BEEF CATTLE MARKETING IN TANZANIA: THE CASE OF MIKONGENI AND PUGU MARKETS

BY

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ABSTRACT

This dissertation examined beef cattle marketing in Tanzania using the case of Mikongeni and Pugu markets. The specific objectives were to examine the trend of cattle supply by grades and sex, to assess variation in market prices within and between years and to analyze the factors which determine prices of beef cattle sold in livestock markets. In addition to primary data, the study used secondary data which were gathered from the Ministry of Industries, Trade and Marketing. Primary data were collected using structured questionnaire and Focus Group interviews with key informants. Descriptive statistics and regression analyses were used in analysing the data. The results of analysis indicated seasonality in both real and nominal prices as well as number of beef cattle supplied between and within years. In both markets, real prices for 2005 remained higher than those in 2006 and 2007. Mikongeni market recorded the highest number of beef cattle supply in May and the least in November. Pugu market received the highest number of animals in August, with low supply in December and March. Market survey revealed that most of the animals supplied to these markets originate from the Lake Zone. Cattle buyers in the terminal market mainly preferred buying animals on weight basis; at the primary market, traders preferred mainly to buy/sell animals based on the buyer – seller agreement. Both markets received fewer heads of cows on the ground that they are preferred as parent stock. Based on these findings, formation of beef cattle marketing body to be in charge of all marketing activities in the country was recommended. The board among others would be responsible for placement and maintenance of marketing infrastructures, transmission of marketing information and supervision of beef cattle marketing activities.

DECLARATION

I, NIZIGAMA JUMA NYABENDA do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

17 - 11 - 2011

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The above declaration is confirmed

18. 11. 2011

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DEDICATION

To my mother and father, for sacrificing so much to bring me up.

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ABBREVIATIONS AND ACRONYMS

BOT	Bank of Tanzania
CPI	Consumer price Index
CTA	Centre for tropical Agriculture
FAO	Food and Agricultural organization
GDP	Gross Domestic product
LINKS	Livestock information network and knowledge system
MALD	Ministry of Agriculture and Livestock Development
MDB	Marketing Development Bureau
MITM	Ministry of Industries, Trade and Marketing
MLD	Ministry of Livestock Development
MLDF	Ministry of Livestock Development and Fisheries
MWLD	Ministry of Water and Livestock Development
NBS	National Bureau of Statistics
NCPI	National Consumer Price Index
NGDP	National Gross Domestic Product
RVF	Rift Valley Fever
SPSS	Statistical Package for Social Sciences
TLMP	Tanzania Livestock Marketing Project
Tshs	Tanzanian Shillings
URT	United Republic of Tanzania
WB	World Bank
WISP	World Initiative for Sustainable Pastoralism
PPLPI	Pro poor Livestock Policy Initiative

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Tanzania is well endowed with livestock resources. It is having the third highest cattle population in Africa after Sudan and Ethiopia (Mlote, 2006). According to the National Bureau of Statistics, the 2002/2003 National Sample Census of Agriculture placed the total National wise cattle population at 16 999 793.

In spite of the existing livestock potential in the country, the contribution of this sector to household and national income has not increased substantially (Mngulwi *et al.*, 2004). For example, in 2006, the livestock sector in Tanzania accounted for only about 3.9% of the total national GDP (URT, 2007). Similarly, the annual animal off take has remained as low as 8 – 10% and per capita meat consumption at 11kg (URT, 2007) which is far below FAO recommended level of 50 kg (MLD, 2006). None the less, Thornton *et al.* (2002) stated that two thirds of the rural poor are livestock keepers despite the fact that livestock is an enabling asset and an important source of livelihood.

There are various reasons for the current low annual animal off take and consequently low meat per capita consumption. In most cases, the purpose of keeping animals has a great influence on the decision by livestock keepers taking their animals for sale. Most cattle keepers for instance, keep cattle as source of income, food (meat, milk and blood) as well as for purposes like prestige and for traditional uses (Mwangulumba *et al.*, 2004; Kitalyi *et al.*, 2005). To fulfil this multiplicity of uses, animal keepers may at any particular time be required to have large herds of cattle.

Marketing constraints also play a big role in low cattle off take within Tanzania (MWLD, 2001; Kitalyi *et al.*, 2005; Mlote, 2006). According to URT (2006), Livestock keepers face difficulties in organizing themselves to evaluate market opportunities and meet market requirements. This problem is also excavated by the fact that past researches have always been directed to aspects of meat supply, demand and consumption patterns rather than livestock marketing trend and pricing (Airey, 1995; Mtenga *et al.*, 1998; Mapunda, 2007).

1.2 Problem Statement and Justification

Despite of the presence of large livestock resource base in Tanzania, many authors have expressed their concern over the marginal contribution of the sector to national economy and livestock keeper's welfare as a whole (Thornton *et al.*, 2002; Kitalyi *et al.*, 2005; Mafuru *et al.*, 2006). Insufficient research works on livestock market and marketing information have been mentioned as the major cause of the trend (MWLD, 2001; Kitalyi *et al.*, 2005; Mlote, 2006; URT, 2003). Many of the past research works have always been directed to aspects of meat supply, demand and consumption patterns, but little on livestock marketing. These studies include research works which were conducted by Airey (1995), Mtenga *et al.* (1998) and Mapunda (2007). More studies on supply pattern, market composition and pricing of livestock are required so as to enable livestock keepers to plan when and where to sell their animals. This information will also help in the formulation of appropriate policies aimed at uplifting the contribution of the sector in the overall national economy. Therefore, the purpose of this study was to asses the current livestock marketing trend and establishes which parameters influence price of beef cattle in primary and secondary markets.

1.3 Objectives

1.3.1 Overall objective

To asses beef cattle marketing trend at Mikongeni Primary and Pugu terminal markets.

1.3.2 Specific objectives

i. To examine the trend of cattle supply in primary and terminal markets by grades and sex,

ii. To assess variation in market price for beef cattle between and within years, and

iii. To analyze the factors which determine prices of beef cattle sold in the primary and secondary markets.

1.4 Research Questions

i. Was the trend of cattle supplied in Primary and Terminal markets increasing or decreasing? If increasing or decreasing trend, what are the reasons?

ii. How do the quantity and price for beef cattle vary between sexes and grades and between and within years?

iii. To what extent are the sex, grade and number of animals marketed influence the price of beef cattle sold in primary and terminal markets?

1.5 Organization of the Dissertation

This dissertation is organized in five chapters. The first chapter presents background information, statement of the problem of the study and the justification. It also includes objectives of the study, research questions and conceptual framework. Chapter two presents the literature review in terms of overview of cattle marketing in Tanzania, available livestock marketing infrastructures and livestock marketing channels. Seasonality in supply, demand and price of cattle is also presented. Methodology used to

carry out this study is presented in chapter three, where study areas, sample size and sampling technique used are explained. Results and discussion are presented in chapter four while conclusions and recommendations are presented in chapter five.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview of Cattle Production in Tanzania

The majority of cattle produced in Tanzania are found in the traditional sector, where cattle are kept in extensive system dominated by pastoralism (Airey, 1995; Mapunda, 2007). Most of these cattle are kept for meat production with an estimated 10% being kept as dual purpose animals for both beef and milk production (Gray, 1981). According to Kurwijila and Kifaro (2002), beef industry in Tanzania relies mostly on the indigenous cattle to East Africa, mainly Tanzania short Horn Zebu and Boran cattle.

2.2 Cattle Distribution in Tanzania

The distribution of cattle in Tanzania is poor. This contributes a lot to low national agricultural output that potentially could be obtained from cattle (Kyomo, 1976). According to 2002/2003 National Sample census of Agriculture, WB (1994) and MLD (2006), cattle are kept in all regions of Tanzania. However, there are big variations in cattle population between these regions (Zones). High population of cattle are found in the lake zone (Mwanza and Shinyanga Regions), followed by the central zone (Singida and Dodoma Regions). The lowest population of cattle are found in the lowland areas of Mtwara and Lindi and the coastal areas of Dar es Salaam and Coast regions (MLD, 2006; URT, 2006).

Table 1: Cattle population in Tanzania

Region	Indigenous cattle	Improved beef cattle	Improved dairy cattle	Total cattle population
Dodoma	1 025 388	1 856	4 643	1 031 889
Arusha	1 532 103	2 853	57 744	1 593 633
Kilimanjaro	351 191	5 454	137 910	494 555
Tanga	350 210	298	27 683	378 338
Morogoro	455 985	26	5 052	461 063
Pwani	110 360	1 140	10 809	122 308
Dsm	4 660	302	1 765	13 195
Lindi	2 019	64	998	3 080
Mtwara	16 383	-	775	17 158
Ruvuma	105 884	181	15 111	121 175
Iringa	401 773	1 659	17 522	420 954
Mbeya	898 050	2 045	40 982	941 077
Singida	1 255 118	925	1 115	1 257 159
Tabora	1 566 169	671	1 851	1 568 691
Rukwa	503 345	274	1 107	504 727
Kigoma	421 613	-	748	422 361
Shinyaga	2 591 532	1 375	11 198	2 604 105
Kagera	869	-	17 050	886 474
Mwanza	1 710 309	-	7 882	1 718 190
Mara	1 090 007	264	8 797	1 099 068
Manyara	1 163 051	1 139	13 761	1 177 951
Mainland	16 424 572	20 527	390,971	16 837 150
Zanzibar	154 381	354	7 908	162 643
National	16 578 953	20 882	398 879	16 999 793

Source: URT (2006).

2.3 Cattle Marketing

ILRI (1995) and Mlote (2006) reveals that livestock marketing in Tanzania normally begins at the level of individual smallholder. Producers usually carry out some or all of marketing steps. Often, because producers are also consumers, little of what is produced is marketed. According to Kohls and Uhl (1990) and Ashimogo *et al.* (1990) as cited by Mapunda (2007) animals from traditional herd are mainly sold alive on the basis of buyer – seller estimates of quality in designated livestock markets.

2.3.1 Livestock marketing infrastructures in Tanzania

The livestock marketing infrastructures in the country supports the supply chain from the producer to the consumer (MLD, 2006). According to MLD (2006), the marketing

infrastructure consists of 300 primary markets located closer to livestock keepers, 10 secondary markets located in Arusha, Dodoma, Singida, Tabora, Shinyanga, Kagera, Mwanza, Mbeya and Mara regions. Others are 4 terminal markets namely Pugu (DSM), Themi (Arusha), Weruweru (Kilimanjaro) and Korogwe (Tanga). In addition, there are 13 holding grounds and 10 railway cattle loading ramps together with 15 veterinary checkpoints located at regional boundaries and at natural barriers (major rivers).

2.3.2 Livestock marketing channels

According to Mlote (2006), there are three major livestock market channels for cattle and small stock marketing in Tanzania. MALD (2002), Mlote (2006) and Bekule and Tilahun (2006) explained that beef cattle marketing starts from the household level where live animals can either be sold directly to primary markets, to secondary markets or to border markets depending on the proximity of the market.

2.3.3 Seasonality in supply, demand and price of cattle

While analyzing cattle marketing in Shinyanga Region Mafuru *et al.* (2006) report that supply, demand and price of beef cattle were significantly influenced by availability of forage and drinking water for animals as well as availability of other sources of income to the household. He adds that, when there is scarcity of forage and drinking water, animals' loose condition thus more are supplied forcing the price to drop. Also Mafuru *et al.* (2006) explained that in the months beginning May to August, prices are usually high because in this period there are many buyers including producers who want to restock their herds. According to Mafuru *et al.* (2006) this is a period when producers have harvested and sold other crops and therefore have money which is recycled into the market.

In England, Digby (1989) when analyzing price trends for beef found out that beef producer prices were generally lower in autumn when supply increases. Prices increases in the third quarter of the year, but fell back in November and December. A study by Ansell (1971) which focuses in Botswana indicates that prices of cattle were very high in January and February relative to prices of November and December. In this case, it was concluded that prices of meat animals varied in response to seasonality in production.

Airey (1995) while investigating livestock and meat supply to Dar es Salaam city, found that daily market values (supply, demand and price) are influenced by several factors, the greatest being uneven supply. He also suggested that in the face of falling numbers prices tend to rise steeply, forced up mainly by the smaller hand to mouth butchers. The larger operators on the other hand, have the cash or credit worthiness to purchase and stockpile supplies of cattle when inflows are high. Seasons of festivities also influence demand as does religious celebrations and holidays.

2.3.4 Cattle live weight, sex and grade distribution in the live market

According to Airey (1995), average live weights of cattle passing through the Pugu terminal market as recorded by Marketing Development Bureau (MDB) for six years (1984-1989) were 245 kg, 250kg, and 203 kg for steers, bulls and cows respectively. The proportions of each sex in the market were 56%, 23% and 21% for steers, bulls and cows respectively. This trend remained constant for the whole period of six years. Also Airey (1995) found that, grouping grade 0 and grade 1 together in respective years during the six years, from existing MDB records, shows that cattle in good slaughter condition made up only 31% of the annual totals sold through the terminal market. Grade 2 animals (good feeder condition) ranged between 43%-48%, poor conditioned types classified as grade 3 ranged between 15-19%, while weak and emaciated stock made up 2-7% of annual

throughput. Average weights were 273 kg, 247kg, 234kg, 225kg and 210 kg for grades, 0, 1, 2, 3, and 4 respectively during the period.

2.4 Tanzania Live Cattle Grading Systems

Two different beef cattle grading systems have been adopted and used in Tanzania. Ministry of Agriculture and Livestock Development (MALD) in 1982 established the five grades beef cattle grading system. Consequently, the Ministry advised Tanganyika Packers Company to use this system when purchasing animals. This system categorizes beef cattle into five grades. These grades are; Tanzania special (grade 0), Tanzania number one, Tanzania number two, Tanzania number three and Tanzania number four. All grades are categorized into sex sub category of Bulls, Steers and cows (MALD, 1982).

