be done. In addition, the choice of this sample size is realistic due to limited time and funds but fulfills the requirements of the study for meaningful analysis.

The summary of the sample size based on the player/actor is presented in the Table 3.

Table 3:　　　**Distribution of sample sizes for the survey**

		Interview location		
SN.	**Actor categories**	**Meatu**	**Kongwa**	**Total**
1.	Cattle keepers (pastoralists and agro pastoralists)	73	74	147
2.	Traders (Auction-primary and secondary)	7	7	14
3.	Retailers (butcher)	12	9	21
	Total	**89**	**93**	**182**

Source: Fieldwork data (2020)

3.4 Sampling Procedure

Purposive sampling was used to select 12 villages from two Districts of Meatu in Simiyu Region and Kongwa in Dodoma of which six villages from Meatu and six other villages from Kongwa District. Six villages from Meatu District namely; Imalaseko, Kubiga, Mwabuzo, Mwamishali, Mwandoya and Kimali and six villages from Kongwa namely; Mtanana, Kongwa, Ugogoni, Sejeli, Kibaigwa and Songambele were selected (Appendix 2).

Prior to random sampling the households were identified from wards/villages sample frame with the assistance of District Livestock and Fisheries Development Officers (DLFDOs); Ward and Village Livestock Extension Officers (WEO and VEO) and village and/or hamlet leaders. The names of households were inserted in the tablets after identified through simple random probability selection from sample frame. In addition to that mobile phone numbers for extension officers at either ward or village level were obtained for quick communication and later identification of the sampled households by the enumerators. In each actor category, different criteria were used as follows;

3.4.1   Selection of beef cattle keepers

The target study unit for that category was indigenous beef cattle keepers who most of them were agro-pastoralist. The last stage of sampling was obtaining at least 12 cattle keepers from every selected village for the interview. This was implemented using Systematic Random Sampling (SRS) after getting the sampling frame from the livestock wards/villages' extension offices.

3.4.2   Selection of beef cattle traders and butcheries.

The study looks at two categories of indigenous beef cattle traders: wholesalers and retailers/butcheries. 7 traders who participate in auction at primary markets in each district, Meatu and Kongwa were selected through purposive sampling for interview from the villages sample frame. Further, 12 and 9 butcheries who selling indigenous beef were selected through purposive sampling in Meatu and Kongwa districts, respectively from wards/villages sample frame.

3.5 Questionnaires Development

Both semi-structured questionnaire (Appendix 4, 5 and 6) and checklist (Appendix 1) were prepared to gather information about the market structure, conduct and socioeconomic characteristics of respondents. Specifically, the semi-structured questionnaire was used to interview cattle keepers, traders, and butchers while the checklist was used to interview key stakeholders including district livestock officers, ward extension officers, slaughter slab operators, meat inspectors and auction officials. The questionnaires were developed for each actor (i.e. cattle keepers, traders, and butchers) (Appendix 4, 5 and 6) and coded in Computer Aided Personal Interviews (CAPI) using Open Data Kit (ODK) platform. The collected data were used to estimate gross margin, added value, market margin and factor affecting gross margin of indigenous cattle beef gross margin. The questionnaire was built based on the study objectives through literature review and discussions with experienced researchers.

3.5.1   Pre-testing of the questionnaire

In order to ensure reliability and validity (face and content validity) of the instrument (questionnaire), the questionnaire was evaluated before being used in the actual field work at the study area. This was done by administering the questionnaire to respondents in villages that were not part of the actual study.

Pre-testing of questionnaire was conducted in two wards, Melela and Mzumbe, Mvomero district, Morogoro region. Each enumerator had to interview one respondent from each node of the value chain where a total number of 20 respondents were interviewed. The administering of the questionnaire was designed to take a minimum of 30 minutes to a maximum of 2 hours depending on the actor and roles played along the value chain. The

questionnaire was improved during in-class training and after pre-testing. The butcheries traders were interviewed in Morogoro municipality.

3.5.2   Data collection methods

According to the nature of the topic and study objective required a reliable and valid facts from respondents and other key sources of relevant information. Both primary and secondary data collection methods were used to obtain the information required for the study. The study therefore adopted methodological triangulation concept whereby several data collection methods are used in collecting both quantitative and qualitative data (Mshana, 2014).

3.5.3   Primary data collection

Primary data for this study were collected through semi structured questionnaires and checklist enabled to get understanding of issues related to the market performance of indigenous beef cattle under the study area. The surveys involved personal interviews using designed, pretested and adjusted   semi structured questionnaires and checklist. The questionnaires were designed for livestock keepers (Appendix 1); the livestock traders (Appendix 2); and last for the butcheries (Appendix 3).

The questionnaires were administered by a researcher and enumerators managed to interview a total of 196 respondents (182 direct respondents and 14 key informants). The data collection organization and method were designed to get and process quality information without delay. Thus, both enumerators and field supervisors were trained on the data handling using open data kit (ODK).

3.5.4   Questionnaire administration

The questionnaires were administered from March to April 2020 in both districts with the assistance of Village Livestock Extension Officers (WEO and VEO) and village and/or hamlet leaders. To ensure high rate of response for the interview, the respondents were interviewed at their respective markets areas after buying and selling activities.

3.5.5   Secondary data

These are data obtained from literature sources or data collected by other people for some other purposes. Thus, secondary data provide second hand information and include both raw data and published ones (Mkani, 2013). In this study secondary data were obtained from livestock market managements; the respective District Livestock and Fisheries Development Office (DLFDO); reading various publications from the Ministry of Agriculture, Food security and Cooperation (MAFC); Sokoine National Agricultural Library (SNAL); and Internet.

3.5.6   Data Processing and analysis

Collected data were downloaded from the server and saved in Excel format. The data were then exported to the Statistical Package for Social Science (SPSS) version 21 for aligning the data with the code book and refining some data and value labels. Data were also exported to Stata 14 for splitting the multiple response sets. The multiple response sets exist in rows such that for example if a respondent selects multiple selection 2, 5, 9; the data appear as single variable with the selections 2 5 7 9. These were split for each to have an independent variable. Stata has an easier command that can split variables that exits as multiple responses in rows to variables in columns based on parsing character. After that, data were cleaned to remove outliers. Then, both descriptive and explanatory (inferential)

analyses were carried out based on specific objectives of the study by using Stata computer program version 14 and Microsoft Excel.

3.5.7 Descriptive analysis

Descriptive analysis was conducted to depict the levels of various discrete variables. Frequencies, percentages and chi-square techniques were used to indicate levels, relative strengths and distributions of respondents.

3.5.8 Explanatory (inferential) analysis

Inferential analysis involved the use of actors' budget to depict gross margin analysis and market margin. The benefits accrued by the market participants (value chain actors) along the value chain are estimated using the gross margin analysis (GM) method and value added (VAD) in each node. Also, the multiple linear regression statistic has been used to show the association among the variables.

3.5.9 Assessment of livestock market structure and conduct

Under market structure and conduct, the areas studied included; market concentration, barrier to market entry, market information, vertical integration, price strategy and selling and buying practice. The concentration ratio (CR) was found by computing the number of cattle beef purchased by largest four firms (buyers) per month divided by total number of cattle beef handled in the markets. Market concentration index was used to identify the market type;

$$CR=C=(XP/IP)*100 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where, CR = C = Market concentration ratio index.

XP = Number of indigenous beef cattle purchased by largest buyers.

IP = Total number of livestock handled in a given livestock market.

Table 4: Description of variables in market concentration and net profit

Variable	Description	Measurement
Concentration ratio (CR)	Market concentration index used to determine the market power.	Bain's table index ration was used to classify the market power.
Indigenous beef cattle purchased.	Indigenous beef cattle purchased by largest buyers.	Number of indigenous beef cattle purchased.
Livestock handled.	Livestock handled in a given livestock market. held or sold.	Total number of livestock. cattle held or sold.

The Bain table ratios was used in drawing conclusion upon the structure of market where a concentration ratio that ranges from 0% to 50% may indicate that the industry is perfectly competitive and above 50% imply imperfect market. According to Ajala and Adesehinwa (2008), the higher the level of concentration, the higher the inefficiency in the market structure and vice versa given other conditions remain the same.

3.6 Gross Margin (GM) Analysis

Debertin (1993), defined gross margin or gross profit as the difference between Total value product (TVP) and the Total Variable Costs (TVC). As a proxy of profit, gross margin is also used as a measure of enterprise profitability. There are various measures of profitability of the enterprises which are Gross Margin (GM), Return on Investment (ROI), Benefit-Cost Ratio (BCR or B/C), Internal Rate of Return (IRR), and Marketing Margin (MM). The GM remains an important measure of resource efficiency in small and Medium Enterprises. Debertin (1993) identified some problems of using GM as a measure of profitability, which are failing to deduct the opportunity costs for the money invested in the enterprise.

However, Kotler (2000) argued that GM is still the most satisfactory measure of resource efficiency for Small and Medium Enterprises. It gives a good indication of the financial health of enterprises; and shows the deep insight into traders' management efficiency of the enterprises. Gross Margin Analysis (GMA) was used to estimate profit for beef cattle actors. GM was calculated using the following formula:

$$GM = \Sigma(P_i Y_i) - \Sigma(P_{xj} X_j) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Where, GM = Gross Margin for the beef cattle market actors (TZS),

Σ = The summation sign,

P_i = Unit price of the ith indigenous beef cattle (TZS),

Y_i = The ith indigenous beef cattle, for i = 1, 2,……, n,

P_{xj} = Unit cost of the jth variable inputs (TZS),

X_j = The jth variable inputs used in keeping beef cattle (for j = 1, 2, 3……, m),

Table 5: Description of variables in function

Variable	Description	Measurement
Gross Margin.	Gross earnings obtained after selling beef cattle.	TZS/animal.
Beef cattle.	Indigenous beef cattle held or sold.	Number of indigenous cattle held or sold.
Variable costs.	The unit costs of variable inputs used to keep the beef cattle.	TZS.

The size of gross margin depends on the services provided, market structure, market price, durability of the product, weight as well as the distance between producers and consumers and may be influenced by market information especially for short-run margins.

3.6.1 Market margin analysis

Marketing margin was used to determine the marketing cost structure as well as the marketing margin spread between all the participants in the market. The marketing margin

refers to the difference between the prevailing prices at the two ends of the marketing ladder at the time when transactions take place (Adesehinwa and Ajala, 2008). The marketing margin shows the fraction of the consumer expenditure as a commodity that is received by the producer and each of the marketing agents. The marketing margin is used to give a close approximation of the market performance. The marketing margin usually expressed in percentages form. The higher marketing margin indicates inefficiency because a high cost is incurred in the provision of marketing services.

Market margin = $\dfrac{\text{Selling price - Supply price}}{\text{Selling price}}$ x100

Where;

Selling price is the retail price.

Supply price is the producers' price.

3.6.2 Determinants of the indigenous beef cattle profitability

A linear regression model was used to analyse the determinants of farmers' profitability. According to the nature of the data, gross income, log model function was used to transform the data so that to limit the effect of outliers and to give the direct estimate of elasticity. Then, the multiple linear regression model was used to determine the relationship between gross margin and variables that are hypothesized to have an effect on gross income of indigenous beef cattle keepers (Gujarati an*d* Porter, 2009). The model, include the variables such as herd size, herding costs, age, business training, market information, and access to credit. The gross margin function was estimated as:

$GM_{ij} = f(X_{ij})$…………………………………………………………………………….(3)

The profit equation will be estimated as:

$Y_{ij} = b_0 + b_{ij}X_{ij} + \varepsilon_{ij}$ ……...………………………….……………………………........ (4)

for i = 1,2,3,......n, and j = 1 and 2.

Where, Y_{ij} = Gross margin for ith respondent in jth district,

b_0 = Constant term (y-intercept),

b_{ij} = Coefficients for independent variables,

X_{ij} = Independent variables,

ε_{ij} = Error term (disturbance term), representing all factors that affect variation

of the dependent variable but are not captured by the independent variables.

