

**CHARACTERIZATION OF BEEF CATTLE PRODUCTION AND
MARKETING SYSTEMS IN THREE SELECTED *WOREDAS* OF
EAST SHEWA ZONE**

M.Sc. THESIS

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JIMMA UNIVERSITY

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MARKETING SYSTEMS IN THREE SELECTED *WOREDAS* OF
EAST SHEWA ZONE**

M.Sc. Thesis

Submitted to the school of graduate studies

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**In Partial Fulfillment of the Requirements for the Degree of Master of Science
in Animal Science (Animal production)**

By

PHILIMON TESHOME

April, 2012

Jimma University

DEDICATION

I dedicate this work to my beloved aunt Birhan Katama (Miye); I cherish her presence in my life.

STATEMENT OF THE AUTHOR

I declare that this thesis is my original work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in Partial Fulfillment of the Requirements for M.Sc Degree at Jimma University and is deposited at the University Library to be made available to borrowers under rules of the Library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

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BIOGRAPHICAL SKETCH

The author was born on October 1988 at Adama town in the former province of Shewa, Oromia, Ethiopia. He attended his primary and junior high school education at Holly Angels Indian Primary and Junior School from 1993/94 to 2003/04 and secondary education at Hawas Comprehensive Secondary High School from 2004/05 to 2005/06 at Adama.

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LIST OF ABBREVIATIONS

| | |
|--------------|-------------------------------|
| AnGRs | Animal Genetic Resources |
| CSA | Central Statistical Agency |
| DA | Development Agent |
| ETB | Ethiopian Birr |
| PA | Peasant Association |
| PRA | Participatory Rural Appraisal |
| RMA | Rapid Market Appraisal |

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Characterization of beef cattle production and marketing systems in three selected *Woredas* of East Shewa zone

ABSTRACT

This study attempted to characterize the beef cattle production and marketing systems in three selected Woredas of East Shewa administrative zone, central Ethiopia. The specific objectives of the study were to characterize beef cattle production, marketing systems and determinants of market choices and to identify constraints and opportunities for beef cattle production and marketing in the study area. A total of 276 beef cattle producers, household heads, were selected and interviewed. Besides, household survey, the marketing system was also assessed from four well known cattle markets in East Shewa administrative zone namely Adama, Mojo, Wonji and Walanchiti. According to results of the study, for 220 (79.7%) of the respondents crop-livestock mixed production system is the main sources of income. Overall mean family size was 8.46 ± 0.17 (Mean \pm SE) heads per household and it was significantly different ($p < 0.05$) among the three woredas. The average herd size of cattle per household in the study area was 10.39 ± 0.21 (Mean \pm SE) heads.. About 83% of the herd owners keep beef cattle to generate cash income and farming purposes. Overall, (76.40%) of the respondents used own products and purchased feeds for their cattle. In the study area the major feed resources ranked first, second and third were crop residue, natural pasture and oil seed cake with an index of 0.296, 0.266 and 0.245, respectively. About 114 (41.30%) of the respondents spent 200-300 ETB per month for the purchase of feed. Ponds and rivers are the major sources of water in the study areas. According to the sample households the constraints to cattle production system were lack of capital, high feed price and shortage of land for grazing and forage development were ranked as first, second and third with an index of 0.250, 0.193 and 0.109, respectively. The majority of the respondents 189 (68.50%); get destination market information before they went out to sell their cattle.. As stated by 237(85.90%) of the respondents; seasonal feed and water availability and the socioeconomic factors (fasting periods, holidays) were the major reasons for the cattle price variation across months/seasons.

Key words: *Beef cattle; Constraints to beef cattle production and marketing; market oriented cattle production system; East Shewa; feed resource*

1. INTRODUCTION

The agricultural sector in Ethiopia, engaging 85% of the population, contributes 52% to the gross domestic product and 90% to the foreign exchange earnings (CSA, 2008). 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 subsector 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 report of Federal Democratic Republic of Ethiopia in 2006/2007 hides, skins and leather products made up 7.5% of the total export value; live animals accounted for 3.1% of the total value of exports during the same period.

With 49.3 million heads of genetically diverse cattle, Ethiopia has the largest population in Africa (CSA, 2009). Cattle produce a total of 3.2 billion liters of milk and 0.331 million tons of meat annually (FAO, 2005; CSA, 2008). In addition, 14 million tons of manure are used annually primarily for fuel. About six million oxen provide the draught power required for the cultivation of cropland (Azage and Alemu, 1998; Befekadu and Birhanu, 2000).

Livestock play a significant role, directly or indirectly, in achieving food self-sufficiency in the country; Provides 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.

In Ethiopia Cattle production plays an important role in the economies and livelihoods of farmers (Belete *et al.*, 2010). Cattle together with sheep and goats are the most important sources of live animal, and hides and skins for export markets (Daniel, 2008). Cattle are therefore closely linked

to the economic, social and cultural live of millions of resource-poor farmers for whom animal ownership ensures varying degrees of sustainable farming and economic stability.

Ruminant Meat production and consumption is also important in the Ethiopian economy. The annual contribution of ruminants to meat production in Ethiopia is estimated to be 3.2 million tones, representing over 72% of the total meat production (Belete *et al.*, 2010). In Ethiopia, the current per capita consumption of milk and meat is 16 liters and 13.9 kg/ year, respectively; being lower than the African and the world per capita averages, which are 27 kg/year and 100 kg/year, respectively (FAO, 2009).

Highlands of Ethiopia are characterized by crop-livestock mixed farming systems. The mixed farming systems developed as a consequence of the beneficial effects resulting from interrelationships and complementarities between crop and livestock production (Shitahun, 2009). Besides, cattle provide traction power that is the single most important source of power in the overall farm power requirements.

Despite the reported high livestock population of the country, the major meat and live animal exporters are complaining of shortage of supply and inferior quality of animals (Getachew *et al.*, 2008). The same outer reported that, the problem could be because of the constraints in the marketing system of exporters themselves, the market information system, poor market infrastructures like road, seasonality in production, competition of the domestic and the export sector, problems in the production system or a combination of several factors.

According to Daniel (2008), Constraints 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.

The Livestock Marketing Authority of Ethiopia (LMA, 2004) estimated the annual potential for export at 72,000 tons of meat with an equivalent value of USD 136 million. According to Workneh (2006), the estimated national off take rates of 10% for cattle, pastoral areas of the country alone, could produce 734,000 heads of beef cattle per annum. When these are compared

to the 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 markets outlets.

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 of Ethiopia (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.

The annual outflow of beef cattle from Ethiopia through informal market is very huge. The immediate destinations of this illicit export are Djibouti, Somalia and Kenya which are further re-exported after meeting domestic demands to the Middle East countries (NEPAD-CAADP, 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 heads of 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 off-take for the unofficial cross-border export and the domestic market.

For market development, dynamic relationship between demand and supply is a prerequisite, but the smallholder production is not market oriented. 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.

East Shewa zone is known in cereal crop production and the resulting crop-residues could be used as potential feed source for fattening cattle. Accessibility of agro industrial by-products, market, roads and other necessary facility makes the zone more suitable for cattle fattening. The zone seems suitable for cattle fattening due to suitable market access and presence roads connecting Addis Ababa with Djibouti. A large number of trucks use this same route to travel to and from the seaports of Djibouti, but detail marketing system has not yet been compiled out.

Though, the zone is estimated to have huge supply of crop-residues. Lack of proper selection of fattening cattle, lack of market information and also poor managements in relation to feeding system, healthcare, housing, watering, etc.; which may lower the performance of cattle fattening. Hence, the producer may not get reasonable benefit from their fattening activity unless appropriate improvement strategies have to be introduced.

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 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 where and how the existing 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. Keeping the above views in mind the following objectives were proposed.

1.1. Objectives of the study

1. To characterize beef cattle production, marketing systems and determinants of market choices.
2. To identify constraints and opportunities for beef cattle production and marketing in the study area.