At present, beef cattle marketing records follows and uses body condition scoring method. This system assigns nine scores to describe four different grades of beef cattle. According to MITM (2005), under the Livestock marketing information network and knowledge system (LINKS), nine condition scores are used to describe three main body condition – (fat [F], medium[M], and lean[L]). These conditions are further subdivide into three categories abbreviated as F+, F, F-, M+, M, M-, L+, L, and L-. Each scoring is given a number from 1(L-) to 9(F+). In a borderline case a half point is added to the lower score, so that a cow described as M-/ L+ is scored as 3.5. Under this system, scores ranging from seven to nine are grouped as grade one, five to six scores as grade two, three to four scores as grade three and finally one to two scores as grade four.

2.5 Price Relationship in the Market

When establishing live cattle grades in Tanzania MALD (1982) suggested that live weight accounts for much of the total live cattle value. However, even from casual observation

not all cattle of the same weight will sell for the same total price, even at a specific time and location. MALD (1982) further reported that most cattle do not sell at the same price per unit of weight (Tshs/kg). Analysis of live cattle prices among cattle of equal weight and age would provide some idea of the extent to which retail value relationships are being reflected in prices paid on the live cattle. Based on this idea, econometricians suggested different functional forms for conducting such an analysis. MALD (1982); Low (1987) and Domininguez (1989) suggested regression analysis as a feasible method of analyzing relationship between economic variables.

2.6 Results from Similar Studies

According to MALD (1982), multiple regression analysis was done by TLMC on sales data collected from Dodoma market in the period from November 1981 to March 1982. From their results, it was noted that there was a stepwise increase in sales prices as grades increased from Tanzania No. 3 to the Tanzania No. 1 grade within each sex class. Comparisons among sexes within grades using total retail sales value relationship as guidance indicated that sales price relationship conforms to expectations; that is, prices were observed in the decreasing order of steer, bulls and cows. Similarly, this relationship was seen in Tanzania No. 1 grade, that is; steers, cows and bulls respectively. However, the Dodoma market data indicated a relationship of bull followed by steers and least price for cows.

2.7 Market Data Handling and Presentation

2.7.1 Use of plots and graphs to better understand and asses price data

Goetz and Weber (1986) suggests that once a time series of price or quantity data has been collected, the second most important step in the analysis is usually plotting the data either manually or by means of computer program. The same author puts forward three primary reasons why it is important to initially plot the data: first, only a plot can convey to the

analyst a quick and easy "feeling for" or overview of the data; second, plotting can be used to find and remove "outliers"; and third, it can be used to approximate missing values where necessary. Data plotting will therefore provide rapid overview of the data before going for a more in-depth analysis of the data.

2.7.2 Inflating price series

Inflating raw or current price data aims at bringing all values to a common denominator (e.g. 2001) (Goetz and Weber, 1986; and Kessy, 2003). The same authors further suggests that, it is generally more desirable to make use of reflated prices in extension work, where the current year becomes the base year with an index value of 100. The first step in inflating a time series is to obtain CPI which attempts to measure the change in the price of a so-called "market bundle of goods" purchased by the average consumer; it may include the price of different goods in the consumer's "food basket", the cost of clothing and housing, farm inputs, etc.

The following formula was put forward by Kessy (2003) as a means of computing CPI:

$$\text{CPI (in a specific year)} = \frac{\text{price of market basket in that specific year}}{\text{Price of market basket in a base year}} \times 100 \quad \ldots\ldots\ldots\ldots (1)$$

CPI is therefore a measure of the average level of prices in a given year relative to the average level of prices in a particular year, called a base year. A base year is a reference year with which prices in other years are compared. Also, Kessy (2003) asserts that CPI is designed to show the change in the general level of prices since the base year. Base year price index is taken on a standard norm of 100. Price changes and consequent changes in the value of money are thus measured as a percentage variation. Different CPI's may be available, measuring price increases of industrial or agricultural goods, or reflecting price changes for different groups of urban or rural consumers.

In Tanzania, the National bureau of statistics calculates NCPI, The National Consumer Price Index (NCPI) covers prices collected in 20 towns in Mainland Tanzania. Prices are gathered for 207 items. All prices collected are the prevailing market prices (NBS, 2009). Currently, with the aim of producing quality and reliable statistics, The National Bureau of Statistics has improved the data processing system and methodology used to compile the CPI as from September 2006. To mark this change, the base price has been changed to December 2001 from annual average of the whole year (2001) to allow for better month - to - month comparison. The weighting patterns used for compiling the Index remain based on the 2000/01 Household Budget Survey. The previous published CPI figures remain the official measure of inflation in the past. Generally, the improved CPI gives a measure of inflation which is about one percentage point higher per year than the old methodology. NCPI for the 1993 to June 2008 period have been summarized in Table: 2 below. NCPI values from 1993 to 2000 period were calculated on annual basis while figures from 2001 to 2008 period are calculated with 2001 set as a base year.

Table 2: NCPI's from 1993 to 2008

Period	General index	Food index	Non food index
Weight (%)	100.0	64.2	35.8
1993	67.8	63.8	74.9
1994	90.2	88.8	92.8
1995	115.8	115.1	117.0
1996	140.1	138.6	142.7
1997	162.6	162.8	162.4
1998	183.5	186.7	175.3
1999	197.9	203.1	185.0
2000	209.7	216.9	191.4
Weight (%)	100.0	55.9	44.1
2001	100.0	100.0	100.0
2002	101.0	101.0	100.9
2003	104.5	105.6	102.9
2004	108.9	111.8	104.6
2005	120.9	129.4	110.1
2006	129.6	138.5	118.5
2007	138.8	148.2	126.8
2008	150.5	164.3	133.1

Source: BOT (2009).

2.7.3 Uses of CPI

Changes in CPI are used to assess price changes associated with the cost of living (NBS, 2007). CPI is one of the most frequently used statistics for identifying periods of inflation or deflation. This is because large rises in CPI during a short period of time typically denote periods of inflation and large drops in CPI during a short period of time usually mark periods of deflation (Kessy, 2003). CPI is also used to calculate real prices from nominal prices. Goetz and Weber (1986) explain that real prices can be derived from nominal prices based on the following relationship:

$$\text{Real price} = \frac{\text{Nominal price}}{\text{Deflator}} \quad \ldots\ldots (2)$$

Price index deflator is expressed as a ratio of two different CPI's. This can be presented as:

$$\text{Deflator} = \frac{NCPI_t}{NCPI_0} \quad \ldots\ldots (3)$$

Where, $NCPI_t$ and $NCPI_0$ are price indices at the current and base year respectively.

2.7.4 Splicing two index series

Goetz and Weber (1986) suggest that a further computational difficulty arises when facing two indices based on different base years. They cite an example where one index series (the old one) may run from 1963 to 1973 with 1963 = 100 as the base year while the other series (the newer one) runs from 1973 to 1983 with 1973 = 100 as the base year. Different base years are usually chosen as the weights of commodities used to calculate a CPI change over time.

With the assumption that we want a new index series for the entire period (i.e. 1963 – 1983) with 1973 = 100 as the overall base year, we have to divide each value from 1963 to

1973 by the CPI value of the old series in 1973. This will give rise to a new value for 1973 in the old series, namely, 1973 will equal 100, and the remaining values in the new series (1973-1983) will remain unchanged. This procedure is called "splicing" two index series

2.7.5 Nominal and real prices

In economics, nominal value refers to any price or value expressed in money of the day as opposed to real value (price) which adjusts for the effect of inflation. An example includes a bundle of commodities such as gross domestic product and income. For a series of nominal values in successive years, different values could be because of differences in the price level, an index of prices. But nominal values do not specify how much of the difference is from changes in the price level. Real values remove this ambiguity. Real values convert the nominal values as if prices were constant in each year of the series. Any differences in real values are then attributed to differences in quantities of the bundle or differences in the amount of goods that the money incomes could buy in each year. Thus, the real values index the quantities of the commodity bundle or the purchasing power of the money incomes for each year in the series.

2.7.6 Regression analysis

Regression theory is mostly about estimation of a relationship between expected values of a dependent variable, Y, on the basis of a known measurement of an independent controlled variable X. For a given level of X_i of the controlled variable X, we can observe different values of the dependent variable Y, and all of these have an expected value of $E(Y/X_i)$ (Ndunguru, 2007; Kothari,2008). Also Ndunguru (2007) explains that multiple linear regression model is described by an equation of the form:

$$Y_i = b_0 + b_1X_{1i} + b_2X_{2i} + ... + b_kX_{ki} + U, \quad (4)$$

where, Y_i represents dependent variable, b_0; Intercept of the equation, X_i; independent variables and b_1.. b_k for regression coefficients of the independent variables while U stands for random error term.

2.8 Conceptual Framework of the Dissertation

In this study, beef cattle marketing were examined from the standpoint of

i. Supply approach: which examined the trend and quantity of beef cattle supplied at the market during the period under study,
ii. Composition approach: this looked at various categories of beef cattle supplied at the market. The categories were grades (two grades) and sex classes (three classes),
iii. Pricing approach: this examined the relationship between price as a dependent variable *vis a vis* sex, grade and volume of cattle marketed as independent variables.

Conceptual framework adopted in this dissertation has been summarized in Fig. 1.

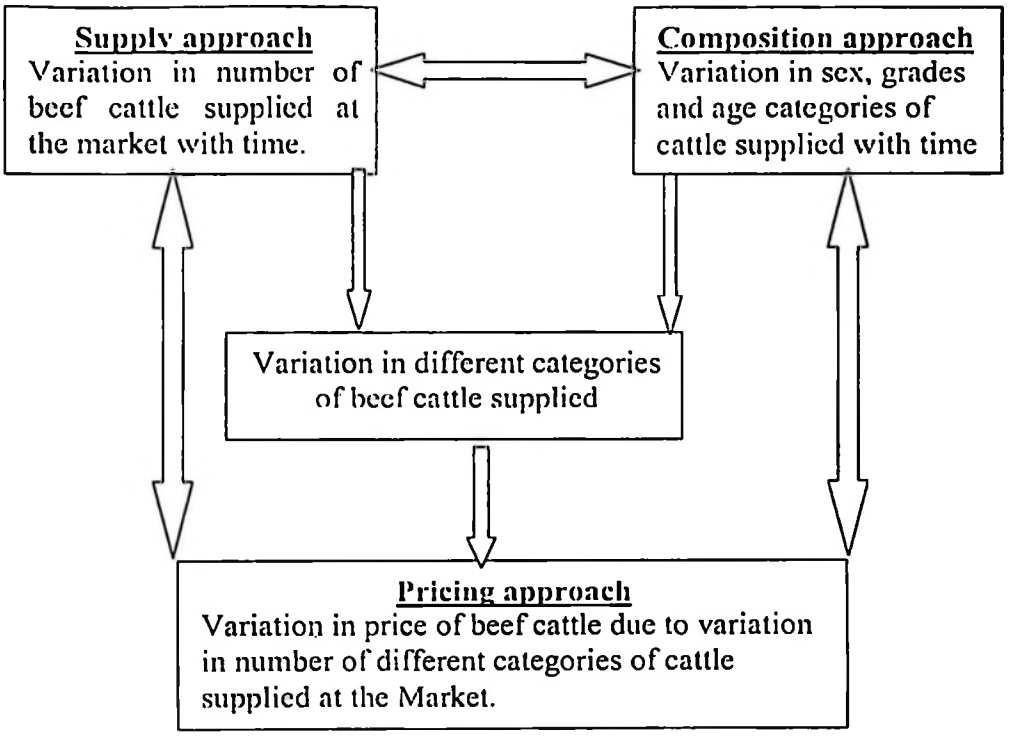

Figure 1: Conceptual framework of the dissertation

CHAPTER THREE

3.0 METHODOLOGY

3.1 The Study Areas

This study covered two major types of livestock markets, namely primary and secondary markets. Mikongeni primary market was selected since most of animals supplied to the market are brought by livestock keepers' from their own herds. Furthermore, the market is listed among the country's most active primary markets. On the other hand, Pugu terminal market was selected based on the fact that all animals are brought to this market by traders who purchase these animals from other markets. The market mostly serves final consumers as well as customers who purchase animals for export.

3.1.1 Pugu terminal market

Pugu terminal market is located in the Pugu area. It is about 22 km from the Dar es Salaam city centre. It is situated on a flat land with gentle slope with an area of about 10 hectares. The market lies along 39.27° east and 6.823° south of the equator. Animals are brought to this area through the Pugu railway station and by road. However, the majority of the animals are brought by railway. The market is owned by the Dar es Salaam city council and operates on daily basis with an estimated 10,000 animals being received at the marker every month (Gutta, J. personal communication, 2009).

3.1.2 Mikongeni primary market

Mkongeni primary market is located in Mvomero district about 50 km from Morogoro Township along Morogoro – Dodoma road. The market is owned by Mvomero District Council and listed as one of the primary markets. The market operates on fortnightly bases with an estimate of 600 cattle per every trading day. Some animals are brought to this

market by road from other Districts. However, since this area is surrounded by migratory pastoralists, most animals arrive at this market by trekking from the surrounding areas. The market lies along 37.661° east and 6.822° south of the equator.

3.2 Data Collection

Both secondary and primary data were used in this study.

3.2.1 Secondary data

Secondary data used in this study falls into two categories. Time series data which were used by NBS (National account section) for calculation of NGDP and the contribution of livestock into GDP are presented and discussed. This information include price against the total number of cattle which were traded on in the country for the period of 15 years (1993 to 2007). Secondary data recorded by the Ministry of Industries, Trade and Marketing for four years (2005 – 2008) at Pugu terminal market and Mikongeni primary market were also used in this study. Information collected in this category include:

i. Number of cattle brought to the market on monthly/annual basis
ii. Number of cattle in various grades (Grade II and III)
iii. Number of bulls, steers and cows brought to the market.
iv. Price of cattle with respect to their grades and sex in various months/year.

3.2.2 Primary data

In consideration of the severe shortage and paucity of time-series data, a structured questionnaire were designed, tested and adjusted before being administered to key market actors so as to supplement secondary data. Important groups which were interviewed are cattle sellers, middlemen and cattle buyers for Pugu market. At Mikongeni market, however, only two groups operate at the market. These are sellers and buyers only.

