BEEF CATTLE PRODUCTION SYSTEM AND OPPORTUNITIES FOR MARKET ORIENTATION IN BORENA ZONE, SOUTHERN ETHIOPIA

M Sc Thesis

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February, 2008

Haramaya University
Beef Cattle Production System and Opportunities for Market Orientation in Borena Zone, Southern Ethiopia

A Thesis Submitted to the Department of Animal Science,
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MASTER OF SCIENCE IN AGRICULTURE
(ANIMAL PRODUCTION)

By

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DEDICATION

I dedicate this work to my beloved mother Joy T/Mariam and my father Tewodros Abebe and to Ethiopian and Eritrean people displaced from both countries.
STATEMENT OF AUTHOR

First, I declare that this thesis is the result of my own work and that all sources or materials used for this thesis have been duly acknowledged. This thesis is submitted in partial fulfillment of the requirements for an M Sc degree at Haramaya University and to be made available at the University’s Library under the rules of the Library. I confidently declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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<td>ACDI/VOCA</td>
<td>Agricultural Cooperative Development International/ Volunteers In Overseas Cooperative Assistance</td>
</tr>
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<td>ANOVA</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>BPDBB</td>
<td>Borena Pastoral Development Bazaar Bulletin</td>
</tr>
<tr>
<td>CBPP</td>
<td>Contagious bovine pleuro pneumonia</td>
</tr>
<tr>
<td>CSA</td>
<td>Central Statistical Authority</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Authority</td>
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<tr>
<td>ESAP</td>
<td>The Ethiopian Society of Animal Production</td>
</tr>
<tr>
<td>ETD</td>
<td>Ethiopian Birr</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agricultural Organization of the United Nations</td>
</tr>
<tr>
<td>FMD</td>
<td>Foot and Mouth Disease</td>
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<tr>
<td>GO</td>
<td>Governmental Organization</td>
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<td>HH</td>
<td>Households</td>
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<td>IGAD</td>
<td>Intergovernmental Authority on Development</td>
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<tr>
<td>ILRI</td>
<td>International Livestock Research Institute</td>
</tr>
<tr>
<td>SA</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>LLP</td>
<td>Livestock and Livestock Products</td>
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<tr>
<td>LMA</td>
<td>Livestock Marketing Authority</td>
</tr>
<tr>
<td>MIDROC</td>
<td>Mohammed International Development, Research and Organization Companies</td>
</tr>
<tr>
<td>MOA</td>
<td>Ministry of Agriculture</td>
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<tr>
<td>MOFED</td>
<td>Ministry of Finance and Economic Development</td>
</tr>
<tr>
<td>NBE</td>
<td>National Bank of Ethiopia</td>
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<tr>
<td>NEPAD–CAADD</td>
<td>New Partnership for Africa’s Development – Comprehensive African Agriculture Development Programme</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
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<tr>
<td>ORDPED</td>
<td>Oromia Region Department of Planning and Economic Development Bureau</td>
</tr>
<tr>
<td>OARD</td>
<td>Office of Agriculture and Rural Development</td>
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ABBREVIATIONS AND ACRONIMS (Continued)

PAs    Peasant Associations
PPS    Probability Proportional to Size
SNNPRS Southern Nations, Nationalities and Peoples Regional State
SPS    Sanitary and Phytosanitary Standards
TLC    Triple Line Consulting Ltd.
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Beef Cattle Production System and Opportunities for Market Orientation in Borena Zone, Southern Ethiopia

ABSTRACT

This study attempted to investigate the beef cattle production system and opportunities for market orientation in southern Ethiopia, Borena Zone. The specific objectives of the study were to characterize cattle production systems, assessment of marketing systems, assess seasonality of domestic cattle meat consumption; and assess potentials and constraints of export abattoirs in Ethiopia. To achieve these objectives, secondary and primary data were used. Export abattoirs, producers, and butcheries interview were sources of primary data. Export abattoirs survey was undertaken on ELFORA Agro-Industries PLC and LUNA export slaughter house PLC. Producers' survey was done the pastoral areas of Borana Zone of Oromiya Regional State in three Pastoral Associations (PAs) and these were Surupha, Dida Yabello and Dubluk. Producers from each PA were selected using Proportional Probability to Size (PPS) approach for each PA. A total of 150 producers were selected based on the number of households in the PAs. To see the marketing system, four markets were covered from Borena pastoral area (Surupha, Haro Beke, Yabelo, and Dubluk). Butcheries survey was done on the purposively selected areas and these were Kara, Sululta, Dukem and Burayu. Butchery’s from each direction of Addis Ababa were selected using Proportional Probability to Size (PPS). A total of 50 butcheries were selected based on their availability in each of the four areas. To see the seasonality of cattle meat consumption, slaughterhouses which give services to the respective butcheries were covered. According to results of the study, 52.7% of the herd owners keep beef cattle to generate cash income and farming purposes. The major feed resources for 147 (98.6%) of the respondents rely on grass from grazing as a basal feed for their cattle, out of which 54 (36.2%) of them used salt as a supplement. Deep wells are the major sources of water in the study areas. According to the sample households the constraints to cattle production system were shortage of grazing land, water, disease, lack of technical supports, lack of security, labor shortage and conflict. Regarding the market information sources, the majority of the respondents 138 (92%), got market information before they went out to sell their cattle. However, the major sources of market information in the study area were informal. Technical supports on cattle marketing issues were obtained from development/extension agents. For 63.3% of the respondents, the determination of the price at the market places were through negotiation between the sellers/producers and the buyers. About 33% (N=149) of the respondents stated that cattle prices increase during the rainy (wet) seasons, mostly from July to August. The major reasons for the cattle price variation across months/seasons as stated by 114 (76.5 %) of the respondents were the seasonal feed and water availability. The major countries that import beef from Ethiopia are Yemen, Egypt, Congo Brazzaville and Cote D’Ivoire, and the export of beef cattle were either in the form of live or processed meat (chilled or frozen carcass). Thus breed, sex, age, weight and sometimes color of the animal for the live export are the major criteria considered by the live animal exporters
and export abattoirs during purchase. The major constraints of the export abattoirs were frequent occurrence of livestock diseases, feed and water shortage along export trade routes, market intelligence and transportation. About 84% of the butcheries purchase beef cattle for slaughtering and retailing meat in their butchers. On average, carcass weight of $143.33 \pm 5.27$ (Mean $\pm$ SE) kilogram per head was reported by butcheries, the selling price of a kilogram of beef was $19.36 \pm 0.423$ ETB (Mean $\pm$ SE). However, the price of meat were significantly ($P \leq 0.05$) higher $26.00 \pm 2.041$ (Mean $\pm$ SE) at Dukem and cattle meat yield were significantly ($P \leq 0.05$) higher $164.00 \pm 8.95$ (Mean $\pm$ SE) at Kara as compared to the other locations. The low demand periods for cattle meat correspond with the period of religious fasting periods by the Ethiopian Orthodox Church followers, the slaughter houses cease or minimize their services due to the fact that butcheries stop ordering cattle slaughter services. The constraints of the butcheries were high tax rates, slaughterhouses problems, high price of cattle at the markets and the illegal backyard slaughtering practices. The overall finding of the study underlined the high importance of institutional support in the areas of market oriented cattle production system, market extension, animal health services and range development in the pastoral area, development of export abattoirs facilities, reducing multiple taxes. Therefore, development interventions should give emphasis to improvement of such institutional support system between exporters, butchers and producers, so as to achieve income to these market actors.
1. INTRODUCTION

1.1 Background of the Study

Ethiopia, like most of the countries in sub-Saharan Africa, is heavily dependent on agriculture. The agricultural sector plays an important role in the overall development of the country’s economy. The sector plays a major role in the national economy and it is the source of income and employment for the rural population (Nigusse, 2001).

Livestock production is an integral part of the Ethiopian agricultural system. The sub-sector contributes 12 and 33% to the total Gross Domestic Product (GDP) and agricultural Gross Domestic Product (GDP), respectively, and provides livelihood for 65% of the population (LMA, 2001). According to the same source, the sector also accounts for 12–15% of the total export earnings, the second in order of importance following coffee.

Ethiopia has the leading livestock population in Africa and the animal population census (CSA, 2004), estimates the livestock population of Ethiopia at 44.32 million cattle, 23.62 million sheep, 23.33 million goats, 2.31 million camels and over 42 million poultry (excluding agro-pastoral and pastoral areas). FAO (1999) estimates a 1.1% growth rate for cattle which is against a backdrop of 2.5% human population growth per annum. In other words, the livestock population growth has been lagging behind the human population growth.

Livestock in Ethiopia provide draught power, income to farming communities, means of investment and important source of foreign exchange earning to the nation. Of the total household cash income from crop and livestock, livestock account for 37 to 87% in different parts of the country (Ayele et al., 2003), and the higher the cash income, the higher is the share of livestock, indicating that increased cash income comes primarily from livestock, particularly in the pastoral areas. Cattle provide traction power that is the single most important source of power in the overall farm power requirements. Moreover,
livestock provides milk, meat, cash income, and serve as a hedge against risk. Cattle together with sheep and goats are the most important sources of live animal, and hides and skins for export markets.

African pastoral systems are currently characterized by instability, food insecurity, decreasing income, increasing poverty, and environmental degradation, loss of key grazing lands to cultivation, annexation by government and private interest, drought, inappropriate development policies, and population growth (Getachew et al., 2005).

Ethiopia’s lowland breeds of cattle, sheep, goats and camels are highly demanded by neighboring countries as well as the strategic livestock markets of the Middle East (Belachew and Jemberu, 2003). According to the same authors, the relatively huge number of livestock resources, proximity to the export markets, conducive investment policies, the liberalization of the economy, the supports and attentions given by the government to export trade gives the country comparative advantages in livestock trade. These conditions have been the driving forces for the establishment of several abattoirs. According to NBE (2001/2002), from 1998–2002, there were only five licensed export slaughterhouses in total have a capacity of handling 7,600 sheep and goats and 200 cattle/day. There are also five meat processing plants (all belong to ELFORA) located in different parts of the country and have considerable processing capacity, but are not fully operational due to high packing costs and lack of markets for the products (NEPAD-CAADP, 2005).

The major animal sources for the export abattoirs are smallholders in the lowlands of the country, the production systems of which have not been properly characterized. However, measurable stride towards that end has not been made. Constraints to and sustainability of the meat export marketing system and potential expansions in relation to sustainable resource utilization and degree of competition with domestic demand have not been investigated. NEPAD-CAADP (2005) indicated that generally, East African livestock trade is characterized by illicit (informal) trade between neighboring countries, and the inflow stocks are used either for domestic consumption (Kenya and Uganda), or for re–
export and domestic consumption (Somalia) or re–export alone (Djibouti). Illicit trade seriously affects Ethiopia. A large number of livestock and livestock products valued at 917 billion Birr annually are lost via the flow into the neighboring countries. Data from Livestock Marketing Authority (LMA) (2001) revealed that an estimated 325,800 cattle, 1,150,000 sheep and goats, 300,000 skins and 150,000 hides go through illicit cross–border trade from Ethiopia.

Enhancing the ability of poor smallholder farmers and pastoralists to reach markets, and actively engaging them is one of the most pressing development challenges. Remoteness results in reduced farm-gate prices, returns to labor and capital, and increased input costs. This, in turn, reduces incentives to participate in economic transactions and results in subsistence rather than market-oriented production systems. Sparsely populated rural areas, remoteness from towns and high transport costs are physical barriers in accessing markets (Holloway and Ehui, 2002). For market development, dynamic relationship between demand and supply is a prerequisite, but the smallholder and pastoral livestock production is not market oriented.

According to Solomon (2004), the livestock sector in Ethiopia plays a vital role in the overall development of the country’s economy. Yet, the existing income generating capacity of livestock as compared to its immense potentials in the country is not encouraging. Under these conditions, farmers have no incentives to improve the quality of their animals through appropriate management practices.

Ayele et al. (2003) reported that current knowledge on livestock market structure, performance and price is poor and inadequate for designing policies and institutions to overcome perceived problems in the marketing system. Knowledge on how marketing routes and systems could contribute to the spread of diseases and the implications of these for national and international trade in livestock is also highly inadequate to design any policy or institutional innovation to improve marketing for the benefit of the poor.
1.2 Statement of the Problem

Recently, several large scale meat processing abattoirs have been established in Ethiopia in response to the emerging meat export opportunities to the Middle East and North African Countries. These developments are in the right direction to increase Ethiopia’s foreign exchange earnings and improving the livelihoods of livestock producers and other actors engaged in the livestock related activities.

One of the major challenges facing the meat export abattoirs has been that the competitiveness of these firms in the domestic and export markets has been limited by the underutilization of their meat processing capacities. It has been observed that the live animal throughput is inadequate and as a result the existing meat processing facilities operate at less than 50% of their operational capacities (MIDROC, 2004; NEPAD-CAAD, 2005; Filip, 2006). This is apparently due to inadequate supply of the required quality live animals for meat processing by the export abattoirs which makes them less competitive in the global or regional meat market. The export abattoirs are competing for the domestic supply of live cattle with the demand for live cattle for domestic consumption, and for formal and informal (cross-border) trade.

The export abattoirs are also required to ensure a consistent and continuous supply of meat or live cattle in order to meet the demand of the customers in the importing countries. Thus, there is an urgent need for export abattoirs to devise alternative strategies to ensure adequate market supply of quality live animals to meet their processing needs in order to improve their efficiency and competitiveness.

The first step towards improving the market supply of quality live animals is to understand the cattle producers’ ownership patterns and marketing behavior, from their source in the Borena area. Such information provides useful insights towards the designing and implementation of strategies to alleviate the shortage of quality live cattle supply in the market.
There is a need to assess whether and how the existing pastoral cattle production systems can provide sustainable and adequate live animal supply which can meet the demand for domestic consumption and the demand for export markets.

1.3 Objectives of the Study

1. To characterize cattle production systems of the study area,
2. Assessment of beef cattle marketing systems in the study areas,
3. To assess potentials and constraints of beef cattle export abattoirs in Ethiopia; and
4. To assess seasonality of domestic cattle meat consumption around Addis Ababa.
2. REVIEW OF LITERATURE

2.1. The Livestock Production Systems

2.1.1. The highland crop–livestock mixed farming system.

As NEPAD-CAADP (2005) stated that the highland crop–livestock mixed farming system encompasses nearly 40% of the country’s land area and is located above 1,500 m.a.s.l. It is featured by a mixed farming system where crop cultivation and livestock production are undertaken side–by–side and complementing each other. According to the same source about 80% of cattle, 75% of sheep and 25% of goats from the total national livestock holdings are found in this production system.

Despite the contribution of livestock to the economy and to smallholders’ livelihood, the production system is not adequately market-oriented (Ayele et al., 2003). There is little evidence of strategic production of livestock for marketing except some sales targeted to traditional Ethiopian festivals. According to the same authors, the primary reason for selling livestock is to generate income to meet unforeseen expenses. Sales of beef cattle are taken as a last resort and large ruminants are generally sold when they are old, culled, or barren. In thehighlands, large numbers of cattle are kept to supply draft power for crop production.

2.1.2. The lowland pastoral and agro–pastoral production system.

NEPAD-CAADP (2005) indicated that the lowlands in Ethiopia cover about 60% of the country’s land area and are situated below 1,500 m.a.s.l. The lowlands are situated in the Eastern, Southern, and Western part of the Central highlands (Afar, Somali, Borena, South Omo, some part of Gambela and Beneshangul). According to the same source the sector is characterized as pastoral and agro–pastoral production systems, where by about
20% of cattle, 25% of sheep and 75% of goats of the total national livestock population are found.

The pastoral society, which depends on livestock resources is able to purchase food grains, cloth and other household items. Their sources of income include sales of animals and animal products and hiring out of drought animals to the highlanders (Beruk and Taffese, 2000). Livestock are the principal source of subsistence providing milk and cash income to cover family expenses for purchase of food grains and other essential household requirements (mostly consumer goods). The pastoral areas have been the traditional source of export animals. Some scholars also indicated that, to a certain extent, Middle East importing countries have preference to the local breeds/types/strains of livestock raised in these areas (Mohammed et al., 2007).

The Borena pastoral system of southern Ethiopia has been traditionally practicing cattle husbandry for wealth storage, milk production, and small ruminants for immediate cash income (Solomon and Coppock, 2000).

Similar to other African pastoral systems, the Borena system has recently shown symptoms of destabilization. Cattle holdings per household are declining and herd dynamics is following a “boom” and “bust” pattern. Drought in the 1980’s and 1990’s has resulted in the death of 37% to 42% of the cattle population, respectively. Aggregating and analyzing the information on mortality of cattle in over 17 years, the Borena losses were valued at about 300 million USD (Solomon and Coppock, 2000).

2.2. Beef Cattle Resource

The Borena Plateau of southern Ethiopia is a pastoral region known for producing high quality cattle (Solomon, 2001). High quality Boran cattle are sought in domestic markets and are exported to the neighboring and Middle East markets (LMA, 2001). According to Solomon (2001), the Borena pastoralists are the dominant ethnic group on the Borena Plateau and they number about 325,000 and herd over one million head of cattle along
with fewer numbers of sheep, goats, and camels. Despite such facts, the pastoralists have become increasingly food insecure and vulnerable to drought and other shocks (LMA, 2001). This could be reversed if development interventions are integrated with market development and the pastoralists are sensitized to focus on market-oriented beef cattle production systems.

2.3. Characteristics of Cattle Market in Ethiopia

According to the results of a base line survey report by ACDI/VOCA (2006b), location advantage, proximity to the strategic cattle markets and sea ports; ethnic similarities, same languages, social and cultural relationships with the people across the borders and weak economic and market bondages within the country have created conducive situations for market links across the borders. According to the same source the neighboring countries bordering these areas either consume locally or re-export to other countries mainly to Middle East countries.

2.3.1. Domestic beef cattle marketing

2.3.1.1. Market structure

Generally, the livestock marketing structure in the pastoralist areas follows four tiers (Ayele et al., 2003; ACDI/VOCA, 2006b; Avery, 2004). These are bush, primary, secondary and terminal markets. The basis of such classifications is mainly number of animals supplied and market participants per market day (Figure 1). Bush markets are markets where animals are exchanged weekly between the pastoralists and small scale traders for breeding purpose or sells in the primary markets. Primary markets are district town markets where the sells volume does not exceed 500 animals per week. The major sellers are pastoralists and small scale traders, whereas the major buyers are assemblers (agents) and medium scale traders. Secondary markets are major towns markets where the weekly supply volume is between 501 and 1,000 animals. Here, the major market
participants are medium scale traders acting as sellers and the big traders as buyers. Tertiary/terminal markets are those markets located at the big cities of the country where weekly over 1,000 animals are supplied. Big traders are major sellers whereas butchers and consumers are the major buyers.

Livestock are generally traded by visual judgement and weighing livestock is uncommon though auctions were used to be practiced in some of the southern (Borena) markets where weighing was also practiced (MOA 1976) Prices are usually fixed by individual bargaining. Prices depend mainly on supply and demand, which is heavily influenced by the season of the year and the occurrence of religious and cultural festivals.
Source: Ayele et al., 2003

Figure 1. Typical Ethiopian livestock market structure.
According to Belachew and Jemberu (2003) in the low lands, where pastoral management system is practiced, livestock are considered as wealth accumulation and manifestation of status in the societal hierarchy. So, marketing of their animals is basically a function of their basic principal source of subsistence providing milk and needs such as food grains, clothing, health care and a period of drought. A report by ACDI/VOCA (2006b) stated that in times of drought, market terms of trade for pastoralists sharply decline. Thus, lack of drought mitigation and coping mechanisms adversely affect the livelihoods of the community. Fodder and pasture shortages during drought forces higher livestock supply to market.