2. LITERATURE REVIEW

2.1. Economic importance of livestock in Ethiopia

Livestock have diverse functions in the livelihood of farmers in the mixed crop-livestock systems in the highlands and pastoralists and agro-pastoralists in the lowlands of Ethiopia. Livestock provide food in the form of meat and milk, and non-food items such as draught power, manure and transport services as inputs into food crop production and fuel for cooking. They are a source of income, which can be used by rural populations to purchase basic household needs and agricultural inputs. In the rural areas of many developing countries, financial services such as credit, banking and insurance are virtually non-existent. In these areas, livestock play an important role as a means of saving and capital investment, and they often provide a substantially higher return than alternative investments. A combination of small and large livestock that can be sold to meet petty-cash requirements to cover seasonal consumption deficits or to finance large expenditure represents a valuable asset for the farmer (Sansoucy *et al.*, 1995). The contributions of livestock can equally be well expressed at household level by its role in enhancing income, food security and social status (Winrock, 1992; Ehui *et al.*, 1998). The contribution of livestock and livestock products to the Ethiopian economy is also significant, accounting for 40% of the agricultural gross domestic product, excluding the value of draught power, fuel, manure and transportation. Livestock and livestock products are also important and significant sources of foreign exchange earnings.

In the mixed crop–livestock systems of the Ethiopian highlands, livestock production is subordinate, but economically complementary to crop production. In this ecological zone, livestock, especially cattle, provide traction, which is a vital contribution to the overall farm labour requirement. Livestock also provide meat, milk, cash income and manure, and serve as a capital asset against risk. Within the integrated crop–livestock production systems, animals play a particular vital role, the extent of which is dependent on the type of production system, animal species and scale of the operation. Dairy production is becoming an increasingly important integrated system in many countries, in which this component generates significant, and more importantly, daily cash income, as well as contributing to the improvement of the livelihoods of very poor people and the stability of farm households. In the semi-arid low lands, cattle are the

most important species because they supply milk for the subsistence of the pastoral families. In the more arid areas, however, goats and camels are the dominant species reared. The former provides milk, meat and cash income, while the later provides milk, transport and, to a limited extent, meat to the nomadic pastoral population (Mbabane, 1997). Cattle are kept for multiple purposes and the emphasis on use varies with the production system. In both crop–livestock and agro-pastoral systems, animal traction ranked first, followed by milk and reproduction. Manure production is also considered as a secondary important by-product by most crop–livestock and agro-pastoralist farmers. In contrast, in pastoralist systems, reproduction/breeding requirements received higher ranks and for female animals breeding outranked the importance of milk production (Workneh and Rowlands, 2004).

Women are usually responsible for feeding animals, cleaning barns, milking, processing milk and marketing of livestock products. Young children, especially girls between the ages of 7 and 15, are mostly responsible for managing calves, chicken and small ruminants and older boys are responsible for treating sick animals, constructing shelter, cutting grass and herding of cattle and small ruminants. The role of women in managing animals that are confined during most of the year is substantial and they are critically involved in removing and managing manure, which is made into cakes and used by the household or sold as fuel (Azage, 2004). In the highlands of Ethiopia, smallholders rear cattle, primarily for the supply of oxen power for crop production. Milk production, cash source, manure and fuel are considered as secondary. Cattle and equine play a vital role in smallholder farms for crop cultivation and transportation (Alemu, 1998).

2.2. Genetic diversity and distribution of cattle in Ethiopia

Maintaining genetic variation is crucial for improving livestock and responding to changes in climate, disease or consumer preferences and “existing AnGR represent a massive past investment which, if managed appropriately, can provide insurance against unknown global future” (Rege and Gibson, 2003). A loss in animal genetic diversity may weaken the chances of future generations to respond adequately to increasing food demand, potential environmental

changes, diseases, and other challenges and catastrophes we cannot foresee (Koehler-Rollefson, 2002).

Given its diversified ecology, its huge livestock size and cattle types which have evolved over time in the various production system, and its geographic location on the route to major livestock migrations across Africa, Ethiopia can be considered as a center of diversity for animal genetic resources. It is also home to most important cattle breeds for eastern and southern Africa (Beyene and Bruke, 1992; Workneh *et al.*, 2004).

The indigenous breed as explained by Hanotte *et al.*, (2002) originated from the migration of Hamitic Longhorn and Shorthorn from Egypt along the Nile Valley and the humped zebu from India through the horn of Africa. The present day Ethiopian cattle are classified in to four main breed groups: the Humpless, Zebu, Sanga, and Zebu-Sanga (intermediate) (Beyene and Bruke, 1992; Workneh *et al.*, 2004). Besides, the Red Bororo or Fellata are also confirmed for their presence (Zewudu, 2004). Sometimes the Humpless cattle are divided in to Shorthorn Humpless and Longhorn Humpless (Alberro and Hailemariam 1982; Beyene and Bruke, 1992). The diversification of Ethiopian cattle breeds is relevant in terms of specific adaptation to the various agro-ecological zones where the breeds exist, for instance for attributes like heat tolerance, disease resistance and drought tolerance. These characters help the breeds to survive and produce under prevailing environmental challenges of the different agro-ecological zones of the country.

2.3. Beef cattle production systems in Ethiopia

According to FLDP (1989), in Ethiopia, there are three types of fattening systems. These are traditional, by-product based, and the Hararghe type of fattening.

2.3.1. Traditional fattening system

In traditional system, oxen are usually sold after the plowing season when they are in poor condition. Meat yields are low, beef is poor quality and the farmer returns are often inadequate to

buy a replacement ox. In the lowlands, where pastoralists do not use cattle for draft, cattle are sometimes fattened on natural pasture in good seasons. In average or poor seasons, lowland cattle are rarely fattened and often have to be sold in poor condition at low prices.

2.3.2. By-product based fattening system

The by-product based fattening is a type in which agro industrial by-products such as molasses, cereal milling by-product, and oil seed meals are the main sources of feed which is more concentrated along the highway from Addis Ababa to Nazareth, where the market is suitable for both the fattened cattle and molasses resulted from the surrounding sugar factories.

2.3.3. Hararghe fattening system

In the Hararghe fattening system, livestock depend more than in the central highlands upon thinning from annual crops during the growing season as the case of cut and carry feeding system; and crop stover and stubble grazing during the dry season. The Hararghe highlands are close to extensive rangeland areas and the working oxen in Hararghe Province come mainly from the rangelands. Typically smallholders purchase oxen from the rangelands (through traders), use them as draught animals for some years and then fatten them prior to sale. The oxen are fattened successfully on farm products alone. The regional success of this strategy is reflected in the price premium offered to fat stock from Hararghe Province on the Addis Ababa market, which is the most important domestic meat market in the country. The relative close proximity of the Province's smallholders to pastoralists in the rangeland areas enables Hararghe farmers to keep relatively more efficient herds (in terms of rates of conversion of animal feed into draught power and other livestock products) than is the case in the central highlands.

2.4. Feed resources in Ethiopia

The major livestock feed resources in Ethiopia are (1) grazing and browsing on natural pastures; (2) crop residues and agro-industrial by-products; and (3) cultivated pasture and forage-crop species (Alemayehu, 1985).

Availability and quality of native pastures vary with altitude, rainfall, soil type and cropping intensity. The total area of grazing and browsing in Ethiopia is estimated at 62,280 million hectares, of which 12% is in the farming areas (more than 600 mm rainfall) and the rest around the pastoral areas (Alemayehu, 1985).

Natural pastures which provide more than 90% of the livestock feed are very poorly managed in both ecological zones in Ethiopia. In the mixed farming mid-altitude areas, better soils are used for cropping and the main permanent natural pasture lands are found on the upper slopes of hills and seasonally waterlogged areas. In the lowlands where pastoralism is practised most of the land except for rivers, swamps, lakes and deserts contains natural pasture which may be associated with woodland in the wetter areas.