Key informant interviews were also carried out to capture important market information. Identified key informants were; zoo sanitary inspectors, revenue collectors and livestock officers from both markets. Staffs from the Ministry of Industries, Trade and Marketing responsible for livestock marketing data handling were also interviewed.

A checklist (Appendix 2) was administered to market officers, information on major sources of cattle, seasonality in number of animals supplied as well as price were explored. In this study, a total of 115 respondents (Table 3) categorized into three groups of cattle sellers, middle men and cattle buyers were interviewed.

Table 3: Number of respondents who were interviewed

Market	Cattle sellers	Middlemen	Buyers
Pugu	25	25	25
Mikongeni	20	-	20
Total	**45**	**25**	**45**

3.2.3 Sampling and sample size

Due to the nature of this study which demands collection of data from individuals with relevant information, the study adopted judgemental sampling. In this technique, the study considers respondents who have relevant information (Mapunda 2007; Adam and Kamuzora 2008). As such a sample of 75 respondents from Pugu market and 40 from Mikongeni market was obtained. This included 25 and 20 respondents from market actors at each market respectively.

3.3 Data Analysis

3.3.1 Secondary data analysis

Due to the presence of two different sets of secondary data, two different approaches of data analysis were adopted. In order to be able to explain the trend in price changes across

years, calculation of real prices of cattle from nominal prices were done. The calculation involved the use of NCPI (food indices) as being reported by NBS. The formula which was previously explained by Goetz and Weber (1986) were adopted. This takes the form:

$$\text{Real price} = \frac{\text{Nominal price}}{\text{Deflator}} \quad \ldots\ldots (5)$$

Deflator was calculated based on the following relationship:

$$\frac{NCPI_t}{NCPI_0} = \text{Deflator} \quad \ldots\ldots (6)$$

Where; $NCPI_t$ and $NCPI_0$ are indices at a given year and base year respectively.

On the other hand, Statistical Analysis System (2000) was used to generate descriptive statistics (least square means, frequencies) for secondary data recorded at both primary and secondary market. The obtained results were further summarized into tables, graphs and histograms for easy interpretation and presentation. Moreover, regression (multivariate analysis) was run to assess the influence of independent variables on dependent ones.

The model adopted was:

$$Y = \acute{\alpha} + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu \quad \ldots\ldots (7)$$

Where;

Y = Dependent variable (price)

$\acute{\alpha}$ = Intercept of the equation

X_1 = Number of animals marketed (supply)

X_2 = Grade of animal supplied

X_3 = Sex of the animal supplied

X_4 = Season of the year

X_5 = Market where the cattle was marketed

X_6 = Month in which the animal was supplied

X_7 = Year in which an animal was marketed

$\beta_1 - \beta_7$ = Regression coefficients for the independent variables

μ = Random error term.

3.3.2 Primary data analysis

SPSS 12.0 was used to determine trend, distributions and magnitudes of individual market variables among respondents (univariate analysis). This was specifically used to indicate and explain the trend in supply of beef cattle at the market as well as the pattern of variation in price within years for different categories of beef cattle received at the market.

3.4 Limitations of the Dissertation

The current livestock market data recording under LINKS program requires that market information which does not exceed 10% of the total supply cannot be reported. Although the present beef cattle grading system categorizes cattle into four grades, beef cattle in grade one and grade four in most cases do not exceed 10% of cattle supplied at the market. Therefore; the most dominantly reported grades are grades II and III only. Thus, the studied and analysed grades were II and III. Similarly, LINKS program was started in 2005; hence no market data could be obtained before this period.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents the research findings. These are based on both primary and secondary data. The results and discussions are divided into two parts. The first part presents results from secondary data. This part includes the supply pattern of beef cattle at both Primary and secondary market as well as the corresponding price of different categories of beef cattle at each market from January 2005 to December 2007. It also presents price trend for beef cattle marketed in Tanzania from 1993 to 2007 period. Moreover, in order to show price variation efficiently, real prices were calculated and discussed. To discuss annual price changes during this period, annual NCPI (food indices) were used to convert nominal to real prices. On the other hand the price trend for Mikongeni and Pugu markets are discussed basing on real prices calculated using monthly NCPI. This covered 2005 to 2007 study period.

The second part presents results from primary information. A structured questionnaire was administered to key market participants so as to explore important information related to beef cattle marketing. Results presented here include major source of beef cattle sold in these markets, knowledge on variation in supply of animals as well as pricing strategies adopted by market participants. Results on knowledge in variation in terms of quantity, qualities as well as price of animals supplied at the market are also reported and discussed.

4.1 Beef Cattle Price Variation Between and Within Years

This section briefly presents and discusses variation in both nominal and real prices of cattle marketed in Tanzania during 1993 to 2007 period.

4.1.1 Annual real and nominal price variation for beef cattle marketed in Tanzania during 1993 to 2007 period

Variation in real and nominal price for beef cattle which were marketed in Tanzania from 1993 to 2007 is presented in Table 4. Results indicate that the highest real prices were recorded in 2006, with the lowest being observed in 1999. Similarly, the trend indicates that there was a steady rise in real prices simultaneously with nominal prices from 1993 to 1995. The period of stability in real prices can be observed from 2000 to 2004. This period preceded a period of a rise in real prices from 2005 to 2007. However, the above trend reveals that real prices of cattle remained lower than nominal prices from 2002 all along to 2007.

Table 4: Annual variation in nominal and real prices for beef cattle marketed in Tanzania during 1993 to 2007

Period	Nominal price	Nominal price %C	NCPI-Food (Base 2001)	%C NCPI (Food)	Real price (Base 2001)
1993	40 974	NA	27.7		147 921
1994	57 232	39.7	38.6	39.4	148 269
1995	89 159	55.8	50	29.5	178 318
1996	74 137	-16.8	60.1	20.2	123,356
1997	105 672	42.5	70.8	17.8	149 254
1998	91 840	-13.1	81.1	14.5	113 243
1999	85 414	-7.0	88.3	8.9	96 732
2000	130 000	52.2	94.3	6.8	137 858
2001	124 448	-4.3	100	6.0	124 448
2002	133 189	7.0	101	1.0	131 870
2003	131 990	-0.9	105.6	4.6	124 990
2004	147 075	11.4	111.8	5.9	131 552
2005	279 117	89.8	129.4	15.7	215 701
2006	309 990	11.1	138.5	7.0	223 819
2007	311 158	0.4	148.2	7.0	209 958

Source: BOT (2009).

The above trend traces variation in NCPI (food index) and hence inflation. An abrupt rise in real price from 2004 to 2005 period could be due to an increase in inflation (Kessy, 2003) as indicated by the increase in CPI. According to Kessy (2003) a rise in inflation

increases the difference between nominal and real prices. This period registered a double increase in the CPI as well as nominal and real prices as compared to the previous period.

4.1.2 Within years' variation in real and nominal prices of beef cattle marketed at Pugu and Mikongeni markets from 2005 to 2007

Fig. 2 and 3 summarize three years' (2005 – 2007) variation in real and nominal prices of beef cattle marketed at Pugu and Mikongeni markets respectively. At Pugu market (Fig. 2), irrespective of higher nominal prices during July to December 2007, the market recorded the lowest real prices in most parts of the year. At this market, comparatively higher real prices can be observed throughout 2005, with 2006 registering slightly lower real prices as compared to 2005. Real prices for 2006 were lower than the rest of the years during October to December period.

At Mikongeni market (Fig. 3), nominal prices for 2007 in the first quarter of the year remained higher than the rest of the years. Nominal prices were also higher between May and August as well as December. The market exhibited different real price trends. In the same year, lowest real prices could be observed between March and April as well as September to November. In most of the months, real prices for 2005 remained higher than those exhibited by 2006 and 2007.

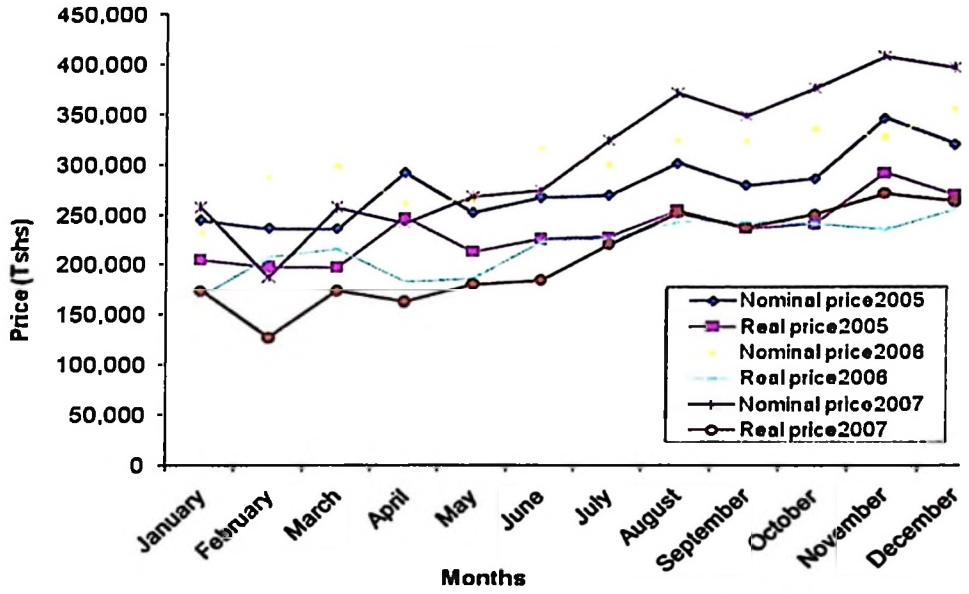

Figure 2: Within years' variation in nominal and real prices for beef cattle supplied at Pugu market from 2005 to 2007.

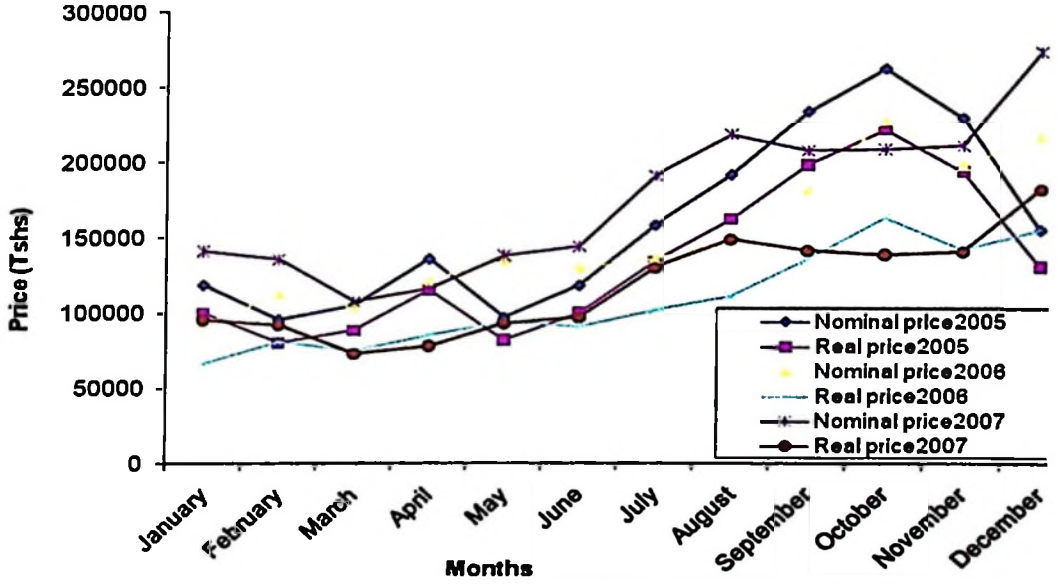

Figure 3: Monthly variation in nominal and real prices of beef cattle traded on at Mikongeni market from 2005-2007.

Low real prices and hence low value of money which were displayed during many months of 2006 in both markets is supported by BOT (2008). BOT report reveals that there was a slowdown in the overall national economy over this period. BOT (2008) explains further that unsatisfactory performance in most of economic activities was largely attributed to high oil prices in the world market and persistent drought which adversely affected agriculture and hydro-power generation in the country. The effect of drought was also explained and supported by Nikola (2007). Nikola (2007) while reporting on effect of drought to livelihood of pastoralists explains that during drought analyses of price movements show that livestock/grain terms of trade turn against livestock. He further notes that price movements are due to two independent processes that aggravate each other, as the production of staples decreases in a period of drought, their prices rise dramatically and pastoralists are thus forced to sell more animals than in normal years to satisfy their needs for cereals. This process in turn causes the price of livestock to decrease.

Relatively, low real prices during the first half of 2005 as compared to the second half of the same year can be explained by an increase in the annual rate of inflation as at the end of March 2006 (BOT 2008). BOT (2008) also indicated that the upward pressure on inflation emanated from food inflation which increased to an average of 9.1 % from an average of 6.9 % owing to shortage in food supply caused by drought in most parts of the country.

4.2 Beef Cattle Supply in Different Markets

The total number of cattle which were supplied and marketed in different markets during1993 to 2007 has been presented in Fig.2.