Belachew and Hargreaves (2005) reported that beef cattle marketing is not characterized by small-scale business with very few assets, personalized trading (mostly with known people), and trading over very short distances. The implication is that animals have to be traded several times in order to reach the large and distant terminal markets. This has the tendency of increasing handling costs, thereby raising retail and suppressing farm gate prices. Markets are dispersed with remote distances lacking price information. Ayele et al., (2003) reported that the number of animals offered in a market is usually greater than the number demanded, so there is usually excess supply.

2.3.1.2. Domestic beef cattle consumption

In Ethiopia fewer cattle are slaughtered than any other animal, even with most butcheries selling only beef (Figure 2) and in Ethiopia the meat intake remained with consuming 9kg per capita annually (FAOSTAT, 2004). Although slaughtering takes place at official slaughterhouses throughout the country, most animals for Addis Ababa residents are slaughtered at the Addis Ababa Abattoirs Enterprise (Mahmud, 2000).
Even if it is difficult to find accurate data on the number of livestock slaughtered in Addis Ababa as readily available data, Irungu and Alemayehu (2002) suggested that only one-third to one-half of the cattle slaughtered at the Kéra abattoir are supplied through the terminal markets of Addis Ababa. Furthermore, according to some estimates, an almost equal number of cattle are slaughtered outside of the designated abattoirs, which are not recorded.

ACDI/VOCA (2006b) indicated that the amount of meat consumed in Addis Ababa represents the largest portion of domestic consumption within Ethiopia, as it has the highest urban population. In the urban area of Addis Ababa, animals are slaughtered in one of the three ways: at the Addis Ababa Abattoir Enterprise (official municipal slaughterhouse), at small private abattoirs operating unofficially or by the individual citizen. Sheep and goats are far more likely to be slaughtered by individual citizens than
cattle, due to their smaller size. According to the same source the Addis Ababa Abattoir Enterprise has an operational capacity of 1,200 cattle monthly based on a 22 working days/month.

Figure 3. Total monthly cattle, sheep and goat slaughtered at Addis Ababa Abattoir (January 2004 to April, 2006).

Irungu and Alemayehu (2002), in their report indicated that there are three abattoirs in Addis Ababa of which two are public owned – Kara Alo and Akaki that are managed by the Addis Ababa Abattoir Enterprise. Akaki slaughterhouse is located in the outskirts of the Addis Ababa and serves both Akaki town and Addis Ababa. Kara Alo, a share company, serves the Eastern peripheral areas of Addis Ababa and supplies meat to some 35 butcheries. Usually, cattle of lower quality are slaughtered in Kara Alo. Avery (2004) mentioned that in regards to sanitation and employee health, the Ministry of Health inspects all food establishments, including butcheries and supermarkets. The inspection, however, is less frequent and also followed loosely.
However, in many developing countries the slaughter of animals is traditionally carried out in unsuitable buildings by untrained staff with little attention to sanitary principles. Pre-slaughter handling is poor and sometimes leads to spread of infection during transportation and in overcrowded lairages, as well as to loss of weight. As Gary *et al.* (2004), indicated the condition of the animal can deteriorate within a few days between selection for slaughter and actual slaughter: fatigue and lack of food will deplete muscle glycogen, which may result in quality deficiencies of the meat after slaughter and the deteriorated quality of meat directly affects the domestic and export markets demand.

### 2.3.2. Beef cattle exports

**2.3.2.1. Overview**

A report from ACDI/VOCA (2006b) stated that, there were seven abattoirs in Ethiopia which processed canned meat products mainly for the army, domestic market and some exports. They are located in Addis Ababa, Melge Wondo, Dire Dawa, Kombolcha, Gondar and Debre Zeit. Of these plants, Melge Wondo was to some extent preparing frozen beef and that of Debre Zeit abattoir produced chilled beef, sheep and goat meat for both domestic and export markets

With the change of government in 1991, Ethiopia has embarked on policy reforms that aim to bring about a market-oriented economic system. Several macroeconomic policy changes were implemented and the above mentioned factories and enterprises became privatized and made to operate in the proclaimed free market. Latter on as a result of privatization, these state owned plants were sold to Elfora Agro Industry, the biggest private firm operating in the meat industry.

With policy reformations after government change in 1991, in response to the available potential for meat export and the liberalization policy, the number of export standard abattoirs has increased to five. The activities and purpose of the meat processing industries in Ethiopia is to produce and supply high quality meat products to the domestic
and export markets. The export market is the main market of the meat processing industries of the country. Products supplied to the local and overseas markets by these companies are chilled/frozen beef, goat meat, mutton, chilled veal, chilled camel meat and red offals.

2.3.2.2. Official exports

According to Belachew and Jemberu (2003), there are few legal exporters engaged in the export of live animals and meat in the country. These exporters secure livestock from pastoral areas by themselves or through agents for export in live or meat form (chilled mutton, goat meat and beef). The Livestock Marketing Authority (LMA, 2004) estimated the annual potential for export at 72,000 metric tons of meat with an equivalent value of US$136 million.

NEPAD-CAAD (2004) reported that the Middle East and North African countries which are considered important for the country’s export in livestock and livestock products (LLP) are: Saudi Arabia, United Arab Emirates, Bahrain, Yemen, Jordan, Kuwait, Oman, Qatar, Iran, Syria and Egypt, respectively. Their annual demand is estimated at US$1.1 billion consisting of 206,846 tons of meat and 12 million heads of live animals (cattle, sheep and goats).

Despite the substantial demand for live animals from Gulf States, export to those markets often face impediments as a result of stringent animal health requirements and repeated bans on import of livestock (Wondwosen, 2003). Livestock exports from Ethiopia are jeopardized by repeated bans, in particular from the countries in the Arabian Peninsula, as they are perceived as carrying the risk of introducing a number of trans-boundary livestock diseases that include Foot and mouth disease, Rinderpest, Contagious bovine pleuropneumonia and Rift valley fever (LMA, 2001). The widely prevalent livestock diseases are major constraints to Ethiopian livestock export. Livestock diseases continue to limit Ethiopia’s access to attractive markets. Increasingly stringent sanitary and phytosanitary standards (SPS) are being set for access to major markets, when the
country still has a very low capacity for meeting these standards at least in major sources of meat animals.

Based on Workneh (2006), the estimated national offtake rates of 10% for cattle, pastoral areas of the country alone, could produce 734 thousand heads of beef cattle per annum. When these are compared to the current demand in the Middle East, they meet only 42% for beef, however, the live beef cattle supplies are well over the demand (144%), requiring new market outlets.

2.3.2.3. Unofficial exports

The annual outflow of beef cattle from Ethiopia through illicit (informal) market is very huge. The immediate destinations of this illicit export are Djibouti, Somalia and Kenya which are further re-exported to the Middle East countries after meeting domestic demands (NEPAD-CAAD, 2005).

The legal export of both live animal and processed meat is thus constrained due to shortage created by the illicit export. Recent studies estimate annual illegal flow of livestock through boundaries reaches as high as 320,000 cattle (Workneh, 2006). This being the potential for export, the actual performance has remained very low, leaving most (55 to 85%) of the projected livestock offtake for the unofficial cross-border export and the domestic market. Thus, according to Ayele et al. (2003) findings, the main sources for this illegal channel are mainly Somali region and Borena of south east and southern Ethiopia, respectively. The immediate destinations of this illegal trade are Djibouti, Somalia, and Kenya that re-export the livestock and their products to different countries where they compete with the legal exporters from Ethiopia (LMA, 2001).
3. MATERIALS AND METHODS

3.1. Description of the Study Area

The pastoral and agro-pastoral areas of Ethiopia are mainly found in the Northeastern, Eastern, Southern, Southeastern and extreme Southwestern part of the country. They are found below 1500 m elevations and comprise 61-65% of the country's land (MOA, 2000). The climate of pastoral and agro-pastoral area is broadly categorized as arid (64%), semi-arid (21%) and sub-humid (15%) zones (EPA, 1998). The estimated human population of the area is about 7.7 million and it is estimated to be 13% of the total human population of the country (MOA, 2000).

Figure 4. Map of the study area.
The pastoral rangeland of Borena is found in the southern part of Ethiopia, laying between 3°36'-60° 38' N and 36°43'-41° 40' E geographical grids in the Southern part of the Regional State of Oromia, it has a spatial area of 69,373.3 km² (about 7.6-12.3% and 19.5% of the total land area of Ethiopia and Oromia, respectively). (ORDPEDB, 2000).

The region is dominated by semi-arid climate. The area has a bi-modal type rainfall regime ranging on average from 400 mm in the South to 600 mm in the North annually. About 59% of the precipitation occurs from March to May and 27% from September to November.

A "dry" year is the one in which annual rainfall is less than 75% of average and this may occur every five years (Baker, 1989) but nowadays this may occur more frequently. The hottest months are December, January, February and March. Several water wells locally called “Ellas” are available in the area. Borena Zone has three agro-climatic conditions namely ‘Kola’, ‘Woima Dega’ and ‘Dega’, which make 69.1%, 28.5% and 2.4 %,of the zone respectively (ORDPEDB, 2000).

According to the new organizational structure of Oromia, the previous Borena Zone has been divided into two Zones. These are Borena and Gujji Zones. Borena Zone is the southern part and has eight woredas namely, Gelana, Abaya, Bule Hora (the previous Hagere Mariam), Yabelo, Arero, Moyale, Dire and Teltele with Yabelo being the Zonal capital. The Gujji Zone is located in the northern part having seven woredas namely, Bore, Uraga, Wadera, Adola, Odo Shakiso, Liben and Kercha with Negelle as the Zonal capital.

### 3.2. Sources of Data

The study was based on both secondary and primary sources of data. The sources of secondary information were ELFORA Agro-industries, LUNA export slaughterhouse, Borena Zone Office of Agriculture, Geda pastoral union, ACDI –VOCA Ethiopia, CARE
Borena, Karalo slaughterhouse, Dukem slaughterhouse, Burayu slaughterhouse and Sululta slaughterhouse.

3.3. Methods of Data Collection

Data from secondary sources were obtained once appropriate sources were identified for the purpose. Data from primary sources were collected from export abattoirs, producers, butcheries and local slaughter house.

3.3.1. Abattoir based survey

Abattoir based survey was carried out at ELFORA Agro-industries Pvt. Ltd. Co. and LUNA export slaughterhouse because currently they are the only functional beef cattle export abattoirs in the country and these are the two abattoirs receiving cattle from the southern parts of the country along the major routes/sources of cattle. In addition to this, the abattoirs supply large amounts of cattle meat to domestic and foreign markets.

3.3.2. Field survey: Producers / pastoralists and market survey

Producers’ survey was conducted employing both formal interviews and participatory rural appraisal (PRA) for base line information techniques, for example, using pairwise ranking matrix for major problems prioritized by producers in Yabello district (Appendix Table 8). Questionnaire survey was conducted on 150 households from two of the purposively sampled woredas of Borena Zone, namely Yabello and Dirre. From Yabello two PA’s, namely Surupha and Did Yabello and from Dirre only one PAs, Dubluk were purposively sampled among other PA’s. The households were identified using systematic random sampling technique and Probability Proportional to Size (PPS). Data was collected by the researcher and using enumerators that were trained for two consecutive days on how to administer the questionnaire.
The markets for this study were selected purposively because they are the main cattle marketing sites in the study area and offer large number of cattle to domestic as well as cross border trade and they have a weighing scale facility at the marketing sight for ease of transaction (personal observation). In all the markets, the market survey was carried out once a week on a major market day (Dubluk market was surveyed on Friday; Harobeke market was surveyed on Sunday and Surupha market was surveyed on Saturday) except for Yabello which does not have cattle market but the export abattoirs have a weighing scale facility at the marketing site for ease of transaction which helped to fix appointments with the pastoralists.

3.3.3. Slaughterhouses and butchers survey

Slaughterhouse survey was conducted through interviews and secondary data resources from Sululta, Kara Alo, Dukem and Burayu slaughterhouses based on their operational services given to the butchery houses in and around Addis Ababa and at this stage, using Probability Proportional to Size (PPS) 50 representative butchers from North, East, South-east and Western directions of Addis Ababa such as Sululta, Kara, Dukem and Burayou, respectively were selected.

These butchers/markets used for this study were selected purposively because they offer relatively a large quantity of beef for domestic consumption at lower cost (personal communication). The researcher and a recruited enumerator collected data, and training was given to enumerator for one day on how to collect data from the sampled butchery houses.

3.4. Data Analysis

The computer software Excel was used for data managing and most of the data were analyzed with SPPS version 14. Descriptive analysis was employed for data analysis. This method of data analysis refers to the use of ratios, figures, percentages, means, standard deviations and charts in the process of examining and describing beef cattle
production, marketing functions, facilities, services, intermediaries, market and animal characteristics. ANOVA (Analysis of variance) and mean difference test were done for independent butchery houses. General linear model (GLM) with Levene test was used, to test similarity or difference of variances for price and yield of meat between butchery houses at different locations.

The following model was used for analysis of price and yield of meat.

\[ Y_i = \mu + L_i + \varepsilon_{ij} \]

\( Y_i \) = Individual butchery houses observation  
\( \mu \) = Overall mean  
\( L_i \) = \( i^{th} \) location effect  
\( \varepsilon_{ij} \) = The error term
4. RESULTS AND DISCUSSION

4.1 Characteristics of Sample Households

4.1.1. Family size

On average, there were eight persons in each household in the study area. The range is from two members in Dida Yabello to 20 persons per household in Dubluk. The largest household size observed in Dubluk is mainly attributed to the number of spouses in the household. According to Coppock (1994) a Borena man could have more than one spouse if he is wealthy enough. Therefore, polygamy type of marriage is common in Borena area. Similarly, a study by Agajie et al. (2002) indicated that having many wives is one of wealth indicators and commonly practiced type of marriage in the area. Moreover having many children is considered as an asset as this guarantees as a supply of labor for herding and farming activities and being large in number in a household has social prestige showing the strength of that family in particular and the clan in general.

4.1.2. Age distribution and participation in household and field works

According to the results of the study (Table 1), most of the people falling under the age groups of 2-10 male (67.3%) and female (68.7%) are enrolled in school and these age groups participate less (45.3%) in the household and farm activities. However, age groups of 11-15 and 16-30 of both male and female groups highly contribute (81.9% and 80.5%, respectively), to household and farm activities. Age groups from 31-55 of male (66.7%) and female (65.3%) highly involve themselves in the farm and household activities, which is mainly because they establish their own family that needs their attention and involvement in different social activities. Age groups of >55 years (33.1%) mostly participate in the households and easy farm activities because of their old age.
Table 1 Age distribution and their respective participation in household and field works

<table>
<thead>
<tr>
<th>Sex</th>
<th>&lt;2</th>
<th>2-10</th>
<th>11-15</th>
<th>16-30</th>
<th>31-55</th>
<th>&gt;55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>29.3</td>
<td>67.3</td>
<td>63.3</td>
<td>52.7</td>
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<td>Female</td>
<td>24</td>
<td>68.7</td>
<td>59.3</td>
<td>67.3</td>
<td>65.3</td>
<td>8</td>
</tr>
<tr>
<td>% (%N)</td>
<td>No</td>
<td>45.3(150)</td>
<td>81.9(149)</td>
<td>80.5(149)</td>
<td>88.7(150)</td>
<td>33.1(148)</td>
</tr>
</tbody>
</table>

Note: Values in brackets show number of respondents on agricultural household and fieldwork activities

Bosolo (2000) indicated that older people articulated their roles in the community as livestock management, management of agricultural activities, especially the selection and preservation of planting materials during the agricultural season, selection of restocking animals, traditional medicine and healing, traditional birth attendants, resolving conflicts (in the family and at clan level) which sometimes takes several days to reach a consensus, collection of fuel wood, control of grazing grounds and traditional leaderships which is in agreement with the results of this study.

4.1.3. Education level of the household heads

It is obvious that education is a base for any development. Results of this study (Table 2) showed that 70.7% of the sampled household heads are illiterates, only 13.3% can read and write, only 12% of them enrolled in primary schools, 2.7% attend secondary school, only 0.7% join above secondary school and 0.7% attended religious schools. BPDBB (2007) reports that most of the pastoralist districts in the Zone have few primary and secondary schools and institutes, so pupils are required to travel long distances even to the nearest primary schools which leads to limited access to modern education opportunities that agrees with the results of this study.
Table 2  Household education level in the study Pastoral associations

<table>
<thead>
<tr>
<th>Education level</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>106</td>
<td>70.7</td>
</tr>
<tr>
<td>Reading and writing</td>
<td>20</td>
<td>13.3</td>
</tr>
<tr>
<td>Elementary school</td>
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<td>12.0</td>
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<tr>
<td>Secondary school</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td>Above secondary school</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Religious education</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>150</td>
<td>100.0</td>
</tr>
</tbody>
</table>

N= Number of respondents

4.1.4. Income sources of the households

In the study area, livestock are the main sources of income and are closely linked to the social and cultural lives of the community. As presented in Table 3, the major (49.3%) sources of household income are crop and livestock production. BPDBB (2007) indicated that in a large portion of the Ethiopian pastoralist population, agro-pastoralism also plays a part. Solomon et al. (2000) reported that the people in the pastoral southern Ethiopia are becoming more dependent on grain and similarly, Nigussie (1999) explains the spread of crop cultivation as an internal response to growing food insecurity and a means of economic diversification, thus grain has become to constitute a significant part (45%) in the diet of about 90% of Borena households. According to the same author the Borena cultivators, however, seldom produce a surplus, even during favorable seasons and home produced grain is barely sufficient for more than four months. These days, however, harvest failures and reduced yields are becoming increasingly common. According to the results of the study, livestock production integrated with all kind of income source is considered as a source of income and survival.

Table 3  Sources of income for living in the study households in Borena Zone

<table>
<thead>
<tr>
<th>Income sources for the households</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock production</td>
<td>16.7</td>
</tr>
<tr>
<td>Crop and livestock production</td>
<td>49.3</td>
</tr>
<tr>
<td>Non farm and crop livestock production</td>
<td>21.4</td>
</tr>
<tr>
<td>Non farm and livestock production</td>
<td>12.6</td>
</tr>
<tr>
<td><strong>Total (N=150)</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Non farm includes private, wage labour, etc*
4.1.5. Ownership of cattle in the household

Results of this study revealed that 54% of the respondents (N=150), indicated that senior male in the household (husband) is the owner of cattle in the household. With the presence of the husband in the house, the role of the wife as the owner is less, which is only 5%. About 27% of the respondents indicated that every family member, including children, has the role in the ownership of cattle. Richard (1990) stated that on the Borena social structure, man is the manager of the household herds and flocks. While married women are the domestic managers of their own houses and are subordinate to men, who are the household heads and who represent their households to the outside world and this agrees with the results of this study. Similar results by Coppock (1994) indicated that Borena men are the heads of households and make the major decisions regarding production strategies and disposal of ruminant and equine livestock. However, when cash demands are higher then cattle can be sold but the sale of cattle usually requires deliberations within the extended family before the final decision.