Therefore, the multiple regression equation profit and related variables was expressed as;

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 \ldots \ldots \ldots \ldots \ldots \ldots (5)$$

Where, Y = Net profit margin per animal (TZS.),

X_1 = Herd size (Numbers of cattle),

X_2 = Herding cost (TZS/Animal),

X_3 = Experience (number of years farmer used to keep cattle),

X_4 = Business training (dummy; Yes= 1, No= 0),

X_5 = Market information (dummy; Yes=1, No=0),

X_6 = Access to credit (dummy; Yes=1, No=0).

Table 6:   Description of variables used in multiple regression model

Variable	Expected sign	Description	Measurement
Gross margin	(+/-)	Profit per animal obtained between total value product less total variable costs.	TZS/animal.
Herd size	(+)	Size of the herd own by actor. purchase.	Number of animals.
Herding costs	(-)	Costs of a casual labor used for herding cattle.	TZS/animal
Experience	(+)	Reasonable number of years a farmer used to keep cattle.	Number of years
Business training	(+)	If a farmer obtained Business technical training	Yes = 1 No = 0
Market information	(+)	If a farmer obtained market information	Yes = 1 No =0
Access to credit	(+/-)	If a farmer accessing credit	Yes = 1; No = 0

3.6.3   Limitation of Multiple Linear Regression (MLR)

In many cases the limitation of MLR model emanated from violation of the basic assumptions of the model. The commonest problems encountered in the regression analysis include abnormality, multicollinearity, heteroscedasticity, and autocorrelation. However the commonest problem in linear multiple regression models is multicollinearity (Gujarati an*d* Porter, 2009). As a first attempt during the model building process, various types of relationships (for example, linear and quadratic) between the dependent variable (y) and each independent variable (Xi) were examined on scattered graphs. Then, the reliability and stability of the regression model was then tested against violation of Ordinary Least Square (OLS) estimation assumptions that is: the normality distribution of residuals, autocorrelation, heteroscedasticity and multicollinearity.

3.6.4 Analysis of challenges facing indigenous beef cattle actors

Henry Garrett's ranking technique was used to arrange most challenges facing the performance of indigenous beef. To find out the most significant factor which influences the respondent, Garrett's ranking technique was used. As per this method, respondents have been asked to assign the rank for all factors and the outcomes of such ranking have been converted into score value with the help of the following formula:

Percentage position = $100 * (R_{ij} - 0.5)/N_j$

Where,

R_{ij} = Rank given for the ith variable by jth respondents.

N_j = Number of variables ranked by jth respondents.

With the help of Garrett's Table, the percent position estimated is converted into scores. Then for each factor, the scores of each individual are added and then total value of scores and mean values of score is calculated. The factors having highest mean value is considered to be the most important factor (Dhanavandan, 2016).

3.6.5 Limitations of the study

Information sought from some of the respondents was based on past experiences; therefore, it was somehow hard to recall especially considering that the majority of those respondents did not keep records and some provision were made. Again, some respondents were a bit reluctant to provide sensitive details such as questions involved their income earned and number of cattle and sample frame found in districts is very limited particular for indigenous beef cattle traders. In overcoming these limitations, the research team spent some additional time looking for respondents and sometimes call-backs and physical revisits was done.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Respondents' Socio-economic Characteristics

The characteristics of respondents have a significant socio-economic connotation on production, marketing and marketing decision on where and when to sell the produce. Also, demographic characteristics of households are essential when analyzing economic data because such factors influence the households' economic behaviour (Meshack, 2015). Therefore, this section describes the characteristics of sampled households based on age, primary occupation, education level and experience in beef cattle activity.

4.1.1 Indigenous beef cattle keepers

Primary occupation varies across the two districts (p<0.05). The variation in primary occupation is due to many cattle keepers in Meatu (93.15%) reporting crop farming as their primary occupation while only 55.4% of respondents in Kongwa district reporting to practice crop farming (Table 7). Generally, results show that, 43.24% of the respondents in both districts depend on indigenous beef cattle keeping as their main second economic activity after crop farming. This is a signal that if beef cattle keeping is properly managed, will contribute significantly to the household's levels and the region's economy at large.

According to Lwaho (2014), education is important tool to manage the business and make the right business decisions. There is no significant variation in the level of education and age across the two districts. In the two districts many of the cattle keepers (74.83%) have at least primary education, (9.52%) attended secondary education, (0.68%) attended college education and (14.86%) do not have any formal education (Table 7). These results indicate that very few highly educated people were engaged in keeping indigenous beef

cattle while the majority of them being primary school graduates. This result conforms with the findings of Mlote (2013), who reported that the majority of the people who keep indigenous beef cattle in Lake Zone area have no formal education.

On the other hand, the results show that cattle keeping is dominated by adults (36-59 years) who comprised 66.67% of the farmers. The age distribution of the respondents showed that the majority range between 20 and 85 years old with only 21.09% of the respondents being 60 years or older (Table 7). This indicates that indigenous beef cattle activity in study area is operated by people within the productive age. Kadigi *et al*. (2013) argues that age influences the income generating capacity of an individual, whereby a direct relationship is experienced. Likewise, age determines individual maturity and ability to make rational decisions. Additionally, more than half of the indigenous beef cattle keepers have access to credit.

Table 7:   Socio-economic characteristics of cattle keepers across the districts surveyed

		District			
		Meatu	**Kongwa**	**Total**	
Socio-economic variable		(n=73)	(n=74)	(n=147)	χ^2 **statistics**
Age categories	Youth (≤ 35 years)	6	12	18	2.1888 (0.335)
	Adult (36 to 59 years)	51	47	98	
	Old (≥60 years)	16	15	31	
Education level	No formal education	11	11	22	6.1467 (0.105)
	Primary education	59	51	110	
	Secondary education	3	11	14	
Primary occupation	College education	0	1	1	
	Cattle keeping	5	32	37	27.3852 (0.000)
	Business	0	1	1	
	Crop farming activity	68	41	109	*
	Wage employment	0	0	0	
Access to credit	Have access	42	20	62	12.9885 (0.000)*
	Do not have access	53	32	85	

* Significant at the 5% probability level; Values in brackets are ρ-values

4.1.2   Indigenous beef cattle traders

Traders (traders of indigenous beef cattle) work in three stages of markets and marketing. There are primary markets, secondary markets and border markets. Primary markets refers to indigenous beef cattle market that operated by local governments where producers (indigenous beef cattle keepers) meet with livestock traders. Secondary market is a regional integrated indigenous beef cattle markets where traders from different regions meet with other beef cattle traders. Border markets is the national markets where indigenous beef cattle traders from different regions meet with export traders (TMB, 2019).

Traders in Meatu participates in primary markets within the region such as Mwanhuzi, Sanga-itinje, Nyashimo, Bariadi, Dutwa, and Bukundi. They transport cattle to secondary markets in Tabora, Mwanza, Musoma and Arusha regions. Some have access to border markets in Sirari, Arusha and Dar es Salaam. Likewise, traders in Kongwa district participates in the primary markets within the district and also secondary markets in the nearby places especially Dosidosi in Manyara region and Border market in Pugu in Dar es Salaam.

There is no significant variation in age of traders across the two districts ($\rho>0.05$). Youth (less than or equal to 35 years of age) are many (60%) in cattle trading. There are both new entrants in the business and the other experienced traders. The minimum years in indigenous beef cattle trading business is 7 years while the maximum years is 16 years. The average years in the cattle trading business is 9.6 years. The long experience in indigenous beef cattle trading would enable the traders to increase marketing skills and improve quality of cattle (Meshack, 2015). Many traders (40%) they do retail and village aggregation (Table 8).

Table 8:   Socio-economic characteristics of cattle traders across the districts surveyed

Socio economic variable			Meatu (n=7)	Kongwa (n=7)	Total (n=14)	χ² statistics
			District			
Age categories (%)	Youth (≤ 35 years)		50	66.67	60	0.1389 (0.709)
	Adult (36 to 59 years)		50	33.33	40	
Years in trading	Mean	9.6				
	Max	16				
	Min	7				
Type of trade (%)	Wholesaler	20				
	Middleman	20				
	Retailer	40				
	Beef fattening trader	20				
Education level (%)	No formal education		80	70	55	
	Primary education			24	30	
	Secondary education		3	5	13	
	College education		0	1	2	

Values in bracket is ρ-values.

4.1.3   Indigenous beef cattle butcheries (Retailers)

Meat shops/butcheries are key in retailing beef cattle in the two regions surveyed. Retailers are characterized with limited access to training services. Results show only 33% of butcheries have received technical training from VETA, TFDA and GS1 barcodes Tanzania. This may explain why most of the traditional butchers lack entrepreneurial skills; enough bargaining power when they sell beef; initiative in improving the quality of their beef and finding good markets for their beef hence less or little market participation. Further, it shows that 85.71% of these trainings were free (Table 9). The findings concur with those reported by the MLF and ILRI (2018) that, farmers who were accessible to the livestock extension service found to participate more in selling their livestock product in Tanzania.

Results indicate that given the opportunity, more than 50% of the retailers would need training on business management to enhance quality and the general beef marketing activities. In retailing business also, there are both new entrants in the business and the other experienced.

Table 9:   Business training to cattle retailers/butcheries across the districts surveyed

		District		
		Meatu	**Kongwa**	**Total**
Socio-economic variable		(n=9)	(n=12)	(n=21)
Received training (%)	Yes	33.33	33	33.33
	No	66.67	66.67	66.67
Free training (%)	Yes	0	25	85.71
	No	100	75	14.29
Years in trading	Mean	12.86		
	Max	36		
	Min	1		

The average number of years many butcher businesses has been in the business is 12.86 years. The minimum is 1 year and the maximum are 36 years. Results imply that these butcheries businesses are being run by experienced people. The variations in the level of experiences suggest existence of easy of entry and exit in the business.

The results show most (95.24%) of the retailers under the butcheries selling mixed beef meat. Many butcheries were involved in selling other type of beef cuts/types including steak, mixed, liver and offal. In Dodoma and Simiyu, not all the butcheries sells steak. It is only 4.76% of butchers who selling steak beef meat (Table 10).   All the butcheries involved in the survey sells mixed.

Table 10: *Product categories sold in butcheries*

	District		
	Meatu	**Kongwa**	**Total**
Product category (%)	(n=9)	(n=12)	(n=21)
Steak	0	11.11	4.76
Mixed	100	88.89	95.24

4.1.4 Mapping of Indigenous Beef Cattle Value Chains

A range of production and marketing functions undertaken in the beef cattle value chain are production, transportation, processing, retailing and consumption. To understand the indigenous beef cattle marketing, consider the Figure 6 below which showing the indigenous beef cattle value chain actors and flow of products (beef cattle and beef).