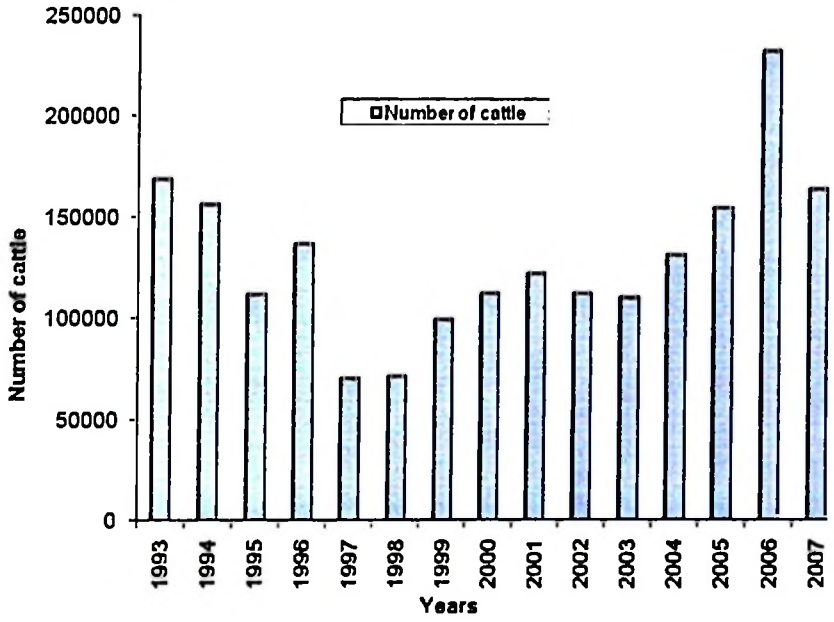

Figure 4: Number of beef cattle marketed in Tanzania from 1993 to 2007

The figure indicates that the highest number of beef cattle was traded on in 2006. It can also be observed that the lowest number of cattle was released during 1997 through 1998. The trend indicates that with an exception of 2003 and 2004, there was a stepwise increase in the number of animals marketed annually from 1997 to 2006 before the abrupt decline in the number of animals supplied in 2007.

The supply pattern displayed here has been documented by different authors. Irregular supply of animals could be due to irregular climatic condition. Nikola (2006) reported that during severe drought, pastoralists are forced to sell more animals preemptively before they become emaciated.

The same argument is supported by Gutta (personal communication, 2009) who argues that pastoralists release more animals during drought years and few during years with ample pasture and drinking water. This is probably the reason why relatively more animals were supplied during 1996, 2004 as well as 2006. Decline in the number of cattle supplied during 1998 period has been attributed to heavy rainfall during this period that broke off the communication network between the high cattle production areas and regions with low cattle population (BOT, 1998). An increase in the number of cattle marketed in 2006 could be due to drought which hit many regions of the country causing acute shortage of pastures and animal feeds thus forcing cattle keepers to release many animals for sale (CTA, 2008). Decline in number of cattle made available for sale during 2007 is due to RVF outbreak and consequently a ban on livestock trading imposed as a means of controlling the disease (Assenga, 2008). This pattern is also supported by MLDF (2008) in his explanation while delivering the 2008/2009 budget speech, the Minister responsible for livestock development explained that as a result of RVF outbreak livestock sector contribution in the national economy decreased to 4.7 in 2007 as compared to 4.8 in the previous year.

4.2.1 Supply of beef cattle at Mikongeni and Pugu markets

Least square means for the overall number of beef cattle supplied at Pugu and Mikongeni markets for the past three years (2005 to 2007) have been presented in Table 5. At Pugu market results shows that significantly higher number of cattle ($P<0.0001$) were recorded during the month of August and October. For Mikongeni market, the highest numbers of beef cattle were supplied in May. In the two studied markets there were no significant difference in the numbers of animals traded during the months of January, February, April, June, September and November. Records also shows that significantly low number of beef

cattle (P<0.0001) were received in December and November for Pugu and Mikongeni markets respectively.

Table 5: Within year's least square means for the overall number of beef cattle supplied at Pugu and Mikongeni markets from 2005 to 2007

Market	Pugu	Mikongeni
Overall	14 741.1	1 867.2
January	14 381.3^{c}	1 497.4^{c}
February	14 291.0^{c}	1 435.3^{c}
March	13 448.2^{d}	1 663.8^{bc}
April	15 617.9^{b}	2 121.0^{a}
May	16 852.9^{a}	2 266.8^{a}
June	16 508.9^{a}	1 838.5^{ab}
July	15 386.2^{b}	2 259.9^{a}
August	16 527.5^{a}	2 051.7^{a}
September	15 570.8^{b}	2 222.7^{a}
October	14 887.2^{bc}	1 729.3^{b}
November	12 587.9^{dc}	1 523.5^{bc}
December	10 833.1^{e}	1 797.1^{b}

NB: Means with similar superscript letters within a column are not significantly different (P<0.0001).

4.2.2 Variation in sex of beef cattle supplied at Mikongeni primary and Pugu terminal markets within years

Mean monthly variation of different sex categories of beef cattle supplied at Mikongeni and Pugu market from 2005 to 2007 are summarized in Table 6.

Table 6: Least square means for different sex categories of beef cattle supplied at Pugu and Mikongeni markets from 2005 to 2007

Sex of cattle	Bulls	Cows	Steer	Overall
Overall	2 990.6	1 281.1	4 756.9	8 991.6
January	2 050.9^{d}	1 236.3^{a}	4 403.2^{c}	7 207.9^{c}
February	2 191.6^{d}	1 238.9^{a}	4 230.1^{c}	6 917.9^{c}
March	2 738.6^{c}	933.7^{a}	4 980.8^{bc}	5 701.8^{d}
April	2 893.8^{c}	873.1^{a}	5 127.0^{b}	8 871.4^{bc}
May	3 042.1^{ab}	1 440.1^{a}	5 433.4^{b}	9 016.6^{b}
June	2 881.9^{c}	1 249.1^{a}	5 885.2^{ab}	9 529.6^{b}
July	3 172.8^{ab}	1 095.1^{a}	5 353.2^{b}	9 570.6^{b}
August	2 762.9^{c}	1 285.4^{a}	6 615.1^{a}	11 283.3^{a}
September	3 209.8^{ab}	1 432.8^{a}	5 003.9^{b}	10 286.4^{ab}
October	3 560.8^{a}	1 925.6^{a}	3 652.9^{b}	10 234.4^{ab}
November	3 973.8^{a}	1 494.9^{a}	3 295.3^{b}	10 065.9^{ab}
December	3 408.5^{a}	1 168.6^{a}	3 102.7^{b}	9 214.1^{b}

NB: Means with similar superscript letters within a column are not significantly different (P<0.0001)

Among the three sex classes, steers were supplied in significantly higher numbers (P<0.0001) than all other sex groups. The same results indicate that cows were supplied at the lowest volume followed by bulls. Within years, the highest numbers were recorded in August with the lowest in March. However, the same results indicated no significant difference in most of the months in the year. The supply trend for individual sex classes followed the same trend with no statistically significance difference (P<0.0001) in the supply of bulls and cows in both markets.

Table 7: Monthly variation in different sex categories of beef cattle supplied at both Mikongeni and Pugu markets from 2005 to 2007

Sex	Bulls		Cows		Steers	
Market	Mikongen	Pugu	Mikongeni	Pugu	Mikongeni	Pugu
Overall	588.4	5392.9	368.7	2120.5	840.8	9317.1
January	496.5^{cd}	$3\,605.3^{c}$	442.4^{a}	$2\,135.3^{a}$	587.3^{c}	$7\,687.9^{c}$
February	521.0^{c}	$3\,862.3^{c}$	271.9^{a}	$2\,300.0^{a}$	705.7^{bc}	$6\,981.6^{d}$
March	685.0^{ab}	$4\,792\,3^{bc}$	241.3^{a}	$1\,627.6^{a}$	790.8^{bc}	$8\,287.0^{c}$
April	675.0^{ab}	$5\,112.5^{b}$	358.5^{a}	$1\,413.6^{a}$	979.2^{b}	$9\,077.0^{b}$
May	873.1^{a}	$5\,211.2^{b}$	447.7^{a}	$2\,451.6^{a}$	933.8^{b}	$9\,487.4^{b}$
June	730.9^{ab}	$5\,033.2^{b}$	251.4^{a}	$2\,204.7^{a}$	834.2^{b}	$10\,825.3^{b}$
July	732.4^{ab}	$5\,613.2^{bc}$	325.9^{a}	$1\,736.9^{a}$	$1\,130.4^{a}$	10285.9^{b}
August	546.1^{c}	$4\,979.8^{bc}$	530.5^{a}	$1\,866.8^{a}$	867.9^{b}	$13\,704.1^{a}$
September	571.1^{c}	$5\,848.5^{b}$	398.9^{a}	$2\,325.0^{a}$	$1\,094.3^{a}$	$10\,717.3^{b}$
October	404.1^{cd}	$6\,717.5^{a}$	430.2^{a}	$3\,246.4^{a}$	706.3^{bc}	$9\,062.5^{b}$
November	340.4^{d}	$7\,607.2^{a}$	368.1^{a}	$2\,395.5^{a}$	663.1^{bc}	$8\,074.5^{b}$
December	485.1^{cd}	$6\,331.8^{a}$	357.8^{a}	$1\,742.3^{a}$	796.8^{bc}	$7\,614.9^{bc}$

NB: Means with similar superscript letters within a column are not significantly different (P<0.0001).

Individual sex categories of beef cattle which were supplied at both Mikongeni primary market and Pugu terminal market during 2005 to 2008 study period have been summarized in Table 7. Results show no statistically significant difference (P<0.0001) in the number of cows which were supplied at individual markets. Difference in supply can be observed within steers. The same result shows significantly higher number of steers in August for Pugu market, while for Mikongeni market the highest record were observed in may and July. For Pugu market the lowest record for steers was observed in February and

for Mikongeni in October to November. A more all less similar supply pattern can be observed within bulls sub class in both markets.

The superiority of steers among other sex classes supplied in both markets is supported by and Airey (1995) and WSIP (2006), who argued that pastoral herds usually, contain very low percentage of unproductive males. Both authors argue further that the excess and unwanted males are always being castrated and fattened for sale. On the other hand, Airey (1995) explains that steers dominate the market with least supply of cows.

4.2.3 Grade variation for beef cattle supplied at both Mikongeni and Pugu markets from 2005 to 2007

Results presented in Table 8 summarizes least square means for grade II and grade III animals supplied at both Mikongeni primary and Pugu terminal markets for a period of three years (2005 – 2007). In both cases, significantly higher numbers of grade II animals were consistently received from January to November with significantly low number ($P<0.0001$) of the same grade in December. Within individual market, there was no significant difference in grade II animals which were supplied at Pugu terminal market between the months of January to October. At this market, significantly low numbers of cattle in grade II were received in November and December. A similar trend was also observed for the supply of grade II animals at Mikongeni market.

Variation in grade III animals supplied at these markets exhibited a slightly different supply pattern from what could be observed with grade II animals. Generally, significantly higher numbers of this grade were received from July to December, while the lowest supply was recorded during January to June period of the year.

Table 8: Least square means for grade II and III beef cattle supplied at Mikongeni and Pugu markets from 2005 to 2007

Market	Pugu	Mikongeni	Overall
Grade II			
Overall	**9 077.7**	**912.9**	**5 353.5**
January	8 430.8^{b}	796.3^{b}	4 299.4^{bc}
February	8 147.9^{b}	898.5^{b}	4 070.0^{bc}
March	9 899.1^{ab}	1 073.0^{ab}	5 485.4^{a}
April	10 379.7^{a}	1 289.3^{a}	5 922.0^{a}
May	11 918.3^{a}	1 371.5^{a}	6 530.5^{a}
June	11 929.6^{a}	1 155.2^{a}	6 805.7^{a}
July	10 703.9^{a}	1 332.5^{a}	6 410.8^{a}
August	10 578.8^{a}	773.2^{b}	6 490.6^{a}
September	8 843.7^{b}	826.5^{b}	5 446.0^{a}
October	7 273.4^{c}	517.2^{c}	4 580.5^{b}
November	6 065.8^{c}	445.2^{c}	4 445.5^{b}
December	4 761.1^{d}	476.5^{c}	3 755.8^{c}
Grade III			
Overall	7 691.2	830.4	4 260.7
January	5 049.0^{b}	768.2^{a}	2 908.6^{b}
February	5 064.0^{b}	632.3^{a}	2 848.2^{b}
March	4 672.8^{b}	725.5^{a}	2 699.1^{b}
April	5 036.5^{b}	738.8^{a}	2 887.6^{b}
May	5 264.9^{b}	917.3^{a}	3 091.1^{b}
June	5 981.6^{b}	676.3^{a}	3 328.9^{b}
July	6 729.9^{b}	799.9^{a}	3 764.9^{ab}
August	9 734.5^{a}	1 059.9^{a}	5 397.3^{ab}
September	10 219.2^{a}	1 093.6^{a}	5 656.4^{ab}
October	11 706.9^{a}	810.9^{a}	6 258.9^{a}
November	11 695.9^{a}	754.9^{a}	6 225.4^{a}
December	11 138.9^{a}	986.6^{a}	6 062.8^{a}

NB: Means with similar superscript letters within a column are not significantly different (P<0.0001).

While supply of grade III animals at Pugu market followed this trend, there were no statistically significant difference (P<0.0001) in the number of grade III animals which were received and traded at Mikongeni market. The large number of grade II animals supplied to the market during the period under study is in conformity to explanation by MALD (1996) that, the Tanzania cattle population roughly approximates a normal distribution with the majority of animals clustered about the mean; hence the majority of cattle supplied to any particular market will be grade II.

4.3 Nominal Price Variation for Beef Cattle Categories Marketed at Mikongeni and Pugu Market, 2005 To 2007

The following subsection presents results on the variation in nominal prices of beef cattle marketed at Mikongeni and Pugu markets from 2005 to 2007. These results include least square means with superscript letters indicating significance difference between months at 0.0001 level of significance. Least squares means with similar superscript letters within a column are not significantly different at 0.0001 level of significance.

4.3.1 Within year's price variation for different beef cattle sex classes marketed from 2005 to 2007

Mean monthly variation in nominal price of bulls, cows and steers which were traded on at both Mikongeni primary market and Pugu terminal market are presented in Table 9. These results show that significantly higher prices for both sex classes were reported in the months of October to December, the same price variation pattern have been displayed throughout all individual sex classes. On the other hand, significantly low prices were recorded in March and May with the same trend being exhibited by individual sex classes across the dataset.