4.1.6. Ownership of grazing lands

Result from this survey revealed that the natural pasture for grazing is communally owned, however, 7 (4.7%) of the respondents additionally use their small plot of land for their young animals found at home. Beruka and Tafesse (2000) obtained a comparable result that in pastoral areas, the natural vegetation on the rangeland is the main source of feed for livestock and in order to utilize the resource properly, the pastoralists undertake traditional range management practices. Richard (1990) mentioned that primary unit of organization is the household. Households are grouped into villages, and villages into village clusters or neighborhoods, which may in turn form a larger grazing encampment. Deda are grazing areas, which are customarily used by a group of villages. Decisions are taken jointly by these villages regarding use of the deda, especially on areas that are to be reserved in the wet season for use in the dry season. Council meetings called to discuss grazing management are commonly coordinated by the most senior man of one of the
villages in the *deda*. Use of the *deda* is not restricted to those villages living within its boundaries, but decisions made by the *deda* council are binding on all users. Essentially, the *deda* is a grazing management unit not a social unit.

### 4.1.7. Family labour for cattle production

Labour mainly focused on seasonal time budgets for the households required to fetch water from the deep wells and that needed for herding. According to results of this study, the longer term of school opening for the children from September to June (39.2%) plays a great role for facing labour shortage in cattle management of the households. About 49% of the respondents indicated that December to February and some times in March, which is dry season and locally called *Bonna*, greatly affects the manpower requirements for cattle management, and during this period elder of the family may travel to other areas in search of feed and water. Similarly, Bosolo (2000) indicated that the long rains occur from March to May, during which time the community plants maize, sorghum, barley and haricot beans. The shorter rainy season occurs from September to the end of November. Nigussie (1999) indicated that poor rains result in an extended dry season which in turn leads to severe shortage of grazing and fodder and unusually early (July) use of the traditional deep wells (*ellas*). Normally *ellas* are used from December onwards. In one of the *ellas* visited in Dubluk, it took a series of 14 people to pull water from the depths of the well where according to the same source, only 8 people are required normally, and the length of time cattle must wait until the *ellas* is recharged has become considerable. Borena society is considered to be more socially cohesive, cooperative and 60.4% of the respondents (N=149) in the study area revealed that there is available manpower for cattle management and production in most of the family members.
4.2. Beef Cattle Production and Marketing System

4.2.1. Beef cattle production system

4.2.1.1. Experience involved in cattle production

Beef cattle production experience refers to the number of years that the producer stayed in cattle production activity. From producers’ survey, it was found out that most of the producers had been in cattle production activities for more than 5 years. Out of the 150 surveyed producers, 11.3%, 13.3%, 16%, 8%, 8% and 24% had cattle production experiences of 5-10, 11-15, 16-20, 21-25, 26-30 and more than 30 years, respectively. While 16.7% of the respondents do not recall when they started, this could be unable to recall the length of the year they started. Similarly, Coppock (1994) indicated that herding may involve males and females from 6 to 25 years of age. Younger children, and females in general, do most of the tending of small ruminants and calf herds near encampments while young men and older boys are more responsible for warra (resident milking cattle) and forra (dry cattle that are far-ranging). Older girls (in their late teens) may herd warra animals if labour is in short supply (Cossins and Upton, 1987).

4.2.1.2. Purpose of rearing beef cattle

The prevailing view of respondents (Table 4) was that, 79 herders accounted for 52.7% of the herd owners seek to accumulate beef cattle to generate cash income and farming purposes. Regarding the farming activities, a report by Helland (1999) stated that, food security crisis resulting from the first large famine in 1973/74 may have aggravated the situation and forced the Borena pastoralists to resort to other types of livelihoods including crop cultivation in marginal and risky areas for crop production in the last 30 years. The emergence of this production system could be a response to food insecurity from livestock caused by a compounded effect of climatic and man made disorders overtime. A report by Beruk and Tafesse (2000) agrees with the results of this study. Similarly, Getachew and Solomon (2007) stated that pastoralists like the Borena will be forced to engage in more commercial livestock activity simply to increase human
carrying capacity through the exchange of animals for grain via market transactions. Management of ruminant livestock is by herding on rangelands closer to settlements and migration with animals during certain times of the year. Hardy and adaptable crops like millet and sorghum, vegetables, fruits and some cash crops are cultivated (Camoens, 1985).

Kamara (2000) has indicated that adoption of cultivation by Borena and privatization of land for commercial purpose drives to restriction of mobility and may end up in full sedentary. Semi arid nature of the Borena rangelands, with their recurrent droughts, will hardly be the basis for stable production systems if sedentarisation results.

<table>
<thead>
<tr>
<th>Purpose of rearing beef cattle</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling and farming</td>
<td>79</td>
<td>52.7</td>
</tr>
<tr>
<td>Selling, farming and food sources</td>
<td>47</td>
<td>31.3</td>
</tr>
<tr>
<td>Selling</td>
<td>17</td>
<td>11.3</td>
</tr>
<tr>
<td>Multiple response</td>
<td>7</td>
<td>4.7</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
</tbody>
</table>

Multiple responses: Selling, Farming, Gift for ceremony and asset

According to results of this study, the primary reason for selling an animal is to meet an acute need of money, in general. About 31% (47 respondents) of the respondents rear cattle for sale, farming and food sources while only 11% (17 respondents) of them rear for sale and only 4.7% (7 respondents) of the respondents rear for sale, farming, gift, ceremony and as social and economic assets. A study by Biruk (2003) showed that the change in vegetation composition coupled with climatic variability has forced pastoralists to spread the risk they are facing by raising different, but easily adaptable species of livestock.

**4.2.1.3. Major feed resources**

Results of this study indicated that 147 (98.6%) of the respondents rely on grass as a basal feed for their cattle, out of which 54 (36.2%) of them used salt as a supplement.
This is mainly because parts of the main stock which are found at home or near the compound especially those ready for sale are supplemented with salt as the producers strongly believe in that salt is helpful for conditioning their beef cattle before sale. According to Cossins and Upton (1987), the Borena manage their cattle in a traditional pastoral fashion. Where water and grazing resources permit, the Borena lead a semi-settled way of life, which is in agreement with the results of this study. The household may remain sedentary throughout a given year or succession of years in and around family residences in a given madda (cover defined areas of land with fixed boundaries freeing which free movement is allowed in it) may last for generations. Coppock (1994) indicated that Borena cattle spend 98% of their feeding time on grasses and other herbaceous plants and 2% on browse.

4.2.1.4. Feeding systems

The feeding systems in the study area were field grazing 118 (78.7%) followed by multiple responses 28 (17.9%) cut and carry, field grazing, semi-grazing and tighten at home (Table 5). In agreement with results of this study, Coppock (1994) stated that in the Borena area there are typical patterns of cattle management systems, including separation of adults from immature, nightly corraling of adults near the compound, milking cows with the calf on foot together, distribution of milking quarters both to human and calf consumption, intensive hand-rearing of calves, water restriction of adult cattle and calves in dry seasons, splitting cattle into home-based and outpost herds and differentiation of management roles according to sex and age among household members have been commonly observed to various degrees. The main reason of keeping certain groups of animals at home were to serve as a source of milk for the family and to follow the health status of sick ones while the main stock are left far for searching feed and available water resources.

As stated by different authors, grazing resources in Borena, pasture and water are to a large extent owned communally and administered by traditional elders who formulate rules about resource use, administer their enforcement and ensure that sanctions and
penalties are implemented. Pastures can either be warra, forra or calf enclosures. Warra areas are grazing areas for lactating cows, and sick and weak animals that return to the encampment everyday so that they can be milked and/or monitored. Forra grazing areas are designated to the grazing of bulls and non-lactating cows (dry herds) such areas are regarded as fallback areas for all Borena people during periods of forage scarcity. Permanent settlement in forra areas is prohibited.

Table 5  Type of feeding system followed by sample households in the study area

<table>
<thead>
<tr>
<th>Feeding systems</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field grazing</td>
<td>118</td>
<td>78.7</td>
</tr>
<tr>
<td>Multiple response</td>
<td>28</td>
<td>17.9</td>
</tr>
<tr>
<td>Semi-grazing</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Tighten at home</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Cut &amp; Carry</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
</tbody>
</table>

Multiple responses: Cut & Carry, field grazing, semi-grazing & tightening at home
N= Number of respondents

Some of the farm products and residues used as a source of feed to the different groups of cattle and 74 (49.3%) of the respondents reported that they just store feed to the home based herds, while 76 (50.7%) of them do not store feed for their animals. In agreement with results of this study, comparable results by Alemayehu (2006) indicated that cattle are herded either as home-based groups or mobile grazing groups in pastoral areas and herd splitting is done depending on the condition of the resource base, availability of labour, sex and age class of animals and whether cows are in milk or dry. Accordingly, purchase of feed during scarce periods, 74% (111 respondents) of the respondents do not purchase feed from market rather they find other solutions such as sending to the feed available areas, while 39 (26%) of the respondents stated that they purchase feed from market for their animals which are found at home. According to the informants and the remaining 39 respondents, the available feeds at the markets are mainly hay and salt. Results of the study revealed that 17 (11.3%) of the respondents spent 50-200 ETB while others 9 (6%), 8(5.3%) and 5 (3.3%) spent 201-400, 401-700 and 701 to greater than 800 ETB, respectively for the purchase of feed.
4.2.1.5. Water sources

Water resources in the study area are dominated by the deep wells thus not representative of the southern rangelands as a whole in terms of water resources. According to key informants, the wells usually occur in groups of four to 20, but around Dubluk there are around sixty wells found which are grouped. It is often contended that these wells were dug by strong men and youth of different ethnic groups, and in order to execute the activity, the population around slaughtered mainly cattle and goats to the workers. Digging these wells may last over a year as it may reach up to 30 m deep. After water is found and all other processes are completed, as an incentive and gift in the form of cattle, goats, and sheep are given to the leaders of ethnic groups, which later was distributed to the youth, men and others who participated in excavation process.

The wells have different features. Animals and people enter the well site by traveling down a long narrow ramp bordered by high earthen walls. The drinking area for animals is a large flat platform below the ground surface. There is also a supervisor who helps keep the watering and exit of stock orderly. The well proper consists of several parts. The water source (Ella) is accessed by a shaft up to 30 m deep with a big hole which may be 1 to 3 m in diameter. At the top of the shaft is a large storage basin (of hundreds of liters capacity), several meters above which is a system of clay watering troughs that services up to several dozen cattle and other stocks at a time. A chain of five to 20 people, usually male, stand on lashed wooden platforms or rocky protrusions in the shaft and pass water from the Ella to the storage basin. One to three more people (youths and adults of both sexes) pass water from the storage to the watering trough. Water is passed using small plastic or metal containers. Next to wells, ponds are the most important water sources in the central plateau and are termed ‘hara’ (Helland, 1980b).

The water resource in the central plateau is perhaps the most fundamental feature that has shaped Borena society (Cossins and Upton, 1987). The deep wells in particular are focal points for social organization and ritual (Helland, 1980b). According to Coppock (1994), the Borena mostly use ponds during the rainy season and wells during the dry season to
supply water for people and animals. Ponds are easily accessed but are available for only a short period of time. The wells are usually a permanent source of water, but require a large input of labour to lift water to the surface (Appendix II, Water sources for cattle in Borena area) that agrees with results of this study.

4.2.1.6. Housing system

House is basically important to protect both human being and animals from predators, theft and from different weather conditions. Thus, the housing system for 142 of the respondents (94.7%) construct barn for their cattle and available herd, 3 (2%) of them put their animals in a homestead shades and 5 (3.3%) of the respondents live together with their animals at home.

4.2.1.7. View on the future size of cattle production/population

Traditionally, the Borena pastoralists are cattle herders. Similarly Kamara (2001) stated that Borena are predominantly engaged in cattle rearing, along with sheep and goats. This trend, however, is gradually changing as camels, horse and donkeys are gradually being integrated into the system, along with the adoption of crops in areas of relatively abundant precipitation. Accordingly, 148 respondents (98.7%) wanted to expand the size of their cattle production in the future, however, only one (0.7%) of the respondents wanted to reduce the herd size mainly due to the recurrent drought and over-grazed rangelands and also one of the respondent planned to maintain the herd size as it is, otherwise if the herd size is over stocked lack of available water and feed forces him to reduce the available stock.
4.2.2. Constraints of cattle production system

4.2.2.1. Shortage of grazing land

Grazing on natural pasture is the most common practice for all species of animals in the Borena rangeland. Accordingly, the results of this study showed that 101 (67.3%) of the respondents explained that the grazing land for cattle is not enough. Richard (1990) stated that within the Borena grazing management system essentially there is an area of grazing which is defined in terms of right of access and which are customarily used by a group of villages. According to Sora (2006) rangeland of Borena has been severely degraded. The grazing area is shrinking from year to year. Bush encroachment is one of the key problems, which has invaded over 50% of Borena rangelands. Over grazing is a common feature in the grazing area and depletion of topsoil has become apparent, a consequence which agrees with the results of this study.

According to the response of 67 (44.7%) households, there is feed shortage for cattle in general and 66 (44%) households responded that the problem is there but it depends on the seasons, while the remaining 17 (11.3%) replied that there is no feed problem in their area. Similarly, study results by Kamara (2001) indicated that there is also land allocation to private grazing and classified at two levels: privatized enclosures for individual household’s grazing and enclosures for groups of individuals or groups of households belonging to the same encampment.

4.2.2.2. Months of feed shortage and coping mechanisms

According to results of this study, January and February are the most critical periods when feed shortage occurs and the commonly held view is that traditional pastoral societies are increasingly distressed with the locally called Bonna which is the dry period as a result feed and water resources decrease both in amount and quality, as indicated by the respondents. Seasonal availability of water constraints the efficient exploitation of forage reserves especially during the dry season. Likewise, Zinash et al. (2000) stated
that the prime effects of meteorological drought are shortages of water and feed. Even if this shortage in extended periods forces pastoralists to lose their assets mainly livestock, pastoralists have developed many strategies to cope up the effects of recurrent droughts.

Thus results (Table 6) revealed that to cope up with the feed shortage, about 61 (40.9%) of the producers send their animals to other areas where there is available feed source and 64 (43%) of them use multiple mechanisms such as storing feed prior to the dry periods, using farm residues and natural vegetation or sending their animals to the feed available areas. The other groups (24 (16.1%)) on top of using the above mentioned coping mechanisms, they exercised cut and carry from available sources, fencing (kallo) unless severe case happened when they expect support from others including Government supply, NGO’s etc.

<table>
<thead>
<tr>
<th>Feed shortage coping mechanisms</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage, farm residue, natural vegetation and send animals to other areas</td>
<td>64</td>
<td>43.0</td>
</tr>
<tr>
<td>Send animals to other areas</td>
<td>61</td>
<td>40.9</td>
</tr>
<tr>
<td>Multiple response</td>
<td>24</td>
<td>16.1</td>
</tr>
<tr>
<td>Total</td>
<td>149</td>
<td>100</td>
</tr>
</tbody>
</table>

Multiple responses: Storage, Farm residue, Natural vegetation, sending, market, Cut and carry, Government supply and Fencing

N= Number of respondents

4.2.2.3. Problems on water sources

Among the 150 respondents 61 of them (40.7%) indicated that there are problems with the water resources such as poor water quality, thus 40 (26.7%) reported that during the dry periods the water quality is poor and results in water born diseases. The 7(4.7%) of the respondents indicated that there is water scarcity both from the ellas (wells) and haras (ponds) mainly during the dry periods, and 9 (6%) reported that there is lack of water resource in the area. In relation with the available stock of animals, the ponds are easily accessed, but the wells require a large input of labour to lift water to the surface but there is lack of man power 5(3.3%). Nine (6%) of the respondents do not know either there is
associated water problems. However, the majority of the respondents 80 (53.3%) revealed that they do not have any problems with water (Table 7). This finding is consistent with that of Helland (1982) who stated that there are three main forms of water sources in the Borena plateau. These are: occasional water such as natural pools, and puddles of rain water lasting only for a few days; temporary water such as ponds and basins that can be both natural and artificial; and the permanent traditional deep wells which are pivotal in pastoral life in Borena. Similarly, Kamara (2001) reported that the Borena mostly uses ponds during the rainy periods and wells during the dry periods to supply water for people and animals. These ponds, however, do not retain water all the year round.

Table 7 Problems on water sources of sample households in Borena Zone

<table>
<thead>
<tr>
<th>Water sources problems</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No problem of water</td>
<td>80</td>
<td>53.3</td>
</tr>
<tr>
<td>Poor water quality</td>
<td>40</td>
<td>26.7</td>
</tr>
<tr>
<td>Lack of water resource</td>
<td>9</td>
<td>6.0</td>
</tr>
<tr>
<td>Don't know</td>
<td>9</td>
<td>6.0</td>
</tr>
<tr>
<td>Water scarcity in the dry season</td>
<td>7</td>
<td>4.7</td>
</tr>
<tr>
<td>Lack of man power</td>
<td>5</td>
<td>3.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

N= Number of respondents

4.2.2.4. Cattle health problems

Efficient and reliable animal health services constitute an essential prerequisite to livestock development in Borena. From the survey results (Table 8) on animal health services, 41.3 % of the respondents use both the government (modern) and traditional medications, 38.7% use government services only, 12 (8%) use traditional medications and 12% of them use private veterinarians and NGO's services. Respondents indicated that the traditional medications are relatively cheaper than the modern one. Both the government and NGO services charge them for the drug only, and not for the other services. On average the producers spend 348.44 ETB (error of 289.454 ETB) per year for medication. On the other hand, as is evident from results of the study 103 (69.1%) and 35 (23.5%) of the respondents replied that there is cattle health problem, but the latter
group added that it depends on the season. Only 11 (7.4%) respondents stated that no problem but they follow their cattle health in different ways (Table 8). Nowadays, traditional herders in the Borena have become more aware of the benefits of veterinary care and are willing to pay for effective and reliable veterinary services. Cornelius and Solomon (1991) in their study indicated that the losses caused by animal health problems could be classified into direct and indirect losses. Direct losses are mainly caused by mortality, while indirect losses are caused by decreased growth, fertility and work output (morbidity losses). Similarly, Leonard (1984) in his finding stated that animal health care services can be classified as private or public goods, depending on who receives the benefits.