Key:

⟶ Flow of products (beef cattle/beef).
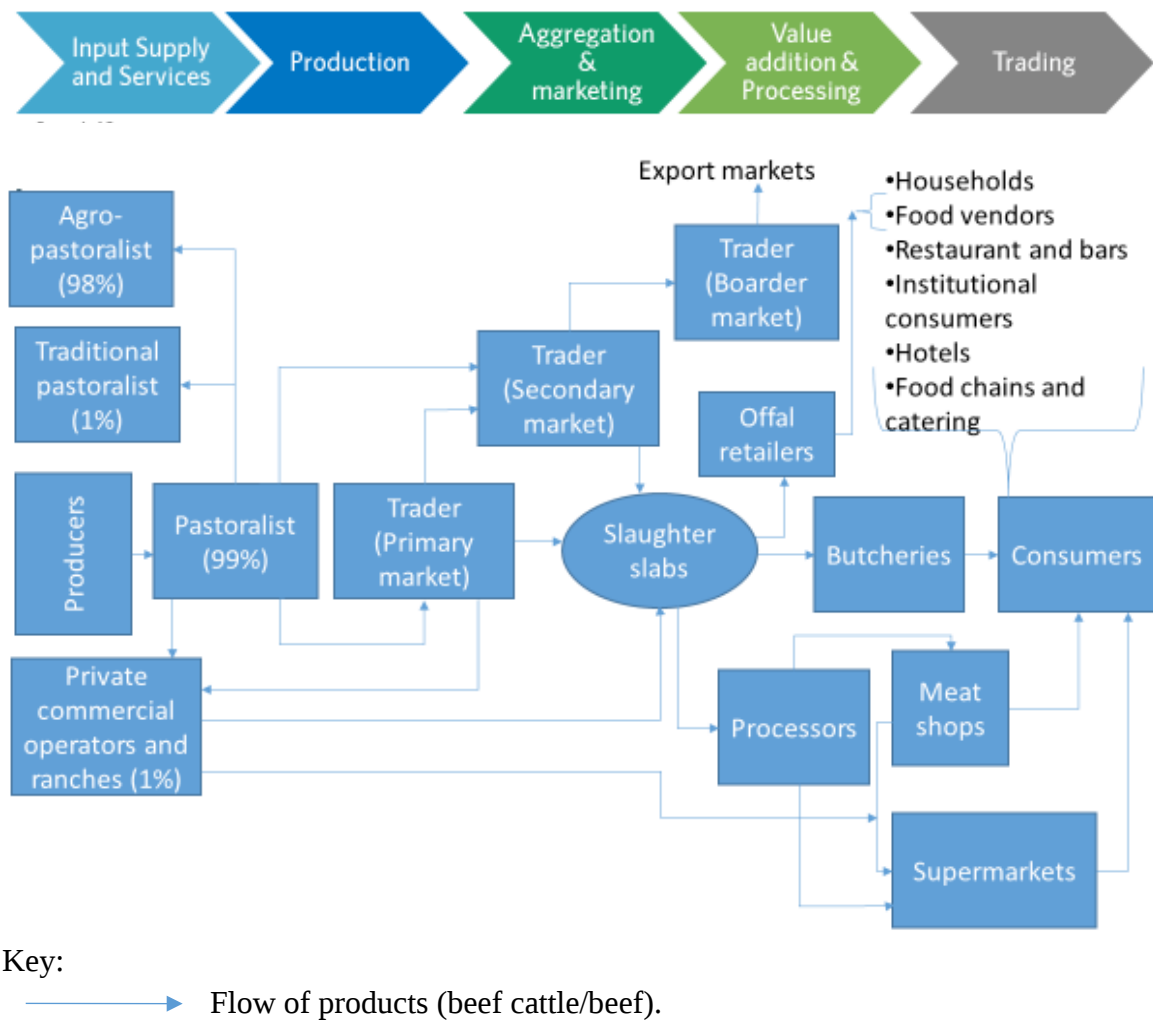
Figure 6:   The current beef cattle value chain structure

4.2 Indigenous Beef Cattle Market Structure

4.2.1   Barrier to market entry

The findings in Table 11 show that, capital requirements served as the main barrier to start

and operating livestock business. About 75% of the traders interviewed indicated that there

were barriers to market entry, and among the barriers mentioned capital attributed to

66.67%, 22.22% lack of enough business knowledge and 11.11% price volatility.

Table 11: *Simiyu and Dodoma: Barriers to entry in indigenous beef cattle market*

	District		
Type of market barrier (%)	Meatu	Kongwa	Total
Capital	71.43	50	66.67
Knowledge of the business	28.57	0	22.22
Price volatility	0	50	11.11
Total			**100**

The study used operating capital as a measure of the initial capital needed for potential

entrants. Analysis showed that the mean value of operating capital for the indigenous

cattle traders interviewed was TZS. 83 890 per cattle. These costs include, among others,

loading and unloading costs, market fees, costs of casual labor, costs of acquisition of

permits (buying and selling permits) and transport cost, as well as, the unofficial costs and

fines incurred enroute, especially to the terminal market of Pugu in Dar es Salaam and

Dosidosi in Manyara.

The mean value of relevant cost required when you want to invest in butcher business was

TZS. 6 005 595.92 which includes building costs (rent), the costs of slicing machine,

slicing equipment (*Panga, Visu, Shoka*), chopping board, mincer machine, weight scale,

hooks, rent, refrigerator, boots and others. Meanwhile, the mean value of operating capital

for the indigenous cattle traders interviewed was TZS. 83 890 per cattle while the mean

operating capital for the beef cattle butcher was TZS. 897 513.59 per month and sold an average of 1776.69 kgs of beef per month. The implication is that indigenous beef cattle trader with less than the mean operating capital of TZS. 897 513.59 per month, might be out of the business unless has an access to credit/loans facilities. Similarly, cattle butcher with less than investing capital of TZS. 6 005 596.92 might be unable to run the business properly unless has an access to credit facilities.

The results show that the size of investment and operational capital could act as a barrier to potential traders. Comparable findings have been reported by Meshack (2015), who observed that capital requirements serve as an entry barrier since only those who have enough capital to cover market costs can enter the market. Therefore, provision of credit facilities to small traders will improve the easy of entry to the cattle business.

4.2.2 Market information

The findings on Table 12 show that 79.59 % of indigenous beef cattle keepers got information about cattle market and available price from their fellow cattle keepers/friends while 13.61 need to go to the market and take available cattle prices on that day for business transactions. There was a lack of easily accessible and reliable formal market information especially on prices. As a result, this led to the problem of information asymmetry where the traders have more information than the cattle farmers, which is a market imperfection thereby maddening negotiations between the sellers and traders. The availability of market information would boosts confidence of farmers who are willing to market their produce.

Table 12:   Major sources of market information for indigenous beef cattle keepers

	District		
	Meatu	**Kongwa**	**Total**
Source of information (%)	(n=73)	(n=74)	(n=147)
Friends/fellow cattle keepers	59	58	117
Direct visit to the markets	11	9	20
Traders	3	4	7
Others	0	3	3
Total			**147**

According to Petro (2019), access to market information has a positive influence on the decision of livestock farmers to participant in the market. This implies that, access to market information and knowledge makes a farmer more informed about market requirements in terms of price, quality, and the right number of livestock which are needed by buyers.

4.2.3   Market concentration index

According to Bain (1959), the concentration indices (CI) were obtained by dividing the volume traded by four largest indigenous beef cattle traders over total volume handled in a market per month in Meatu and Kongwa districts. The market was found to have numerous buyers and sellers. The results revealed a concentration ratio of 32.32% and 28.01% for Meatu and Kongwa district, respectively, which indicate that the market for the indigenous beef cattle was unconcentrated. This might be due to lack of enough capital as most of indigenous beef cattle traders own small capitals and hence can only buy a small amount of beef cattle. Also, most of the indigenous beef cattle traders did not rely on one market for their purchase of livestock, normally they were itinerants, as the markets were conducted in weekly basis the traders moved from one primary market to another purchasing livestock, while other traders purchased at the farm gate. This findings comply with the results reported by Rupindo (2009), who indicated that the Morogoro urban's livestock market structure has the characteristics of a perfect competitive market.

Table 13: **Summary of indigenous beef cattle** *market concentrations and their components per month*

	District	
	Meatu	**Kongwa**
Four largest buyers	(No. of indigenous beef cattle)	(No. of indigenous beef cattle)
First largest buyer	192	380
Second largest buyer	300	466
Third largest buyer	336	480
Fourth largest buyer	360	490
Total	1188	1816
Amount handled	3676	6484
Market concentration	**32.32%**	**28.01%**

4.2.4 Integration in the market

Analysis revealed that 25.14% out of the 14 sampled indigenous beef cattle traders were also beef cattle keepers while the remaining 74.83% were only buyers who assemble to sell in the weekly market. It was found that 10% of the indigenous beef cattle traders were wholesalers, 35% middlemen while 50% were retailers and remain 5% were beef fattening trader. This implies that some of the producers are also traders operating in the same market. The market could therefore be said to be integrated since some of the respondents coordinate production and marketing decisions in the industry. This vertical integration could result in higher marketing margin because the traders through integration could gain market power and control over the price paid by consumers. Similar findings have been reported by Adesehinwa and Ajala (2008) who observed vertical integration in pig marketing in Zango Kataf Local Government Area of Kaduna State, Nigeria.

4.3 Indigenous Beef Cattle Market Conduct

4.3.1   Marketing arrangements and dynamics in the study area

4.3.2   Indigenous Beef cattle markets in Meatu and Kongwa districts

The study found that, there were more than 9 operating primary auction beef cattle markets in Meatu district and more than 7 in Kongwa district. Mhonze and Mbande are the largest secondary markets in Meatu and Kongwa districts respectively. These markets

usually operate in a weekly bases. Many beef consumed in the both regions come from these two district, Meatu and Kongwa where primary markets are predominant.

Indigenous beef cattle keepers; traders and retailers face various dynamics in relation to markets and marketing of beef cattle and beef cattle products. Many (72.1%) of beef cattle keepers sell their cattle at primary markets and some sends to the auction. Few cattle keepers have participated in the high-level markets (secondary and border markets).

Table 14:   Markets used in selling cattle

Markets used in selling cattle (Valid cases n=147)	Responses		Percent of Cases
	n	**Percent**	
Primary Market (At the household premises)	102	53.5	72.1
Primary market (at the auction)	64	32.3	43.5
Secondary market auction	25	12.6	17
Border market auction	3	1.5	2
Total	**198**	**100**	**134.7**

Many cattle keepers sell their cattle at the households. Results from Table 14 show that 53.5% prefer selling at the household which leads to them avoiding some costs associated with selling at the auctions. It shows that 33% report to have not incurred any cost during selling of their cattle. Those few who had sent cattle to the auction report transport costs and movement permits/market charges to be the main cost items incurred.

During selling of cattle, cattle keepers sell mainly to traders. Few sells directly to village aggregators and middlemen. Market preference is driven by both price and non-price factors. Reasons driving preference of cattle keepers selling at the household premises include the auctions being too far from the households; avoiding some market and transportation charges; and nonexistence of price differentiation when selling at the household and at the auctions. Those who prefer selling at the auction mention opportunity to accessing competitive pricing at the auction; and higher chance of selling due to many

buyers at the auction to be the main reasons. Most of the cattle keepers' (51.5%) report that buyers to prefer cattle with an average weight of 100-200kg.

4.3.3 Source of Indigenous beef cattle

The results from Table 15 indicated that about 60% of sampled indigenous beef cattle traders bought cattle from traditional cattle keepers, 20% bought cattle from ranches, particular to those who operated in Kongwa district, Dodoma while the remaining 20% got cattle from other sources. This implies that the marketing chain for indigenous beef cattle in the study area is a long one in that, livestock can pass through many market participants or succession of markets before reaching the final consumer, for example indigenous beef cattle could pass through up to three traders in the same market before reaching the butcher.

Table 15: *Source of beef cattle in primary markets*

	District		
	Meatu	**Kongwa**	**Total**
Source of beef cattle (%)	(n=7)	(n=7)	(n=14)
Traditional cattle keepers	50	66.67	60
Ranches	0	33.33	20
Others	50	0	20
Total			**100**

Additionally, it was revealed that 40% of the traders under study areas performing beef cattle fattening. Traders buy weak animals and feed them with extra feed (supplements) for some months before they sell them again to secondary markets. The cattle is kept in feedlots for about three to four months and when the animal reconditions, it is sold to secondary markets usually at Pugu in Dar es Salaam, butcher operators and exporters.

4.3.4 Purposes for keeping indigenous beef cattle by pastoralists/agro-pastoralists

The respondents indicated that there were several reasons for which households kept cattle. Some of those reasons depend on the individual needs either directly (food) or indirectly (income/store of wealth). The results in Table 16, show the low importance attached to keeping cattle for commercial purposes (7.48%) as opposed to the provision of the way of life (41.45%), followed by being a store of wealth (16.33%). The use of livestock as a store of wealth was also reported by Byaruhang*a et al*. (2014) who noted that goats keepers in Teso sub region of Uganda, used goats as a store of wealth instead of commercial purpose. The more likely pastoralists' use banking as a store of wealth or saving storage alternative, the more likely they were to regulate their cattle herds. This study found that apart from those few traders who engaged in beef fattened business, most of the pastoralists and agro pastoralist in Meatu and Kongwa districts attached low importance to commercial cattle keeping as a result a low volume of indigenous beef cattle trade. The few cattle sales that are made are meant for problem solving but not as intentional selling to earn profit from their sales. The other objectives of rearing cattle included the desire to obtain manure for use in own farm; dowry especially in Meatu during marriages; cattle drawn cart/ox-wagon used in transportation and animal draft power for ploughing.