Table 9: Least square means for nominal prices (in Tshs) of bulls, cows and steers supplied at all markets from 2005 – 2007

Sex class	Bulls	Cows	Steers	Overall
Overall	267 330.7	211 394.2	311 849.7	263 527.9
January	224 397.4^{bc}	169 894.3^{c}	269 079.5^{c}	217 898.1^{c}
February	218 794.7^{c}	166 153.4^{c}	259 381.1^{d}	211 173.1^{c}
March	224 652.7^{bc}	169 361.9^{c}	266 830.0^{c}	193 741.3^{c}
April	236 584.5^{bc}	184 557.1^{cd}	282 124.6^{c}	232 575.0^{b}
May	225 930.4^{bc}	182 463.8^{c}	272 891.3^{c}	222 257.3^{c}
June	241 736.1^{bc}	192 225.9^{bc}	286 650.5^{c}	238 165.6^{b}
July	265 082.8^{b}	216 647.7^{b}	307 679.2^{b}	259 732.3^{b}
August	299 877.5^{b}	239 684.3^{ab}	329 504.1^{b}	288 698.9^{b}
September	299 828.5^{b}	235 075.2^{ab}	339 627.9^{b}	292 065.6^{ab}
October	322 275.6^{a}	260 396.4^{a}	364 995.9^{a}	312 607.3^{a}
November	323 131.5^{a}	257 596.9^{a}	376 606.8^{a}	316 465.6^{a}
December	325 784.3^{a}	262 673.9^{a}	386 825.2^{a}	316 298.9^{a}

NB: Means with similar superscript letters within a column are not significantly different (P<0.0001).

4.3.2 Nominal price variation for beef cattle sex categories at both markets from 2005 to 2007

Table 10, shows least square means for prices of bulls, cows and steers at Pugu and Mikongeni markets. Within the sex classes results show that steers were sold at a significantly higher price (P<0.0001) than other sex classes followed by bulls and cows receiving the least price. Within years, the highest price was recorded in November to December for both markets. Similarly, the lowest price were recorded in March and May for both markets. This trend in price variation can be seen across individual sex classes for both markets.

Table 10: Least square means for the price of beef cattle sex classes (in Tshs) at both markets from 2005 to 2007

Sex classes	Bulls (Tshs)	Cows (Tshs)	Steers (Tshs)	Overall (Tshs)
Pugu terminal market				
Overall price	**339 579.9**	**261 696.7**	**400 958.1**	**317 702.9**
January	299 238.2^{d}	212 656. 9^{d}	359 570.9^{d}	300 306.4^{ab}
February	293 688.2^{d}	212 010.6^{d}	349 499.1^{d}	297 896.9^{b}
March	313 865.3^{c}	231 308.4^{c}	375 467.9^{c}	291 276.5^{b}
April	313 799.2^{c}	235 313.2^{c}	376 647.3^{c}	301 944.5^{ab}
May	297 908.9^{d}	231 557.3^{c}	364 727.3^{c}	286 305.9^{b}
June	332 746.9^{c}	247 185.1^{d}	383758.7^{bc}	300 690.3^{ab}
July	333 074.6^{c}	274 589.6^{c}	390 506.3^{bc}	314 192.5^{ab}
August	381 739.2^{ab}	292 631.8^{b}	410 406.9^{b}	323 610.3^{ab}
September	356 840.1^{ab}	283 484.1^{b}	407 496.9^{b}	322 599.2^{ab}
October	364 756.4^{ab}	297 418.2^{b}	428 001.6^{b}	334 926.0^{ab}
November	390 594.4^{a}	307 779.4^{a}	471 889.0^{ab}	364 161.2^{a}
December	396 707.9^{a}	314 425.4^{a}	493 525.6^{a}	374 525.4^{a}
Mikongeni primary market				
Overall	194 361.5	160 789.3	223 324.1	193 948.4
January	149 430.6^{de}	129 206.1^{d}	174 915.4^{cd}	151 179.3^{cd}
February	144 002.9^{dc}	119 251.3^{d}	168 553.9^{cd}	143 559.9^{cd}
March	138 474.5^{e}	107 890.8^{d}	159 882.9^{d}	135 379.3^{d}
April	161 553.9^{d}	136 391.1^{c}	192 688.9^{cd}	164 806.2^{cd}
May	161 503.8^{d}	134 127.3^{c}	182 515.8^{d}	160 217.9^{d}
June	154 611.8^{d}	135 397.5^{c}	191 350.0^{d}	164 365.2^{d}
July	199 991.5^{c}	158 768.7^{bc}	232 265.1^{cd}	197 660.9^{cd}
August	216 830.6^{b}	188 953.7^{b}	249 440.5^{bc}	219 010.6^{bc}
September	240 784.2^{ab}	185 487.9^{b}	276 862.1^{ab}	241 345.3^{ab}
October	271 542.3^{a}	219 028.1^{a}	297 170.6^{a}	262 510.1^{a}
November	244 050.7^{ab}	204 847.2^{ab}	276 177.4^{ab}	241 459.8^{ab}
December	249 561.2^{ab}	210 121.1^{ab}	278 067.3^{ab}	245 885.5^{ab}

NB: Means with similar superscript letters within a column are not significantly different (P<0.0001).

4.3.3 Mean monthly variation in price (Tshs) of various grades of beef cattle at Pugu and Mikongeni markets from 2005 to 2007

The price of different categories of grade II and grade III beef cattle supplied at Mikongeni primary market and Pugu terminal market are presented in Table 11.

Table 11: Least square means for the price (in Tshs) of grade II and III beef cattle at Mikongeni and Pugu markets, 2005 – 2007

Market	Pugu	Mikongeni	Overall
Grade II			
January	373 248.4^{d}	193 272.2^{cd}	284 428.8^{cd}
February	364 323.1^{d}	182 845.9^{d}	274 255.3^{d}
March	388 836.9^{c}	173 121.2^{cd}	279 445.5^{d}
April	392 858.5^{c}	208 417.3^{c}	297 360.4^{cd}
May	369 273.4^{d}	196 204.7^{cd}	278 466.5^{d}
June	397 639.2^{c}	207 497.9^{c}	299 506.7^{cd}
July	414 055.4^{bc}	246 900.6^{bc}	326 550.6^{cd}
August	446 502.3^{bc}	256 895.8^{bc}	351 375.6^{c}
September	440 624.6^{bc}	290 748.6^{ab}	365 797.2^{ab}
October	454 773.6^{bc}	313 548.3^{a}	386 946.9^{ab}
November	499 352.8^{a}	297 830.8^{ab}	401 950.5^{a}
December	502 474.5 ^{a}	291 514.9^{ab}	400 665.4^{ab}
Grade III			
January	203 006.5^{d}	110 030.1^{d}	156 507.3^{b}
February	202 733.3^{d}	104 319.8^{d}	154 711.7^{b}
March	218 672.1^{d}	965 87.6^{d}	157 995.9^{b}
April	218 397.3^{d}	116 883.4^{d}	167 888.9^{b}
May	218 484.1^{d}	120 963.8^{d}	168 401.5^{b}
June	235 999.3^{c}	119 121.2^{d}	178 355.6^{b}
July	247 658.8^{c}	145 215.3^{bcd}	196 142.6^{b}
August	275 515.9^{ab}	182 163.1^{abc}	226 249.5^{a}
September	262 404.4^{b}	192 659. 1^{ab}	224 644.3^{a}
October	284 824.4^{ab}	213 947.7^{a}	248 980.8^{a}
November	297 041.7^{a}	187 993.9^{ab}	242 605.2^{a}
December	296 814.4 ^{a}	203 264.9^{a}	248 090.8^{a}

NB: Means with similar superscript letters within a column are not significantly different (P<0.0001).

The overall trend indicates that higher prices for grade II animals were recorded during September to December period with significantly higher price being observed in November. Similarly; significantly low price for grade II animals ($P<0.0001$) were recorded from January to March period. A more or less pricing trend can also be observed from individual markets. Prices of Grade III animals exhibited similar pattern. It can be observed that significantly higher prices for this grade were recorded from August to December and the lowest price from January to July.

4.3.4 The relationship between price and season, grade and sex of animal marketed

Linear regression results on influence of season, grade and sex of an animal as well as the number of animals marketed at Mikongeni and Pugu Markets on price are presented in Table 12. The R^2 value being 0.896 indicates that all independent variables best predicts the model. These results indicate that model fit as demonstrated by R^2 and t value did vary across independent variables. Location of the market, year in which the animal was marketed, the sex, grade of the animal and volume of cattle supplied positively affected the price of an animal marketed. Season in which cattle was marketed negatively affected the price of animals at the market.

The negative relationship between price and season of the year can be explained by low value fetched by animals during dry season as they lose weight due to lack of sufficient fodder and drinking water. This inference is supported by Mafuru *et al.* (2006) who assert that when there is scarcity of forage and drinking water animals lose condition thus more are supplied forcing the price to drop. Positive relationship between the volume of animals supplied at the market and price is an indication that there has been an increase in price accompanied by an increase in the number of beef cattle marketed. This trend constitutes an apparent exception to the law of demand, yet it does not negate it. Similar results were

market, the study revealed that among all 75 respondents who were interviewed, the proportions of each category were 36%, 34.7% and 29.3% for cattle buyers, cattle sellers and middlemen respectively. At Mikongeni market, cattle buyers made 60% of all respondents while cattle sellers amounted to 40%. This implies that there is more or less homogeneous mixture of market participants who are involved in beef cattle marketing.

4.4.3 Frequency of attending the market

Frequency of attending the market can have an impact on the persons' knowledge and experience on cattle marketing. Responses had been categorized into; frequent, less frequent and seasonal. At the terminal market, among all respondents who were interviewed, 96% made frequent visit to the market with only 2.7% and 1.3 % attending the market occasionally and on seasonal basis respectively. At the Mikongeni market, 97.5 % respondents made frequent visit to the market with only 2.5 % attending the market occasionally.

4.4.4 Duration in beef cattle trading

Respondents were asked to indicate how long (in years) they have been in beef cattle trading. The duration with which a respondent has been in business has a bearing on the profitability of the enterprise. At the terminal market, responses appeared in the proportions of 62.7%, 29.3% and 8% for over five years, three to five years and below three years in business respectively. A similar image was displayed at the primary market, where 80% of participants had more than five years in beef cattle trading. Only 10% had less than three years and between three to five years experience in trading. These results therefore indicate that most cattle traders stay in business for long time, while more newcomers are being attracted by the industry.

4.4.5 Mode of acquiring animals to be supplied at the market

This question was required to be responded to by cattle sellers only. At Pugu market, the majority of respondents making up to 76.9% reported to be obtaining animals from other primary markets as well as informal village markets. 15.4% obtained animals directly from livestock keepers, 3.8% were purchasing animals from the same market and sold at the same market on a later day depending on prevailing market price. Similarly, 3.8 % reported to be taking some animals from their own herds. At Mikongeni market, a different pattern was observed. This being a primary market, 86.7% of all respondents were taking animals from their own herds, 6.7% obtained animals directly from livestock keepers, while, the similar proportion (6.7%) bought and sold at the same market. This pattern is in agreement with different explanations on beef cattle marketing. This reveals that marketing begins at the household level, through primary markets up to terminal or border markets depending on proximity (MALD, 2002; Mlote, 2006 and Bekule and Tilahun, 2006).

4.4.6 Major source of animals

The source of trading animals had been classified into four zones. The zones are; Lake zone which include Tabora, Shinyanga and Mwanza regions. The Central zone represents Dodoma and Singida regions. Southern highlands zone include Iringa, Mbeya and Rukwa regions and northern zone standing for Kilimanjaro, Arusha and Manyara.

Mikongeni being a primary market, respondents from this market could not respond to the question on where they obtain animals. Responses from Pugu market shows that 54.7% of all respondents obtained their animals from Lake Zone, 37.7% from central zone, 5.7% from southern highlands and 1.9 % from northern zone. The trend in major source of animals revealed in this study conforms to findings by Mamman (2005). The study by

Mamman (2005) in Nigeria shows that beef cattle are normally being transported from areas with high livestock population to areas with high demand. In Tanzania, according to 2002 livestock census, the highest population of livestock were found in the lake zone. None the less, about 65% of Tanzanian beef cattle population can be found along the lake and central zones (URT, 2006; Mtenga *et al.*, (1998) explained also that more live animals were being transported from high livestock density areas to areas of low density and high meat demand such as Dar es Salaam.

4.4.7 Main customers

The main customers varied greatly among two markets. At Pugu terminal market, butcher men accounted for 42.5%, making the highest proportion of all customers at the market. Other categories were; customers who buy for export, middlemen, buyers who supply other markets and livestock keepers who want to restock their herds. Their proportions in percentage were; 10%, 12.5%, 32.5% and 2.5% respectively.

At Mikongeni primary market, livestock keepers who wish to restock their herds accounted for 53.8% and made up the highest proportion. Other proportions were 7.7%, 23.1%, and 15.4 % for butcher men, middlemen, and traders who supply other markets respectively. Direct observation and discussion with some key market participants revealed that most pastoralists were always supplying weak, old and poorly performing animals from their herds in exchange for young animals to restock their herds.

The dominance of butcher men at the terminal market could be due to the fact that beef is the most significant type of meat consumed in Dar es Salaam, both at household level and in food selling business (Mtenga *et al.*, 1998). At the primary market, however, apart from

other customers, producers meet other producers who wish to purchase animals for stock replacement or fattening (Bekule and Tilahun, 2006).

4.4.8 Access to market information

When respondents were asked on how they access market information such as price and number of animals at the market, 49.3% of respondents from the terminal market received information from friends through phone calls as well as through visiting the market themselves on the marketing day. Only 1.3% could receive market information through news media. At Mikongeni primary market, those who access market information as they visit the market accounted for 65%. On the other hand, 30% and 5% received market information through friends and media respectively. These findings are similar to explanations by Msemwa *et al.* (2008) and Nengovhela, *et al.* (2005) that farmers have severe lack of market information. Nengovhela, *et al.* (2005) while analysing the outcomes of using continuous improvement and innovation method to improve livestock marketing for the resource poor farmers in South Africa explained that due to lack of information, farmers could barely understand their commodity marketing chain. In a research on market participation of smallholder poultry producers in Northern Vietnam, Thornton *et al.* (2002) concluded that the marketing constraint of smallholder poultry producers is limited market information among others. Ndikumana *et al.* (2002) in their research on smallholder livestock producers in Vietnam argued that traders are generally the main providers of information about markets and prices for the small farmers. The authors also argue that in some cases, the government delivers information to farmers, however, very often; market information which eventually reaches to farmers is either outdated or not useful at all because of the unsystematic and bureaucratic provision.