Table 8  Health services for cattle in the study areas

<table>
<thead>
<tr>
<th>Health services</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government and Traditional medications</td>
<td>62</td>
<td>41.3</td>
</tr>
<tr>
<td>Government</td>
<td>58</td>
<td>38.7</td>
</tr>
<tr>
<td>Traditional medications</td>
<td>12</td>
<td>8.0</td>
</tr>
<tr>
<td>Multiple responses</td>
<td>18</td>
<td>12.0</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Multiple responses: Private veterinarians, NGO's, Government and Traditional medications
N= Number of respondents

4.2.2.5. Source of other technical support

Sources of technical support (Table 9) for 40% and 34.7% of the respondents mainly come from Office of Agriculture and traditional supports by the fellow pastoralists, respectively. About 10.7% of the respondents obtained technical supports on cattle management and production from both sources. In addition to the above sources technical supports, 10.7% of the respondents used the radio transmission, follow agricultural news from newspapers, television, different conferences prepared by the zonal administration and different NGO’s operating in the area as a sources of information. As it is evident in the Table below, contribution from NGO’s is only 4%.
Table 9  Sources of technical support services on beef cattle production in the study area

<table>
<thead>
<tr>
<th>Technical support services</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>OARD</td>
<td>60</td>
<td>40.0</td>
</tr>
<tr>
<td>From fellow farmers</td>
<td>52</td>
<td>34.7</td>
</tr>
<tr>
<td>OARD &amp; fellow pastoralists</td>
<td>16</td>
<td>10.7</td>
</tr>
<tr>
<td>Multiple responses</td>
<td>16</td>
<td>10.7</td>
</tr>
<tr>
<td>NGO's</td>
<td>6</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Multiple responses: OA, fellow pastoralists, radio, newspaper, TV, Conferences of the administration & NGO's

N= Number of respondents

Even if these are the sources of the technical support for cattle production in the study area, 106 of the respondents (70.7%) mentioned that the technical supports they were getting are not enough and the issues they want to get the technical support are several and are listed in Table 10. Cattle health, feed, production and marketing are the most important issues where supports are needed according to 115 (76.7%) of the households; health, feed and marketing are the next important issues required by 19 (12.7%) respondents and 16 (10.6%) of the respondents need supports on cattle fattening, breeding and product utilization.

Table 10  Lists of technical support required by the sample producers in Borena Zone

<table>
<thead>
<tr>
<th>Issues on technical support requirements</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle health, feed, production and marketing</td>
<td>115</td>
<td>76.7</td>
</tr>
<tr>
<td>Health, feed &amp; marketing</td>
<td>19</td>
<td>12.7</td>
</tr>
<tr>
<td>Cattle fattening, breeding and product utilization</td>
<td>16</td>
<td>10.6</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.2.2.6. Beef cattle production constraints and suggested improvement strategies

Respondents’ problems on cattle production are listed in Table 11. For 33 (22%) respondents, feed shortage and lack of water are number one problems. About 11 (7.3%) respondents, animal health related problems such as lesions, weight loss during the dry season, fracture of cattle in the field, mortality, lack of veterinarians and others were major problems, and 18 (12%) respondents indicated problems with socio-economic nature such as many privately fenced areas in the former grazing fields. Another 12 (8%) respondents indicated lack of security or theft as major problems. Animal disease,
shortage of feed and water collectively were mentioned as the main problems by 12 (8%) respondents. Ten percent of the respondents indicated multiple responses on their problems such as natural factors (recurrent drought), biological factors (failure of conception, lack of breeding bulls and predators), health factors (impurity of water), feed and water scarcity (cattle are not conditioned timely), labour shortage (herder, water pull, theft, predators) and conflicts. IGAD (2006) mentioned that conflicts brought about by either scarcity of natural resources such as food, pasture and water, or simply lack of sustainable management of the available resources as major problems of pastoral communities. MOFED (2002) grouped the major socio-economic and institutional constraints affecting pastoral development into four broader categories: ecological constraints such as erratic rainfall leading to persistent drought, inadequate pasture and water for animals and human beings; poor facilities such as access to health and education services as a result of mobility, poor animal husbandry and animal health services and poor market outlet owing to absence of infrastructures and information; weak institutional support such as frequent and destructive conflicts and tribal disputes, poor governance and administrative structure and gender insensitivity and lack of clarity of vision and strategy for pastoral development such as donor driven, unsustainable programs and projects, pastoral communities had not been adequately consulted and involved in the project design and implementation. The problems and constraints as already outlined above are clearly complex and inter-woven.

<table>
<thead>
<tr>
<th>Production constraints</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No problem</td>
<td>49</td>
<td>32.7</td>
</tr>
<tr>
<td>Feed and water related</td>
<td>33</td>
<td>22.0</td>
</tr>
<tr>
<td>Socio-economic factors</td>
<td>18</td>
<td>12.0</td>
</tr>
<tr>
<td>Multiple responses</td>
<td>15</td>
<td>10.1</td>
</tr>
<tr>
<td>Lack of security</td>
<td>12</td>
<td>8.0</td>
</tr>
<tr>
<td>Health and feed-water</td>
<td>12</td>
<td>8.0</td>
</tr>
<tr>
<td>Animal health related</td>
<td>11</td>
<td>7.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Multiple responses: Natural factors, Biological factors, Health, Feed-water, Labor shortage & Conflict*

*N= Number of respondents*
The traditional coping mechanisms for the problems stated above are presented in Table 12. Traditionally, for common cattle diseases use of traditional practices such as burning at the swellings or tumors, use of roots and leaves of trees through drinking or administering on their skins. However, for feed shortage villages together fence grazing area or sometimes those who have private plots of lands for ploughing avail their lands for grazing even though the majority of them prefer to send their cattle herd to other feed or water available areas or some of them store feed during the feed available season. If severe cases happened, they prefer to de-stock or sell their cattle. Strategy for coping up with the lack of security in the study area is by moving their cattle to secured area. According to the respondents mostly such cases happened during the dry seasons and when they moved to areas that are not familiar to them or if the herders are young in their age then theft could be carried out by strangers. Strategies for coping up with lack water are digging different water sources by villagers. In households where there is labor shortage they send their cattle to a family or relative for short period of time until the pasture recovers.

Table 12 Other consequent beef cattle production problems and alleviation strategies followed by the community in the study area

<table>
<thead>
<tr>
<th>Problems</th>
<th>The indigenous alleviation strategies</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle health problems</td>
<td>Traditional medicines</td>
<td>40</td>
<td>39.6</td>
</tr>
<tr>
<td></td>
<td>Fencing grazing area</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>Sharing ploughing land</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Feed shortage</td>
<td>Send animals to other areas</td>
<td>18</td>
<td>17.8</td>
</tr>
<tr>
<td></td>
<td>Store feed</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Destocking</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Lack of security</td>
<td>Move to secured area</td>
<td>8</td>
<td>7.9</td>
</tr>
<tr>
<td>Lack of water sources</td>
<td>Dig for water</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Mix my animals with neighbour</td>
<td>15</td>
<td>14.9</td>
</tr>
<tr>
<td>Labour shortage</td>
<td>Give animals to relatives</td>
<td>7</td>
<td>6.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>101</td>
<td>100.0</td>
</tr>
</tbody>
</table>
4.2.3. Cattle marketing system

4.2.3.1. Types of markets

According to different scholars livestock markets are categorized into primary, secondary, and terminal markets based on types of major market participants, volume of supply per unit of time and the purpose of buying (Yacob, 2002; Ayele et al., 2003; Abbey, 2004; ACDI/VOCA, 2006b). Based on the above classification, the available livestock markets in the Borena are composed of seven primary, five secondary and one terminal markets (Table 13).

Table 13  Classifications of surveyed sample markets

<table>
<thead>
<tr>
<th>Market types</th>
<th>Market day(s)</th>
<th>Livestock type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary markets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yabello</td>
<td>Saturday and Tuesday</td>
<td>Sheep and Goats</td>
</tr>
<tr>
<td>Surupha</td>
<td>Saturday and Monday</td>
<td>Cattle, Sheep, Goats and Camel</td>
</tr>
<tr>
<td><strong>Secondary markets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haro Bake</td>
<td>Sunday</td>
<td>Cattle, Sheep, Goats and Camel</td>
</tr>
<tr>
<td>Dubluk</td>
<td>Friday</td>
<td>Cattle, Sheep, Goats and Camel</td>
</tr>
</tbody>
</table>

**Yabello primary market**

Yabello market is located 570 km from the capital, Addis Ababa. It is found in Yabello town, the capital of Borena Zone. There are two market days, Saturday and Tuesday. Saturday, is the major market day for sheep and goats. Yabello is a market place for sheep and goats. Camel and cattle are not traded in this market. However, Elfora agro-industries buy cattle in this market through appointments and other mechanisms and it has its own weighing scale in Yabello market. The compound in the market place is well fenced with wooden poles.
Surupha primary market

It is an open market place located on the main road to Moyale. Mostly unsold animals from this market move to Haro Bake market, which is the closest to the Surupha market. It is a market place for cattle, camel, sheep and goats. The compound of the market is open and is not fenced.

Haro Bake secondary market

Haro Bake market is located 550 km from Addis Ababa on the main route to Moyale in the Borena Zone. Bake market is held on Sundays in the pastoral area and it is a market place for cattle, camel, sheep and goats. Pastoralists prefer this market place because of its proximity to watering point. Thus, all types of animals supplied to this market are first watered and trekked to it. This market serves as a secondary market place in the Borena Zone. The compound of the market is fenced with tree branches.

Dubluk secondary market

Dubluk market is the other secondary market in Borana Zone. It is located 635 km from Addis Ababa on the main route to Moyale. Dubluk market is held on Friday and it is a market place for cattle, camel, sheep and goats. It is also another preferable place for the pastoralists because of the presence of watering point near by. The compound of the market is well fenced with wooden poles.

4.2.3.2. Cattle marketing actors

In this study, different types of market participants were observed in each of the markets surveyed. These include pastoralists/producers, producer/pastoralist traders, part-time traders, fulltime traders, butchers, hotel owners, brokers/commission agents and consumers.
Pastoralists/producers

According to ACDI/VOCA (2006b), pastoralists and agro-pastoralists are the main producers of livestock in the Ethiopian livestock value chain, raising some combination of cattle, sheep, goats and camels. Pastoralists in the southern parts of the Borena area tend to raise larger herds of sheep, goats, camels and cattle in that order of importance as the sheep, goats and camels are more drought resistant. Similarly, according to the observations made in the selected markets, pastoralists were the major sellers supplying the animals that come to these markets. Cooperatives were also important participants of livestock marketing in the Borena Zone. The Geda Pastoralist Cooperative Union in Yabello has about nine primary cooperatives in Yabello and Dirre districts. Thus, the cooperative union supplies livestock to different organization.

Farmers’/Pastoralists traders

In the study area, farmer/pastoralist traders normally live in rural areas and their main occupation is farming/livestock raising. They enter in to cattle trading activity at the time when they are idle at peak transaction periods of the year. They buy cattle at the farm gate and village level and sell to the available markets, which are near to their residence. They are also engaged in buying cattle from the same market during early hours of the day when the price is low, and sell the animals to benefit the advantages of increased prices in late hours of the day or even the next market day.

Amateur Traders

Amateur traders are those engaged in other business activities and reside in urban areas. According to Solomon (2004), these types of traders participate in cattle trading business at the time of high margin, that is, at the time of New Year and religious festivals. Other times of the year, they return to their regular business activities. These types of traders are mostly found in primary and secondary markets.
Itinerant Traders

Itinerant traders are those permanently engaged in cattle trading activity throughout the year that have or do not have any cattle-trading license. Mostly, these traders buy cattle from primary and secondary markets and sell them at terminal markets of Moyale, Nazreth and Addis Ababa (Solomon, 2004).

Butchers

Butchers are those who are engaged in selling of cattle meat to consumers. They are found in rural as well as in urban areas. They usually buy cattle from primary and secondary markets. Most butchers slaughter cattle in a traditional way in villages and they do not use slaughterhouses. But, most of the butchers found in the urban centers use abattoirs for slaughtering their cattle.

Brokers/Delalas

Brokers or locally called Delalas are also important participants principally in facilitating the transaction. They interfere in negotiation and help purchasers and owners in bargaining. For their services they just expect some tip willingly paid by buyers but commonly the sellers’ pay them too. Sometimes, some of the Delalas after taking their commission may engage in cattle trading business. Some of them can take money, buy and deliver to the owner.

4.2.3.3. Cattle marketing channels and routes

In the study area, different cattle marketing channels (Fig. 5) were identified in exchange functions between producers/pastoralists, market actors and finally to consumers. The major channels identified were:

1. Pastoralists-small/medium traders-itinerant traders-butchers-consumers;
2. pastoralists-itinerant traders-butchers-consumers;
3. pastoralists-amateur traders-itinerant traders-butchers-consumers;
4. pastoralists-small/medium traders-butchers-consumers;
5. pastoralists-itinerant traders-export market and
6. pastoralist- small/medium- itinerant traders- export market
Functions

- Collection
- Commercial Fattening
- Processing
- Export

Producers/Pastoralists

Small/Medium Traders

Local Butchers

Itinerant traders

Urban butchers

Fattening units

Live cattle exporters

Export abattoirs

Domestic markets

Export markets
(Congo, Cote D’ivore, Egypt, Yemen, Gulf markets)

Consumers

Source: Survey result (own formulation)

Figure 5: Cattle marketing channel of the Borena Zone (2006/2007)
Regarding the marketing route, there are two main livestock-marketing routes in the study area. One is going to Moyale border market (illegal export to Kenya) and the other to Addis Ababa terminal market (domestic market). Similar studies by Mohammed et al. (2007) stated that before 2005 the demands in the central market for cattle were so low and the major marketing routes were towards Kenya through the Moyale market, where there was relatively better demand. Since 2005, marketing routes for cattle have been towards the domestic markets because of the opening of the export market (Figure 6), which is comparable with the results of this study.

Concerning the cattle price difference across different markets, 22 (14.7%) of the producers believed in that there is no any difference across the markets while the majority 128 of the respondents (85.3%) remarked that there is a price variation across different markets. Based on the results of this study, the market routes which have relatively better cattle price are Dubluk (29.3%), Haro Bake (23.3%) and Moyale (20%) markets. According to multiple responses (12.7%) in addition to the above identified markets, Surupha and the terminal markets towards Nazareth and Addis Ababa are considered as good beef cattle markets. This indicates that there is high competition between the market actors towards the indicated routes. Considering the lower beef cattle price at the other markets, about 44.7% of the respondents indicated that Fintchewa, Elwaya, Arero, Mega, Teltele and other bush markets (Ollas) have lower prices.
Source: Survey result (own formulation)

Figure 6: Cattle marketing routes of Borena Zone (2006/2007)
According to the producers’ experiences, the reasons for these price variations across different markets were different and 68 (45.3%) stated that the number and kind of traders available, proximity of the markets to urban centers, availability of roads to the markets, infrastructure at the markets and the availability of brokers and their pressure at the markets have influence on the price of beef cattle. The other 46 (30.7%) agreed only that the difference in number of traders at markets affects the cattle price, while only 3.3% and 2.7% of the respondents indicated that the number of cattle and conformity or body condition of the cattle at the markets, respectively also have an effect on the price variations.

4.2.3.4. Beef cattle selling practices

Results of the study revealed that 42.3% of the respondents prefer to sale their cattle at Haro Bake (secondary market) and 37.3% preferred to sale at Dubluk (secondary market), while the remaining 20% of the producers, in addition to the above mentioned secondary markets, also preferred other primary markets such as Yabello, Surupha and others including bush markets (Ollas) and the terminal market at Moyale. The main reasons for preference of the above markets by 67 (45.0%) of the respondents were proximity of the markets and the prices given in those markets and 62 (41.6%) of the respondents preferred a particular market mainly because of its proximity, while the remaining 13.4% stated not only the good price and proximity, but also the availability of the variety of traders in the market.

Regarding the period of selling of cattle, 90 (61.2%) stated that they sell their beef cattle when the market price is high and whenever the household needs for purchase of essential commodities. The other 30 (20.4%) stated they sell their beef cattle only when the market price is high, while 12 (8.2%) mostly sell if any problem arises at the household level. The remaining 10.2% sell when there is high selling price at the markets, during the harvest seasons, and when they want to sell for different reasons such as purchase of grains and clothing. According to results of the study, the major reasons for selling of cattle were to settle government debt, cover school fee and household
expenses, to fulfill social obligations, to cover health bills and to buy replacement stock. This finding is consistent with the results of ACDI/VOCA (2006a) that revealed in all markets in the Borena area, pastoralists and agro-pastoralists purchase and sale livestock for restocking purposes. To maintain the herd size, pastoralists often sale an animal that greatly exceeds their immediate cash needs, such as a large un-castrated bull, and with the remaining money they purchase a smaller bull or heifer.

4.2.3.5. Transportation systems

The results of this study revealed that 100% of the respondents trek their cattle to primary, secondary and even to the near terminal market of Moyale. This finding is consistent with the report of Yacob (2002) stated that in Ethiopia, the supply of livestock to the primary, secondary and terminal markets is mostly done through trekking.

In the study area (Table 14), the producers 65 (43.3%) trek their animals by themselves; 24 (16 %) trek both by the owner and hired labour; 11.3% use hired labor; 12% engage the producer together with neighbors and the remaining 26 (17.4%) trek their cattle by themselves, relatives, use hired labor and with neighbors. Similar findings by Solomon (2004) reported that in most cases, a minimum of two drivers are sufficient for cattle trekking but sometimes the number might increase if security is assumed to be problem in the area. In this case, producers may use different means of identification (painting by colors, symbols on skin, etc) in different parts of the body of cattle to identify their own from others.

Road networks provide the necessary links and access to services and markets for agricultural commodities among others. However, results of this study revealed that producers used traditional stock routes to move their animals to the markets. In the same way, MOFED (2002) reported that inadequate infrastructure is an indicator of the inability of the poor to access social services (assets) and facilities. Lack of access to transport networks limits poor communities from market participation and constrains
their economic opportunities and then contributing to inability to strengthen human capabilities and this agrees with results of this study.

Table 14  Producers preference on trekking cattle to the market place in the study area

<table>
<thead>
<tr>
<th>Preferences on cattle trekking</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>65</td>
<td>43.3</td>
</tr>
<tr>
<td>Multiple responses</td>
<td>26</td>
<td>17.4</td>
</tr>
<tr>
<td>Myself and hired labour</td>
<td>24</td>
<td>16.0</td>
</tr>
<tr>
<td>Myself and neighbor</td>
<td>18</td>
<td>12.0</td>
</tr>
<tr>
<td>Hired labor</td>
<td>17</td>
<td>11.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>150.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Multiple responses: Myself, Relative, Hired labor & Neighbor
*N= Number of respondents*

The larger proportions of the producers trek their own animals to markets along with relatives or neighbours, and is aimed at minimizing costs. If they use hired labor, 95 of the surveyed producers indicated that they pay an average of 4.63 ETB per animal (error of 3.14 ETB) and for the farthest markets, the 87 surveyed producers reported of paying an average of 12.97 ETB per animal (error of 6.8 ETB), and at times this can go to a maximum of 30 ETB per cattle. According to 149 respondents on average it takes about three hours to reach the nearest market and to reach the farthest market such as Moyale, it may take around one to seven days. Similar study results by Solomon (2004) revealed that in Borena, on the average, animals walked about 35-50 km per day to reach the market. Comparable study results by ACDI/VOCA (2006a) on cattle trekking fees in the Borena Zone revealed that trekking fee from Dokole to Dubluk market, which is 37 km and covered by one day the trekkers charged 3 ETB per animal, on the other hand the trekking fee from Moyale to Dubluk market which is 250 km and lasts for eight days the trekkers charged 31.25 ETB per animal and that agrees with results of this study.

**4.2.3.6. Market information**

Market information is vital to minimize information gaps and uncertainties that exist in the agricultural sector. It is imposed by producers in their planning of production and marketing. On the other hand, it is identically required by other market participants in
arriving at optimal trading decisions. According to the results of this study on market information sources, the majority of the respondents 138 (92%), get destination market information before they went out to sell their cattle. The major source of information is informal (Table 15). Regarding sources of market information, most of the respondents preferred market visit (54 (36.0%)), while the other groups (56 (37.3%)) mentioned in addition to market visits they have multiple information sources such as relatives and neighbors. Out of these, 28 (18.5%) of them mentioned in addition to neighbors and markets visit they used extension agents, cooperatives and traders as sources of market information.