Table 16:   Purposes for keeping indigenous beef *cattle by pastoralists/agro-pastoralists*

	District		
	Meatu	**Kongwa**	**Total**
Cattle keepers' purpose (%)	**(n=73)**	**(n=74)**	**(n=147)**
Way of life	46	15	61
Store of wealth	5	19	24
For prestige	19	2	21
Security/insurance	2	16	18
Commercial purpose	0	11	11
Food	1	9	10
Others	0	2	2
Total			**147**

4.3.5   Factors considered by indigenous beef cattle keepers in setting prices

Farmers have their own criteria in setting prices for their produces. In both districts: Meatu and Kongwa, the study found that criteria for setting price for cattle were observation of physical condition, weight of cattle, cattle breed and age of cattle. The findings concur with those reported by Petro (2019) that, as the animal belonging to higher grade based on weight and dentition attracts more prices as compared to the lower graded one. The higher price will motivate farmers to sell more live cattle and goats to the nearest market. In the conduct of selling, many (87.8%) cattle keepers indicate the prices to be arrived through negotiations. Few cattle keepers indicate the price to be either fixed by a buyer or fixed by the seller (the cattle keeper). The practice of the buyer/seller fixing the price depends on the situation of the market in terms of the forces of demand and supply. During the survey, 81.6% of the cattle keepers indicated to be aware of the prices prevailing in the nearby markets. Additionally, 86.4% of the cattle keepers knows the price in advance before taking the cattle to the market. However, many cattle keepers are not satisfied with the prices offered in the markets.

Table 17:   Factors considered in setting the price of indigenous *beef cattle*

Factors for setting Price	Responses		
(Valid cases=147)	n	Percent	Rank
Observation of physical condition	76	51.7	1
Weight label define	34	23.13	2
Age	30	20.41	3
Breed	5	3.4	4
Other	2	1.36	5
Total	**147**	**100**	

4.3.6   Mode of payment

The results show that about 51% of respondents sold their cattle on the basis of cash payments, while the remaining 49% farmers sold their cattle basing on both cash and

credit (Table 18). Most of the farmers sold on credit had regular buyers. Terms of payments for credit sales were without interest and the time of payment was one week as the markets normally operated on weekly basis. This finding implies that most of the farmers preferred cash payments. Comparable findings were reported by Rupindo (2009). Main reasons as to why most farmers preferred cash payment were stated to be untrustworthy of some traders, moreover, most cattle keepers had no selling plan, instead they sold their animals in order to solve immediate financial obligations they faced and hence could not sell on credit as they had to go back home with the money to pay for their needs.

Table 18: *Mode of payment for indigenous beef cattle*

Mode of payment	Responses		
(Valid cases=147)	n	Percent	Rank
Cash	74	51	1
Credit	0	0	3
Both: Cash and Credit	73	49	2
Total	**14**	**100**	

4.3.7   Seasonality of demand and supply

There are fluctuations in the demand and supply for indigenous beef cattle and beef cattle products. The perceptions of the key value chain actors (beef cattle keepers and traders) towards the demand of cattle and beef cattle products is mixed. Results in Table 19 show that 52.4% of respondents indicate the demand to have decreased, 42.9% increased and the remaining 4.8% reveal the demand to have remained constant.

Table 19:   Demand for indigenous beef cattle

	Responses	
Demand for beef (Valid cases=21)	n=21	Percentage
Increase	9	42.86
Decrease	11	52.38
Remain constant	1	4.76
Total	**21**	**100**

The months of high sale are December, June and July whereas the months of low sale are January, February and March (Figure 7).
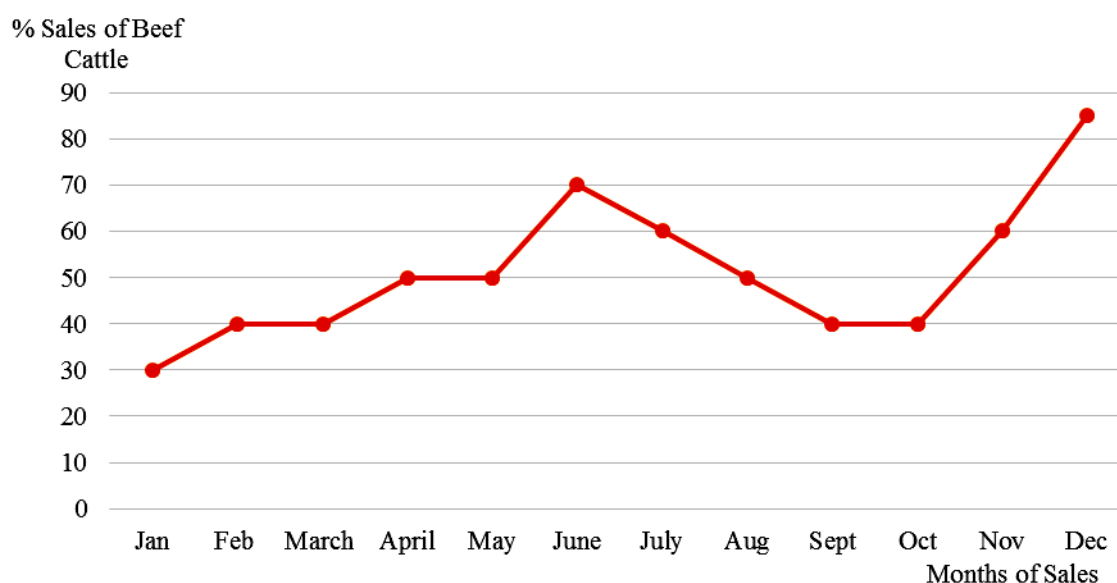
Figure 7: Seasonality fluctuations of indigenous beef cattle and beef cattle products

Findings from Figure 7 show the proportions of value chain actors reporting the level of sales as low or high in a particular month. The decrease in the supply of cattle is mainly influenced by the weather conditions such that during the dry spell, few cattle are available in the markets. The increase in the demand of beef cattle in December is due to being festival seasons. June and July are key months of harvest in Tanzania hence drives positively the demand of beef.

4.4 Indigenous Beef Cattle Market Performance

4.4.1 Economic benefits (gross margins) acquired by indigenous beef cattle actors

Indigenous beef cattle keepers, traders and retailers/butcheries generates benefits along the beef cattle value chain. The traders involved in beef cattle fattening generates the highest gross margin of around 54.05% followed by the vertically integrated-butchery who generates 46.21%. The beef cattle keepers generated the lowest gross margin of 13.66%.

Details of the benefits generated by actors are discussed in the following sections (Figure 8).
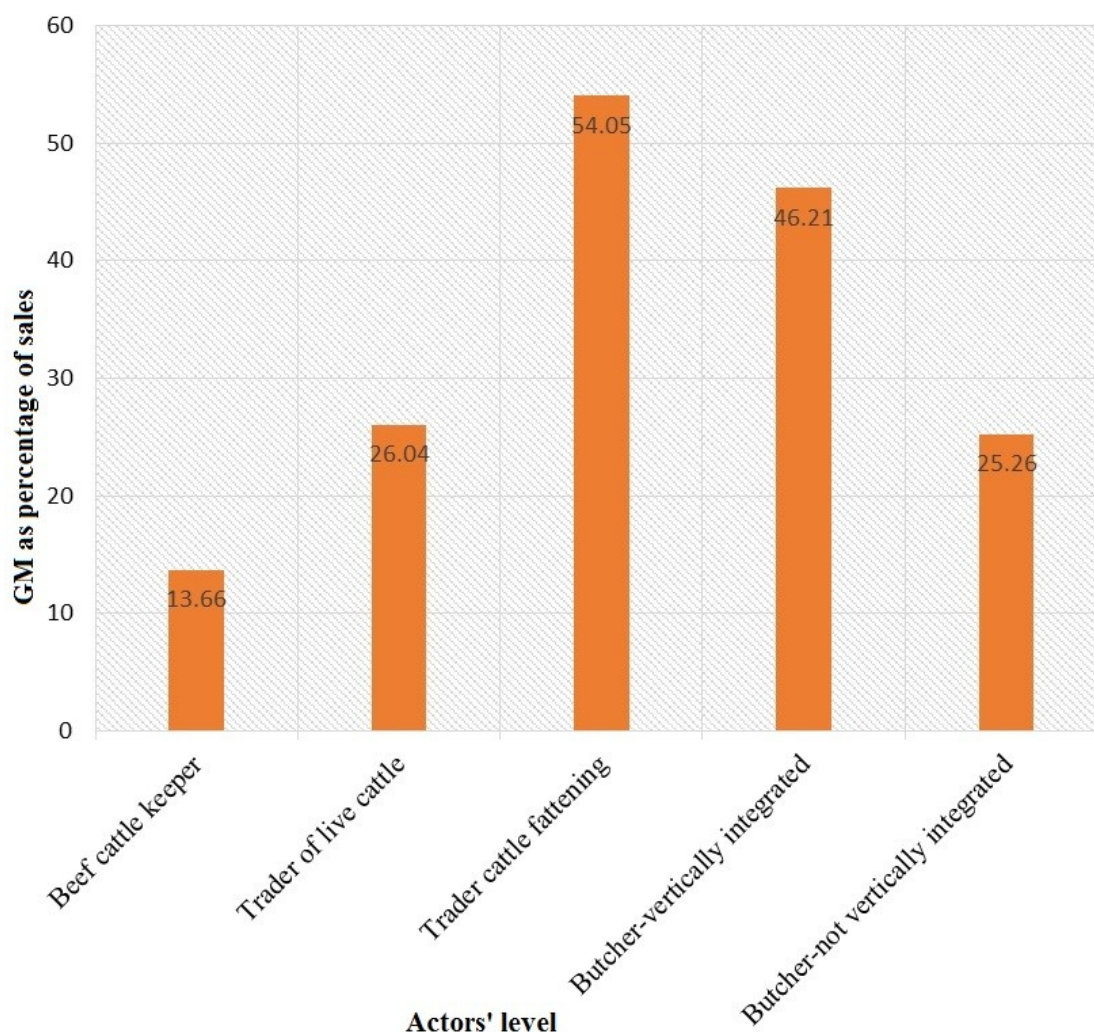
Figure 8: **The economic benefits (gross margins) generated by Indigenous beef cattle actors**

4.4.2 Pastoralists and agro pastoralists gross margins with constant prices

Cattle keepers surveyed are not well commercialized and integrated into the cattle business. There were no proper records of costs of acquiring cattle by farmers. Under this way of cattle rearing, it is difficult to establish production coefficients that can lead to obtaining margins/value added by cattle keepers within the chain without making provisions of costs of some activities involved. Also, many of cattle keepers in study area possess cattle and they do not need to go and buy calves. Therefore, in calculating the

variable costs the provision was made by suppose that a cattle keeper bought a certain number of 1-year old calves at TZS. 100 000 under the prevailing market price and keeps them for additional five years and selling them at the age of six years. In Meatu district, the results of analysis of the profitability at the producer level suggest that farmer received a gross margin of TZS. 21 829.86 per animal which is equal to (8.73%) of the value of sales and added value of TZS. 150 000. The costs of animal was the highest (48.35%) of total variable costs of rearing indigenous beef cattle followed by dipping/spraying (18.91%) of the total variable costs of production. This was followed by drugs/medications (13.71%), Labour for herding (12.09%) and deworming (5.76%). Other costs accounted for 1.76% of the total variable costs. Additionally, this survey finds no cattle keepers who are engaged in wage employment.