Considering the country as a whole, grazing lands contribute 53% of the total land area. Even though the amount of grazing area seems to be large, the yield and quality of the pasture is very low. Due to poor management and overstocking, natural pastures in both ecological zones are highly overgrazed resulting in serious land degradation, loss of valuable species and dominance by unpalatable species (Alemayehu, 1985). In subhumid mid-altitude areas, natural pastures are dominated mainly by *Hyparrhenia* species, which tend to grow fast and become stemmy and fibrous within short period of time thus losing their palatability and feed value. In these areas, the overgrazed pastures are dominated by unpalatable *Sporobolus* and *Pennisetum* species. Herbage growth is luxuriant during the wet season and this gives large bulk of herbage during the dry season, which is burnt to encourage re-growth in subsequent rains. In semi-arid mid-altitude zones, rainfall is the major factor influencing primary productivity (Alemayehu, 1985). Because of diversity of climate, a number of forage species, mainly grasses are found in both ecological zones. Natural grasslands of the highland areas are rich in legume species, while grasslands of the mid-altitude and lowland zones have lower proportion of legume. The proportion tends to decrease with decrease in altitude. The less abundant native legumes of the lower altitude have sprawling growth.

Cereal straw from teff, barley and wheat is the largest component of livestock diet in the intermediate and highland areas of Ethiopia. Straw is stacked after threshing and fed to animals during the dry season, as are pulse–crop residues (e.g. horse beans, chickpeas, haricot beans, field peas and lentils). At lower altitudes in the highland areas maize, sorghum and millet stovers occur to a greater extent than at higher altitudes. Teff is grown at intermediate altitudes and barley replaces wheat at the higher altitudes, where pulses are also grown to a great extent. The nutritive value of teff straw is equivalent to medium-quality hay and the residue of other cereal crops is only of poor to fair quality. On the other hand, pulse haulms are high-quality roughage with 5–8% protein content (Alemayehu, 1985).

2.5. Beef Cattle Production Constraints

Hence, the role of livestock is significant in this farming system (Getachew, 2002). There are, however, key constraints to the productivity of livestock in Ethiopian highlands. These include poor nutrition, poor genetic resources in terms of productivity, prevalence of animal diseases, unfavourable socio-economic factors, and lack of livestock policy (Agajie *et al.*, 2002).

Cattle require consistent sources of protein, energy, minerals, vitamins, and water to maintain productivity and health. The area of land allocated to grazing in the highlands progressively declined through time due to the expansion of cultivation (Alemayehu, 2002; Zerihun, 2002). As a result of this, scarcity of feed resources is the major bottleneck to livestock production in the highlands of Ethiopia, where natural pasture and crop residues are the major sources of feed supply to livestock (Seyoum and Zinash, 1995; Zinash *et al.*, 1995; Zerihun, 2002).

Markets are dispersed with remote distances lacking price information. (Belachew and Hargreaves, 2003) 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.

Generally under-nutrition and malnutrition, poor genetic potential and diseases are the major constraints to increased livestock productivity in the country. Inadequate government services emanating from organizational problems, finance and inadequate trained manpower have also hampered progress in the sub-sector (ILCA, 1991).

2.6. Status of Cattle Marketing in Ethiopia

Livestock markets in Ethiopia function at three levels consisting of primary, secondary; and terminal markets (EEPA, 2001). Some (Solomon *et al*, 2000) also include a nominal fourth tier at the farm gate level, which could hardly be considered to function as a market. Primary markets have been identified as village level markets with a supply of less than 500 head of cattle/week where primary producers (farmers and pastoralists) sell small number of animals to small traders, other farmers (replacement animals), farmer or pastoralist traders and in some cases to consumers and local butchers. Such markets are not fenced, have no scales, and no feeds and watering facilities. Purchasing is done through ‘eye ball’ negotiations. A good majority of the livestock markets in Ethiopia belong to this group.

Secondary markets are trader and to some extent butcher dominated markets, with an average volume of 500 – 1,000 head per week consisting of finished, breeding and draught stocks and located mainly in regional capitals. Secondary markets serve the local consumers to some extent but mainly feed the terminal markets. These markets also supply live animal exporters and meat processors. The terminal markets are located in large urban centers consisting of Addis Ababa, Dire Dawa, Dessie, Nazareth and the coffee growing regions of Sidama and Gideo. Medium to large-scale traders and butchers dominate these markets. Average volume of cattle brought to these markets may exceed over 1000 head/week.

However, most producers sale their stock and livestock products at local markets directly to consumers or small traders at relatively low prices. Without exception markets are open places in villages and towns. Distance from the market, poor trekking routes and lack of holding grounds create unfavourable conditions for producers forcing them to sell their stock at low prices. Marketing of livestock is not determined on the basis of their weight and quality, but by direct

tiresome bargaining between buyers and sellers. Due to these unfavourable marketing systems and the discouraging price on the producers' side they are not encouraged to improve the quality and the off-take of their animals (Alemayehu, 2003). The same author reported that the possibility also exists for the country to regain its place in the export trade, particularly in Gulf and Middle East countries where its stock, especially sheep and cattle, have preference and established demand if marketing infrastructure is to be improved.

3. MATERIALS AND METHODS

3.1. Description of the Study Area

East Shewa administrative Zone is found in the central part of Ethiopia, laying between 8° 0' N and 38° 40' E geographical grids in the eastern part of the Oromia National Regional State (<http://oromiyaa.com>). The estimated human population of the area is about 1,356,342; with an area of 8,370.90 km² (CSA, 2007). This study was conducted in three selected *woredas* (districts) of East Shewa administrative Zone; these were composed of three (low land, mid land and extreme low land) areas represented by Lome, Adama and Boset *woredas*, respectively. Lome *woreda* located about 60 km from Addis Ababa and about 40 km from Adama town. The *woreda* has an altitude ranging from 1500 to 2400 meters above sea level. Mean annual rainfall of the *woreda* is 800 to 1200 mm and the mean annual temperature is 18 °C – 23 °C. Lome is bordered on the south by the Koka Reservoir, on the west by Ada'a Chukala, on the northwest by Gimbichu, on the north by the Amhara Region, and on the east by Adama. Adama *woreda* is located at altitude ranging from 1840 to 1940 meters above sea level, 99 km southeast of Addis Ababa. Mean annual rainfall of the *woreda* is 600 to 900 mm and the mean annual temperature is 17 °C - 28 °C. Adama *woreda* is bordered on the south by the Arsi Zone, on the southwest by Koka Reservoir which separates it from Dugda Bora, on the west by Lome, on the north by the Amhara Region, and on the east by Boset. Boset *woreda* located about 135 km from Addis Ababa and about 35 km from Adama town. This *woreda* is predominantly level land with undulating features; almost 90% is less than 1500 meters above sea level. Mean annual rainfall of the *woreda* is 500 to 900 mm and the mean annual temperature is 22.5 °C - 25.0 °C (Dagne, 2009). Boset *woreda* is bordered on the south by the Arsi Zone, on the west by the Awash River which separates it from Adama, on the north by the Amhara Region, and on the east by Fentale (<http://oromiyaa.com>).

3.1.1. Land area and human population

Data on the land area and human population of the three districts are presented in table (1). The total land area of the three study districts is 3178.73 km². According to CSA (2007), the Adama *woreda* is more densely populated than the Boset and Lome *woredas*. Boset and Lome *woredas* have 108.3 and 197.3 inhabitants per km², respectively; while Adama *woreda* has 419.3 inhabitants per km², which is much greater than the Zone average of 181.7.

Table 1. Land area and human population in the study area

| | District | | |
|--|----------|---------|----------|
| | Lome | Adama | Boset |
| Land area, km ² | 709.85 | 1,007 | 1,461.88 |
| Population | | | |
| Male | 60,125 | 79,013 | 73,925 |
| Female | 56,955 | 76,336 | 68,187 |
| Rural population | 78,309 | 129,027 | 115,598 |
| Urban dwellers | 38,771 | 26,322 | 26,514 |
| Total population | 117,080 | 155,349 | 142,112 |
| Human population density, head/km ² | 197.3 | 419.3 | 108.3 |

Source: CSA (2007).