### Table 15  Producers sources of market information in the study area

<table>
<thead>
<tr>
<th>Market information sources</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets visit</td>
<td>54</td>
<td>36.0</td>
</tr>
<tr>
<td>Relatives, neighbors, markets visit</td>
<td>56</td>
<td>37.3</td>
</tr>
<tr>
<td>Extension agent, cooperatives, neighbors, markets visit, traders</td>
<td>28</td>
<td>18.5</td>
</tr>
<tr>
<td>No market information</td>
<td>12</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* N= Number of respondents

On the information preference aspect (Table 16), 108 (72%) respondents preferred own market visits while in addition to market visits, 25 (16.6%) of them preferred market information from relatives and neighbors, and the remaining 5 (3.4%) preferred extension agents, cooperatives and local traders. The main reasons for selecting the specified source(s) of market information are reliability (42.7%), accessibility (36.7%) both reliability and accessibility (12.7%). The lack of easily accessible and formal market information, such as end market quality and quantity requirements, prices and delivery timing needs might be available to limited market participants. However, for those at the lower levels, particularly for the producers, lack of the formal market information could result in mistrust and weak relationships along the chain and might be a contributing factor in decreasing the efficiency of the transactions.
Table 16  Producers preference on source of market information in the study area

<table>
<thead>
<tr>
<th>Sources of market information</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets visit</td>
<td>108</td>
<td>72</td>
</tr>
<tr>
<td>Relatives, neighbors, markets visit</td>
<td>25</td>
<td>16.6</td>
</tr>
<tr>
<td>Extension agent, cooperatives, traders</td>
<td>5</td>
<td>3.4</td>
</tr>
<tr>
<td>No market information</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100.0</td>
</tr>
</tbody>
</table>

N= Number of respondents

The market information sources accuracy was judged by respondents scale as follows, 55 (36.7%), 64 (42.7%), 17 (11.3%) and 2 (1.3%) of the respondents rated the accuracy of the information as very high, high, medium and low, respectively. The time gap for the required information on the market depends on the purpose of selling. Most of the respondents (106 (70.7%)) get information weekly, 15 (10%) whenever they want, 8 (5.3%) and 9 (6%) of them obtain fortnightly and sometimes as required, respectively. Abdi et al. (2004) concluded that the challenge remains to be on how to collect livestock price information from remote pastoral areas, analyze and report back to the communities in a timely manner for it to be meaningful in terms of trade, food security and early warning which agrees with results of this study.

4.2.3.7. Development/extension agents’ participation

Even if different NGO’s and GO’s projects actively operate in the study area for different objectives, advice on cattle marketing issues is limited from development/extension agents given the huge available resource and the growing demand from the local and export market. As is evident in Table 17, 62% of the respondents do not have any information from these agents or NGOs operating in the area. Only 14 (9.3%) respondents have certain knowledge on quality of cattle for market from these agents, 33 (22%) have got certain knowledge on quality of cattle for market, the right time of sale, price on cattle at different markets and health aspects. The remaining 6(4%) and 4(2.7%) of the respondents have acquired knowledge both on the time of sale and price of cattle at different markets by the participant development or extension agents in the study area.
Table 17 Development/extension agents’ involvement concerning cattle marketing in the study area

<table>
<thead>
<tr>
<th>Advices on cattle marketing by different agents</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No advice</td>
<td>93</td>
<td>62</td>
</tr>
<tr>
<td>On quality, time, price and health</td>
<td>33</td>
<td>22</td>
</tr>
<tr>
<td>On quality of cattle for market</td>
<td>14</td>
<td>9.3</td>
</tr>
<tr>
<td>On the time to sale cattle</td>
<td>6</td>
<td>4.0</td>
</tr>
<tr>
<td>On price of cattle at different markets</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>150</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*N= Number of respondents*

4.2.3.8. Pricing

4.2.3.8.1. Price determination

In beef cattle marketing and transactions at the study area (N=150), for 63.3% of respondents the determination of the price at the market places were through the negotiation between the sellers/producers and the buyers. About 34.7% of the producers indicated that they are the decision makers on selling of their cattle at the markets. Hence, in the producers survey, 109 (73.2%) of the respondents stated that the brokers do not have any influence when they sell their cattle, but 40 (26.8%) of the respondents stated that brokers influence through lowering the margins of the sellers; 35 (23.4%) and 5 (3.4%) of the respondents stated that brokers interfere between the sellers/producers and the buyers. Thus, the roles of the brokers in the Borena area are often lowering the transaction costs and increase the number of successive negotiations, through lowering the marketing margins of the sellers.

4.2.3.8.2. Seasonal price variations

About 33% (N=149) of the respondents stated that cattle prices increase during the rainy (wet) seasons, mostly from July to August. Thus, the number of cattle in the market declines and prices increase. The relatively increased availability of grass in the range improves the body condition of the animals and enhances the productivity of milk for
household consumption, thus in most cases no body wants to sell cattle during the rainy season.

Faced with poor pastures and little water, Borena pastoralists begin to move their cattle in July to even more remote areas in search of grazing and water (Negussie, 1999). Similar findings of ACDI/VOCA (2006) revealed that after the rains begin sales decline as pastoralists recondition their animals with the new pasture and in the months July and August it reaches to minimal offtake in both Borena and Guji Zones. This is in line with results of this study.

During the dry season locally called, Bonna, which occurs mainly in the months of January and February, forces pastoralists to sale (23.6%) their cattle at lower prices. About 20% of them stated they sell their cattle at lower prices during the dry periods (from December to March) and the other 15.5% sell their cattle relatively at the lower costs in the months of January to March. In addition all of the respondents stressed the month of January which is the driest month than other months but according to a study by Negussie (1999) the failure to observe a significant decline in livestock prices may be explained by lack of effective market demand.

According to the producers, in months (wet seasons) when the cattle price becomes higher on average the price of well conditioned and young animal could reach as high as 2719.52 ± 44.85 ETB (Mean ± SE), while in months (dry period) when the cattle price become lower the average prices of an animal could reach as low as 1092.70 ± 46.31 ETB (Mean ± SE).

4.2.3.8.3. The reason for cattle price variation across months/seasons

The major reasons for the cattle price variation across months/seasons as stated by 114 (76.5%) respondents were the seasonal feed and water availability. Delay of onset of rainy season results in prolonged dry season and severe drought. In such an event, grass fails to grow, livestock are deprived of feed and loose their productivity. Due to the
typically uneven patterns of rainfall in the zone, pocket areas will always be under some stress even in a relatively good year. In such cases, localized herders respond by moving with their animals to an area where water and feed are relatively available. Similarly, Negussie (1999) stated that periodically rainfall is more generally insufficient resulting in a region-wide drought in which case the benefits of mobility become limited. Six (4%) of the respondents stated market problems such as traders availability, fluctuation of prices and lack of infrastructure also contribute in cattle price variation. About 3.4% of the respondents stated that the socioeconomic factors (fasting periods, holidays) and conflict also play a role in cattle price variation. According to Negussie (1999), Borena Zone is recognised as an area where ethnic tensions are present and often exacerbated by drought conditions. Similar report by Barry et al. (2006) indicated that there is a frequent clash between the clans such as Borena, Guji and Gebra for grazing areas and watering points, but recently the main reason for conflicts was the creation of new administrative boundaries by the government. However, 14.8% of the respondents stated that there is no any variation of price for beef cattle in different seasons.

The majority (61.5%, (N=148)) of the producers believed that the trend for cattle price in their area is increasing and 35.1% stated that the trend is decreasing, while 3.4% of the respondents stated that there is no major change. Thus, the majority (64.2%) of the producers are happy with the prevailing cattle price in their area. While the remaining 35.8% of the respondents are not happy with the existing cattle price in their area and suggested solutions to improve cattle prices thus 14.2% of the respondents wanted to sell their cattle at improved price than the current price and 12.8% stated that in addition to the current traders, other traders should visit the markets while the remaining 5.4%, 2% and 1.4% stated pastoralists should be organized along their traditional structures in order to tackle the socioeconomic constraints including recurrent conflicts and government assistance to cope disaster, respectively.
4.2.3.9. Decision makers in the household

Even if Richard (1990) stated that the basic unit of Borena social structure is the family unit of a man, his wife/wives and their children, with the family owned livestock, then results of the survey on 149 households revealed that the decision makers on purchase or sale of cattle in a family unit is negotiation (47.4%) of the whole family, but the role of the husband (35.6%) is still important and binding (Table 18).

Table 18  Decision making on purchase or sale of cattle in family

<table>
<thead>
<tr>
<th>Family members</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Husband</td>
<td>53</td>
<td>35.6</td>
</tr>
<tr>
<td>Negotiation</td>
<td>71</td>
<td>47.7</td>
</tr>
<tr>
<td>Husband and wife</td>
<td>21</td>
<td>14.1</td>
</tr>
<tr>
<td>Wife</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td>Total</td>
<td>149</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*N= Number of respondents

4.2.3.10. Impact of selling cattle on beef cattle production and ownership

During the survey, producers were asked whether there is any impact of selling cattle on production and on animal ownership or not. About 66.4% of the respondents stated that selling cattle does not have any impact on their production, but the remaining 33.6% respond that there is an impact on production. Accordingly, 22.1% stated selling of breeding bulls directly affects the breeding stock and the remaining 11.4% mentioned that the number of their herd may decrease, and this may create some kind of disagreement between the family members.

Regarding impact on animal ownership during sales of cattle by the sample households, 57 (38.3%) respondents mentioned multiple responses that nothing will happen, but either raise another or buy another cattle as a replacement stock. The effect of decrease in number (0.7%), and disagreement at home (0.7%) did not have significant effect on animal ownership (Table 19).
Table 19  Sales of animals and its impact on ownership in the household

<table>
<thead>
<tr>
<th>Animal sale and its impacts</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple responses</td>
<td>57</td>
<td>38.3</td>
</tr>
<tr>
<td>Nothing will happen</td>
<td>34</td>
<td>22.8</td>
</tr>
<tr>
<td>I will buy another</td>
<td>31</td>
<td>20.8</td>
</tr>
<tr>
<td>I will raise another</td>
<td>13</td>
<td>8.7</td>
</tr>
<tr>
<td>I lose my status</td>
<td>12</td>
<td>8.1</td>
</tr>
<tr>
<td>disagreement at home</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Their number may decrease</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>149</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Multiple responses: Nothing will be happened, raise another & buy another*
*N= Number of respondents*

4.2.3.11. Beef cattle consumption trends

The Borena people are said to be communal by nature and sharing is integral part of their lifestyle. Normally, they shared a plate of food with two or three other people and whenever food is cooked in the family; children are fed first, followed by older people and adults. The question regarding feed was not well received which is similar problem with Bosolo (2000), but to see beef consumption trend in the study area, 105 (70.5%) slaughter and consume beef at home frequently, while 44(29.5%) do not slaughter by themselves, but share slaughtered cattle with neighbours in a system locally called *kirtcha*.

The period of consumption is not specific, and 67 (45%) respondents have multiple responses such as during festivals, during unknown times (sometimes) and if the health status of their cattle seems poor they slaughter it while 23 (15.4%) of them slaughter their cattle only during unspecified times or sometimes and 6.7% slaughter only during festival periods and the remaining slaughter only during drought (2%) periods and when their cattle health status seems poor.

Regarding the frequency of beef consumption per household per year, according to 102 of the respondents, it reaches a maximum of ten times and minimum of no consumption per year, but on average households consume meat at home twice per year.
Table 20  Time of beef cattle meat consumption at home

<table>
<thead>
<tr>
<th>Period for consumption</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple responses</td>
<td>67</td>
<td>45.0</td>
</tr>
<tr>
<td>Sometimes</td>
<td>23</td>
<td>15.4</td>
</tr>
<tr>
<td>During drought</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>When cattle in poor health</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>During festivals</td>
<td>10</td>
<td>6.7</td>
</tr>
<tr>
<td>No</td>
<td>43</td>
<td>28.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>149</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Multiple responses: Festivals, sometimes & cattle in poor health
N= Number of respondents*

4.3. Beef Cattle Export and Domestic Markets

4.3.1. Beef cattle export markets

4.3.1.1. Customers’ origin and order

The major countries that import beef from Ethiopia are Yemen, Egypt, Congo Brazzaville and Cote D’ivoire, and the export of beef cattle is either in the form of live or processed meat (chilled or frozen carcass).

Purchasing of live cattle at the markets is performed based on the requirements of the customers. Thus breed, sex, age, weight and sometimes color of the animal for the live export are the major criteria considered by the export abattoirs during purchase. Due to lack of weighing facilities, mostly cattle transaction is done ‘based on evaluation and assessing the body conditions, which tend to be highly subjective (Solomon, 2004).

*Age and weight combination*

Results of the study revealed that age of the animal ranging from two to four years are required in combination with a minimum weight of 250 kg and a maximum of 400 kg. Similarly, Filip (2006) pointed out that intact male animals between four and six years of age and with at least 280 kg in weight are preferred by the purchasing agents of the
abattoirs which is based on the end market requirements. Thus, pastoralists tend to supply far larger numbers of these types of animals to the markets.

**Breed**

According to the response from the abattoirs, these countries prefer Borena breed and the export abattoirs obtain the required animals mainly from Borena and Guji Zones.

**Sex**

As Ethiopian law prohibits the export of female animals, unproductive cow sold for domestic consumption are purchased by butchers, hoteliers and restaurant owners. In addition to market driven needs, and a prohibition against exporting female animals, pastoralists often retain breeding females to maintain or increase herd sizes (Filip, 2006).

**Color**

Coat color has an effect on live animal export. Almost all colors are preferred for live export but black, this is due to the religious conditions of the recipient countries, mainly the Middle east markets. But, if the mode of export is in the form of meat then the coat color of the animal has no role to play.

**Physical defects**

Physical defects such as skin damage, broken horns, broken legs and blind eyes have effect on live animal exports. In addition, the short horned cattle are preferable for live animal exports.

**4.3.1.2. Beef cattle purchase**

According to the responses by the export abattoirs, the domestic market is not competing with them. Their evidence for this assertion was that they purchase cattle from markets
with the specifications and selectively for export purposes. These specifications are age and weight combinations, sex, and color in which the domestic markets are not interested in. However, the better cattle price offered by the export abattoirs could affect the cattle price in the domestic market. This is due to the fact that the sources of animals for both the export and domestic market are the same and the suppliers immediately start to ask for higher prices of all cattle types without considering the purposes of the buyer.

According to the export abattoirs, they obtained the required type of beef cattle mainly using their own agents from the sources, official suppliers, small/medium scale traders, itinerant traders and the producers. Market sources for export abattoirs are listed on Appendices 5, 6 and 7.

### 4.3.1.3. Conditioning

It is customary for the export abattoirs to properly condition the animals after purchasing at their fattening units for a period of about three months. The holding grounds of the abattoirs include feeding pen, quarantine area, veterinary services and production of cattle feed. The export abattoirs, within their accommodation grounds, treat against internal and external parasites, vaccinate and condition the animals.

Elfora Melge Wondo export abattoir owns a holding ground that can accommodate 1000 cattle at a time. Similarly, Luna PLC owns a holding ground that can accommodate 500 cattle at a time.

Table 21: Holding ground, lairage and slaughter capacity of export abattoirs

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Holding ground</th>
<th>Daily Capacity</th>
<th>De-boning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lairage</td>
<td>Slaughter</td>
<td></td>
</tr>
<tr>
<td>Elfora</td>
<td>Melge Wondo</td>
<td>1000</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Luna</td>
<td>Mojo</td>
<td>500</td>
<td>120</td>
<td>120</td>
</tr>
</tbody>
</table>
4.3.1.4. Disease inspection

The widely prevalent livestock diseases are major constraints to Ethiopian livestock export (LMA, 2001). Livestock export from Ethiopia is jeopardized by repeated bans, in particular from the countries in the Arabian Peninsula, as they are perceived to carrying the risk of introducing a number of trans-boundary livestock diseases (Wondwosen, 2003).

According to professionals from the export abattoirs, the export abattoirs are regularly inspected by appropriate professionals and get an approval from each recipient country. The regular and direct supervision by the Inspection Department of Animal Products, Ministry of Agriculture and Rural Development healthy animals slaughtered at an officially approved slaughterhouse. Ante-mortem inspection within 12 hours before slaughter and under direct post-mortem inspection of veterinary services to check the origin of animals and the perfect properties for human consumption are strict requirements. For live cattle export, the ante-mortem inspections include rinderpest, foot and mouth disease and contagious bovine pleuropneumonia through serological test and the animals are vaccinated against anthrax, blackleg, bovine pasteurolosis, contagious bovine pleuropneumonia, lumpy skin, and FMD. For the processed meat the post-mortem inspection includes only foot and mouth disease serological test.

4.3.1.5. Current trends

Regarding the trend on demand/volume of the customers, it has been decreasing from time to time. This is apparently due to inadequate supply of the required quality live animals at profitable prices for meat processing by the export abattoirs. The meat export abattoirs are also required to ensure a consistent and continuous supply of high quality and safe meat in order to meet the demand of the customers in the importing countries. However, to some extent the abattoirs fulfilled customers’ criteria, even if there is shortage in the supply of the required criteria such as weight and age combinations from domestic markets.
4.3.1.6. Constraints

Prevalence of disease

The frequent occurrence of livestock diseases in the country directly inflict a heavy loss on the export abattoirs’ business and further regaining of their market takes time which depresses the abattoirs to perform their scheduled activities (LMA, 2004). FAO (1995) stated that the incidence of rinderpest, contagious bovine pleuro-pneumonia, sheep and goat pox, blue tongue, fowl pox, pullorosis, anthrax, blackleg, haemorrhagic septicemia, bovine tuberculosis, brucelosis, etc. have severely limited the livestock production and export potential of the country. Outbreak of some of the diseases in the region is one of the major obstacles in export market development resulting in frequent bans from importing countries (NEPAD-CAADP, 2005). A study by Belachew Hurrissa (2004) stated that trade ban by Saudi Arabia and subsequently by Emirates in September 2000 resulted in drastic drops in livestock exports. According to the same source, meat export dropped almost by half, and revenue in 2001 declined by 43% and as a consequence primarily it is the pastoralists who are the most affected.

Feed and water shortage

According to responses by the export abattoirs, along export trade routes and at the embankment port availing feed and water in holding grounds are increasingly becoming a serious challenge to the beef cattle export trade. Similarly, NEPAD-CAADP (2005) indicated that the problem of feed and water is much more pronounced during drought crises, which is a recurrent phenomenon in pastoral ecosystems.

Market surveillance

The exporters stated that from different markets the required age groups could be obtained but mostly are not at the required body weight range or vice versa. The supply of cattle to the abattoirs also vary from season to season due to transportation and road access problems to purchase deep from the producers and during the rainy season flood and quantity of required cattle types at markets may decrease. Similarly, NEPAD-
CAADP (2005) reported that there is no systematically developed marketing system that can serve the interests of exporters. The traditional multi-tier livestock markets are scattered and are characterized by too small throughput for efficient marketing on the part of exporters. Thus, exporters must be able to collect over large area and prolonged time to get sufficient number of animals for export and this is in agreement with results of the present study.