4.4.9 Market and marketing costs

Marketing charges varied greatly among the two markets. Other costs apart from the cost of buying animals were; transportation costs, herding costs, trenching, grazing or feeding and market dues. Costs incurred at the market are summarised in Table 13. Official market charges included livestock movement permit and market fee. At Pugu market, weak animals were being fed with cut fodder at a cost ranging from 500 Tshs to 1000 Tshs per bundle. Similarly; drinking water was supplied to weak animals which could not manage to move out of the market for free grazing at a cost of 300 Tshs per 20 litres bucket. Transportation costs varied according the distance from the origin of animals to the destination market. On average, an animal could be transported from Lake Zone to Dar es Salaam at a cost ranging between Tshs. 50 000 to Tshs 70 000. On the other hand, transportation cost from Mikongeni market ranged between Tshs. 200 000 to Tshs. 300 000 for single truck able to ferry 30 animals.

Table 13: Other costs incurred at the market

Cost(Tshs)	Pugu market n = 75	Mikongeni market n = 40
Transportation costs		
Mean	22 698.1	225 625.0
Minimum	1 000.0	2 500.0
Maximum	70 000.0	300 000.0
Herding costs		
Mean	19 750.0	5 645.2
Minimum	500.0	500.0
Maximum	10 000.0	10 000.0
Watering costs		
Mean	512.7	200.0
Minimum	200.0	200.0
Maximum	5 000.0	200.0
Grazing/feeding costs		
Mean	2 062.5	281.7
Minimum	500.0	50.0
Maximum	10 000.0	900.0
Market fees		
Mean	1 817.2	2 362.1
Minimum	300.0	1 000.0
Maximum	2 000.0	2 750.0

Direct observation and discussion with key informants at the market revealed that most cattle traders were complaining on extra cost they have to bear in managing their animals while at the market. Similar to what were explained by Nikola (2007) that market transaction costs are very high. According to Nikola (2007) pastoralists face the risk of being displaced from their traditional markets by global competitors due to high prevailing marketing and transaction costs. On the other hand, Rendani (2005) argues that transaction costs are significant in rural economies where communications and transportation facilities are poor, markets are segmented and access to market participation is restricted. Transaction costs, visible or hidden, which are associated with product exchange, are embodiments of access barriers to market participation by resource poor households (Musemwa *et al.*, 2007).

4.4.10 Other sources of income and asset ownership

In this study, 14.3% of all respondents from Pugu terminal market participated in agricultural activities as a complimentary source of income. 85.7% engaged themselves in other mercantile business to supplement their income. At Mikongeni primary market, only 41.2% were involved in other commercial activities with the remaining 58.8% practising agricultural crop production as additional source of income. These proportions predicts the relative profitability of livestock trading between those involved in livestock trading at primary markets and those at secondary and terminal markets.

According to Nikola (2007) identifying the access to assets is the first step of a livelihood analysis and serves to distinguish different wealth groups who face common constraints and options. Respondents were required to indicate different assets they own. These assets were equally assumed to accrue from livestock trading. Listed assets were houses, tractor, vehicles, livestock and shops.

Respondents from terminal market were seen to own more houses than those from primary market. Although there were no difference in mean ownership of tractors for respondents from both markets; on average, respondents from Mikongeni primary market owned more numbers of livestock than market participants at Pugu terminal market. All assets owned by respondents from both markets are summarized in Table 14. Possession of alternative source of income as well as asset ownership could help to improve smallholders' ability to secure and repay loan required to invest in agriculture. It could also help to overcome a working capital constraint (Bailey *et al.*, 1999).

Table 14: Mean asset ownership by respondents

Asset type	Pugu market n = 75	Mikongeni market n = 40
House		
Mean	1.4	1.3
Minimum	1.0	1.0
Maximum	3.0	2.0
Tractor		
Mean	1.0	1.0
Minimum	1.0	1.0
Maximum	1.0	1.0
Vehicles		
Mean	1.4	1.1
Minimum	1.0	1.0
Maximum	3.0	2.0
Livestock		
Mean	589.1	281.7
Minimum	20.0	50.0
Maximum	6 200.0	900.0
Shops		
Mean	1.3	1.3
Minimum	1.00	1.0
Maximum	3.0	2.0

4.4.11 Starting and current capital

Capital status of all respondents was explored in terms of the total number of animals they are able to trade on at each marketing day. At Pugu market, 48% of all respondents started beef cattle trading business with less than five animals. Other proportions were 18.7%, 22.7%, 8, and 2.7 % for five to ten, ten to twenty, twenty to thirty and more than thirty animals respectively. At Mikongeni primary market 52.6% of all respondents joined

beef cattle trading with less than five animals as their starting capital. At the same market, about 40% of respondents had five to ten animals as their starting capital while only 7% started beef cattle trading with twenty to thirty animals. At this market no respondent who joined the business with more than thirty animals. Results indicated that there was no great variation in current trading capital among markets. The majority of the respondents from both markets were trading at ten to twenty animals with only the terminal market having few traders able to trade with more than 100 animals per trading day.

4.4.12 Knowledge on beef cattle grading and possibility of obtaining loans

Knowledge in beef cattle grading as well as possibility of obtaining loan to improve livestock trading can be an indication of respondent's efficiency in beef cattle trading. At Mikongeni primary market, all respondents (100 %) declared to have no access or possibility of getting loans. At Pugu terminal market, 30.7% of all respondents had possibility of getting loans while 69.3% had no access to loans. Key informant interviews at Pugu market revealed that well functioning informal savings and credit scheme existed among two dominant market groups. The groups are cattle traders (Besela) and Middlemen (Garagaja). This inference is supported by Gulli (1998) who explained on the existence and performance of informal microfinance schemes in various communities as compared to formal microfinance schemes. On the other hand, 64 % of respondents from terminal market had knowledge in beef cattle grading with only 36 % having no knowledge in grading. At the primary market, 42.5 % knew beef cattle grading and 57.5 % remained without knowledge in grading.

4.4.13 Best means of exchange to provide true value of the animal

Since the current government emphasis is for all animals to sell on weight basis, respondent's awareness on best means of exchange to bring true value of the animal

indicates awareness of livestock keeping community towards economically means of buying or selling animals. Responses from all respondents in both markets revealed that all transactions involved only negotiations between buyer and seller. When respondents were asked to propose the best means of buying and selling which can fairly benefit buyers and sellers; 70.7% of respondents from Pugu terminal market preferred buying or selling animals based on weight or body condition. 22.7% preferred selling or buying animals based on seller – buyer agreement and 6.7% had no idea on what could be the best method. At Mikongeni primary market, 65% preferred buying or selling based on seller – buyer agreement, 32.5 % buying on weight basis and the remaining 2.5 % had no idea on the best terms of trade. These findings support previous explanation by Aklilu, *et al.* (2002) who, according the current livestock marketing style, asserted that in Sudan, Kenya and Ethiopia the owners of butcheries are the most powerful group in the livestock marketing chain followed by middlemen who act as interface between traders and butchery owner. Similar findings were also reported by Mlote (2006) and Mapunda (2007) that animals from traditional herd are mainly sold alive on the basis of buyer – seller estimates of quality in designated livestock markets. Musemwa *et al.* (2008) supports these inferences that without timely and usable information farmers usually are weaker at the bargaining process versus traders and other agents who often have more information due to their exposure to a wider geographic area or other certain reasons.

4.5 Variation in Price and Number of Cattle Supplied at the Market

4.5.1 Months with more animals supplied at the market

45.3% of Pugu market respondents thought of having more animals being supplied during January to March period. Other responses were; 4.0%, 10.7% and 18.7% for April to June, July to September and October to December respectively. At the same market, 21.3% of respondents had no idea about the season with more supply of animals. At Mikongeni

market, 47.5% of all respondents proposed the April to June period as the period with more beef cattle being supplied at the market. Similarly, 42.5% nominated January to March period while 5% recommended July to September and October to December periods. Discussion with markets officers revealed that supply of animals was influenced by availability of water and forage closer to markets. During the rainy season livestock keepers stay in areas closer to livestock markets since forage and drinking water are readily available, however, during dry season pastoralists are forced to move their animals in remote areas in search for the same hence difficult to send animals back to the market.

4.5.2 Seasonally high supply of beef cattle

In both markets, Seasonality in availability of feeds and water for animals was named the main reason for the trend in beef cattle supply at the market. This reason accounted for 50.7% and 57.5 % at the terminal market and primary market respectively. While giving their views on the trend, most livestock keepers cited availability of pasture and drinking water for animals closer to market as the reason why more animals are supplied at the market during January to June periods. They also explained that during dry season, animals are taken into other areas with ample pasture and drinking water which are in most cases far away from markets. Seasonality in income among pastoralists scored 47.9% and 25% from respondents at the secondary market and primary market respectively. Seasonality in income among farmers who are main consumers of beef scored only 1.4% from respondents at Pugu market and 17.5% from Mikongeni market. This implies that beef cattle supply at primary markets can be affected by seasonality in water and pasture availability as well as variation in income of both livestock keepers and farmers (Mafuru *et al.*, 2006). However, there is growing evidence that pastoralists dispose of their marketable animals in a manner consistent with sound economic behaviour (Bekule and Tilahun, 2006). Similar observations were reported by Gezahegn (2006) that the volume

of livestock offered during each market day (supply) is the function of several factors. First, the need for cash on the part of the pastoralists and the strength of the demand for their animals influence the daily supply. While reporting on pastoralism in Eritrea, Gezahegn (2006) also noted that the number of animals sold at each market center increases with an increase in the households' desire to purchase food or non-food items. For example, livestock marketing is intensified during Muslim religious holidays when almost every household needs cash for non food items and clothing.

4.5.3 Months with low supply of beef cattle at the market

The months from April to June period was named by the majority of respondents from both markets as the period with low supply of beef cattle. The responses were 36% and 47.5% for Pugu and Mikongeni market respectively. At Pugu market, other responses were; 21.3% for January to March and 17.3% for October to December period. 20% of all respondents at the terminal market had no idea about seasonal variation in cattle supply.

At Mikongeni market, 42.5% of all responses nominated July to September, 7.5% January to March and 2.5% October to December period. These findings are different from what were previously found out by other researchers. The difference could probably be due to influence of RVF outbreak in 2007 (Assenga, 2008). During the outbreak, there were tremendous drop in animals supply at all markets between January and June, whence; most of respondents, especially from the terminal market would be reflecting the past year's trend and not the actual situation.

4.5.4 Reasons for having low supply of beef cattle

Different reasons were explained to be the cause of low supply of beef cattle during different periods of the year. At Pugu terminal market, seasonal variation in livestock keeper's income accounted for 61.3%. At Mikongeni primary market, seasonal availability

of pasture and drinking water for animals accounted for 57.5%. At the terminal market, seasonality in water and forage availability accounted for only 36 % and 2.7% for seasonal variation in income of farmers who are main consumers of beef. Other responses from primary market were 30% and 12.5 % for seasonal variation in cattle keeper's income and variation in farmers' income respectively. On the other hand, direct discussion with key informants revealed that low supply of animals occurred when some livestock keepers', who also grow agricultural crops had harvested farm crops. According to key informants, at this point livestock owners had less need for cash hence decide to keep their animals until some later date. Seasonal availability of forage and pasture being the reason for low supply of animals during some parts of the year supports the previous findings by Nikola (2007) who explained that Pastoralists also migrate to better feed resource areas for grazing and water as a strategy to mitigate feed and water shortages during droughts and long dry periods.

4.5.5 Period with the highest price for animals

Responses from terminal and primary markets varied greatly. At the terminal market, 76 % of all respondents proposed post harvest period as the period when beef cattle fetches high price. Contrary to that; only 37.5 % of respondents from primary market selected the period closer to annual festivities like Christmas, Eid and end of year as the period when the highest price of beef cattle can be recorded. At the terminal market, this reason occupied the second position being nominated by 9.3% of respondents. At the terminal market, other responses were; 8% and 6.7% for dry season and wet (rain season) respectively. Other responses from the primary market were; 32.5%, 27.5%, and 2.5 % for post harvest, dry season and rain season respectively. Responses on period with high price and low price are summarized in Table 15.

This trend corresponds to what was explained by Delgado and Staaz (1980). In their findings, while studying on livestock and meat marketing in West Africa, they found out that in the year after a poor barley yield the number of small ruminants supplied to the market increased as lambs were sold to generate cash to purchase grains.

Table 15: Seasons with high and low price of beef cattle at the market

Reason for the trend	Pugu market n = 75	Mikongeni market n = 40
Season with high price (%)		
Near festivities like Christmas, eid and end of year.	9.3	37.5
During dry months of the year.	8	27.5
During rain season.	6.7	2.5
When farmers have sold their farm produce	76	32.5
Total	**100**	**100**
Season with low price (%)		
Near festivities like Christmas, eid and end of year.	0	30
During dry months of the year.	92	35
During rain season.	6.7	32.5
When farmers have sold their farm produce.	1.3	2.5
Total	**100**	**100**

4.5.6 Period when more animals can be sold

The possibility of selling more animals at the market indicates increased market demand as well as scarcity of the product. Many respondents at the terminal market were uncertain as to when more animals could easily be sold. This made up 53.3% of all responses. This was followed by 29.3% of all responses who proposed October to December period to be the period with possibility of selling more animals. A more or less similar response was given by 55% of respondents from the primary market who also proposed October to December as the period with high possibility of selling more animals. At the terminal market other responses were; 14.7% and 2.7% for April to June and July to September respectively. At the primary market other proportions of responses were; 17.5%, 5.0%, and 2.5% for October to December, January to March and April to June periods respectively. At the same market, 20% of respondents were not aware of the season with high demand for cattle at the market.