3.2. Data sources and methods of collection

3.2.1. Beef cattle production systems

The data collection process involves a number of participatory steps and questionnaire survey-based methods. Prior to questionnaire focus group discussion (with a check list) was used to investigate and understand the general beef cattle production system of the area. Social and

resource mapping of the study area, personal observations at the time of visits and pre-testing of questionnaire were done before actual data collection.

In order to characterize the beef cattle production systems in the area, farmers/producers were interviewed using a structured questionnaire. The questionnaire was consisted of close and open-ended questions. Enumerators (diploma holders in Animal Science), was recruited and trained before commencement of actual data collection. Personal observations were carried out to gather additional information to characterize the beef cattle production systems in the study area; Feeding and housing of beef animals, beef and beef cattle markets, health and extension services were some of important activities included during field observations.

Multi-stage sampling procedures (Schuler, 1967) were followed for the primary data collection. In the first stage, three neighboring woredas (districts) namely Adama, Boset and Lome, among the 16 different woredas, were purposively selected based on beef cattle fattening potentials. Each woreda was then categorized in to three altitude based strata's. In the second stage, based on reconnaissance survey and PRA information the representative kebeles (peasant associations) from each strata, three from each woreda were identified using simple random sampling technique. In the third stage, individual households having beef cattle of any breed and size and/or adopted improved beef cattle fattening practices were identified and selected using systematic random sampling technique. A list of households in each survey site was organized with the help of the chief of kebele/DA and questioned using structured questionnaire.

Questionnaire survey was conducted on 276 households from the three different agro ecology of East Shewa administrative Zone, namely Lome, Adama and Boset. From Lome three PA's; namely (Biyo bisiqe, Tsade and Dibandiba). From Adama three PA's, namely (Kechema, Kuriftu and Mermersa) and from Boset three PA's, namely (Digalo Wanga, Merqo and Tiri) were selected. Sample size determination was based on proportion of total household population experience in beef cattle fattening in each *woreda* (Cochran, 1977).

3.2.2. Beef and live animal marketing system

To see the marketing system (Table 2), five markets were covered from East Shewa zone (Adama, Dera, Mojo, Wonji and Walanchiti livestock market). The markets 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. In all the markets, the market survey was carried out once a week on a major market day (Adama market was surveyed on Sunday; Mojo market was surveyed on Wednesday and Saturday; Wonji market was surveyed on Wednesday and Thursday; Walanchiti market was surveyed on Saturday and Dera market was surveyed on Tuesday).

Table 2. Classifications of surveyed sample markets

| Market types | Market day(s) | Livestock type |
|--------------------------|------------------------|-------------------------|
| <i>Primary markets</i> | | |
| Wonji | Wednesday and Thursday | Cattle, Sheep and Goats |
| Mojo | Wednesday and Saturday | Cattle, Sheep and Goats |
| <i>Secondary markets</i> | | |
| Dera | Tuesday | Cattle, Sheep and Goats |
| Walanchiti | Saturday | Cattle, Sheep and Goats |
| <i>Terminal markets</i> | | |
| Adama market | Sunday | Cattle |

Source: Personal observation

3.2.3. Nature of the data

The data includes two categories: qualitative and quantitative. The qualitative parameters include, among other things, the involvement of family members in beef cattle production, the background of the cattle owner, cattle housing, types of feeds and feeding, type of cattle drinking water resources, type of breeds and breeding techniques, beef marketing, characterization of

market participants, market channels, main constraints for beef and beef cattle production and opportunities for improving beef production. The quantitative parameters included are age of the household head, family size, herd structure, owned and rented land by the producer and number of animal loss in the last one year because of disease.

3.2.4. Data entry, analysis and presentation

Data (both qualitative and quantitative) were cleaned and entered into Microsoft office Excel sheet every day after administering questionnaire to prevent loss of data. All the surveyed data were analyzed using statistical procedures for social science (SPSS) version 16 (SPSS, 2007). Statistical variations for categorical data were tested by means of cross tabs, with significant differences at $P < 0.05$; while the descriptive statistics for the numerical data was subjected to one way analysis of variance (one-way ANOVA) using the general linear model procedure of SPSS. Mean comparisons was carried out using Duncan's multiple range tests. Levels of significance also considered at $P < 0.05$.

For parameters required ranking, indices were calculated to provide ranking of major feed type, major constraints for the beef production in the study area and economically important cattle disease in the different districts (Mula *et al*, 2006). The indices were calculated as follows;

Index= Sum of (3 x number of household ranked first + 2 x number of household ranked second + 1 x number of household ranked third) given for an individual reason, criteria or preference divided by the sum of (3 x number of household ranked first + 2 x number of household ranked second + 1 x number of household ranked third) for overall reasons, criteria or preferences.

Analyzed data was presented using table, figures, percentages, means, and standard error in the process of examining and describing beef cattle production, marketing functions, facilities, services, intermediaries, market and animal characteristics.

4. RESULT AND DISCUSSION

4.1. Socio Economic Characteristics of Inhabitants in the Study Woredas

The socio economic characteristics of sampled households namely: family status, gender aggregates, educational category and religion of the respondent households are presented in Table 3.

4.1.1. Household characteristics

According to the result of the study, Overall, among the sample household (N=276) of cattle fattening participants 77.2% were headed by male (Table 3). This result in the current study is in agreement with the study conducted in Darolabu district, Western Hararghe (Dereje, 2011) who was reported 78.3% of male headed households. However, the proportion of household headed by male lower than the proportion 96.6% reported in Jimma zone (Oumer, 2011) and 95.6% reported in Ilu Aba Bora zone (Teshager, 2012). The study showed that high proportion of marriage and low frequency of divorced. As per the result of this study there is high proportion of married households 84.1% in Lome, 80.4% in Adama district and 71% in Boset and small proportion of divorce 4.3%, 2.9% and 5.8% in Lome, Adama and Boset district, respectively. The proportion of single and widowed household in Lome, Adama and Boset district were 1.4%, 3.6%, 14.5% and 10.1%, 13%, 8.7%, respectively.

It is obvious that education is a base for any development. Overall, out of the total households interviewed (N=276), 62% were illiterate and it was significantly different ($p < 0.001$) among the three districts, being highest in Boset 79.7% followed by Lome 65.2% and Adama 51.4% *woredas*. This result is in agreement with the study conducted in Bure which reported illiteracy rate of 57% (Adebaby, 2009) and that reported 50% illiteracy in Western Hararghe (Dereje, 2011). Relatively more households 24.6% in Adama attended junior secondary education and high school graduate than those in Lome 10.1% and Boset 5.8% *woredas*. This may be due to the fact that most of the *kebeles* in Adama *woreda* were closer to Adama town, which has a better access to schools.

Table 3. Sex, level of education, religion and marital status of respondents in the study area

| Factors | District, Average (%) | | | Overall (N=276) | p |
|------------------------|-----------------------|--------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Head | | | | | |
| Male | 84.1 | 76.8 | 71 | 77.2 | ns |
| Female | 15.9 | 23.2 | 29 | 22.8 | ns |
| Education level | | | | | |
| Illiterate | 65.2 ^{ab} | 51.4 ^b | 79.7 ^a | 62 | *** |
| Reading and writing | 20.3 | 17.4 | 14.5 | 17.4 | ns |
| Grade 1 - 8 | 10.1 ^b | 24.6 ^a | 5.8 ^b | 16.3 | ** |
| Grade 9 - 12 | 4.3 | 6.5 | - | 4.3 | ns |
| Religion | | | | | |
| Orthodox | 60.9 | 68.8 | 66.7 | 66.3 | ns |
| Muslim | 18.8 | 17.4 | 27.5 | 20.3 | ns |
| Protestant | 20.3 ^a | 13.8 ^{ab} | 5.8 ^b | 13.4 | * |
| Marital status | | | | | |
| Married | 84.1 | 80.4 | 71 | 79 | ns |
| Single | 1.4 ^b | 3.6 ^b | 14.5 ^a | 5.8 | ** |
| Widowed | 10.1 | 13 | 8.7 | 11.2 | ns |
| Divorced | 4.3 | 2.9 | 5.8 | 4 | ns |

Means on the same row with different superscripts are significantly different ($P < 0.05$); N= Number of respondents; ns= not significant; * $p < 0.05$, ** $P < 0.01$, *** $P < 0.001$

As shown on Table 3; the dominant religion in the study area was Orthodox and 68.8%, 66.7% and 60.9% of the population follows Orthodox in Adama, Boset and Lome, respectively. This is supported with census conducted by the Central Statistical Agency of Ethiopia (CSA, 2007), in

East Shewa the majority of the inhabitants professed Ethiopian Orthodox Christianity, with 69.33% of the population having reported they practiced that belief. Overall, the major occupation of the respondents was farmers 72.5%, ealders 12.3%, group leader 9.4% and political leader 4.7%.