**Transportation**

Responses by the export abattoirs indicated that cattle are transported by road, sea and air for purposes of fattening or slaughter. However, there are no live cattle transport lorries in the country rather they used small trucks from the markets to their holding grounds and used chain trailer to the Djibouti port. Factors involved with “transport stress” include pre-transport management, noise, vibration, novelty, social regrouping, crowding, climatic factors (temperature, humidity and gases), restraint, loading and unloading, time of transit and feed and water deprivation that are stressful or hazardous to the cattle, or that lower carcass and meat quality and weight losses are not included in the study but should be considered as an important factors to consider.

The processed meat such as chilled meat export has been taking place using the available cargo space in scheduled passenger flights. The limited spaces by the Airline, forces the abattoirs mostly to operate under capacity. When cargo space is not available, exporters are forced to take back the consignments to their own cold chain facilities. Live cattle export is mainly done by the sea transport through Djibouti, since it is the only port for livestock export from Ethiopia.

**Inadequate infrastructure**

The indicated abattoirs’ internal constraints are the moderately financial problems, their limited processing capacity, age of the processing plants, and absence of the modern processing machineries. The existing export abattoirs and processing plants operate far below their capacities (MIDROC, 2004; NEPAD-CAAD, 2005; Carmen, 2006).
Similarly FAO (1995) reported that the obsoleteness of the export abattoirs’ facilities and machineries is also another hindrance and is in agreement with results of this study.

### 4.3.2. Beef cattle domestic markets

#### 4.3.2.1. Beef cattle purchase and purpose

The butcheries are also directly involved in buying animals from the markets and their objectives are for slaughtering and selling purposes at the periods when there is demand from the clients’. Of the 50 butcheries interviewed in the study area, 84% purchase beef cattle for slaughtering and retailing meat in their butchers. While 16% of the butcheries participate in buying animals from the market depending on their situation, either only during the holidays or other period of the year.

Regarding the purchasing activity by the butcheries, 78% purchase beef cattle from markets by their own, while 14% used to purchase using their commission agents and brokers at the markets. The remaining 8% used multiple ways of purchasing such as by their own, relatives and family members assist them on purchasing activities (Table 22).

<table>
<thead>
<tr>
<th>Means of purchasing animals</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own</td>
<td>39</td>
<td>78.0</td>
</tr>
<tr>
<td>Brokers/commission agent</td>
<td>7</td>
<td>14.0</td>
</tr>
<tr>
<td>Multiple responses</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

_Multiple responses: Own, Relatives and Family._

_N = Number of respondents_

Results of the butcheries survey on the sex selection during purchasing activities revealed that, dry cows are used for slaughtering purposes, thus sex of the animal is not an important factor for slaughtering purposes unlike to the exporters. Of the 50 butcheries surveyed, 46% purchase dry cows for slaughter and consumption purposes, while 54% do not purchase or used dry cows for consumption purposes.
The higher demand for the Borena cattle for export purposes hinders the butcheries from using Borena cattle in their local business activities. The results of this study showed that 94% of the butcheries do not purchase Borena cattle. The main reasons mentioned were unavailability of the breed in their nearest market areas, high prices at the terminal markets, difficulty to find Boran cattle from the source and the financial capability to transport animals. Only 6% of the butcheries used the breed in the past and it was only around 1.5% percent of the slaughtered animals per year.

4.3.2.2. Market supply and competition

According to the responses of the selected 50 butcheries, the supply of cattle in the markets vary from season to season and the main reasons (Table 23) mentioned were the price change from time to time in the markets (according to 68% of the respondents) and price changes, the transportation cost increment from time to time, the frequent drought occurrences at different part of the regions, problems of disease and the illegal export that fluctuates the price from high to low prices at different times and markets were the reasons (according to 16% of the respondents). Furthermore, butcheries considered occurrence of drought (8%) and lack of feed (8%) forced the farmers to bring more animals to the market and sale at lower prices.

Table 23  Reasons on cattle supply changes at markets by owners’ of butcheries in the study area

<table>
<thead>
<tr>
<th>Reason</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in price</td>
<td>34</td>
<td>68</td>
</tr>
<tr>
<td>Drought</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Lack of feed</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Multiple responses</td>
<td>8</td>
<td>16.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Multiple responses: Price change, Transportation problem, Drought, disease, illegal export  
N = Number of respondents*
Regarding the competition of the butcheries at the markets with the export abattoirs, 94% of the butcheries have the same estimation that the abattoirs have influenced them on purchasing cattle at the same markets and 66% of them reported that the export abattoirs purchased the high quality beef animals at higher prices. While 18% and 10% of the butcheries believed in that the export abattoirs influenced them at the markets by purchasing the cattle at high price and purchase in mass, respectively (Table 24). Similarly, ILRI (1995) indicated that for supply and demand to determine price, a competitive situation must exist in the market.

Table 24 Competition effects of the export agents on butcheries in the study area

<table>
<thead>
<tr>
<th>Export agents competition effects</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase at high price and in mass</td>
<td>33</td>
<td>66.0</td>
</tr>
<tr>
<td>Purchase at high price</td>
<td>9</td>
<td>18.0</td>
</tr>
<tr>
<td>Purchase in mass</td>
<td>5</td>
<td>10.0</td>
</tr>
<tr>
<td>No effect</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td>I do not know</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

N= Number of respondents

4.3.2.3. Selling cattle meat

**Price**

The selling price of a kilogram of beef was 19.36 ± 0.423 ETB (Table 25).

Table 25 Selling price per kilogram of cattle meat at the selected butcheries (Feb-Mar. 2007).

<table>
<thead>
<tr>
<th>Location</th>
<th>N</th>
<th>Mean ± SE</th>
<th>Min.</th>
<th>Max.</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sululta</td>
<td>17</td>
<td>18.12 ± 0.696</td>
<td>15</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Kara</td>
<td>20</td>
<td>18.90 ± 0.250</td>
<td>16</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Burayu</td>
<td>9</td>
<td>19.78 ± 0.572</td>
<td>16</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Dukem</td>
<td>4</td>
<td>26.00 ± 2.041</td>
<td>22</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>19.36 ± 0.423</td>
<td>15</td>
<td>30</td>
<td>0.000</td>
</tr>
</tbody>
</table>

SE= Std. Error of Mean, N= Number of respondents, Sig. = Significant value, Min. = Minimum, Max. = Maximum.
There is significant difference of price of meat/kg between the butcheries (Appendix Tables 1 and 2). The result shows that the butcheries have different market sources and the price difference could be a sign of meat quality difference. The price of meat was significantly \((P \leq 0.05)\) higher 26.00 ±2.041 ETB at Dukem as compared to the other locations. This might be as a result of the type or quality of animal supply from the terminal markets (Kera and Nazareth).

**Yield**

On average, carcass weight per head was \((\text{Mean} \pm \text{SE}) 143.33 \pm 5.27\) per kg. as reported by butcheries (Table 26).

<table>
<thead>
<tr>
<th>Location</th>
<th>N</th>
<th>Mean ± SE</th>
<th>Minimum</th>
<th>Maximum</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burayu</td>
<td>7</td>
<td>123.57a ± 12.66</td>
<td>70.00</td>
<td>150.00</td>
<td></td>
</tr>
<tr>
<td>Sululta</td>
<td>16</td>
<td>127.50a ± 5.28</td>
<td>80.00</td>
<td>150.00</td>
<td></td>
</tr>
<tr>
<td>Dukem</td>
<td>4</td>
<td>137.50ab ± 7.50</td>
<td>120.00</td>
<td>150.00</td>
<td></td>
</tr>
<tr>
<td>Kara</td>
<td>20</td>
<td>164.00b ± 8.95</td>
<td>110.00</td>
<td>250.00</td>
<td>0.005</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>143.30 ± 5.27</td>
<td>70.00</td>
<td>250.00</td>
<td></td>
</tr>
</tbody>
</table>

SE= Std. Error of Mean, Min. = Minimum, Max. = Maximum, Sig. = Significant value.

There is significant difference on cattle meat yield per head between the butcheries (Appendix Tables 3 and 4). The result shows that the butcheries have different production and decision plans. The reported cattle yield were significantly \((P \leq 0.05)\) higher 164.00 ± 8.95 \((\text{Mean} \pm \text{SE})\) at Kara as compared to the other locations. According to responses from the butcheries they usually purchase aged animals from the highland areas mainly from the primary and secondary markets found through the market routes Dese to Debre Birhan.

**Trends**

The selected 50 butcheries typically sold only cattle meat. About 94% of the butcheries believed in that the selling price of meat showed increment from the past times and the
reasons mentioned (Table 27) for that according to 28% of the respondents are the export market and the increment of the local demand for the cattle meat enhanced the price of meat and 24% believed only after the export market opened the price for a kilogram of cattle meat domestically increased. The other group (22%) agreed on multiple factors contributing to the price increase such as together with the opening of the export market channels that resulted on the cattle shortage at the markets and that created tension and the available cattle sold at high prices resulted the competition between the different market actors. Additionally, 20% of the respondents believed in that in addition to the export market and rise of the local demand for beef, the lack of feed and its high cost if available and the high cost of transportation contributed a lot to the high price of meat. Similarly, a study by ACDI/VOCA (2006a) indicated that the increasing trends in the prices paid for animals by both abattoirs and live animal exporters has caused a subsequent increase in the domestic market purchase price for cattle, sheep and goats for local consumers, butchers and retailers.

Table 27  Reasons given for price increase of cattle meat by Owners’ of butcheries in the study area

<table>
<thead>
<tr>
<th>Reasons for meat price increment</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export market and high local demand</td>
<td>14</td>
<td>28.0</td>
</tr>
<tr>
<td>Export market</td>
<td>12</td>
<td>24.0</td>
</tr>
<tr>
<td>Export market, high cattle price cattle shortage</td>
<td>11</td>
<td>22.0</td>
</tr>
<tr>
<td>Export market, local demand, high feed cost &amp; high transportation cost</td>
<td>10</td>
<td>20.0</td>
</tr>
<tr>
<td>Decreasing</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td>I do not know</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

N = Number of respondents

Selling durations

To put off a carcass sold on average it took one to two days for 66% of the butcheries and less than a day for 16% of the butcheries, but three to five days for 18% of the butcheries (Table 28). On a better market days such as holidays on average 3.28 ± 0.34 (Mean ± SE) animals are slaughtered and sold per day per butcher.
According to butcheries, the preferred time of the day by consumers to buy meat varies. The most preferred purchasing time of the day by 72% customers (Table 29) is the time between 6 am and 8 am in the morning and for 12% of the customers it is between 8 am and 10 am, while the remaining 10% of the customers preferred time is before 6 am. If the meat offered to the market cannot be sold in good times, 64% of butcheries sold it at a lower price, while 18% either take it home for consumption or sell it at a lower price, and 14% take it to other market(s) to sell at lower price and the remaining 4% butcheries used facilities to keep it up in the refrigerator until it sold.

Table 29  Purchasing period preferable by customers from the butcheries in the study area

<table>
<thead>
<tr>
<th>Purchasing period</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 a.m -8 a.m.</td>
<td>36</td>
<td>72.0</td>
</tr>
<tr>
<td>8 a.m -10 a.m.</td>
<td>6</td>
<td>12.0</td>
</tr>
<tr>
<td>Before 6 a.m.</td>
<td>5</td>
<td>10.0</td>
</tr>
<tr>
<td>10 a.m -12 p.m.</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td>12 p.m-2 p.m.</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Clients

Clients are customers of the butcheries that include consumers, restaurants, and other butcheries from urban centers. About 46% of customers for the butcheries are restaurants from Addis Ababa and 28% are other butcheries, consumers, retailers and restaurants located at the central Addis Ababa. Accordingly, consumers found at different levels constitute 26% of the total (Fig 7).
Selling prices

Selling price is the amount of money or value asked for a product to purchase. There is price variation for a kilogram of cattle meat between the butcheries found at the outskirt of Addis Ababa and at the central Addis Ababa. According to the perception of the 34% of butcher owners the price difference among them could be the cattle sources for the butcheries found at the center of Addis Ababa which is the terminal market in which the purchasing price for cattle is relatively higher and they buy conditioned animals that cost them more compared to the animals slaughtered by peripheral butcheries. About 34% of the butcheries indicated that the price difference is attributed to the high purchasing price of selected animals from the terminal market, the expensive facilities (e.g. house) used by the city butcheries, the high transportation costs if they purchase from other secondary or primary markets, the products they sell (e.g. boneless meat and smaller quantity) to customers unlike the peripheral butcheries that sell the whole carcass and meat with bone and the higher purchasing power of the city customers on purchasing at high cost. Of the respondents, 16% agreed on the capability of the customers on purchasing a kilogram of meat created the price difference here and there. The other 8% and 6% of the respondents believed that the difference aroused due to other extra service they give and high cost on slaughtering services, respectively. According to report from ACDI/VOCA (2006a) while the middle and upper class populations of Addis Ababa are able to accommodate this price increase, the study found regional butchers’ demand decreasing as the rural
populations incomes have remained static overtime and cannot accommodate the large increases in meat prices per kilo.

4.3.2.4. Constraints of butchery houses

The main constraints of the butchery houses mentioned are presented in Table 30. Some of the slaughterhouses that give services to the butcheries forced the butcheries to sell the hides and skins from their animals at lower prices, than at the black market. According to responses by the slaughterhouses this is done because the slaughterhouses do have their own processing facilities mainly used to keep its quality standard but in the black markets the quality of the hide may deteriorate. Studies by TLC (2006) in agreement with results of this study indicated that hides and skins are susceptible to peri- and post-slaughter defects. Peri -slaughter defects occur where animals are collected and slaughtered. For example, training in the use of proper knives can eliminate damage caused by cuts and perforations. Similarly, post-slaughter defects such as putrefaction are relatively easy and cheap to eliminate by the introduction of prompt and proper preservation.

<table>
<thead>
<tr>
<th>Problems</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High tax rate</td>
<td>16</td>
<td>32.0</td>
</tr>
<tr>
<td>Slaughterhouse problems</td>
<td>14</td>
<td>28.0</td>
</tr>
<tr>
<td>High price of cattle</td>
<td>14</td>
<td>28.0</td>
</tr>
<tr>
<td>Backyard slaughtering</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>No problem</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*N = Number of respondents*

The butcheries found at Burayou and Sululta complained that in most of the cases their customers are caught by Police at the gate to Addis Ababa. This is mainly due to the customers used public transportation, carrying the meat in plastic bags. However the reason given by the butcheries were the regional government considered their meat as a contraband and poor in sanitation but the main reasons by the regional government were the meat should be transported to the city using the slaughter houses track van safely and
properly to the consumers, but this could be a problem for the butcheries that their customers in the city are dispersed and the amount of meat required by them could also differ (Yeshak Abadi-Trader, personal communication).

The other major problem stated by the butcheries was the high service charges including the high tax rates paid at different levels, from purchase of animals to slaughtering services shown in Table 31. For instance purchasing cattle from the Borena Mega market to Nazareth at checking points for tax, which starts from Mega, ends at Adama (Mega, Yabello, Finca’a, Dilla, Awassa, Meki then finally at Adama). The rate per cargo (Isuzu truck loads approx. 10 cattle) may differ from place to place and it is 20 ETB at Mega, 20 ETB at Yabello, 30 ETB at Finca’a, 50 ETB at Dilla, 30 ETB at Awassa, 20 ETB at Meki and 90 ETB at Adama. Thus, an increase in associated costs in any of these points from purchasing to slaughtering contributed to increased selling price of cattle meat to the consumer. FAO (2004) in agreement with the results of this study points out that livestock are the most repeatedly taxed agricultural commodity in Ethiopia. Accordingly, ACDI/VOCA (2006a) indicated these price increases are then passed on to the consumers in both Addis Ababa and regional cities. The slightly higher prices in Addis Ababa also include the transportation margins for animals being trucked into the central areas from the rural regions. Transit and sales taxes, as well as marketing fees, differ between regions and are neither usually spent on services provided to the sector nor used for improving market/livestock facilities and it is in line with results of this study.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Slaughter house</th>
<th>Service charge ETB for butchers.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Share holders</td>
</tr>
<tr>
<td>1</td>
<td>Dukem</td>
<td>61.00</td>
</tr>
<tr>
<td>2</td>
<td>Sululta*</td>
<td>33.00</td>
</tr>
<tr>
<td>3</td>
<td>Burayu</td>
<td>28.5</td>
</tr>
<tr>
<td>4</td>
<td>Kara’lo</td>
<td>154.25</td>
</tr>
</tbody>
</table>

* Cooperatives and tax free.
N = Number of respondents

The increase in purchasing price of cattle at different markets is the other constraint for the butcheries. Similarly results by ACDI/VOCA (2006a) indicated that the relative cost of raising livestock has not increased dramatically, yet the prices paid for export quality
animals at primary, secondary, and terminal markets has increased in recent years. Accordingly, the better prices for the exporters at the same markets both for the domestic and the export markets results subsequent increase in the domestic market purchase price for cattle.

Results of the butchers’ survey revealed that the backyard slaughtering which is illegal affects the butchers’ cattle meat selling trends. According to Yacob (2002), it is difficult to find accurate data on the number of livestock slaughtered in Addis Ababa, however, the available data suggest that only one-third to one-half of the cattle slaughtered at the Kéra abattoir are supplied through the terminal markets of Addis Ababa. Furthermore, according to some estimates, almost equal numbers of cattle are slaughtered outside of the designated abattoirs, which are not recorded. Similarly ACDI/VOCA (2006a) indicated that the vast majority purchased cattle by individual citizens is not slaughtered in municipal slaughterhouses but at their homes, leading to extreme difficulties in calculating accurate figures regarding domestic consumption amounts and which agrees with results of this study.

### 4.3.2.5. Cattle meat consumption trend

After cattle are purchased at the markets by butcheries they are sent directly to the official slaughterhouses. Thus, according to ACDI/VOCA (2006b), the amount of meat consumed in Addis Ababa represents the largest portion of domestic consumption within Ethiopia, as it has the highest urban population. In the urban area of Addis Ababa, animals are slaughtered in one of the three ways: at the Addis Ababa Abattoir Enterprise (official municipal slaughterhouse), at small private abattoirs operating unofficially or by the individual citizens. According to results of the study the selected butcheries obtained the slaughtering services from the official slaughterhouses, which are found near the markets and most of their customers are from the urban areas of Addis Ababa. The slaughter houses: Sululta slaughterhouse, Kara’lo slaughter house and Burayu slaughterhouse has an operational capacity of 400 cattle, 800 cattle and 200 cattle per day,
respectively. During the last peaks the abattoirs operated at their slaughtering capacity of 9.54% for Sululta, 9.11% for Kara’lo and 20.8% for Burayou.