Table 20:   Costs, revenues and gross margins from raising beef cattle in the study area

I) Meatu district	Value by age of sold cattle			
	TZS per head/year	TZS per head for 6 years	TZS per head for 4 years	Percentage proportion
a). Benefit				
Average selling price		250 000	200 000	
b). Costs				
Costs of animal	100 000	100 000	100 000	48.35
Labour for herding	5000	30 000	20 000	12.09
Dipping/Spraying	7823.5	46 940.97	31 293.98	18.91
Drugs/Medications	5672.45	34 034.72	22 689.81	13.71
Deworming	2136.57	12 819.44	8546.3	5.17
Others	729.17	4375	2916.67	1.76
Total costs	21 361.69	128 170.14	185 446.76	100.00
Gross margin		21 829.86	14 553.24	
Gross margin as percentage of sales		8.73	7.28	
Added value		150 000	100 000	

Meanwhile, results for Kongwa district indicated that beef cattle keeper received a gross margin of TZS. 40 981.36 which is equal to (13.66%) of the value of sales and added

value of TZS. 200 000. The results suggested that costs of animal is the highest (43.01%)
followed by labour for herding (21.5%) of the total variable costs of production.
Dipping/spraying occupied (10.85%), drugs/medications (7.28%) and deworming
(21.22%). The costs of labour in Kongwa is higher than in Meatu due to high demanding
of wage in Kongwa meanwhile most of cattle beef keepers' in Meatu districts used family
labour.

Table 21: Costs, revenues and gross margins from rearing indigenous beef cattle in the study area

	Value by age of sold cattle			
II. Kongwa district	**TZS per head/year**	**TZS per head for 6 years**	**TZS per head for 4 years**	**Percentage proportion**
a). Benefit				
Average selling price		300 000	220 000	
b) Costs				
Costs of animal	100 000	100 000	100 000	43.01
Labour for herding	10 000	60 000	40 000	21.5
Dipping/Spraying	5047.84	30 287.02	20 191.35	10.85
Drugs/Medications	3386.94	20 321.63	13 547.75	7.28
Deworming	957.99	5747.92	3831.95	2.06
Other Variable Costs	7110.34	42 662.07	28 441.38	15.29
Total costs	126 503	259 018.64	206 012	100
Gross margins		40 981.36	13 988	
Gross margin as percentage of sales		13.66	6.36	
Added value		200 000	120 000	

During the survey, it was observed that only few respondents had constructed feed storage
facilities and dug water wells for their animals. The costs of Labour for herding,
dipping/spraying and medications constitute the largest cost element in the pastoral system
of both Meatu and Kongwa districts (Figure 9).
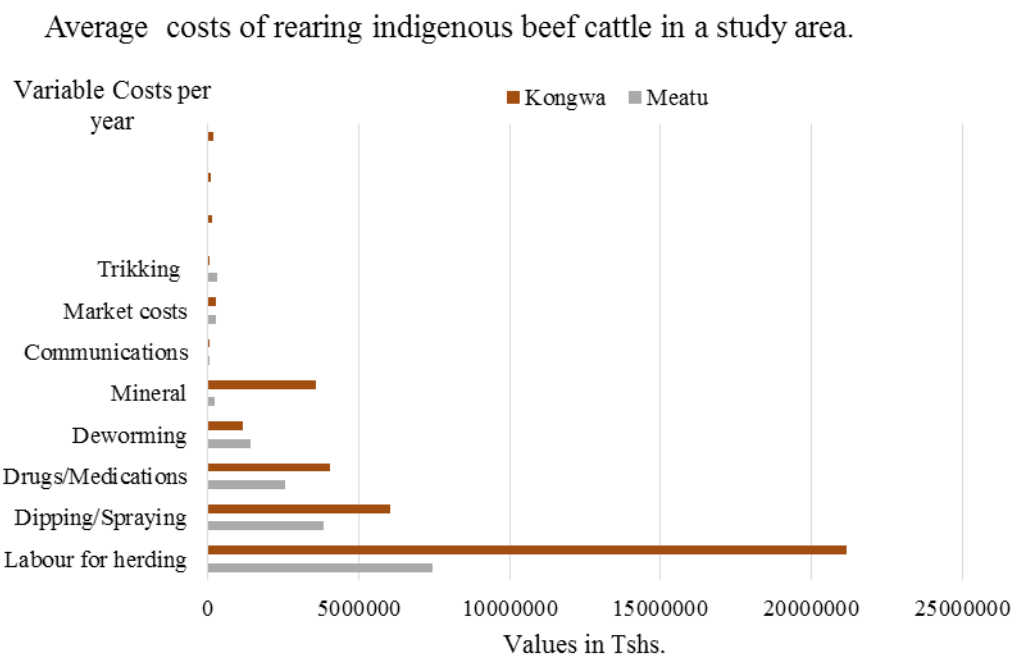
Figure 9: **Average costs of raising beef cattle in the study areas**

4.4.3 Indigenous beef cattle traders' gross margins with constant prices

Indigenous beef cattle traders buy beef cattle from primary markets. Live cattle bought from cattle keepers and village aggregators are mainly sold at primary markets. Traders also buys live cattle from one primary market and sells at another primary market. Small scale traders collaborate with other traders to aggregate live cattle for transporting to secondary markets. The margins shown consider zero risk (for instance no death of cattle during trading process). In reality for example if the trader is transporting live cattle from Simiyu region to Dar es Salaam, the chance of getting loss of live cattle through death is about 1%. Traders of live cattle, trade on a margin of around 26.04% (average of TZS. 78 118.91 per animal/month). The value added per cattle during trading is TZS. 100 000 per animal of six years. This shows that traders seem to earn much compared to farmers who on average earn TZS. 2 062 per animal/month with added value of TZS. 200 000 per animal.

Table 22: Gross margins for indigenous beef cattle traders and fatteners

S/N	Descriptions	Traders		Fatteners	
1	Number of animals	3242		3242	
2	Weight gain per animal	100		200	
		Non fattened cattle		**Fattened cattle**	
	Benefits (TZS)	**(TZS)**	**Benefits per animal**	**(TZS)**	**Benefits per animal**
3	Cattle selling price	@ 300 000/=;		@500 000/=	
4	Revenues	972 600 000	300 000	1 621 000 000	500 000
	Variable costs.	TZS/month	% of total cost	TZS/month	% of total cost
5	Purchasing price @ 200 000/=	648 400 000	90.14	648 400 000	87.06
6	Charged for market permit	4 647 500	0.65	4 647 500	0.62
7	Market fees	5 115 000	0.71	5 115 000	0.69
8	Buying/transportation cost	1 800 000	0.25	1 800 000	0.24
9	Selling/Transportation cost	57 676 000	0	57 676 000	7.74
10	Feeds	0	0	6 276 000	0.84
11	Treatment	0	0	135 000	0.02
12	Communications	0	0	569 000	0.08
13	Labour (header wages)	0	0	2 244 125	0.3
14	Casual Labour	1 700 000	0.24	17 953 000	2.41
15	Total Variable cost	**719 338 500**	**100**	**744 815 625**	**100**
16	Gross Margin	253 261 500	78 118.91	876 184 375	270 260.45
17	Gross margins % of sales	26.04		54.05	
18	Added value		100 000		300 000

Traders on cattle fattening buys live cattle from primary or secondary markets and fattens them for 3 months. Fattened cattle are normally fed sunflower seed cake; maize and rice bran, cotton seed cake and minerals. After the three months, the trader sells the fattened cattle at secondary or border markets in Mwanhuzi, Dosidosi, Kiteto, Mkutani, Tabora municipal and Pugu-mnadani, depending on the scale of trading. Traders under cattle fattening trade on a margin of around 54.05% (with average gross margin TZS. 270 260.45 per animal/year). The value added per cattle during trading is TZS. 350 000 (Figure 10). This value added is more than 300% higher than that obtained by live cattle trader who is not involved in cattle fattening.

No. of traders
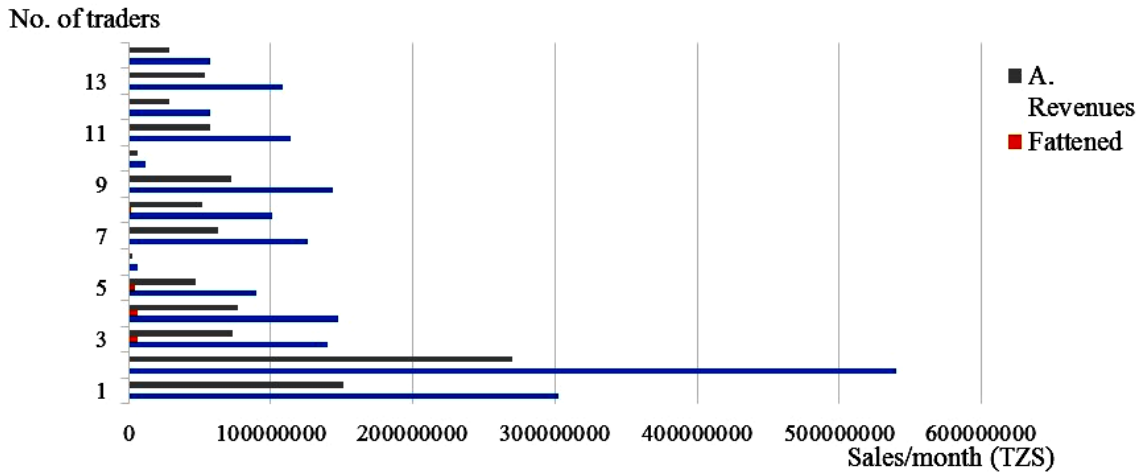
Figure 10: **Sales of fattened and non-fattened indigenous beef cattle per month**

The findings in Table 22 show that, the cost of purchasing cattle was the most remarkable (90.14%) for none fattened and (87.06%) for fattened traders of the total variable costs followed by transportation cost (7.74%); casual labour (2.41%) for fattened traders. The remaining costs were insignificant *i.e.* less than 1%.

4.4.4 Gross margins for retailers (butcheries)

Butcher business has two types of actors depending on their sourcing mechanisms. There are vertically integrated butcheries operators that buys live cattle from the primary or secondary markets and send them to slaughter slabs for slaughtering. This type of butchery operators makes more than 90% of all the butcheries operators in the study area. The remaining buys carcass from the slaughter slabs. The vertical integrated butcheries business has the highest value added in the chain. The margin of vertically integrated butcheries operators is TZS. 268 265 per head while that of nonintegrated butcheries operators stand at TZS. 201 000 per head. Vertically integrated butcheries operators earned 21% higher than those who are not integrated. The proportions of value added are 44% and 30.55% for the integrated butcheries operators and those who are not integrated respectively.

As it was in the case for traders, the most important cost for butcher/meat shops operators came from purchase of beef cattle. This represented about 85.47 % of the total cost followed by labour or wage for butcher operators which accounted for 5.13% of the total cost. The rest of the cost items were small, and they accounted for less than 5% each of the total cost as shown in Table 23.

Table 23: *Gross margins for vertical integrated butchers (retailers)*

S/N	Item	TZS/head	
1	Revenue from one cattle		
2	Carcass 60kg @ 6000/=	360 000	
3	Head	35 000	
4	Hide	5000	
5	Offal and legs Total	35 000	
6	**Total revenue**	435 000	
	Costs		**Percentage of total cost**
7	Purchasing price (live cattle)	200 000	85.47
8	Market (charges) fees	2000	0.85
9	Buying /movement permit Market	2000	0.85
10	Transportation from market to slaughtering area	5000	2.14
11	Holding pen fee	3000	1.28
12	Slaughtering fee	5000	2.14
13	Meat transportation fee from slaughtering area	5000	2.14
14	Labour (meat seller)	12 000	5.13
15	**Total variable costs**	**234 000**	**100**
16	Gross margin	201 000	
17	Gross margin as percent of sales	46.21	
18	Added value	235 000	

For the case of the butchers who bought carcass, the highest cost for this category was the cost of buying carcass from the slaughter slabs which was TZS 4167 per kg followed by labour cost (wage) which was about TZS. 12 000 per day. On average quantity of carcass bought was 60 kgs net weight, which accumulated a gross margin of TZS. 90 980 per day which is equivalent to 25.27% of the total sales per day (Table 24).