The overall average age of the household head was 45.68 years old, and ranged from 25 to 71 years (Appendix Tables 3), and it was significantly different ($p < 0.001$) among the three districts, being the highest in Lome 48.98 followed by Boset 46.92 and Adama 43.40 years old on average (Table 4). The present result was comparable with the 46.2 years obtained in North Gondar (Azage, 2009) and 44.3 years obtained for cattle keepers in Fogera district (Belete, 2006).

In Ethiopia, all age groups who are above ten years old in the rural areas are involved in agricultural activities (CSA, 2008). According the finding of the present study, out of the total respondents (276) of the interviewed households in this study average number of females 1-15 years old (1.78) ($p < 0.001$), males 1-15 years old (1.83) ($p < 0.01$), female 15-30 years old (1.24) ($p < 0.001$), male 15-30 years old (1.25) ($p < 0.001$) and adults above 30 years old (2.35) ($p < 0.001$) was found in each household (Table 4). Thus, the above results indicate that family members in the productive age group were higher than that of the non-productive age groups and this in turn implies that households have good source of family labour for different farm activities.

As shown on Table 4, the overall mean family size was 8.46 heads per household, and it was not significantly different ($p < 0.001$) among the two districts; Lome and Boset , being the highest in Boset 9.64 followed by Lome 9.18 and Adama 7.50 number of family per household. The present result is similar with the result found in west Hararghe, with total family size per household 9.68 (Dereje 2011). The average family size obtained in the study area was also comparable with the result (7.39 and 7.26 heads per household) obtained in the Shashemene–Dilla (Sintayehu, 2007) and Wolayta (Ayantu, 2006), areas, respectively. However, it was higher than the national average (5.20), reported by CACC (2002) and (5.70) reported by (Tesfaye, 2008).

Table 4. Age of household head and family structure

| Age structure | District, mean (number) | | | Overall (N=276) | SE | p |
|----------------|-------------------------|--------------------|--------------------|--------------------|-------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | | |
| HHH age | 48.99 ^a | 43.41 ^c | 46.93 ^b | 45.68 | 0.425 | *** |
| Female (1-15) | 2.09 ^a | 1.54 ^b | 1.97 ^a | 1.78 | 0.058 | *** |
| Male (1-15) | 1.90 ^{ab} | 1.64 ^b | 2.13 ^a | 1.83 | 0.068 | * |
| Female (15-30) | 1.35 ^a | 1.09 ^b | 1.43 ^a | 1.24 | 0.042 | ** |
| Male (15-30) | 1.51 ^a | 1.08 ^b | 1.32 ^{ab} | 1.25 | 0.053 | ** |
| Above 30 | 2.33 ^b | 2.14 ^b | 2.81 ^a | 2.36 | 0.065 | *** |
| Family size | 9.19 ^a | 7.51 ^b | 9.64 ^a | 8.46 | 0.172 | *** |

Means on the same row with different superscripts are significantly different ($P<0.05$), N= Number of respondents; SE=Standard Error of Mean; HHH=Household head; * $p<0.05$, ** $p<0.01$, *** $p<0.001$

4.1.2. Land holding and its usage

Area under annual crop is highest in Lome. However land used for perennial crop and Pasture is higher in Boset. Land holding and land use pattern of respondents in the study *woredas* are summarized in Table (5).

Result from this survey revealed that the natural pasture for grazing is communally owned. The overall average land holding per household in the three *woredas* was 3.18 ha per household and it was significantly different ($p<0.001$) among the three *woredas*, being the highest in Lome 4.30 followed by Boset 3.15 and Adama 2.63 hectare of land per household. The maximum and minimum land holding under annual crops was 9 ha and 0.25 ha, respectively (Appendix Tables 4). And the maximum and minimum land holding under pasture was 2 ha and 0 ha, respectively. Similar result was reported by Teshager (2012) in Ilu Abora zone, with average land holding per household 3.05 hectare. The average land holding in the study area were greater than the value reported for Gomma district of Jimma zone 1.93 ha (Belete, 2009); Alaba in southern Ethiopia

2.3 hectare (Tesdeke, 2007) and the national average land holding 1.2 ha an average of 1.14 for the Oromia Region (CSA 2008). On the other hand, this result is smaller than the mean average land holding of 5.28 hectare per household in Metema district (Tesfaye 2008). The respondents who had better lands were having better pasturelands i.e. they allocate a plot of land in their homestead for animal feeds as well. In the surveyed *woredas* most of the farmers owned 0.6 to 1.5 and 0.1 to 0.3 hectares of crop and pasture lands, respectively. A few respondents had large areas of the crop lands.

Table 5. Land holding of cattle fattening respondents

| Land holding | District, mean (ha) | | | | SE | p |
|----------------------------|---------------------|-------------------|-------------------|--------------------|-------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | Overall (N=276) | | |
| Annual crop land owned | 2.75 ^a | 1.52 ^b | 1.63 ^b | 1.85 | 0.057 | *** |
| Annual crop land rented | 1.24 ^a | 0.64 ^b | 0.84 ^b | 0.84 | 0.051 | *** |
| Total annual crop land | 3.99 ^a | 2.16 ^b | 2.47 ^b | 2.69 | 0.079 | *** |
| Perennial crop land owned | 0.31 | 0.30 | 0.39 | 0.33 | 0.029 | ns |
| Perennial crop land rented | 0.00 | 0.03 | 0.03 | 0.02 | 0.006 | ns |
| Total perennial crop land | 0.31 | 0.33 | 0.41 | 0.34 | 0.030 | ns |
| Total pasture land | 0.15 ^b | 0.13 ^b | 0.34 ^a | 0.19 | 0.023 | * |
| Total land holding | 4.30 ^a | 2.63 ^b | 3.15 ^c | 3.18 | 0.087 | *** |

*Means on the same row with different superscripts are significantly different (P<0.05), N= Number of respondents; SE= Standard Error Mean; ns= not significant; **p<0.01, ***p<0.001*

4.1.3. Livestock holding and ownership of cattle in the household

Results of this study revealed that, overall 58% of the respondents (N=160), indicated that male in the household (husband) is the owner of cattle in the household, This value of cattle ownership in the household is similar to the 54% reported for the Borena area (Daniel, 2008). About 11.2% owned by the female (wife) and 19.2% owned both by husband and wife. About 11.6% of the respondents indicated that every family member, including children, has the role in the ownership of cattle (Figure 1).