Figure 8 Local abattoirs cattle slaughter operations (2004 to 2007)

Source: Survey result

During the low demand periods for cattle meat which correspond with the period of religious fasting for the Ethiopian Orthodox Church followers, the slaughter houses cease or minimize their services due to the butcheries terminate their activity. As from the figure above, the months mostly lie down on March thus the consumption trend either decrease (March, 2007 at Sululta) or terminate totally. But immediately after the fasting period ends, the consumption of cattle meat increases from April to May at higher rate. From end of August to September, due to the Ethiopian New Year ceremony and finding of the true “Meskel” slightly showed up an increment for the consumption trend. October to December generally considered as less consumption due to existence of only one ceremony, Ramadan, for the consumption and fasting period for the Ethiopian Orthodox Church followers. From January to February the Ethiopian Christmas, Epiphany and traditionally the wedding ceremonies are also high during these periods for that reason the consumption of cattle meat relatively enhanced. From June to July the consumption trend be decreased due to fasting period till late of June for the Orthodox Christians and almost no religious or cultural festivals during the main rainy season. Generally, the
decrease in consumption mainly is caused not only by the frequent drought from the source areas, but also the rising of purchase price of cattle at markets, the rising cost of meat and other consumer goods.
5. SUMMARY AND RECOMMENDATIONS

5.1. Summary

Cattle herding is the dominant activity for the Borena pastoralists and their livelihood is mainly dependent on livestock husbandry. One of their main sources of income is the production and sale of livestock and livestock products. In order to constitute the market oriented production system, the beef cattle production system requires due attention for further development plans and actions. Then the marketing portion also needs anticipated attention in any on-going strategies. This study attempted to investigate the beef cattle production system and its marketing prospect, the way through the export and the domestic markets.

The specific objectives of the study were to asses the beef cattle production systems of the Borena area, to asses the marketing system, the consumption trends and constraints of the export abattoirs. To achieve these objectives, secondary and primary data were collected. Data from primary sources were collected through export abattoirs, producers/herders and Butchers’ surveys, in three classified phases. On the first phase, two potential beef cattle export abattoirs (ELFORA Agro-industries and LUNA export slaughter house) were included. On the second phase of field (producers/herders) survey, three pastoral associations were included. To see the marketing channel and routes, four sample markets were included from Borena zone (Yabello, Surupha, Haro Bake and Dubluk). The third phase of the study included Butcheries from Sululta slaughterhouse, Karalo slaughterhouse, Dukem slaughterhouse and Burayu slaughterhouse. In addition, municipal slaughter houses that give services to the butcheries were included.

Regarding the natural resources, from the total respondents (N=101) 67.3% explained that the grazing land for cattle is not enough, causing feed shortage for their beef cattle. There are three main forms of water resources: the occasional water, temporary water and the permanent water sources. The occasional and temporary water sources do not retain water all the year round and use them in rainy periods. The permanent water sources are deep by nature and used in dry periods to supply water for people and animals. But
during the dry period, 40.7% of the producers indicated that the water sources are poor in quality and less in quantity resulting in shortage of the water.

According to 92.6% of the respondents there is cattle health problem in the study areas. Thus, pastoralists manage the animals’ health problem either traditionally from the fellow producers or using modern techniques both from the GOs and NGOs.

In the study, different cattle marketing channels were identified in exchange functions between producers/pastoralists, market actors and finally to consumers. Regarding the marketing route, there are two main livestock-marketing routes in the study area. One is going to Moyale border market (illegal export to Kenya) and the other to Addis Ababa (Kera) terminal market (domestic market). The results of the study revealed that since 2005, marketing routes for cattle are comparatively different and towards the domestic markets because of the opening of the export market and better local demand.

Regarding market information sources, 92% of the respondents have market information mainly through own market visit, relatives, and neighbour before they went out to sell their beef cattle, which seem informal. But advice on cattle marketing issue from development/extension agent in the study area is non-existant thus, 62% of the respondents do not have any information from these agents or NGO’s operating in the area.

According to the responses from the export abattoirs, the domestic market is not competing with them. Accordingly, they purchase the beef cattle from markets with the specifications and are selective on age and weight combinations, sex, and color, which the domestic markets are not restricted for such specifications. Reasonably, 46% of butcheries purchase dry cows for slaughtering and consumption purposes, as sex is not restriction for domestic consumption. But the better cattle purchase price by the export abattoirs could affect the cattle price at the domestic market, this is due to the reason that sources for both export and domestic market are the same and the suppliers immediately start to ask for more selling price of all cattle types. The increased trends in the prices
paid for animals by both export abattoirs and live animal exporters have caused a subsequent increase in the domestic market purchase price for cattle. Thus the selling price of a kilogram of meat at butchery will be increased to the consumer.

Currently the increase in purchasing price of cattle at different markets, their related costs and the high taxation rates of the butcheries resulted for the increased selling price of one kilogram of cattle meat, reportedly brought at an average price of 19.36 ETB per kilogram.

5.2. Conclusions and Recommendations

It was observed from the export abattoirs experience that the low land breeds (Borena) cattle are highly demanded by the Middle East as well as North African countries. However, the export abattoirs are also complaining of market supply shortage. Therefore, there is a need to explore different alternative strategies of increasing the supply of quality live animals for export abattoirs.

The pastoralists in the study area have long been engaged in trade and are pressing for expansion and improvement. The pastoral area is serving two kinds of market known as domestic and international market including; local butchers and national domestic market, cross-border and export sales supplying market. However, the unbalanced livestock marketing supply and demand is underbelly presumed due to: poor accessibility of pastoralists to formal market informations such as the demanded quality cattle in terms of age, weight and body conditions; inconsistency of market seasonality; poor market extension services; poor transparency and information gap between agents of the export abattoirs; poor infrastructure development; low prices and selling options; poorly organization and numerous weaknesses of livestock marketing system.

The constraints of cattle production system of sample households at the study area were shortage of grazing land, shortage and problems on water sources, cattle health problems, lack of technical supports, lack of security and conflict. Contribution of beef cattle
production and marketing depends largely on assured supply of accompanying inputs such as feed, veterinary services and improved cattle marketing facilities.

Based on this study, the following areas need attention if beef cattle production is to develop into a market-oriented business operation in the study areas.

- Improve the available natural pasture, develop and implement over the communal/pastoral rangeland management systems.
- Organization and management of watering points.
- Improve animal health services delivery including paravet training and drug supply system with close monitoring and supervision.
- Conflict resolution method should be addressed; community and the traditional conflict resolution practices should be a starting point in any conflict resolution efforts.
- Development of extension services on the pastoral areas in terms of beef cattle production and marketing systems.
- Reduce the long chain in the marketing system and establish strong linkage between the producers and the exporters.
- Encourage formations of pastoral marketing cooperatives in order to create transparency with export operators, to increase market awareness and sustainable market information systems.
- Development of export abattoirs facilities and infrastructures.
- Standard weights and grades in livestock and meat trade should be developed and their adoption should be developed.
- Establishing credible Sanitary and Phytosanitary Standards certification system to the meat processing plants to fulfill the requirements of importing countries.
- Reducing multiple payments and taxes at different checking points for official cattle trade.
- Control the sanitary measures in the butchery houses.
As a scope for future research work in the study areas, the following points can be considered:

- Study the use of various herbs, plants and plant parts used for ethno-veterinary medicine.
- Examine the possibility of credit provision for improved beef cattle production and marketing.
- Examine complete sanitary measures in the processing lines, improvement and upgrade the local slaughterhouses to beef slaughtering and meat hygiene requirements.
6. REFERENCES


Intergovernmental Authority on Development (IGAD), 2006. Pastoral Conflicts in the Horn Reviewed. A news letter of the Intergovernmental Authority on Development.


Oromiya Region Department of Planning and Economic Development Bureau (ORDPEDB), 2000. Base Line Information on Livestock Assessment in Pastoral area of Oromia Regional State, Finfinne, Ethiopia.


7. APPENDICES
### 7.1 Appendix I. Appendix Tables

**Appendix Table 1: ANOVA for selling price of cattle meat at the study areas**

<table>
<thead>
<tr>
<th></th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between locations</td>
<td>208.400</td>
<td>3</td>
<td>69.467</td>
<td>13.947</td>
<td>.000</td>
</tr>
<tr>
<td>Within locations</td>
<td>229.120</td>
<td>46</td>
<td>4.981</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>437.520</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SS= Sum of Squares, Ms= Mean Square, Sig.= Significant value.

**Appendix Table 2: Pairwise comparisons for selling price of meat at the study areas.**

<table>
<thead>
<tr>
<th>(I) location</th>
<th>(J) location</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.(a)</th>
<th>95% Confidence Interval for Difference(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kara</td>
<td>Sululta</td>
<td>.782</td>
<td>.736</td>
<td>.293</td>
<td>-2.264 - .700</td>
</tr>
<tr>
<td></td>
<td>Burayu</td>
<td>-.878</td>
<td>.896</td>
<td>.332</td>
<td>-2.681 -.925</td>
</tr>
<tr>
<td></td>
<td>Dukem</td>
<td>-7.100(*)</td>
<td>1.222</td>
<td>.000</td>
<td>-10.561 -4.639</td>
</tr>
<tr>
<td>Sululta</td>
<td>Kara</td>
<td>-.782</td>
<td>.736</td>
<td>.293</td>
<td>-2.264 -.700</td>
</tr>
<tr>
<td></td>
<td>Burayu</td>
<td>-1.660</td>
<td>.920</td>
<td>.078</td>
<td>-3.512 .192</td>
</tr>
<tr>
<td></td>
<td>Dukem</td>
<td>-7.882(*)</td>
<td>1.240</td>
<td>.000</td>
<td>-10.379 -5.386</td>
</tr>
<tr>
<td>Burayu</td>
<td>Kara</td>
<td>.878</td>
<td>.896</td>
<td>.332</td>
<td>-.925 2.681</td>
</tr>
<tr>
<td></td>
<td>Sululta</td>
<td>1.660</td>
<td>.920</td>
<td>.078</td>
<td>-1.192 3.512</td>
</tr>
<tr>
<td></td>
<td>Dukem</td>
<td>-6.222(*)</td>
<td>1.341</td>
<td>.000</td>
<td>-8.922 -3.523</td>
</tr>
<tr>
<td>Dukem</td>
<td>Kara</td>
<td>7.100(*)</td>
<td>1.222</td>
<td>.000</td>
<td>4.639 9.561</td>
</tr>
<tr>
<td></td>
<td>Sululta</td>
<td>7.882(*)</td>
<td>1.240</td>
<td>.000</td>
<td>5.386 10.379</td>
</tr>
<tr>
<td></td>
<td>Burayu</td>
<td>6.222(*)</td>
<td>1.341</td>
<td>.000</td>
<td>3.523 8.922</td>
</tr>
</tbody>
</table>

Based on estimated marginal means

* - The mean difference is significant at the .05 level.

a - Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).
Appendix Table 3: ANOVA of cattle meat yield/kg. of the study areas.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between locations</td>
<td>15423.116</td>
<td>3</td>
<td>5141.039</td>
<td>4.963</td>
<td>.005</td>
</tr>
<tr>
<td>Within locations</td>
<td>44540.714</td>
<td>43</td>
<td>1035.831</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>59963.830</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SS=Sum of Squares, Sig. = Significant value, MS = Mean Square

Appendix Table 4: Pairwise comparisons for cattle yield in Kg. of the study areas

<table>
<thead>
<tr>
<th>(I) location</th>
<th>(J) location</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.(a)</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kara</td>
<td>Sululta</td>
<td>36.500(*)</td>
<td>10.795</td>
<td>.002</td>
<td>14.730</td>
<td>58.270</td>
</tr>
<tr>
<td></td>
<td>Burayu</td>
<td>40.429(*)</td>
<td>14.134</td>
<td>.007</td>
<td>11.925</td>
<td>68.932</td>
</tr>
<tr>
<td></td>
<td>Dukem</td>
<td>26.500</td>
<td>17.628</td>
<td>.140</td>
<td>-9.050</td>
<td>62.050</td>
</tr>
<tr>
<td></td>
<td>Burayu</td>
<td>3.929</td>
<td>14.585</td>
<td>.789</td>
<td>-25.484</td>
<td>33.342</td>
</tr>
<tr>
<td></td>
<td>Dukem</td>
<td>-10.000</td>
<td>17.992</td>
<td>.581</td>
<td>-46.283</td>
<td>26.283</td>
</tr>
<tr>
<td>Burayu</td>
<td>Kara</td>
<td>-40.429(*)</td>
<td>14.134</td>
<td>.007</td>
<td>-68.932</td>
<td>-11.925</td>
</tr>
<tr>
<td>Dukem</td>
<td>Kara</td>
<td>-26.500</td>
<td>17.628</td>
<td>.140</td>
<td>-62.050</td>
<td>9.050</td>
</tr>
<tr>
<td></td>
<td>Sululta</td>
<td>10.000</td>
<td>17.992</td>
<td>.581</td>
<td>-26.283</td>
<td>46.283</td>
</tr>
</tbody>
</table>

Based on estimated marginal means
* The mean difference is significant at the .05 level.
a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).
### Appendix Table 5: Sources for live cattle exported to Egypt by market location

<table>
<thead>
<tr>
<th>S/N</th>
<th>Location</th>
<th>Quantity</th>
<th>Contribution by %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Debre Zeit Area</td>
<td>2</td>
<td>0.04</td>
</tr>
<tr>
<td>2</td>
<td>Enewari</td>
<td>2</td>
<td>0.04</td>
</tr>
<tr>
<td>3</td>
<td>Asebe Teferi</td>
<td>3</td>
<td>0.06</td>
</tr>
<tr>
<td>4</td>
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</tr>
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<tr>
<td>8</td>
<td>Chancho</td>
<td>7</td>
<td>0.14</td>
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<td>9</td>
<td>Kuni</td>
<td>7</td>
<td>0.14</td>
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<td>10</td>
<td>Guer-Ginchi</td>
<td>8</td>
<td>0.16</td>
</tr>
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<td>Didea FC union</td>
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<td>12</td>
<td>Wonji Feed-lot</td>
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<td>0.28</td>
</tr>
<tr>
<td>13</td>
<td>Cheffa</td>
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<td>AA/kera</td>
<td>34</td>
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</tr>
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<td>16</td>
<td>Private Suppliers</td>
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</tr>
<tr>
<td>17</td>
<td>Kality</td>
<td>57</td>
<td>1.13</td>
</tr>
<tr>
<td>18</td>
<td>Wonji</td>
<td>58</td>
<td>1.15</td>
</tr>
<tr>
<td>19</td>
<td>AA/Sebeta</td>
<td>62</td>
<td>1.22</td>
</tr>
<tr>
<td>20</td>
<td>Kombolcha</td>
<td>86</td>
<td>1.70</td>
</tr>
<tr>
<td>21</td>
<td>Metehara kuni</td>
<td>96</td>
<td>1.90</td>
</tr>
<tr>
<td>22</td>
<td>Shallo</td>
<td>114</td>
<td>2.25</td>
</tr>
<tr>
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<td>137</td>
<td>2.71</td>
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<tr>
<td>24</td>
<td>D/Berhan</td>
<td>143</td>
<td>2.82</td>
</tr>
<tr>
<td>25</td>
<td>Awash Melkasa</td>
<td>154</td>
<td>3.04</td>
</tr>
<tr>
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<td>Dire Dawa</td>
<td>161</td>
<td>3.18</td>
</tr>
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<td>Muketuri</td>
<td>162</td>
<td>3.20</td>
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<td>Guder</td>
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</tr>
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<td>29</td>
<td>Yabellio</td>
<td>461</td>
<td>9.11</td>
</tr>
<tr>
<td>30</td>
<td>Negele Borena</td>
<td>729</td>
<td>14.40</td>
</tr>
<tr>
<td>31</td>
<td>No records*</td>
<td>842</td>
<td>16.63</td>
</tr>
<tr>
<td>32</td>
<td>Shallo Quarantine</td>
<td>1382</td>
<td>27.30</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>5063</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Source: ELFORA Agro-Industries PLC.

* No records for the cattle sources
Appendix Table 6: Sources of boneless beef meat exported to Egypt by market location

<table>
<thead>
<tr>
<th>S/N</th>
<th>Location</th>
<th>Quantity</th>
<th>Contribution by %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kombolcha</td>
<td>2</td>
<td>0.10</td>
</tr>
<tr>
<td>2</td>
<td>Private supplier</td>
<td>3</td>
<td>0.14</td>
</tr>
<tr>
<td>3</td>
<td>Nazareth</td>
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</tr>
<tr>
<td>4</td>
<td>Mojo</td>
<td>36</td>
<td>1.73</td>
</tr>
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<td>5</td>
<td>Cheffa</td>
<td>63</td>
<td>3.03</td>
</tr>
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<td>6</td>
<td>Negelle Borana</td>
<td>99</td>
<td>4.76</td>
</tr>
<tr>
<td>7</td>
<td>Nettle</td>
<td>101</td>
<td>4.86</td>
</tr>
<tr>
<td>8</td>
<td>Awash Melkasa</td>
<td>115</td>
<td>5.53</td>
</tr>
<tr>
<td>9</td>
<td>Eneware</td>
<td>165</td>
<td>7.94</td>
</tr>
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<td>10</td>
<td>No records*</td>
<td>251</td>
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<td>Shallo Quarantine</td>
<td>495</td>
<td>23.81</td>
</tr>
<tr>
<td>12</td>
<td>Wonji</td>
<td>730</td>
<td>35.11</td>
</tr>
</tbody>
</table>

Total 2079 100.00

Source: ELFORA Agro-Industries PLC.

* No records for the cattle sources

Appendix Table 7: Sources for beef carcass exported to UAE, SA and Congo Brazzaville by market location.

<table>
<thead>
<tr>
<th>Location</th>
<th>Carcass quantity in kg.</th>
<th>Contribution by %</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negelle</td>
<td>54,348</td>
<td>55.38</td>
<td>Feb. – Dec. 2005</td>
</tr>
<tr>
<td>Mekelle</td>
<td>43,790</td>
<td>44.62</td>
<td>Jan. – Dec. 2006</td>
</tr>
</tbody>
</table>

Total 98,138 100

Source: Luna Export Slaughter House PLC.
Appendix Table 8: Pair wise ranking matrix for major problems prioritized by producers in Yabello district.

<table>
<thead>
<tr>
<th></th>
<th>RF</th>
<th>SC</th>
<th>SL</th>
<th>HS</th>
<th>LPW</th>
<th>LVE</th>
<th>FS</th>
<th>MP</th>
<th>LR</th>
<th>SD</th>
<th>LWP</th>
<th>Total</th>
<th>Rank</th>
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<td>9</td>
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</tr>
<tr>
<td>SL</td>
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<td></td>
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<td></td>
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</tbody>
</table>

Check list for major problems prioritized by producers in Yabello district.

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<tr>
<th>Problems</th>
<th>Codes</th>
<th>Rank</th>
</tr>
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<tbody>
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<td>Rainfall related problems</td>
<td>RF</td>
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</tr>
<tr>
<td>School related problems</td>
<td>SC</td>
<td>2</td>
</tr>
<tr>
<td>Shortage of land</td>
<td>SL</td>
<td>3</td>
</tr>
<tr>
<td>Health service problem</td>
<td>HS</td>
<td>4</td>
</tr>
<tr>
<td>Lack of pure water</td>
<td>LPW</td>
<td>5</td>
</tr>
<tr>
<td>Lack of veterinary assistances</td>
<td>LVE</td>
<td>6</td>
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<tr>
<td>Feed shortage</td>
<td>FS</td>
<td>7</td>
</tr>
<tr>
<td>Market problems</td>
<td>MP</td>
<td>8</td>
</tr>
<tr>
<td>Lack of road</td>
<td>LR</td>
<td>9</td>
</tr>
<tr>
<td>Shortages of development agent</td>
<td>SD</td>
<td>10</td>
</tr>
<tr>
<td>Lack of water pump</td>
<td>LWP</td>
<td>11</td>
</tr>
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</table>
7.2 Appendix II. Forms used in the study

Phase One. Survey questionnaire for export abattoirs

Name of enumerator------------------
Date of interview------------------
Region-----------------------------
Zone-----------------------------
Woreda----------------------------
Name of the abattoir---------------
Name of respondent----------------

1) How long have you been in export of slaughtered animals business?
   1. < 1 year  2. 1-5 years  3. 5-15 years  3. 15-20 years
2) To which country (ies) do you export slaughtered cattle?
   Name of the country (ies) ---------------------------------------------

3) What kind of cattle breed do these countries prefer?
   1. Horro   2. Boran   3. Any other (specify)

4) Do you get the required breed at the market?
   1. Yes   2. No

5) What are the criteria’s to purchase these animals from the market?