Table 24: *Gross margins for butcheries (retailers) buys beef from the slaughter slab*

S/N	Item	TZS/head	Percentage of total cost
1	Revenue from the sales of carcass		
2	Carcass 60kg @ 6000/=	360 000	
	Costs		**Percentage of total cost**
3	Purchasing Price (Carcass) 60@ 4167/=	250 020	92.94
5	Transportation of meat from slaughtering area to butchery	5000	1.86
6	Labour (Meat seller)	12 000	4.46
7	Others	2000	0.74
8	**Total costs**	**269 020**	100.00
9	Gross margin	90 980	
10	Gross margin as a % of sales	25.27	
11	Added value	109 980	

4.4.5 Determination of indigenous beef cattle market margin

Based on the selling and buying prices, the marketing margins for indigenous beef cattle keepers, traders and butcheries were calculated and summarized in Table 25. The high market margin reflects less income/earnings for indigenous beef cattle actor and more benefit to the other market functionaries. The overall market margin was (40.28%) which indicates that indigenous beef cattle market under a study area was inefficiency and a high cost incurred in the provision of marketing services. Traders and butcheries received at least 33% and 44% respectively of consumer's price per beef cattle. Also, it has been noted that producers' (beef cattle farmers) received the higher market margins (60%) than other market participants. This imply that there a numerous number of transaction costs incurred within the indigenous cattle beef business nodes from producers (cattle beef keepers) to retailers (butcherers) due to inefficiency of marketing system.

Table 25: **Meatu and Kongwa districts: determination of actors'** *market margin*

Actor level	Average selling price per beef cattle	Average supply price per beef cattle	Market margin
Beef cattle keepers	250 000	100 000	60%
Traders	300 000	200 000	33.30%
Butcheries	360 000	200 000	44.40%

4.4.6 Determinants of indigenous beef cattle keepers gross margin

Findings from regression analysis show that only 67.63% of the variations in beef cattle keepers' gross margin (GM) are due to the independent variables included in the regression model. This implies that 67.63% variation of dependent variable (GM) per cow was captured and explained by the explanatory variables within the model.

The findings on Table 26 show that, the herd size (number of beef cattle farmer possess) of livestock farmers was statistically significant at the 99% level of confidence as its shown by p-value (i.e. *P<0.01*) and positive related to beef cattle profit margin. The coefficient for this variable is 0.628 which means that one percent increase in herd size leads to a 0.628 percent increase in farmer's income. The inelastic elasticity means that income obtained by farmers is not very sensitive to change in herd. This might be interpreted that cattle beef keepers were not willing to sell their cattle and obtained much income despite the increase in the size of their herd. They were not keeping cattle for commercial purpose. These findings agree with that by Petro (2019) that a farmer with large flocks of animals has high probability of selling the surplus to the markets compared to those with less number of animals.

Table 26: **Estimated log linear regression model of the gross margin on factors** affecting profitability of beef cattle keepers

Independent variable	Exp. Sign	Est. Coefficient	Standard error (se)	t-stat
Log Herd size	+	0.628*	0.154	4.07***
Log Experience	+	0.809	0.491	-1.65
Log Herding cost	-	-0.802*	0.249	3.21***
Marketing information	+	0.578	0.582	0.60
Business training	+	0.35	0.609	0.95
Access to credit	+/-	-0.54	0.522	-1.04
Constant term	+/-	3.164	3.062	1.03

n = 19

R^2 = 0.6763

t ≥ 2.4, significant at 1%.

The findings also show that herding cost of beef cattle was statistically significant and negative (P<*0.01*). The coefficient for herding cost is -0.802 which means that controlling for the effects of other variables, a one percent increase in herding cost leads to a 0.802 percent decrease in farmer's gross income. This means that for every shilling income obtained by a farmer, accumulate 0.80 shilling as herding costs. Other, remaining hypothesized variables; experience, marketing information, business training, and access to credit were not statistically significant.

4.5 Challenges Affect the Market Performance of Indigenous Beef Cattle

4.5.1   Major production challenges of Beef cattle in Meatu and Kongwa districts

The challenges faced by indigenous beef cattle keepers in the production of beef cattle were almost similar in Meatu and Kongwa districts. Drought (shortage of water and pastures) and prevalence of diseases are the main constraints that have been reported by 94.6% and 51% of the cattle keepers respectively. The findings show that other production challenges identified by most of the beef cattle keepers in Meatu and Kongwa districts were: high costs to buy cattle drugs, few cattle dipping facilities in some areas, theft of cattle, availability of improved breed, drugs centres are found far away from residential areas, accessibility of livestock extension services, lack of credit facilities and presence of wild animals. The remaining other challenges were less than 10% which included lack of reliable markets and expired or fake cattle drugs.

Table 26:   Multiple response in production constraints

Production constraints (Valid cases n=147)	Responses		
	n	**Percent**	**Percent of cases**
Drought (shortage of water and pastures)	139	25.4	94.6
Prevalence of diseases	75	13.7	51
High costs to buy cattle drugs	71	13	48.3
Few cattle dipping facilities in some areas	62	11.3	42.2
Theft of cattle	42	7.7	28.6
Availability of improved breed	39	7.1	26.5
Drugs centres are found far away from residential areas	38	6.9	25.9
Accessibility of livestock extension services	22	4	15
Lack of credit facilities	21	3.8	14.3
Presence of wild animals	19	3.5	12.9
Lack of reliable markets	11	2	7.5
Expired or fake cattle drugs	8	1.5	5.4
Total	**547**	**100**	**372.1**

4.5.2   Major Marketing challenges faced Indigenous beef cattle keepers in Meatu and Kongwa districts

Beef cattle keepers were assessed in terms of marketing challenges they faced. The findings show that, many (74.2%) those involved in indigenous cattle beef keeping were not satisfied with the prevailing market price. Absence of weighing scales in primary markets; absence of cattle keepers' associations; and low number of buyers in the market are among the marketing challenges reported by farmers (Table 27). Cattle keepers were also confronted with lack of trust in the markets which involves a lot of cheating and sometimes use of fake currencies. The other risks include loss of cattle; long distances to the markets; and high market charges especially the movement permit.

Table 27: **Multiple response in marketing challenges faced by Indigenous beef cattle keepers**

Marketing challenges (Valid cases=147)	Responses		Percent of Cases
	n	**Percent**	
Low price of cattle comparing to rearing costs	69	37.9	74.2
Absence of weighing machines in primary markets	28	15.4	30.1
Low number of buyers in the market	24	13.2	25.8
Other	19	10.4	20.4
Lack of market information	17	9.3	18.3
The process of selling cattle consumes more time	16	8.8	17.2
Absence of cattle keepers' associations	9	4.9	9.7
Total	**182**	**100**	**195.7**

4.5.3 Major trading challenges facing traders

The findings on Table 28 show that the major trading challenges mentioned by traders in the two districts were inadequate market infrastructure, low capital, loss of cattle from or away to the market, unreliable markets (price fluctuation), low grade cattle in the market (emaciated cattle), getting loss in business (less returns), Other challenges are taxes (levies) in the market and cost of transportation of cattle.

Table 28: **Major marketing challenges facing traders**

Marketing challenges (Valid cases=147)	Responses		
	n	**Percent**	**Percentage of cases**
Problem of market infrastructure	70	38.46	75.1
Low capital	32	17.58	32.1
Loss of cattle from or way to the market	24	13.19	26.8
Unreliable markets (Price fluctuation)	18	9.89	22.4
Low graded cattle in the market (emaciated cattle)	15	8.24	19.3
Transportation of cattle on trek is a tedious work	14	7.69	18.2
Getting loss in business (less returns)	9	4.95	10.7
Total	**182**	**100**	**204.6**

4.5.4 Trading challenges facing butcheries (retailers)

The present study also assessed the challenges faced by butcheries in Meatu and Kongwa districts. The findings show that major trading challenges mentioned by butcher men were hurdles in obtaining customers. Survey results show 62.5% who report decrease in sales in the past two years. Other main challenges facing them includes limited knowledge and skills on business planning and management and high competition from other beef outlets. The butcheries owners report also the high costs associated with obtaining slicing machines to be extremely high.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study examine the indigenous beef cattle market performance Simiyu and Dodoma regions in order to provide information that will be used to devise interventions aimed at improving the market performance of indigenous cattle beef in Tanzania at large. The study specifically determine the indigenous beef cattle's market structure and conduct in Meatu and Kongwa districts. The findings suggested that the market for the indigenous beef cattle was unconcentrated or competitive and capital is a main barrier to enter into a business for both traders and butcheries. There were market information asymmetry, many charges and taxes and final price of beef cattle mainly arrived through negotiations between seller and buyer depending on spot market situation.

The second objective was to compute the gross margin of indigenous beef cattle keepers, traders and butcheries (retailers) along the indigenous beef cattle value chain nodes. Results showed that indigenous beef cattle fatteners obtained the higher gross margin (54.05%) and value added (TZS. 300 000 per animal) compared to other actors in indigenous beef cattle value chain. The low gross margin obtained by indigenous beef cattle farmers can be attributed to high herding costs, charges and tax. Marketing of live cattle attracts charges and taxes of up to TZS.14 600 per animal from the market (primary, secondary or border market) to slaughtering.

The third objective was to analyse the determinants of gross margin of the indigenous beef cattle value chain actors in the study area. The findings show that the gross margin which

is a proxy for profitability was mainly determined by herding size and herding costs. Herding cost surpass herding size in affecting the gross margin of farmers.

The fourth objective was to determine market challenges facing indigenous beef cattle keepers, traders and butcheries under the study area. The result obtained show that indigenous beef cattle keepers faced with both production and market challenges meanwhile traders and butcheries faced with market challenges that hinder the better market performance for indigenous beef cattle.

Overall, the study revealed that indigenous beef cattle market under a study area is under performed due to high cost incurred in rearing beef cattle and provision of marketing services. Thus, marketing performance of indigenous beef cattle will highly depend on intervention to reduce or eliminate the challenges that face indigenous beef cattle keepers, traders and butchers/meat shops.

5.2 Recommendations

Based on the findings of the study, the following recommendations are suggested for the improvement of indigenous beef cattle market performance in selected villages in Simiyu and Dodoma regions in order to enhancing the competitiveness of indigenous cattle beef production in Tanzania at large.

i. To improve the bargain power of indigenous beef cattle keepers in term of price and physical quality of the beef cattle. The district councils should put effort to help indigenous beef cattle keepers to form groups through conducting a special campaign village per village by using village general meetings to explain to them the importance and benefits of producer organizations so as to improve farmers' market bargaining power. Also, enable the indigenous beef cattle actors particular

indigenous beef cattle keepers to secure loans/credits services and make them commercial oriented.

ii. District market officials should avail information about prices, volume and quality requirements of cattle to market participants through different media such as radio, television, village gathering sites and social networks. This information should be updated on a regular basis and made available to all markets' parties to avoid information asymmetry and influence of middlemen.

iii. The district councils under department of livestock development to provide business training to indigenous beef cattle keepers in informal or formal groups by training them on different production, marketing and quality control techniques as these will help them to improve their competitiveness. The extension service officers should emphasize on the use of cattle fattening technique as the study revealed the fattening generates the highest gross margin/value added among the beef cattle value chain actors.

iv. The district council authority should play more role in the provision of physical infrastructure in the markets such as closed livestock sheds, bidding rings, weighing scales, fencing the markets, dipping services and improvement of feeder roads joining the markets to main (tarmac) roads. These will also help in reducing of some costs including herding costs as the study suggested that reduction of herding cost by 0.8 will rise gross income of farmer by 1 shilling.

v. The district council authorities should reduce some of the taxes and market charges taken from the beef cattle business as these discourage more traders from getting into the business, but also it makes those traders who are already in the business to

pay low price to indigenous beef cattle keepers in order to have profit after paying the taxes. To allow subsidies to beef cattle inputs such as drugs in order to reduce herding cost which has much effect to farmers' gross margin.

5.3 Suggestions for Further Research

The sample size used in this study is very small to be a good representative of all actors (indigenous beef cattle keepers, traders and butcheries) in the districts. The sampling design also might have influenced the results as purposive sampling was used in this study.

Further studies are suggested to find out the economic off take rates among indigenous beef cattle keepers so that to give a clear understanding as to what extent indigenous beef cattle keepers are willing to sell their cattle and transform them into commercial oriented.

REFERENCES

APPENDICES

Appendix 1: Checklist

Checklist of interview questions with Indigenous beef cattle keepers.