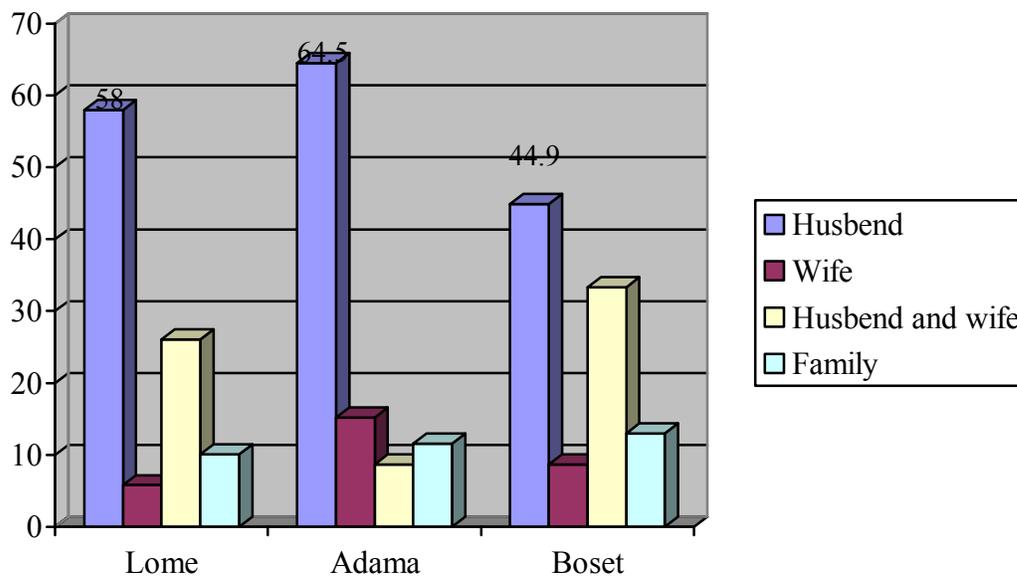


Figure 1. Owner of cattle in the household

Cattle holdings and herd structure in the three *woredas* are presented in Table 6. The overall mean cattle holding per household were 10.39 heads per household and significantly differ among the three *woredas*, being highest in Lome 12.86 followed by Boset 10.83 and Adama 8.95 heads per household. This value of cattle holding is comparable to the 8.7 heads reported for the North Gondar area (Azage, 2009) and 8.01 heads per household reported for the Mekelle area (Negussie, 2006). However, the current finding was much lower than the holdings in Metema *woreda* (15.53 heads per household) reported by Tesfaye (2008).

Regarding herd composition, the overall average number of oxen in the three woredas (4.40 heads per household), milking cow (1.95 heads per household), dry cow (1.10 heads per household), goat (5.06 heads per household), sheep (3.73 heads per household), chicken (12.24 heads per household) in the herd was higher ($P<0.05$) than other classes of animals. The average number of heifers was (1.15 heads per household), and they are used for replacement purposes. The average number of breeding bulls (0.22 heads per household) was the lowest in the herd as bulls are shared among households in the community for breeding purpose.

Table 6. Livestock holding of the respondents

| Livestock composition | District, mean (number) | | | Overall (N=276) | SE | p |
|-----------------------|--------------------------|-------------------------|--------------------------|--------------------|--------------|------------|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | | |
| Milking cows | 2.37 ^a | 1.66 ^b | 2.11 ^a | 1.95 | 0.062 | *** |
| Dry cows | 1.06 | 1.04 | 1.27 | 1.10 | 0.053 | ns |
| Oxen | 5.88 ^a | 3.90 ^b | 3.93 ^b | 4.41 | 0.131 | *** |
| Calves | 2.10 ^a | 1.09 ^b | 1.98 ^a | 1.57 | 0.069 | *** |
| Young heifer | 1.10 | 1.14 | 1.21 | 1.15 | 0.069 | ns |
| Bull | 0.35 ^a | 0.10 ^b | 0.30 ^a | 0.22 | 0.027 | *** |
| Total cattle | 12.86^a | 8.95^c | 10.83^b | 10.39 | 0.212 | *** |
| Goats | 2.65 ^c | 4.31 ^b | 8.98 ^a | 5.06 | 0.267 | *** |
| Sheep | 3.39 ^b | 3.29 ^b | 4.92 ^a | 3.73 | 0.201 | ** |
| Donkey | 2.02 ^b | 2.57 ^a | 1.97 ^b | 2.29 | 0.100 | * |
| Horses | 0.45 | 0.59 | 0.34 | 0.49 | 0.048 | ns |
| Mule | --- | 0.13 | --- | 0.07 | 0.014 | *** |
| Chicken | 12.07 | 12.29 | 12.32 | 12.24 | 0.432 | ns |

*Means on the same row with different superscripts are significantly different ($p<0.05$), N= Number of respondents; SE=Standard Error of Mean; ns=not significant; * $p<0.05$, ** $p<0.01$, *** $p<0.001$*

4.1.4. Family labour for cattle fattening and income sources

According to CSA (2003), family workers constitute the highest proportion (56%) of the population in agricultural households who were engaged in agricultural activities at country level. And about 38 % of the working population was own account workers working in their farms working alone or with the help of family members but without hiring labor.

Based on this result of the present study, the majority 69.9% (N=193) of the respondents in the study area revealed that family members are the available manpower for cattle management and production in their home (Table 7), regarding work distribution in their home 67.8% of the respondents stated that selling beef cattle is done by the male (father) and care regard to herding, feeding and watering is done by daughters and sons (91.3%), daughters and sons (78.6%) and father, mother, daughters and sons (96%), respectively. The remaining 26.4% use family and hired labour for cattle management and production, among the total respondents only 3.6% use hired labour in there home, this result is similar to (3.9%) result for Ilu Aba Bora zone (Teshager, 2012) and the report of CSA (2003); the proportion who hires other in their farm was only about 4% showing the low capacity of the country's agricultural industry to create employment opportunity for non-holders.

In the study area, crop production is the main sources of income. As presented in Table (7) overall, the major (79.7%) sources of household income are mixed crop-livestock production, being highest in Boset (100%) and did not vary significantly with Lome *woreda* (91.3%), but in Adama *woreda* only 63.8% of the respondents lean on mixed crop and livestock production the remaining 15.9% and 20.3% use pure livestock production and multiple responses (Crop production, livestock production and wage labour) as a source of income, respectively. Pure livestock production is highest income source in Lome than Boset, by 8.7% among the respondents in Lome. This may be due to the fact that most of the *kebeles* in Lome *woreda* were closer to Mojo town, which has a better access to major export abattoirs like ORGANIC and LUNA export slaughter house. In addition to selling beef to foreign markets, the abattoirs supply large amounts of cattle meat to domestic and foreign markets.

Table 7. Sources of income for living and sources of labour

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Sources of income | | | | | |
| Livestock production | 8.7 ^b | 15.2 ^a | -- | 9.8 | ** |
| Crop and livestock | 91.3 ^a | 62.3 ^b | 100 ^a | 79 | *** |
| Multiple responses | -- | 20.3 ^a | -- | 10.1 | *** |
| Sources of labour | | | | | |
| Family | 63.8 ^b | 78.3 ^a | 59.4 ^b | 69.9 | ** |
| Hired | 7.2 | 1.4 | 2.9 | 3.3 | ns |
| Family and hired | 29 ^{ab} | 20.3 ^a | 37.7 ^a | 26.8 | * |

Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; ns= not significant; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

4.2. Beef Cattle Production System

4.2.1. Purpose of rearing beef cattle

Livestock are a major source of cash income and produce a range of intermediate and final products in the traditional farming systems of Ethiopia. Regional differences exist in the relative importance of these products, but in all the cases, the presence of livestock on smallholders' farms enables them to be more productive and stable over time than would be the case in their absence (Rodriguez and Anderson 1985). Purpose of rearing beef cattle and reasons for selling beef cattle in the three study *woredas* are presented in Table 8.