4.5.7 Period when few animals can be sold

The period with possibility of selling few animals indicates season with low demand. Although many respondents at the terminal market (49.3%) indicated to be uncertain over periodic variation in demand for beef cattle, most respondents from both markets selected January to March period as the period within which few animals can be sold at the market. These made up 30.7% and 52.5% responses from Pugu terminal and Mikongeni primary market respectively. Other responses at the terminal market were 9.3% for July to September and 5.3% for both April to June and October to December. At Mikongeni market 20%, 17.5%, and 2.2 % represented April to June, July to September and October to December period respectively. Only 7.5% of respondents at the primary market had no idea about the season with possibility of selling few animals at the market. A summary of responses for seasons with high as well as low demand of beef cattle at the market are presented in Table 16.

Table 16: Seasons with possibility of selling many and few animals at the market

Period	Pugu market n = 75	Mikongeni market n = 40
Season with possibility of selling many animals (%)		
January to march	0.0	5.0
April to June.	14.7	2.5
July to September.	2.7	17.5
October to December	29.3	55.0
Not certain	53.3	20.0
Total	**100.0**	**100.0**
Season with possibility of selling few animals (%)		
January to march	30.7	52.5
April to June.	5.3	20
July to September.	9.3	17.5
October to December	5.3	2.5
Not certain	49.3	7.5
Total	**100.0**	**100.0**

4.5.8 Pricing strategy

Respondents from both markets were required to indicate what features they consider as they set and adopt price during buying, selling or blocking beef cattle. There was no

difference in responses between markets. Animal's body condition was mentioned as the factor considered mostly during price setting. This factor made up 76% and 77.5 % of all responses from terminal market and primary market respectively. 24% and 22.5 % of responses proposed adoption of the market price for terminal market and primary market respectively. Similar inference were drawn by MALD (1982) while establishing live cattle grades in Tanzania that live weight accounts for much of the total live cattle value.

4.5.9 Attributes used in price determination at the market

The number of animals available at the market was identified as the main factor influencing price at both terminal and primary market. Responses were 54.7% and 37.5% for terminal market and primary market respectively. At Pugu market, other reasons in the order of importance were season of the year, sex of the animal and animal's body condition. Their proportions were; 17.3%, 16%, and 12% respectively. At Mikongeni market, the responses in the decreasing order of importance were; animal's body condition as well as sex of the animal and season of the year with the same score. Their percentages were 27.5% and 17.5 % for animal's body condition together with sex of the animal and season of the respectively. These findings are in agreement with explanations given by Mushi (2004) that class (sex and age) and grade of goats only determine market price to a small extent since they are highly variable and not understood by stakeholders in the marketing chain.

4.6 Variation in Body Condition and Gender of Animals Supplied at the Markets

4.6.1 Gender of the animal mostly supplied at the market

Respondents from Pugu terminal market proposed entire males (bulls) to be dominantly supplied at the market. These made up 92% of all responses. Steers contributed only 8% with no responses on females. At the primary market, 52.5% selected bulls as the

dominant category at the market, with steers contributing 47.5%. However, direct observation and direct discussion with market participants revealed that steers and bulls are sometimes supplied at almost equal amount. According to them, variation depends on the region of origin and season of the year. This inference is supported by CTA (2008) who asserts that pastoral herds usually contain very low percentage of unproductive males.

4.6.2 Views on dominance of gender classes at the market

45.3% of responses from Pugu market cited availability of a given sex class at primary markets as the main cause of the dominance. At the Mikongeni market, more scores (52.5%) proposed the better price fetched by a given sex category as the main reason for the higher availability. This reason was mentioned as the second reason for the trend at the terminal market and made up 37.3% of all responses. At the primary market, low value of the animal in the heard scored 27.5% and availability of the class from livestock keepers and primary market accounted for 20%. At the terminal market, other responses were 37.3% and 17.3% for possibility of being sold at high price and low value of the sex class in the heard respectively.

4.6.3 Gender of the animal least supplied at the markets

More Respondents from both markets suggested that cows were least supplied at the market. The responses were 92% and 95 % for Pugu market and Mikongeni market respectively. At Mikongeni market, 8 % proposed steers as the second in least supply while 5 % of respondents at the primary market selected bull as least supplied.

4.6.4 Reasons for low supply of a given sex class

Preference of a certain sex class as a parent stock, ranked the first as the reason for less availability of a given sex class at the market. This comprised 64.9% and 62.5% at the

terminal market and primary market respectively. A given sex class being least available at primary markets ranked the second with 27% and 25% scores from terminal and primary market respectively. Possibility of fetching low price scored only 8.1% and 12.5% at Pugu market and Mikongeni market respectively. Least supply of cows (female) at the market could be due to the fact that many pastoralist would like to retain more cows in the heard not only as a parent stock, but also as a means of offsetting long calving intervals and thus stabilize milk production (Coppock, 1994).

4.6.5 Most preferred sex of cattle

Responses from Pugu terminal market revealed that 54.7 % would prefer trading on bulls while 45 % on steers. At Mikongeni market 62.5 % preferred trading on steers and 37.5% on entire males. Key informant interviews indicated that most traders would prefer steers as trading stock.

4.6.6 Views on gender preference

A given sex class being heavier and attractive to traders was considered to be the main reason for being preferred as a trading stock. This made up 37.3% of responses from terminal market and 42.5% from primary market. The possibility of producing high quality meat took the second position with 33.3% and 32.5% responses from terminal and primary market respectively. Being able to produce comparatively more meat than other classes scored 29.3% and 25 % responses from Pugu market and Mikongeni market respectively.

4.6.7 Seasonal variation in animal's body condition

Variation in animal's body condition reflects the value of animals available at the market during a particular season of the year. Responses from both markets indicated that the

Months from April to June is the season with more animals in good body condition being supplied at the market. According to the same results, these proportions constitute 45.3% at the terminal market and 62.5% responses at the Mikongeni market. At Pugu market, other proportions were; 20% and 17.3% for January to March and October to December respectively. 17.3% of responses at the terminal market were not aware of the trend. At the primary market only 37.5 % thought of January to March period being the season with more good quality beef cattle being supplied at the market. Observation on the period with more animals in poor body condition revealed different pattern among the two markets. 53.3% responses from Pugu market selected July to September while only 37.5% of responses from primary market nominated this period. At Mikongeni market more responses (55%) selected October to December period as the time when more weak animals can be observed at the market. At the terminal market, this period was nominated by 5.3% only. Responses on the variation of animal's body condition have been summarized in Table 17.

Table 17: Within year's variation in animals' body condition

Period	Pugu market n = 75	Mikongeni market n = 40
Season with more animals in good body condition (%)		
January to march	20	37.5
April to June.	45.3	62.5
July to September.	0	0
October to December	17.3	0
Not certain	17.3	0
Total	**100**	**100**
Season with more animals in poor body condition (%)		
January to march	4	0
April to June.	4	0
July to September.	53.3	37.5
October to December	5.3	55
Not certain	33.3	7.5
Total	**100**	**100**

Variation in animals' body condition reflects seasonal variation in quality and quantity of forage available in the rangeland. Saka (2001) while writing on Livestock production, productivity and feed resources in western Africa explained that in the mid wet season forage biomass is higher in quality and quantity, with crude protein up to 9% in most of the native grasses. Natural grasses and legumes are rich and highly digestible at this period. As the dry season sets in, the protein level drops and the roughage quantity increases. There is an increase in lignin content and voluntary intake decreases. This is a poor feed resource, resulting in weight loss and decreased fertility and milk yield for up to 4-5 months of the year.

4.6.8 Improving beef cattle marketing in Tanzania

Beef cattle traders from both Mikongeni and Pugu markets gave different recommendations to improve beef cattle marketing in Tanzania. 61.3% of respondents at Pugu suggested that more emphasis should be put on selling animals on weight basis. The system means that animals should not be sold through visual observation and buyer - seller agreement. On the other hand, 50% of respondents from Mikongeni market proposed improvement in livestock markets so as to have areas to keep unsold stock to be sold on a later date with better price. At the terminal market, other responses were; 25.34%, 9.44% and 4% for improvement in livestock markets so as to have areas to keep unsold stock, loan availability to traders and removal of middle men in the livestock marketing chain so that animals would be sold directly to buyers respectively. At the primary market, 25% responses proposed removal of middle men in the livestock marketing chain, 15% proposed government intervention in the livestock marketing system so that animals can be sold on weight basis while 10% advised availability of credit to stakeholders.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 Variation in nominal and real prices of beef cattle marketed in Tanzania

This study has revealed that real and nominal prices of beef cattle do vary intermittently. From 1993 to 2000, real prices were higher than nominal prices. Real prices fell lower than nominal prices from 2000 to 2007.

5.1.2 Variation in supply of cattle between years

Actual number of beef cattle which were marketed in Tanzania during 1994 to 2007 period expressed an irregular pattern. The number of animals marketed exhibited an upward trend from 1998 to 2007, a slight decrease in number of animals marketed was observed in 2002 towards 2003.

5.1.3 Variation in real and nominal prices of cattle within years

At the terminal market, higher nominal prices were observed from July to December of 2007. The same market recorded the lowest real prices in most parts of the year. Comparatively higher real prices can be observed throughout 2005, with 2006 registering slightly lower real prices as compared to 2005. Real prices for 2006 were lower than the rest of the years during October to December period.

At the primary market, nominal prices for 2007 remained higher than the rest of the years in the first quarter of the year. Nominal prices were also higher between May and August as well as December. The market exhibited different real prices trend. In the same year, lowest real prices could be observed between March and April as well as September to

November. In most parts of the year, real prices for 2005 remained higher than those exhibited by 2006 and 2007.

5.1.4 Variation in number and nominal price of cattle supplied at primary and secondary markets

Generally, at the secondary market, significantly higher number of beef cattle was supplied during August to October period. At the primary market, higher number of beef cattle was observed in May. In both markets, there were no significant difference in the number of animals traded during the months of January, February, April, June, September and November. Low number of beef cattle was received in December and November for both terminal and primary market respectively.

In terms of sex, steers were supplied in significantly higher number. The month of August was the month with significantly higher supply and least supply at both markets being recorded in March. Grade wise, more grade II animals were received at both markets from March to August period. More grade III animals could be observed from July to December.

Market prices varied between months, significantly higher prices for both sex classes were reported from October to December. The same price variation pattern has been displayed throughout all individual sex classes at both markets. Low cattle prices were reported in March to May with the same trend being exhibited by individual sex classes across both markets. The price for grade II cattle which were supplied at these markets varied intermittently. Higher price for grade II were observed from September to December with the highest price being recorded in November. Low price for the same grade were observed from January to March.

As it has been discussed in this study pricing of Grade III animals differed from that of grade II. Since it is inferior to grade II its higher prices could be observed from August to December and the lowest price from January to July.

5.1.5 Relationship between price and season, grade, sex and number of animals marketed

Linear regression results on influence of season, grade and sex of an animal as well as the number of animals marketed at Mikongeni and Pugu Markets on price indicated that season in which the animal was marketed negatively affected the price of beef cattle. Other factors such as gender of an animal marketed, month and season of the year positively affected the price of an animal being marketed. Contrary to the law of demand, due to annual increase in price of cattle coupled with increase in the number of beef cattle supplied to the market, an increase in the number of animals marketed resulted into increase in price of animals at the market.

5.1.6 General information related to beef cattle marketing

At both markets, cattle buyers dominated the market followed by cattle sellers with many respondents reporting to be attending the market frequently. The majority of beef cattle traders had been in beef cattle trading in a period exceeding five years. The majority of beef cattle sold at the terminal market originated from primary and village informal markets. Moreover, at the primary market, many animals were taken from producer's own herds.

5.1.7 Respondents' understanding on beef cattle marketing trend

Market survey revealed that more beef cattle being supplied to both Mikongeni primary market and Pugu terminal market originated from central and lake zones of the country.

These zones are currently having the highest cattle population. While many cattle traders had been in business for more than five years, they started beef cattle trading with less than five animals and operated at trading capital ranging from ten to twenty animals.

The main customers differed among the two markets. At the terminal market, butchermen dominate the market with people who wish to restock their herds making the minority. At the primary market, livestock keepers who wish to restock their herds made up large proportion of the market customers. At this market, traders buying animals to supply to other markets were few than other market categories. The mode of acquiring market information differed among markets. At the terminal market, phone calls from friends who are at the market were named the most important source of market information. At the primary market, many traders received market information as they visit the market on the trading day.

This study revealed different market and marketing costs charged at the market. At the terminal market livestock sellers had to pay for feeding and watering of their unsold animals. But this case was different at the primary market. The study has shown that such expenses were not at the primary market. At the primary market there is no provision for keeping unsold animals. As such, all animals are sold on the same trading day. The study has shown that the cost of transporting animals from Lake and Central zone range from Tshs 50 000 to Tshs 70 000 per heard.

Market participants' views on possibility of getting loans differed across markets. While at the primary market there was no possibility of getting loans, a well functioning informal savings and credit scheme existed among middlemen and cattle buyers groups at the terminal market. Knowledge in cattle grading also differed among the two markets. At the

terminal market many respondents (64%) were aware of beef cattle grading, with only a few of market participants at the primary market (42.5%) being aware of beef cattle grading.

The study shows that beef cattle trading transactions at both markets involved buyer – seller agreements on value. This kind of trade as shown in the study was proposed to be the best term of trade. This is opposed to buying or selling animals on weight basis which is the current government emphasis.

5.1.8 Variation in price and number of cattle supplied at the market

Based on information collected from both primary and terminal market through market survey, more animals are being supplied during January to March period. Similarly, few animals are being supplied at these markets during April to June period. Two major reasons were raised as the cause for the seasonal variation in number of animals supplied at these markets. These are seasonal variation in forage and drinking water availability. As revealed by the respondents, these influence the number of cattle available at both primary and terminal market. Seasonal variation in livestock keepers' income was also mentioned as the second important reason for the seasonality in supply.