1. Where do you source the inputs?

 2. What is the most important input that is preferred by Indigenous beef cattle keepers?

3. What is the buying price of that input?

4. What challenges do you encounter in finding the inputs?

5. What is your turnover per year?

6. Do you keep a records for you are sells?

7. What are the average production costs per animal?

8. Which resources are most expensive?

9. What are your views towards the improve productions and making the indigenous beef cattle keeping a commercial oriented practise?

Checklist of interview questions with traders

1. Where do you source animals for your business?

2. What is the average purchasing price per animal?

3. What are the costs associated with your business?

4. Do you have any business arrangement with your suppliers?

5. Do you have any business arrangement with your customers?

6. What challenges do you face in your business?

7. What is the price per kilogram of each beef product?

 8. What is the method of payment?

7. What are your views towards improve indigenous beef cattle business and making the more profitable practice?

Checklist of interview questions with extension officers

1. What challenges do smallholder farmers face in your working area?

2. What beef quality control measures do farmers practice in your area?

3. Who are the major livestock business actors in your working area?

4. What sources of beef market information do you use?

5. How do farmers in your area access market information?

6. What challenges do you encounter in your extension work?

8. What do you think is the best approach to link indigenous beef cattle producers to profitable markets?

Appendix 2:   A list of the sample villages from which HH were selected.

Region	District	Villages	Cattle keepers	Traders	Butcheries
Simiyu	Meatu	Imalaseko	13	1	2
		Kubiga	12	1	2
		Mwabuzo	12	1	2
		Mwamishali	12	2	2
		Mwandoya	12	1	2
		Kimali	12	1	2
Dodoma	Kongwa	Mtanana	12	1	1
		Kongwa	14	2	4
		Ugogoni	12	1	1
		Sejeli	12	1	1
		Kibaigwa	12	1	1
		Songambele	12	1	1

Appendix 3:   Sample Size Determination

Based on the sample size formula by Kothari (2004) percentage or proportion when

estimating a population.

$n = N/ (1+Ne^2)$

Where,

        n = Sample size.

        N = Sampling frame.

        e = Precision error.

Appendix 4: Questionnaires for household who keep indigenous beef cattle.

Introduction

Questionnaire Number………………………………………………………

Date of interview …………………………………………………………

Contact details of the farmer: Mobile number……………………………

Name of respondent …..……………………………………………………

Age of respondent…………………………………………………….. ……

District ……………..Ward……………………… Village/Street ……………

Education level of respondent:

    1= No formal education [ ] 2=Primary education [ ]

    3= Secondary education [ ] 4=College education [ ]

a. Management practices

1. What is your primary occupation?

    1= Wage employment [ ] 2= cattle keeping [ ]

    3= Business [ ]

2. What is your secondary occupation?

    1= Wage employment [ ] 2= Cattle keeping [ ] 3= Business [ ]

    4= Crop production [ ] 5= others (specify) [ ]

    3. What management practices do you use? a) Pastoral system [ ] b) Agro- pastoral

    system [ ] c) Others (specify) [ ]

4. What is the current size of the herd you keep?

5. What is the opinion of the family on the future size of the beef cattle production?

    1= to expand [ ] 2= to reduce [ ] 3= to maintain as it is [ ] 4= other (specify) [ ]

6. For what purpose do you rear beef cattle? 1= for prestige [ ] 2= way of life [ ]

3= store of wealth [ ] 4= security/insurance [ ]

5= Food [ ] 6= source of income [ ] 7= commercial purpose [ ]

7. For how long have you have been keeping these cattle (years) ………………

8. What is the main source of labor used in beef cattle production?

1= Family [ ]   2= Hired [ ]   3= both family and hired [ ]

b. Costs

9. Variable inputs for each beef cattle (Please fill the table below)

Variable costs	Unit of measurement	Frequency (Twice a week or a month	Unit cost	Total cost/per year
Commercial Minerals				
Labor for herding				
Drugs/medication				
De-worming				
Dipping/Spraying				
Veterinary/breeding services				
Water				
Others (Specify)				

10. Do you access veterinary services? 1=Yes [ ]   0 =No [ ]

11. If yes, how often: 1= very frequently [ ] 2= frequently [ ] 3= Less frequently [ ]

12. If No give reasons………………………

13. Do you consider veterinary services adequate? 1=Yes [ ]   2= No [ ]

14. Why do you consider that veterinary services not adequate?

1=long distance to find veterinary centres (shops) [ ]

2=some drugs have expired or are fake [ ]

3=livestock officers do not visit farmers due the large area of the villages [ ]

4=Presence of chronic diseases [ ]

15. Do you have access to credits 1= Yes [ ]   2= No [ ]

16. If yes, name the institution from which you access the credits

1= Commercial banks [ ]   2=SACCOs [ ]   3= Microfinance [ ]

4 = others (specify) [ ]

17. If No, why ………………………………………………..

18. What are the production constraints do you face in keeping your cattle?

1=Drought (shortage of water and pastures) [ ]

2=High costs to buy cattle drugs [ ] 3=Lack of Fund [ ]

4=Expired or fake cattle drugs [ ]

5=Drugs centres are found far away from residential areas [ ]

6=Presence of wild animals [ ] 7=Theft of livestock [ ]

8=Prevalence of diseases [ ]

9=Few cattle dipping facilities in some areas [ ] 10=Lack of credit facilities [ ]

c. Markets for livestock

19. Frequency of market days (at primary markets)

1=Once per week [ ] 2= Twice per week [ ] 3= Once per month [ ]

4= Twice per month [ ] 5= any other (specify)….. [ ]

20. Please indicate marketing costs you face when you need to sell your cattle

Cost item	Frequency (e.g. twice a week).	Costs (TSH)	Total variable cost per year
Labour (loading and unloading)			
Transportation cost			
Hidden cost (waiting time, etc.)			
Communication			
Market charges			
Others (specify)			

21. On average how many beef cattle do you sell per month? ....

22. How many cattle (number) have you sold per month? (Please specify per each outlet)

1=Auctions……… [ ] 2= Abattoirs… [ ] 3 = Direct to butcher………. [ ]
4= Middlemen…… [ ] 5= Traders……… [ ] 6 = Farmer cooperatives……… [ ]
7= others (specify) …………… [ ]

23. Where do you normally sell your cattle?

  1= Auctions [ ] 2= Abattoirs [ ]   3= Middlemen [ ] 4= Traders [ ] 5.Butchery
  6= others (specify) [ ]

24. Which market do you prefer among the following?

  1= Butchery [ ] 2= Primary market [ ] 3=Secondary market [ ]
  4= Abattoirs [ ]   5=other (specify) [ ]

25. Why do you prefer that market?

  1=use of weighing facilities [ ] 2=It is nearby the livestock farmers [ ]
  3=Good environment for selling [ ] 4=No other alternative market [ ]
  5=No other alternative market [ ] 6=others (specify) [ ]

d. Prices

23. Who set the price for the cattle sold? 1=Buyer [ ] 2=Seller [ ] 3=others (specify)…. [ ]
24. How do you arrive to the final price per unit? 1=Negotiations [ ] 2= Price fixed by a buyer

  [ ] 3=Price fixed by a seller (farmer) [ ]
25. How do you fix prices of beef cattle?
  1=Take market prices [ ] 2=calculate cost involved [ ] 3=other (specify)…… [ ]
26. Are you aware of prices prevailing in the nearby market? 1=Yes [ ] 2= No[ ]
27. Do you know price in advance before taking your consignment to the market?
  1= Yes [ ] 2= No [ ]

28. What factors are considered in setting up the price of animals?
  1= Weight [ ] 2= Age [ ] 3= Breed [ ] 4= Observation of physical condition [ ] 5= others

  (specify) [ ]
29. If breed, which breed is preferred?......................................
30. If observed physical conditions, which one?...........................
31. Are you satisfied with the current beef cattle prices? 1= Yes [ ] 0= No [ ]
32. If no why? 1=price is low [ ] 2=operational costs are very high [ ]
  3=No unit of measure the weight of cattle [ ]
  4=buyers offers price which are in their favor [ ] 5= others (specify) [ ]
33. What was the mode of the trade?
  1=Contract sale [ ]   2=First come /first served [ ] 3= others (specify) [ ]
34. Do you have any contractual arrangement with buyers of your beef cattle?
  1= Yes [   ] 0= No [   ]
35. If yes, what kind of contract? 1= Formal [   ]   2= Informal contracts [   ]
36. If no, why…………………………………………………………………..
37. How do you get information on market and price for beef cattle?
  1= through friends/fellow cattle farmers [ ] 2= Radio/newspaper [ ]
  3= Direct visit to the markets [ ]   4= Traders [ ]

e. Other factors that affect livestock production and marketing

38. Are there any constraints/ challenges you face in marketing your cattle?
    1= Yes [ ] 2=No [ ]
39. If yes, what are these constraints?
    1= Unreliable markets (price fluctuation) [ ]
    2= Low price of cattle comparing to raring costs [ ]
    3= the process of selling cattle consumes more time [ ]
    4= low numbers of buyers in the market [ ]
    5= Lack of market of market information [ ]
    6= Absence of weighing machines in primary markets [ ]
    7= Problem of market infrastructure [ ]
    8= Absence of farmers association [ ]
40. What do you think that can be done to overcome such challenges?
    ……………………………………………………………………………………………
    ……………………………………………………………………………………………

f. Business Development and support services

42. Have you received any business or technical training? 1= Yes [ ] 0= No [ ]

43. If yes, when and what were the contents?

44. Who were the providers of that training?

45. Did you incur any cost in attending that training? 1=Yes [ ] 0=No [ ]

g. Regulations

46. Are they any regulations/laws/rules set by the authority toward beef marketing?

    1=Yes [ ]   0=No [ ]

47. If yes in Question 46, what are they? (Mention)

    …………………………………………………………………………………………

    …………………………………………………………………………………………

48. What are the effects of these regulations on beef cattle production and marketing?

    …………………………………………………………………………………………

    …………………………………………………………………………………………

Thank you for your cooperation.

Appendix 5:   Questionnaire for Household traders of indigenous beef cattle

A. Introduction

   Questionnaire number……… Date of interview……………

   Name and mobile contacts……………………………………

   Name of trader-optional (Retailer, Wholesaler, Middlemen etc.)……………………

   District …………… Ward………………Village/street………………

None	Primary	Ordinary Secondary	Advanced Secondary	Diploma	Degree	Other (Specify)

Level of education (indicate by putting a tick):

B. Market operation

B 1: Market(s) to buy

1. Type of trade involved
   1= Whole seller [ ]   2= Retail [ ] 3= Middlemen [ ] 4 = others (specify) [ ]
2. What is the source of beef cattle you sell? 1= Livestock keeper [ ] 2=Ranches [ ]
    3=Trader [ ] 4=Retail [ ] 5= other (Specify) [ ]
3. How many years have you been in livestock business? ………………..
4. On average how many cattle do you purchase per month?.........................
5. Is there any variability in the volume of cattle you buy between seasons?
   1 = Yes [ ] 0 = No [ ]
6. If yes, which month do you buy more or less cattle?
    More cattle (months) …………………….
    Less cattle (months)………………………..
7. What was the mode of payment?
    1 = Cash [ ]   2 = Credit [ ]   3 = Other (Specify [ ]

8. Who sets the price of cattle?
   1=Seller [ ]   2= Buyer [ ]   3= both buyer and seller 4= others (specify) [ ]
9. What factors are considered in setting the price?
   1= Supply and demand forces [ ]   2= Quality grades [   ]
   3= Observation of the physical condition [ ] 4= Breed [ ] 5= Weight [ ]
   6= Others (Specify) [ ]
10. How do you fix prices of beef cattle?
    1= Take market prices [ ] 2= Calculate cost involved [ ] 3= other (specify)… [ ]
11. Do you know price in advance before taking your consignment to the market?