Table 8. Purpose of rearing beef cattle and reasons for selling beef cattle

| Factors | District, Average (%) | | | Overall (N=276) | p |
|----------------------------|-----------------------|--------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Purpose of rearing | | | | | |
| Selling | 21.7 | 15.2 | 15.9 | 17 | ns |
| Selling and farming | 78.3 | 84.8 | 84.1 | 83.3 | ns |
| Reasons for selling | | | | | |
| Settle government debt | 5.8 | 10.9 | 7.2 | 8.7 | ns |
| Cover school fee | -- | 23.2 ^a | 1.4 ^b | 12 | *** |
| Replace older stock | 49.3 ^b | 53.6 ^{ab} | 68.1 ^a | 55.4 | * |
| Multiple responses | 44.9 ^a | 11.6 ^b | 23.2 ^b | 22.8 | *** |

Means on the same row with different superscripts are significantly different ($p < 0.05$); N=Number of respondents; ns= not significant; * $P < 0.05$, *** $P < 0.001$

According to result of the study above (Table 8) out of 276 respondents, 47 beef cattle fattening participants accounted for 17% of the herd owners seek to accumulate beef cattle to generate cash income from the sell, highest value in Lome with 21.7% and followed by Boset (15.9%) and Adama (15.2%). Among the total respondents, 84.8%, 84.1% and 78.3% of respondents rear beef cattle to generate cash income and farming purposes in Adama, Boset and Lome *woredas*, respectively. This purpose of rearing beef cattle in the three *woredas* in East Shewa zone was higher than to other finding conducted in Borena zone (Daniel, 2008). 52.7% of the herd owners seek to accumulate beef cattle to generate cash income and farming purposes. Regarding to the reason of selling beef cattle, the study revealed that, overall 153 (55.4%) of the respondents sell there cattle to replace older stocks, and this did not significantly differ between the three study *woredas*. In Adama Zuria *woreda* (23.2%) of respondents reported that they sell there cattle to cover school fee of their children's learning in Adama town.

4.2.2. Access of farmers to information and training

Information is a base to increase productivity in the small scale production. Some farmers got information about improved beef production from the kebeles extension agents and mass media (radio and newspaper) who were giving extension services around on the contrary most farmers did not get any information about beef production and perhaps that is why involvement of the farmers in beef production in study area was very low. Based on the present study, farmers in the study area get information on practicing beef production from different sources. As it is indicated on Table 9 out of 276 respondents 33.7% and 34.4% of them follow traditional way and used indigenous knowledge from their parents about the rearing techniques, respectively. Farmers were getting information from a mass media (the radio), about 18.8% of the farmers indicated that mass media such as radio and news paper as a good source of information on improved beef production. There are also few NGO's giving a kind of extension services on beef production. As it is shown in the table, contribution from development agent, farmer association and NGO's is only 33.7%. This result shows comparatively high participation of farmer association and NGO's in the area than (4%) obtained for the pastoral society in Borena zone (Daniel, 2008). Regarding training on beef development, overall 199 (72.1%) respondents take training improved beef production for few days at *woreda* and PA level.

Table 9. Means of information to improve beef production

| Factors | District, Average (%) | | | Overall (N=276) | p |
|---------------------------------|-----------------------|------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Means of information | | | | | |
| Mass media | 13 ^b | 29 ^a | 4.3 ^b | 18.8 | *** |
| Follow traditional way | 56.5 ^a | 21 ^b | 36.2 ^b | 34.4 | *** |
| Family back ground | 17.4 | 13 | 8.7 | 13 | ns |
| DA, farmer association and NGOs | 56.5 ^a | 21 ^b | 36.2 ^c | 33.7 | *** |

*Means on the same row with different superscripts are significantly different (p<0.05), N= Number of respondents; DA= Development agent and NGO= Nongovernmental organization; ns= not significant; ***P<0.001*

4.2.3. Cattle housing and waste management

House is basically important to protect both human being and animals from predators, theft and from different weather conditions. Cattle were tethered either on the communal grazing land or in fences near the homestead during summer months. They tether the cattle in the homestead and nearby farmlands to use the cattles' dung for fertilization purposes. The dung was made to fertilize the communal pasture. It is only the oxen that were housed since they are used mainly for traction purposes in the dry and wet seasons. Most farmers house their cattle in the dry as well as wet seasons, although some of them did not house them in both seasons.

Based on the present study on Table 10, over all out of 270 respondents interviewed 116 (42%) of them house their cattle and this did not differ between Adama and Boset *woredas* but better housing is found in Lome *woreda* 52.2% of the respondents house their animal (Appendix Table 10). This result concurs well with the study conducted in Jimma zone (Oumer, 2011); study in Ilu Aba Bora zone (Teshager, 2012). Whereas the rest 151 (54.7%) and 9 (3.3%) of them tether the animal in the yard and did not house cattle, respectively. The same result was obtained (3.3%) who do not house there cattle at all in Ilu Aba Bora zone (Teshager, 2012). Most of the farmers (44.8%) use grass as a roofing material and (93.8%) use mud as flooring material to made the house for their cattle, comparatively better use of corrugated iron and plastic as roofing materials and concrete as flooring material is found in Adama and Lome *woredas*. The management of the cattle is poor even in some kebeles there was no cattle housing which really further exposes the cattle to cold stress which directly affects the productivity of the animals.

As the result of the present study, majority of the respondents (33%) use the dung as source of fuel (made in to cow dung cake) and for selling. Most of the conflicts in the neighbors (71.4%) and (26.1%) results from animals entering the yard of others and pollution resulted from manure, respectively. The resolving mechanism 32.2% (N=39) is negotiate by the help of elders and giving compensation for the loss or damages.

Table 10. Types of housing and Roofing and flooring materials used in animal housing

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------------------|-----------------------|--------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Type of housing | | | | | |
| In a house | 52.2 | 39.9 | 36.2 | 42 | ns |
| Tethered in the yard | 44.9 | 55.1 | 63.8 | 54.7 | ns |
| In fences | 2.9 | 5.1 | -- | 3.3 | ns |
| Roofing material | | | | | |
| Corrugated iron | 18.8 ^a | 10.1 ^{ab} | 5.8 ^b | 11.2 | * |
| Grass | 14.5 ^b | 40.6 ^a | 30.4 ^a | 31.5 | ** |
| Plastic | 18.8 ^{ab} | 31.9 ^a | 17.4 ^b | 25 | * |
| Multiple response | 10.1 ^a | -- | -- | 2.5 | *** |
| Flooring material | | | | | |
| Concrete | 7.2 | 5.1 | -- | 4.3 | ns |
| Mud | 58 ^b | 78.3 ^a | 53.6 ^b | 67 | *** |

Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; ns= not significant; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2.4. Feed resources

Major feed resources used in different agro ecologies are presented in table (11). Accordingly; crop residue, natural pasture and oil seed cake are the first, second and third major feed resources used in the study area with an index of 0.296, 0.266 and 0.245, respectively. Industrial by product, Concentrates and Molasses treatments were some of the feed resources mentioned by the producers but ranked least. Overall, majority (Figure 2) of the respondents (25%) indicated that teff straws is the major livestock feed types, with the highest in Lome 55.1% followed by Boset 29%. This could be due to the fact that the potential of teff production in Lome *woreda*. The respondents also reported that feed availability depends on seasons. Feed shortage is the main problem especially during dry season in the study area to maintain market oriented livestock development extension.