The period when highest price of beef cattle can be recorded differed across markets. At the terminal market highest price was realised when farmers who are the major customers of cattle and beef have harvested their crops. At the primary market high price were offered to animals at the period closer to annual festivities like eid, Christmas and new year. Market survey indicated that many respondents from the terminal market were uncertain as to what period of the year when more or few animals could be purchased on a given marketing day. However, October to December period was nominated to be the

period with possibility of selling many animals. Similarly, January to march period was proposed as the period when few animals can be sold at the market.

The animal's body condition was observed to be the most guiding factor in determining price of an animal in all markets. Similarly; the number of animals available at the market was mentioned as the main attribute influencing price at both markets. This trend can be explained by the fact that most animals traded on in these markets are for slaughter. This can also be due to the fact that majority of the customers at the secondary markets are butchermen who purchase animals for slaughter.

5.1.9 Variation in body condition of animals at the market

In the studied markets, bulls were reported to be more supplied than other sex classes. The same observation revealed constant least supply of cows at both markets.

In the studied markets, availability of the sex class at the primary market was mentioned as the reason for higher supply of the class at the terminal market. At the primary market, possibility of a given sex class fetching better price accounted for its higher availability at the market. The fact that a given sex class can be preferred as parent stock was the major reason for cows being least supplied at both markets.

Although key informant interview and participants' observation revealed that steers would be mostly preferred as the trading stock, at the terminal market many respondents would prefer to sell or buy bulls than steers. Many respondents from the primary market preferred selling or buying steers. A given sex class looking heavier and well finished were the reasons for preferring a given sex class or sex as a trading stock.

The study has revealed that the period from April to June was the period with many animals being supplied in good body condition. The Months of July to September were the months in which many animals were supplied to the market in relatively poor body condition.

5.1.10 Opinions to improve beef cattle marketing in Tanzania

Beef cattle traders from both the Mikongeni and Pugu livestock markets gave different recommendations to improve beef cattle marketing in Tanzania. Many respondents at the terminal market proposed more emphasis on selling/buying animals on weight basis but not through visual observation and buyer - seller agreement. On the other hand, many respondents from Mikongeni primary market proposed improvement in livestock markets and marketing activities. This should include market information dissemination, infrastructure development as well as supervision and monitoring of all marketing activities.

5.2 Recommendations

The study has highlighted some very important clues which deserve to be taken into consideration. The first being seasonality in supply of beef cattle at the market, their corresponding prices as well as animals' body condition. The gap between nominal and real prices revealed in this study can be an indication of less profitability of the industry to some groups of people (e.g. Cattle keepers) involved in beef cattle trading since the nominal price received per animal is very low when compared to real price. This calls for thorough investigation on various circumstances surrounding beef cattle marketing at different levels. Based on these findings, the following recommendations aimed at improving beef cattle marketing activities and improve profitability of the enterprise in Tanzania are put forward:

i. Formation of beef cattle marketing body which will be in charge of all marketing activities in the country. This study has revealed that many market participants lack market and market information. Participants at the terminal market, apart from paying for necessary marketing costs (market dues and movement permits) they were also required to pay for feeding and watering costs. In the presence of livestock marketing board such costs are supposed to be barred by the board. Operations of the board can also replace some actors in the livestock marketing chain thus reducing the length of the chain for the benefit of producers and final consumers.

ii. Establish beef cattle marketing information system which will reach and benefit all individuals involved in beef cattle marketing, more emphasis to be put on proper collection of livestock marketing data. The available information and support services should be packaged into accessible and user-friendly forms.

iii. Construction of cattle holding grounds and night kraals for keeping unsold animals so that livestock traders are not forced to sell all their animals on the same day. Holding grounds should be equipped with watering and feeding facilities so that animals do not loose condition and value while at the market.

iv. The findings of this study calls upon stakeholders in the livestock sector to search and disseminate more information related to beef cattle marketing. Hence the study suggests that further researches should be carried out by using more primary data from many markets. Secondary data collected from different markets can also help to give a broad picture of the industry.

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APPENDICES

Appendix 1: Questionnaire for livestock traders at Pugu and Mikongeni markets

A: General market information

Name of the market:.....

Location of the market (District).....Date of interview:.....

Mode of market operation: i. Daily. ii. Bi weekly. ii. Once per week. iii. Fortnightly.

B. Respondents' general information.

1. Name of respondent:.....
2. Type of operation performed:
   - i. Selling, ( ) ii. Blocker, ( )
   - iii. Buying, ( ) iv. Multiple ( )
3. Frequency of attending the market:
   i. Regular, ( ) ii. Irregular, ( ) iii. Seasonal. ( )
4. How long have you been in business:
   - i. Less than 3 years, ( )
   - ii. 3 – 5 years, ( )
   - iii. More than 5 years. ( )
5. Mode of acquiring animals you supply at the market (if you are a seller):
   - i. From own stock, ( ),
   - ii. Buy directly from pastoralists, ( )
   - iii. Buy from other markets, ( ),
   - iv. Purchase from same market and sell on later date. ( )
6. In what region is your major source of animals:
   - i. Lake zone (Tabora, Shinyanga and Mwanza) ( ),
   - ii. Central zone (Dodoma, Singida) ( )
   - iii. Southern highlands (Iringa, Mbeya, Rukwa) ( ),
   - iv. Northern zone (Kilimanjaro, Arusha, Manyara) ( )
   - v. Other regions; specify:.....
7. Who are your main customers:
   i. Butcher men, ( ) ii. Exporters, ( )
   iii. Blockers ( ) iv. Traders who buy to supply to other markets ( )

v. Livestock keepers who want to restock their heard ( )

vi. Other; specify:.....

8. What is your major source of market information such as price and demand:

i. From friends in other markets ( )

ii. From news media ( )

iii. Obtained at the market on the trading day ( )

iv. Other; specify:.....

9. Indicate other costs incurred during trading apart from purchasing/selling price:

Item	Transport	herdsman	watering	Feeding	Market fee	Other (specify)
Cost(Shs)						

10. What are your other sources of income apart from livestock trading:

i. Salaried job, ( ) ii. Farming, ( )

iii. Other mercantile business e.g. Shop ( )

iv. Other; specify:.....

11. What assets do you own (as alternative source of income) :

Item	Houses	Tractor	Vehicles	livestock	Retail shop	Other (specify)
Quantity						

12. What were your initial trading volume:

i. Less than 5 animals, ( ) ii. 5 – 10 animals ( )

iii. 10 – 20 animals ( ) iv. 20 – 30 animals( )

v. More than 30 animals ( )

13. What is your current trading volume:

i. 10 – 20 animals , ( ) ii. 20 – 30 animals ( )

iii. 30 - 50 animals ( ) iv. 50 - 100 animals ( )

v. More than 100 animals ( )

14. Have you been able to receive any credit/finance from any financial institution in order to improve your business?

i. Yes ( ) ii. No ( )

15. Do you have any knowledge on beef cattle grading;

i. Yes ( ) ii. No ( )

16. What is the dominant mode of animals' trading at this market:

i. Animals sold/ purchased on weight basis ( )

ii. Animals sold/ purchased based on negotiations between buyer and seller without weight measurements ( )

17. In your opinion what do you think would be the best terms of trade to provide true value of the animal:

i. Animals sold/ purchased on body weight basis ( )

ii. Animals sold/purchased based on body condition without taking body weight measurements ( )

iii. Not sure ( )

C: Trend in supply and price of animals

1. When do you experience large number of animals supplied at the market:

i. Jan – March, ( ) ii. April – June, ( )

iii. July – Sept, ( ) iv. Oct – December, ( ).

v. No idea

2. In your opinion what do you think would be the reason for this trend:

i. Seasonality in availability of feeds and water for animals, ( )

ii. Seasonality in income among pastoralists, ( )

iii. Seasonality in income among farmers who are main consumers of beef, ( ) iv. Other; specify:.....

3. When do you experience least number of animals supplied at the market:

i. Jan – March, ( ) ii. April – June, ( )

iii. July – Sept, ( ) iv. Oct – December, ( )

v. No idea

4. In your opinion what do you think would be the reason for this trend:

i. Seasonality in availability of feeds and water for animals, ( )

ii. Seasonality in income among pastoralists, ( )

iii. Seasonality in income among farmers who are main consumers of beef, ( ) iv. Other; specify:.....

5. When do you experience the highest price for animals supplied at the market:

i. Near festivities like Christmas, eid and end of year, ( )

ii. During dry months of the year ( ),

iii. During rain season ( )

iv. When farmers have sold their farm produce, ( )

v. Other; specify:.....

6. When do you experience the lowest price for animals supplied at the market:

i. After festivities like Christmas, eid and end of year, ( )

ii. During dry months of the year, ( )

iii. During rain season, ( )

iv. When farmers have sold their farm produce, ( )

v. Other; specify:.....

7. When do you sell more animals (highest demand):

i. Jan – March, ( ) ii. April – June, ( )

iii. July – Sept, ( ) iv. Oct – December, ( )

v. No idea ( )

8. When do you sell few animals (low demand):

i. Jan – March, ( ) ii. April – June, ( )

iii. July – Sept, ( ) iv. Oct – December, ( )

v. No idea ( )

9. What pricing strategy do you use:

i. Based on animals' body condition ( ) ii. Adoption of market price ( )

iii. Both 1&2, ( ) iv. Other, specify:.....

10. What is the single most important attribute do you consider most influential determinant of price in the market:

i. Gender of animal, ( ) ii. Body condition, ( )

iii. Number of animals available at the market, ( )

iv Season of the year, ( ) v. Other, specify:.....

D. Trend in animal condition and gender supplied at the market

1. Which sex is mostly supplied at the market:

i. Bulls, ( ) ii. Steers, (...) iii. Cows ( )

2. In your opinion, what could be the reason for this trend:

i. They are not productive in the heard as compared to others, ( )

ii. They fetch relatively high price hence supplied to increase income of livestock keepers ( ),

iii. They are available in relatively large numbers from livestock keepers and primary markets

iv. Other; specify:.....

3. Which sex is least supplied at the market:

   i. Bulls, ( ) ii. Steers, ( ) iii. Cows, ( )

4. In your opinion, what could be the reason for this trend:

   i. They are preferred as parent stock hence retained in the heard, ( )

   ii. They fetch relatively low price hence not preferred as commercial stock,()

   iii. They are not readily available from pastoralists and primary markets ( )

   iv. Other; specify:.....

5. Which sex do you prefer most as a trading stock:

   i. Bulls, ( ) ii. Steers, ( ) iii. Cows, ( )

6. What is the reason for your preference:

   i. They are heavier and attractive to traders, ( )

   ii. They produce relatively large amount of meat as compared to other sexes, ( )

   iii. They produce comparatively better quality meat, ( )

   iv. Other; specify:.....

7. In what period of the year when animals are supplied in good body condition:

   i. Jan – March, ( ), ii. April – June, ( )

   iii. July – Sept, ( ) iv. Oct – December ( )

   v. No idea

8. In what period of the year when animals are supplied in poor body condition:

   i. Jan – March, ( ) ii. April – June, ( )

   iii. July – Sept, ( ) iv. Oct – December ( )

   v. No idea

9. In your opinion, given an opportunity, which areas would you propose to be emphasized so as to improve livestock marketing in Tanzania.

   i. Improvement in livestock markets so as to have areas to keep unsold livestock to be sold on a later date with better price.

   ii. Traders to be given loans to improve their business.

   iii. To remove middle men in the livestock marketing chain so that animals would be sold directly to buyers and improve their income.

   iv. Animals to be sold based on weight and not through mere observation.

   v. Other areas; mention.....

Thank you for your cooperation

Appendix 2: Checklist of Questions for Key Informants

A. General marketing information.

1. Who are key actors in beef cattle trading at this market?
2. In what region is the major source of animals brought to this market
3. Who are main customers?
4. What do you consider to be the major source of market information such as price and demand at this market?
5. What are key market and marketing costs (fees and other charges)

Item	Transport	herdsman	watering	Feeding	Market fee	Other
Cost(Shs)						

6. What is the dominant mode of animals' trading (terms of trade) at this market?
7. In your opinion, what do you think would be the best terms of trade to provide true value of the animal?

B: Trend in supply and price of animals

1. When do you experience large number of animals supplied at the market?
2. In your opinion what do you think would be the reason for this trend?
3. When do you experience least number of animals supplied at the market?
4. In your opinion what do you think would be the reason for this trend?
5. When do you experience the highest price for animals supplied at the market?
6. When do you experience the lowest price for animals supplied at the market?
7. When are animal suppliers able to sell more animals on a given trading day (highest demand season)?
8. When are animal suppliers able to sell few animals (low demand season)?
9. What pricing strategy do many traders adopt at the market?
10. What is the single most important attribute do you consider most influential determinant of price at the market?

C. Trend in animal condition and gender supplied at the market.

1. Which sex is mostly supplied at the market?
2. In your opinion, what could be the reason for this trend?
3. Which sex is least supplied at the market?
4. In your opinion, what could be the reason for this trend?
5. Which sex do you prefer most as a trading stock?
6. What is the reason for your preference?
7. In what period of the year when animals are supplied in good body condition?
8. In what period of the year when animals are supplied in poor body condition?
9. In your opinion, given an opportunity, which areas would you propose to be emphasized so as to improve livestock marketing in Tanzania?

Thank you for your cooperation

Appendix 3: List of individuals (key informants) Contacted

No	Name	Institution	Location	Responsibility
1	Mr. Gutta, J	Ministry of Industries Trade and Marketing	Dar es salaam	In charge to LINKS
2	Mr. C.T.C Manumbu	Ministry of Industries Trade and Marketing	Dar es salaam	Marketing Officer
3	Mr. Raphael Mzeru	Pugu terminal market	Dar es salaam	Zoo sanitary inspector
4	Mr. Max Kintu	Pugu terminal market	Dar es salaam	Zoo sanitary inspector
5	Mr. Shasha	Pugu terminal market	Dar es salaam	Zoo sanitary inspector
6	Mr. Mark Maley	Kibaha zoosanitary check point	Kibaha	Zoo sanitary inspector
7	Mr. Kiangi	Mikongeni primary market	Morogoro	Zoo sanitary inspector
8	Mr. Ishanga	Mikongeni primary market	Morogoro	Retired livestock field officer/livestock trader