6) Which sex is preferable for your market?
   1. Male   2. Female

7) What age range is preferable for your market? ---------------------

8) Do you get this age group at the market?
   1. Yes   2. No

9) If yes, how do you identify their age?
   1. Teeth   2. Observation   3. Other (specify)
10) If no, what do you think is the reason? --------------------------------------------------------
-----------------------------------------------------------------------------------------------
11) Does skin color has effect on your cattle purchase?
   1. Yes  2. No
12) If yes, what color is preferable?
13) What weight range is preferable to purchase?  
14) Do you get this weight range at market?
   1. Yes  2. No
15) If no, what do you think is the reason? --------------------------------------------------------
-----------------------------------------------------------------------------------------------
16) Does physical defect affect your purchase of cattle?
   1. Yes  2. No
17) If yes, what type of defects?
18) Do you have holding ground at the abattoir?
   1. Yes  2. No
19) If yes, how many cattle can it accommodate at a time? ----------------------------------------
20) How many cattle can your abattoir slaughter per day? ----------------------------------------
21) How is your method of slaughtering?
   1. Mechanically  2. Using machine  3. Other(Specify)
22) If mechanically, how many cattle can your abattoir slaughter per day? ----------------------
23) If using machine, how many cattle can your abattoir slaughter per day? ----------------------
24) Are there complete slaughtering facilities and services in your abattoir?
   1. Yes  2. No
25) If yes, please indicate/explain the available slaughtering facilities/services.

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
26) What are the major diseases inspected at your abattoir?
   1. FMD  2. CBPP  3. RVF  4. Other (Specify)

27) Who is the inspector at the abattoir?
   1. Ministry of Agriculture  2. Your professionals  3. Other (Specify)

28) Do you satisfy your customer’s demand/volume with respect to resource of the country?
   1. Yes  2. No

29) If no, what is your reason? _______________________________________________________
    _______________________________________________________
    _______________________________________________________

30) Do you think domestic market is competing with you?
   1. Yes  2. No

31) If yes, how? _______________________________________________________
    _______________________________________________________

32) If no, how? _______________________________________________________
    _______________________________________________________

33) Currently what is your selling price of slaughtered cattle? -------- Br/kg

34) Who specifies the selling price of slaughtered cattle?
   1. Your self  2. Government  3. Other (Specify)

35) Do you think the price for export market affect the domestic market?
   1. Yes  2. No

36) If yes, mention how it affects. _______________________________________________________
    _______________________________________________________

37) If no, why? _______________________________________________________
    _______________________________________________________

38) How is the trend on demand/volume of your customers?
   1. Increasing  2. Decreasing  3. Constant  4. It depends  5. Other (specify)

39) If decreasing, what is the reason?
   1. High price  2. Low quality  3. Disease causes  4. Other (specify)
40) What are your customer’s criterions to purchase slaughtered cattle?
   1. Age   2. Sex   3. Weight   4. All   5. Other (mention)
41) Do you fulfill the customers’ criterion?
   1. Yes   2. No
42) If no, what is your reason?
   1. Market problem   2. High competition with domestic market   3. Air transportation problems   4. Other (Specify)
43) Who supply cattle for you?
44) How much do you pay per animal?  ------------
45) How many cattle on average can you purchase per week?  ------------
46) Why are you not purchasing more than this number per week?
   1. Financial constraints   2. Could not handle more than this number
   3. The price is high   4. The supply is insufficient   5. Lack of market (demand)
47) Does the supply of cattle to your abattoir vary from season to season?
   1. Yes   2. No
48) If yes, what is the reason?
   4. Disease incidence   5. Or other, specify
49) In which months of the year do you think is the cattle price become higher and lower?

<table>
<thead>
<tr>
<th>Month</th>
<th>high price</th>
<th>Month</th>
<th>lower price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

50) Why do you think is the reason for cattle price variation across months/season?  -----
-----------------------------------------------------------------------------------------------
51) How long does it take you to reach resale market?
   1. 1-2 days   2. 2-5 days   3. 5-7 days   4. > 7 days
52) What mode of transportation do you use?
   1. Air lines   2. Shipping lines   3. 1 and 2   4. Other (Specify)
53) If you use Air lines, how much do you pay per head of slaughtered cattle?
   1. Nearest market-------------Birr   2. Farthest market--------Birr

54) If you use Shipping lines, how much do you pay per head of slaughtered cattle?
   1. Nearest market-------------Birr   2. Farthest market--------Birr

55) How do you do if you cannot sell the slaughtered cattle you offered to the export market?
   1. Take them to Restaurants   2. Take them to Hotels  3. Sell at lower price
   4. Other means indicate-----------------------------------------------

56) Do you fatten (condition) animals before bringing to market?
   1. Yes   2. No

57) If yes, for how long?
   1. Two weeks  2. One month  3. Two months  4. Three months
   5. > three months

58) During what time of the day do you think purchase of cattle is preferable in terms of price?
   1. 12-2 hrs  2. 2-4 hrs  3. 4-6 hrs  4. 6-8 hrs  5. 8-10 hrs  6. Other(Specify)

59) What are other internal constraints you face? (mention)---------------------

60) What do you recommend to alleviate these constraints? (mention)---------------------

61) What are other external constraints you face? (mention)---------------------

---

Thank you very much for your time!
Phase Two. Field survey

B. Formal survey

Name of enumerator----------------------

Date of interview----------------------

Region-------------------------------

Zone---------------------------------

Woreda-------------------------------

Name of market--------------------

Name of house hold head----------------------

1. Gender of house hold head
   1. Male 2. Female

2. Marital status of the house hold head
   Married ☐
   Single ☐

3. Age of house hold head _____________ (years)

4. Education level of house hold head
   1. Illiterate 2. Reading and writing 3. Elementary school

5. Family size and composition
   1. Total family size: male _________ female_________
6. What are the sources of income for living?
   4. Crop and livestock production  5. All  6. Other ________________.

7. Do you have been involved in cattle production?
   1. Yes  2. No

8. If yes, when did you start? -------- (Year/month)

9. If yes, for what purpose do you rear beef cattle?
   1. Selling  2. Farming  3. Other ________________ (specify)

10. If for selling, do you practice cattle fattening before selling?
    1. Yes  2. No

11. If yes, when did you start? -------- (Year)

12. If yes, where do you get the animals for fattening?
    1. Buy from market
    2. Buy from neighbours
    3. From own herd
    4. From relatives
    5. From office of agriculture
    6. From other organizations
    7. Other ____________________

13. If no, why?
    1. It is not profitable
2. No cash/credit to start with
3. Lack of feed
4. Disease prevalence
5. No market
6. Labour shortage
7. I don’t know how to do it
8. I don’t like it
9. Other ________________

14. Who is the owner of cattle in the household?

15. What is your future opinion about fattening?
   1. I will do fattening  2. I won’t do fattening  3. I don’t know  4. Other _____

16. What is your source of technical support about beef cattle production?
   1. Office of Agriculture
   2. From fellow farmers
   3. Radio
   4. Newspapers and television
   5. Conferences of the administration
   6. Other ___________________

17. Is the technical support sufficient?
   1. Yes  2. No

18. On what issues do you want to get technical support?
   4. Cattle marketing  5. Other ________________

19. Do you want to expand your beef cattle production or to maintain as it is now?
   1. Reduce  2. Expand  3. Maintain, as it is  4. It depends
   5. Other ________________
20. What is the opinion of the family on the future size of the beef cattle production?
   1. To expand  2. To reduce  3. To maintain as it is  4. It depends  5. Other ____________

21. Is the trend of beef cattle production and productivity increasing or decreasing?
   1. Increasing  2. Decreasing  3. No change  5. Other ____________

22. Is the cash income you generate from beef cattle production increasing or decreasing?
   1. Increasing  2. Decreasing  3. It varies  4. I don’t know  5. Other

23. How grazing lands are owned in your area?
   1. Individually owned  2. Communally owned  3. Both

24. Do you have sufficient grazing land for your cattle?
   1. Yes  2. No

25. If no, how do you overcome the shortage? ______________

26. Is there feed shortage for cattle in general?
   1. Yes  2. No  3. It depends on the season

27. When is feed shortage critical? ________________________________
   (write months)

28. What do you do to cope up with the feed shortage in this (these) month (s)?
   1. Rely on stored feed
   2. Rely on farm residues
   3. Rely on the natural vegetation
   4. Send my animals to other areas
   5. Rely on the market
   6. Other ________________

29. Do you store feed for your animals?
   1. Yes  2. No
30. If yes, what type of feed you store?
   4. Other ________________________________ (specify)

31. What are the main feed resources for your cattle during feed available seasons?
   4. Other ________________________________ (specify)

32. What type of feeding system do you follow?
   1. Cut and carry (Zero grazing)  2. Grazing  3. Other _____________ (Specify)

33. What are the sources of water for your beef cattle?
   4. Other ________________________________ (Specify)

34. Do you have any other associated problems regarding water sources?
   1. Yes  2. No

35. If yes, what is it? ________________________________ (Mention)

36. What type of herding systems do you practice?
   1. Rotational/communal  2. Individual  3. Hiring a person
   4. ________________Other (Specify)

37. What type of housing system do you use?
   1. Home stead shades  2. In living rooms with the family  3. Barn
   4. Other ________ (Specify)

38. Do you have sufficient family labour power for cattle production?
   1. Yes  2. No

39. In which months do you face labour shortage? (Mention the months)

40. Do you have any other consequent beef cattle production problems?
   1. Yes  2. No

41. If yes what are the problems? (Mention)

42. If yes, what are the indigenous alleviation strategies?  Mention.
43. Is there a problem of cattle disease?
   1. Yes    2. No    3. It depends on the season

44. Whom do you assist the health of your cattle?
   4. Other _____ (Specify)

45. How much do you pay on average per year for medication of your cattle?

________________________________________________________________________

46. How much do you pay on average in a single trip to medicate your cattle?

________________________________________________________________________

47. Do you buy cattle feed from the market?
   1. Yes    2. No

48. If yes, how much do you spend per year? __________

________________________________________________________________________

49. Do you get market information before you sell your cattle?
   1. Yes    2. No

50. If yes, from where do you get market information?
   4. Neighbors    5. Own markets visit    6. Other (specify)

51. Which source of market information do you prefer?
   4. Neighbors    5. Own market visit    6. Other (specify)

52. What is your reason for selecting the specified source(s) of market information?
   1. It is accessible    2. It is reliable    3. Other (specify)

53. To what extent is the market information you get is accurate?

54. How frequent do you get market information?

55. Do you get advice on cattle marketing issue from development/extension agent?
   1. Yes    2. No
56. If yes, on what aspect?
   1. On quality of cattle to be produced for the market  
   2. On the time to sale cattle  
   3. On price of cattle at different markets  
   4. Other (specify)

57. Where do you mostly sell your cattle?
   1. Negelle  
   2. Dubluk  
   3. Surupa  
   4. Didliben  
   5. Yabello  
   6. Other (specify)

58. What is your reason of preference while you decide to sell your cattle at a particular market?
   1. Relative advantage of price  
   2. Proximity of the market  
   3. Other (specify)

59. How many hours does it take to reach the market that you frequently visit to sell your cattle?
   1. Nearest market ------------------hours  
   2. Farthest market-----------------hours

60. How do you take your cattle to the market?
   1. Trekking  
   2. Trucking  
   3. Both

61. Who trek your cattle to the market place?
   1. Your self  
   2. Relative  
   3. Hired labor  
   4. Neighbor  
   5. Other (specify)

62. If you hire labor, how much do you pay?
   1. For nearest market-------------birr/head  
   2. For farthest market---------------birr/head

63. To whom do you sell your cattle?
   1. Trader  
   2. Abattoir  
   3. Local butcher  
   4. Other (specify)

64. Do you think that there is road/ transportation problem to access market in your area?
   1. Yes  
   2. No

65. What is you suggestion to improve physical market access? -------------------

66. Who determine the price at the market place?
   1. Seller  
   2. Buyer  
   3. Broker  
   4. Negotiation b/n seller and buyer
   5. Other (specify) -------------------------------

67. Do you think that there is cattle price difference across different markets in your area?
   1. Yes  
   2. No
68. If yes, in which market is the cattle price is higher and lower?
   1. Better /higher price at -----------------------------------------------market
   2. Lower price at -----------------------------------------------market

69. What do you think is the reason for these price variations?
   1. Difference in number of traders     2. Proximity to urban center     3. Difference in road and transportation facilities     4. Other (specify) _____________

70. In which months of the year do you think is the cattle price become higher and lower?

   1. Month   higher price                   2. Month     lower price
      ------------  ------------              ------------  ------------
      ------------  ------------              ------------  ------------
      ------------  ------------              ------------  ------------

71. Why do you think is the reason for cattle price variation across months/season?

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72. What factors determine cattle price at the market place?

73. What is your feeling/perception on the prevailing cattle price in your area?
   1. Very good   2. Good   3. Poor   4. Other (specify)

74. Do the brokers have an influence on you while you sell your cattle?
   1. Yes               2. No

75. If yes, how they influence you? -----------------------------------------------

------------------------------------------------------------------------------------------------

76. What is the trend of cattle price in your area?
   1. Increasing     2. Decreasing     3. No change     4. Others

77. Are you happy with the prevailing cattle price in your area?
   1. Yes      2. No

78. If no, what do you think is the solution to improve cattle price in your area?
   Mention ……………………………………………………………………………
   ……………………………………………………………………………………
79. Why do you sell your cattle?
   1. To settle government debt  2. To cover school fee  3. To cover health fee
   4. To replace older stock  5. Other (specify)

80. When do you mostly sell your cattle?
   1. When price is high  2. During harvest season  3. When need arises
   4. Other (specify)

81. Who decide on purchase or sell of cattle in your family?

82. What happened on animal ownership after you sold your cattle?
   1. Nothing  2. I loss my status  3. I will raise another  4. I will buy another
   5. Other (Specify) ____________________________

83. Is there any impact of selling cattle on herd structure in your compound?
   1. Yes  2. No

84. If yes, mention ____________________________.

85. Do you consume beef cattle meat at your home?
   1. Yes  2. No

86. If yes, at what time?
   1. During festivals  2. Any time  3. Other (Specify)

87. How many times? __________ per month.

Thank you very much for your time!
Phase Three. Survey questionnaire for butchers

Name of enumerator----------------------
Name of respondent------------------------
Date of interview-----------------------
Woreda ----------------------------------
Sub-city----------------------------------

1) How long have you been in selling cattle meat?
   1. < 1 year   2. 1-5 years   3. 6-10 years   4. 11-15 years   5. 16-20 years
   6. >20 years
2) Do you participate in cattle trading year round?
   1. Yes                     2. No
3) If no, at what period of the year do you participate?
   1. Only during holidays   2. When price becomes low
   3. Other period of the year (specify) ---------------------
4) From which market do you buy cattle for resale purpose?
   1. Farm gate (Farmer)     2. Primary market     3. Secondary market
   4. Terminal market     5. Other (specify) ------------
5) Who purchases cattle for you?
   1. Yourself   2. Brokers/commission agent
   3. Relatives   4. Family members   5. Others, please specify---------------------
6) If others/brokers, how much do you pay per animal?
7) Do you purchase dry cow for slaughtering purpose?
   1. Yes   2. No
8) Let us say you slaughter 100 beef cattle per year then, how many of them could be
   Boran cattle? ------------
9) Does the supply of cattle in the markets vary from season to season?
   1. Yes   2. No
10) If yes, in which months of the year do you think is the cattle supply and demand
    becomes higher and lower?
11) What is the reason in the supply changes?
12) Do you think the export market is competing with you?
   1. Yes   2. No
13) If yes, how?
   1. They purchase at high price   2. They purchase in mass   3. Other(specify)
14) What is the current selling price of meat? ----- (Br/kg)
15) Do you think the selling price of meat fro time to time increasing, decreasing or what?
   1. Increasing   2. Decreasing   3. No change   4. Other (specify)
16) If increasing, what is the reason?
   1. Export market   2. High local demand   3. Transportation cost   4. Other (Specify)
17) How long does it take you to sell slaughtered cattle?
   1. <1 day   2. 1-2 days   3. 3-5 days   4. > 7 days
18) Who performs the activity?
19) If you hired labor, how much do you pay per head for this activity? ----- Birr
20) How many cattle (on average) do you sell on a better marketing day?
   -------------- (head)
21) Are there complete facilities and services in your butchery house?
   1. Yes   2. No
22) If yes, please indicate/explain the available marketing facilities/services.

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23) Who are most of your products sold to?

24) How do you do if you cannot sell the cattle meat you offered to the market?
   1. Take it back home  2. Take it to other market (s)
   3. Sell at lower price  4. If other means indicate-----------

25) What do you think is the reason about the difference of selling price of 1 kg. meat
    between you and city butchery houses?
   1. 
   2. 
   3. 

26) During what time of the day do you think selling of cattle meat is preferable in
    terms of price?
   1. 12-2 hrs  2. 2-4 hrs  3. 4-6 hrs  4. 6-8 hrs  5. 8-10 hrs  6. Other (Specify)

27) From where do you get the slaughtering service?
   1. Indoor  2. Addis Ababa abattoir (Kera)  3. Around abattoir
   4. Other (Mention name)---------

28) How much do you pay to the abattoir per cattle for the slaughtering service?

29) How many kgs. do you get from single cattle after slaughtered?

30) What type of problem do you face in selling cattle meat? Indicate according to their
    order of importance. -----------------------------------------------
        -------------------------------------------------------------
        -------------------------------------------------------------
        -------------------------------------------------------------

31) What do you think about the solutions of constraints mentioned above?
    ---------------------------------------------------------------
    ---------------------------------------------------------------

Thank you very much for your time!
Water source for cattle in Borena area

Schematic diagrams of a Tula well on the Borena Plateau:

Photo by Daniel Tewodros
Earth mound for permanent water sources (Ellas) at Dubluk. *Photo by Daniel Tewodros*
Queue for water drinking. Photo by Daniel Tewodros
Drinking from pipe water. *Photo by Daniel Tewodros*

A. trek to grazing after drinking water. *Photo by Daniel Tewodros*
B. trek to grazing crossing the Addis Ababa- Moyale main road after water drinking

Dubluk secondary market. *Photo by Daniel Tewodros*
Butchers snapshot

Interview with sample Butchery house at Sululta.

Consumers to purchase meat at Kara
Kara Alo slaughter house distributing meat to butcheries.
Trimmed meat and offal for sale to lower income group consumer