1= Yes [ ] 0 =No [ ]
12. What are the means of transport do you use?
    1= on treks [ ]   2= by Trucks [ ]   3 = others (specify) [ ]

B 2: Cost(s) involved

13. Please provide details of your costs you have incurred in your business last year 2018

Cost item	Number	Frequency of (e.g. 2 times per month)	Costs (TZS)	Total cost per month
Labor (loading and unloading)				
Transportation of cattle				
Casual labor				
Market charges				
Communication				
Losses of animals (deaths)				
Market fee				
Movement permit (buying)				
Transportation (Buying)				
Herders wages(labor)				
Treatments				
Feeds				
Food				
Movement permit (selling)				
Taxes				
Others (specify)				

14. What is the average distance from the area where you buy cattle to the most frequent

    market? ……..….. Km……..… hours
15. If by truck, do you share this mode of transport with others traders? 1 = Yes [ ] 0 = No [ ]
16. How do you share the costs? 1 = by weight/ volume [ ]   2 = per trip [ ]   3 = equally

    irrespective of size/volume [ ]   4 = per distance [ ]   5 = number of animals [ ] 6=

    Other (Specify) [ ]

B 3: Market(s) to sell

17. Where/to whom do you sell cattle?
    1 = Wholesalers [ ]   2=Industrial processors [ ]   3 =Retailers [ ]
    4=trader [ ]   5=butcher dealer 6 = Other (Specify)……… [ ]
18. Do you have any contractual agreement with suppliers of products?

        1= Yes [ ]   0 = No [ ]

19. If yes, please indicate the kind of agreement?   1 = formal contract [   ]   2 = informal

    contracts [ ]

20. Do you have any contractual agreement with buyers of products?

   1 = Yes [ ]   0 = No [ ]

21. If yes, please indicate the kind of agreement?   1 = formal contract [ ]   2 = informal

   contracts [ ]

22. How do you normally get pricing information?

   1= Direct visit to the markets [ ]   2= fellow traders [ ] 3= newspapers [ ]

   4= radio/TV [ ]   5= others (specify) [ ]

23. What are the criteria used in setting prices?

   1= Cost incurred [ ] 2=supply and demand forces [ ] 3= others (specify) [ ]

24. What challenges are you facing in your business?

   1=problem of market infrastructure [ ] 2=low capital [ ]

   3=Beef cattle Affliction to traders when they sell outside the country [ ]

   4=Lost of cattle from or way to the market [ ]

   5=price fluctuation [ ]   6= low graded cattle in the market (emaciated cattle) [ ]

   7=some cattle are sent to the market when sick [ ]   8=unreliable markets   [ ]

   9=Transportation of cattle on trek is a tedious work [ ]

   10=death of cattle on a way from the market [ ] 11=theft of cattle [ ]

   12=getting loss in business (less returns) [ ] 13=others (Specify) [ ]

25. What suggestions do you recommend to the government to reduce the challenges

   encountered in your business?

   ………………………………………………………………………………………………

   …………………………………………………………………………………………

C. Business Development and support services

   26. Have you received any business or technical training? 1=Yes [ ] 2= No [ ]

   27. If yes, when and what were the contents?

   28. Who were the providers of that training?

   29. Did you incur any cost in attending that training? 1=yes 2=No [ ]

D. Regulations

   30. Do you know any regulation/laws/rules set by the authority toward beef

marketing?

1= Yes [ ] 2= No [ ]

   31. If yes in Question 37, what are they? (Mention)

   …………………………………………………………………………………………………

   …………………………………………………………………………………………………

E. General Information

32. What challenges are you facing in your business?

    1=problem of market infrastructure [ ] 2=low capital [ ]
    3=Beef cattle Affliction to traders when they sell outside the country [ ]
    4= Lost of cattle from or way to the market [ ]
    5=price fluctuation [ ] 6= low graded cattle in the market (emaciated cattle) [ ]
    7=some cattle are sent to the market when sick [ ]
    8=unreliable markets   [ ]
    9=Transportation of cattle on trek is a tedious work [ ]
    10=death of cattle on a way from the market [ ] 11=theft of cattle [ ]
    12=getting loss in business (less returns) [ ] 13=others (Specify) [ ]

33. What suggestions do you recommend to the government to reduce the challenges encountered in your business?

Thank you for your cooperation.

Appendix 6: Questionnaire for household Butcheries/Meat shops

Introduction

Questionnaire No……………………………………………………….
Date of interview …………………………………………………………
Name of respondent………………………………………….
Contacts mobile/e-mail………………………………………..
Village/Street…………………………………………………
Ward…………………   District ………………
Name of butchery/ meat shop (optional)……………………

    Level of education (indicate by putting a tick):

None	Primary	Ordinary Secondary	Advanced Secondary	Diploma	Degree	Other (Specify)

a. Marketing information and market condition

1. Years in business……………….number of years
2. What is the source of beef you sell?

1=Ranches [ ] 2=Traditional cattle [ ]
3= Imported [ ]   4= Both local and imported [ ] 4= Other (specify) [ ]
3. If imported from where …………….. (Country)
4. A type of beef you sell.
    1=Quality beef [ ] 2= Normal beef [ ]
    3= both quality and normal beef 4=others…… (specify) [ ]
5. Do you sell other meat substitutes?
    1= Yes [ ] 0 = No [ ]

6. If yes, what other meat substitutes to beef do you sell?
   1= Chicken [ ] 2= Fish [ ] 3=Goat meat [ ] 4=Pork [ ] 5= Both Chicken and Fish [ ]
   6= Both Goat and Chicken [ ] 7=Chicken, Fish and Goat [ ]
7. What quantity in Kilogram of quality beef do you sell per week?
8. What is the single most important quality attributed do you consider to judge quality beef?

   1= Tenderness (flavor, palatability and texture) [ ]

   2= Color [ ] 3=Fat distribution [ ]   4=juiciness [ ]
9. Who are your main customers?
   1= Tourists [ ]   2= Households [ ]
   3=Hotels/restaurants [ ]   4=both households and hotels/restaurants [ ]
   5= both households and supermarkets [ ]   6= others (specify) [ ]

10. What price do you charge per unit? TSH/Kg

    - Steak…………………………………

    - Mixed ………………………………….

    - Liver …………………………………………

    - Other (specify)…………………………………

11. How your customers react towards beef prices?

    1= high price [ ]

    2=low Price [ ]   3= Reasonable price [ ]   4= other (specify) [ ]

13. What do customers say about your product and services? Give possible opinions

    1= Good product [ ]   2=Normal beef [ ]   3= Needs improvement [ ]
    4=others (specify) [ ]

b. Price variability and marketing condition

14. When do you sell more beef? Give possible months

   ………………………………………………………………………………….

   …………………………………………………
15. What are the reasons for more sales in those periods?
    1=High money circulation within people [ ] 2=after harvest of crops [ ]
    3=festivals periods [ ] 4=others (specify) [ ]
16. In which period of the year do you sell less beef? Give possible months
    ……………………………………………………………………………………
17. What do you think are the reasons for fewer sales in those periods?
    1=Low peak in tourism [ ]   2=period of sending of pupils to schools [ ]
    3=low money in those months 4=other [ ]
18. In your opinion has the demand for quality beef increased or decreased in the past two years?
    1= Increased [ ] 2=decreased [ ] 3=remained constant [ ]
19. What changes have occurred in quality beef over the last two years ?......
    1= Better packaging [ ] 2= No change[ ] 3= Better grading
    4= compliance of hygiene and safety standards [ ] 5= other (specify) [ ]
20. What pricing strategy do you use?
    1= Cost based 2=competition based
    3= Both Cost based and competition based 4= other (specify) [ ]
21. In your opinion, is demand for beef higher than that of substitutes?
    1= Yes 0=No
22. Do you advertise your product ……………
    1= Yes [ ]   0= No [ ]

23. How do you advertise your product
    1= use of radio [ ] 2=use of TV [ ]
    3=Use of leaflets/brochures [ ] 4=others(specify) [ ]
24. What are other strategies do you use to increase beef sales?
    1=good language (customer care) [ ]
    2=Compliance to hygiene and safety standards [ ]
    3=Selling standard meat cuts [ ] 4=other (specify) [ ]
25. What challenges you face when undertaking your business?
    1=shortage of equipments for handling and cutting [ ]
    2=in adequate capital and lack of credit facilitation [ ]
    3=customers do not prefer to purchase chilled meat [ ]
    4=Limited knowledge and skills on business planning and management
    5=High operational costs [ ]
    6=Market problem (few customers) [ ]
    7 =Higher levies imposed to butcheries/meat shops [ ]
    8=others (specify) [ ]
26. In your opinion, what needs to be done to improve beef industry?
    1=Construction of modern butcheries [ ]
    2=Livestock keepers to be advised on modern farming [ ]
    3=Cross breeding between traditional and Exotic breeds [ ]
    4=Land for grazing should be used at maximum utilization [ ]
    5=National Ranches need to be restored and enabled to produce high quantity [ ]

6=Enforcement of rules and regulation pertaining to cleanliness [ ]
7=Fattening of cattle to improve the cattle quality [ ]
8=Adequate information to livestock farmers on access to drugs and medication[ ]

c. Cost in beef marketing

27. Please indicate all costs incurred in the process of marketing in a week

Item	Cost (TZS)
The cost of purchasing live cattle	
The cost of purchasing beef in TZS/Kg	
Transport	
Storage facilities	
Electricity	
Packaging materials	
Advertisement (if applicable)	
Market dues	
Slaughter fees	
Labour costs /salary	
Rent	
Other costs (Specify)	

d. Business Development and support services

28. Have you received any business or technical training? 1=Yes [ ] 0= No [ ]

29. If yes, when and what were the contents?

…………………………………………………………………………..

30. Who were the providers of that training?

……………………………………………………………………………

31. Did you incur any cost in attending that training? 1= yes [ ] 0= No [ ]

e. Regulations

32. Do you know any regulation set by the authority toward beef marketing?

    1=Yes [ ] 0= No [ ]

33. If yes in Question 29, what are they?

…………………………………………………………………………………

34. What are the effects of these regulations on beef cattle production and marketing?

(List)

…………………………………………………………………………………

…………………………………………………………………………………

35. Given the opportunity what important aspect would you need intervention to enhance

your quality for beef marketing activities?

        1= Credit access facilitation [ ]

        2= Business management skills [ ]

        3= Market linkage and information [ ]

        4=Graded cattle [ ]

        5= others (specify) [

Thank you for your cooperation.

Appendix 7: *Example of a VC value added sheet capture*

Assumptions of Production coefficients				
1.The bought beef is sold only in one operational day				
2.The carcass is about 60% of the animal live weight				
Revenue Streams				
Item	**Unit**	**Quantity**	**Price**	**Total (TZS)**
Steak	TZS/kg			
Mixed	TZS/kg			
Minced meat	TZS/kg			
Liver	TZS/kg			
Horns	TZS/piece			
Offal	TZS/kg			
Hides for leather or food	TZS/piece			
Shin (beef foreshank)-kongoro+mkia	TZS/piece			
Head	TZS/piece			
Bull pizzle	TZS/piece			
			Total revenue	
Costs Streams	**Unit**	**Quantity**	**Price**	**Total (TZS)**
Variable input costs				
Live cattle	TZS/cattle			
Beef	TZS/Kg			
Packaging material	TZS/Kg			
		Total variable input cost		
Operating Costs	**Unit**	**Quantity**	**Price**	**Total (TZS)**
Transport from the slaughter slab to the butcher	TZS-Lump sums			
Slaughtering fees	TZS/cattle			
Religious slaughter man cost	TZS/cattle			
Labour for slaughtering	TZS/cattle			
Labour for selling in the butcher	shs/person/day			
Water	TZS/20 litres			
Electricity	TZS/day			
Storage fees	TZS/kg/day			
		Total Operating Costs		
Overheads	**Unit**	**Quantity**	**Price**	**Total (TZS)**
Market charges	TZS/day			
Security fee	TZS/day			
TFDA and TBS fees	TZS/day			
TRA fees	TZS			
Board meat certification	TZS/day			
LGA service levy (% of gross profit)	TZS			
Trading license	TZS/day			
Administrative costs (telephone bills, stationary, insurance)	TZS/day			
			Total Overheads	
			Total Trading Cost	
			Gross Margin	
		Percentage of gross margin (%)		