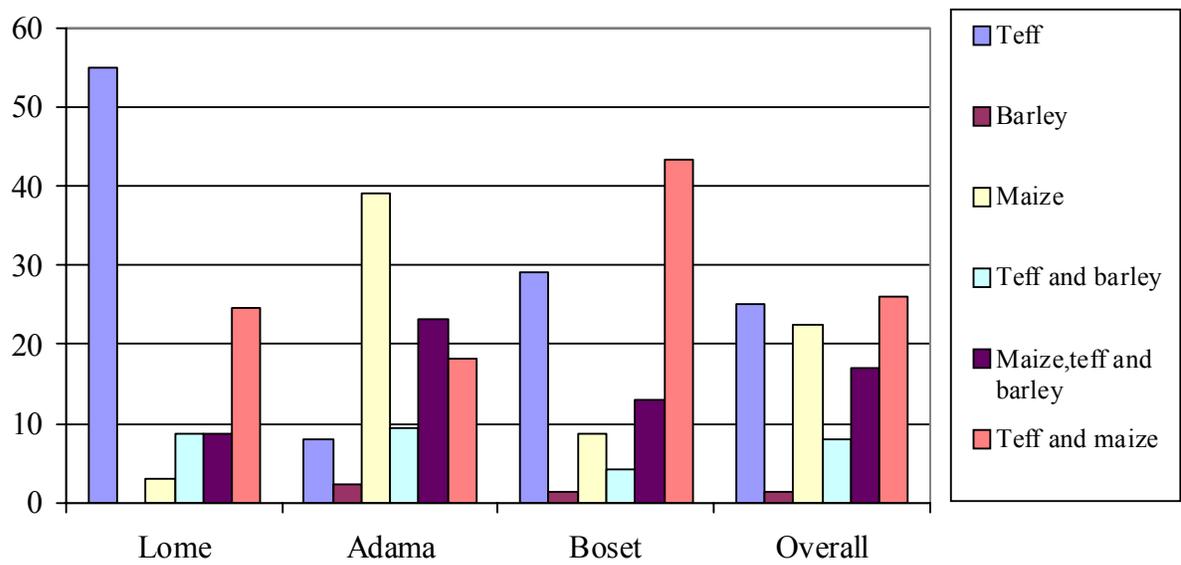


Figure 2. Types of crop residue used for cattle feed

Most of the feed staffs (76.4%) are own and purchased feeds. Among the total respondents (N=276), in Adama Zuria 122 (88.4%) of them use both own and purchased feeds for their beef cattle, followed by Boset 73.9% and Lome 55.1%. Results of the study (Figure 3) revealed that 114 (41.3%) of the respondents spent 200-300 ETB while others 8 (2.9%), 71 (25.7%) and 83 (30.1%) spent 50-100 ETB, 100-200 ETB and above 300 ETB per month, respectively for the purchase of feed.

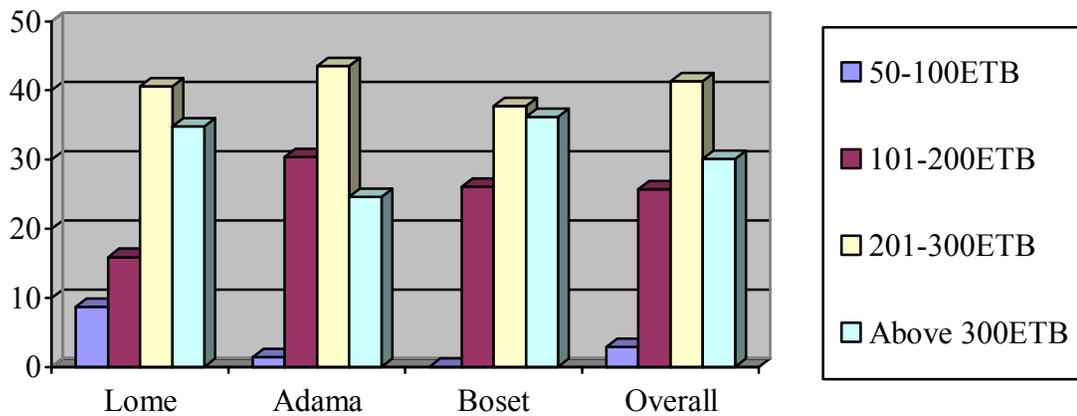


Figure 3. Money spend for feed per month

Table 11. Ranking of major feed type in the different districts (%)

| | Districts,index(mean) | | | | | | | | | | | | | | | |
|-----------------------|-----------------------|------|------|-------|---------------|------|------|-------|--------------|------|------|-------|---------|------|------|-------|
| | Lome (N=69) | | | | Adama (N=138) | | | | Boset (N=69) | | | | Overall | | | |
| | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index |
| Oil seed cake | 17.4 | 21.7 | 15.9 | 0.186 | 27.5 | 40.6 | 15.2 | 0.298 | 11.6 | 23.2 | 40.6 | 0.203 | 21.0 | 31.5 | 21.7 | 0.245 |
| Crop residue | 78.3 | 10.1 | 13.0 | 0.447 | 29.0 | 2.2 | 16.7 | 0.180 | 53.6 | 20.3 | 24.6 | 0.380 | 47.5 | 8.7 | 17.8 | 0.296 |
| Natural pasture | 4.3 | 37.7 | 42.0 | 0.217 | 20.3 | 36.2 | 23.9 | 0.262 | 23.2 | 52.2 | 18.8 | 0.321 | 17.0 | 40.6 | 27.2 | 0.266 |
| Concentrates | -- | 10.1 | 2.9 | 0.039 | 5.8 | 3.6 | 3.6 | 0.047 | 2.9 | 1.4 | 1.4 | 0.021 | 3.6 | 4.7 | 2.9 | 0.039 |
| Industrial by product | -- | 20.3 | 26.1 | 0.111 | 13.0 | 14.5 | 31.9 | 0.167 | 7.2 | 2.9 | 13.0 | 0.066 | 8.3 | 13 | 25.7 | 0.128 |
| Molasses treatments | -- | -- | -- | --- | 4.3 | 2.9 | 8.7 | 0.046 | 1.4 | -- | 1.4 | 0.009 | 2.5 | 1.4 | 4.7 | 0.025 |
| Total | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 |

Index= sum of [3 for rank 1 + 2 for rank2 + 1 for rank 3] for each factors divided by sum of all the factors

The major feeding systems in the study area was Semi-grazing 111 (40.2%) followed by multiple responses 84 (30.4%) (Zero grazing and semi-grazing), the remaining 18.8%, 6.9% and 3.6% comprises full grazing, zero grazing and multiple responses (semi and full grazing), respectively (Table 12). In Adama, 9.4% of the respondents use zero grazing system which is higher than Boset and Lome 8.7% and 0%, respectively. In the study district 70.3% of the respondents grow forage crops for their cattle, among the forage crop grown by cattle fattening participants grass and forage legume (94.3%) takes the first, followed by tree legume.

Table 12. Types of grazing system used for beef animals

| Factors | District, Average (%) | | | Overall (N=276) | p |
|-----------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Grazing system | | | | | |
| Zero grazing | 8.7 | 9.4 | -- | 6.9 | ns |
| Semi-grazing | 60.9 ^a | 46.4 ^b | 5.8 ^c | 40.2 | *** |
| Full grazing | -- | 7.2 ^b | 60.9 ^a | 18.8 | *** |
| Zero and semi-grazing | 21.7 | 31.9 | 26.1 | 30.4 | ns |
| Semi and full grazing | 8.7 | -- | 5.8 | 3.6 | ns |

*Means on the same row with different superscripts are significantly different ($p < 0.05$), N= Number of respondents; ns= not significant; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

In the study area the major feed supplements used for the beef cattle includes amole (salt), concentrate feed, industrial by-product and maize. As reported by 62% of the respondents amole (salt) is the major feed supplement. There are different ways of supplementation, from 276 respondents 108 (67.8%) of them use the supplement as a mix (appendix 8).

4.2.5. Drinking water sources

In the study site they have water sources for watering animal like rivers, pipeline, ponds and well (Appendix Tables 7). Majority (26.4%) of the owner use pond followed by (23.9%), (22.1%) and (9.4%) use rivers, pipeline and/or pond and multiple responses (river, pipeline and wells) for watering animals, respectively. This water sources not available through out the year. Shortage of water encountered during dry season especially during January to June. At these time farmers use pipeline and well as mechanism of adoptability water shortage problems (Table 13).

With respect to watering frequency, in the study area about 98.2% of the respondents offered drinking water for their fattening cattle twice per day and the remaining 1.8% offered drinking water one times per day. Regarding the method of water delivery, overall 70.3% of the respondents deliver water by bringing the animal to the water source (Table 13).

About 88% of the respondents revealed that fattening cattle have got access to the water source within 500 meters-1 km distance and the rest 10.5% of the respondents revealed that water is served within 2 km distance; in Adama some respondents (2.9%) got access to the water source within 3-4 km (Figure 4).

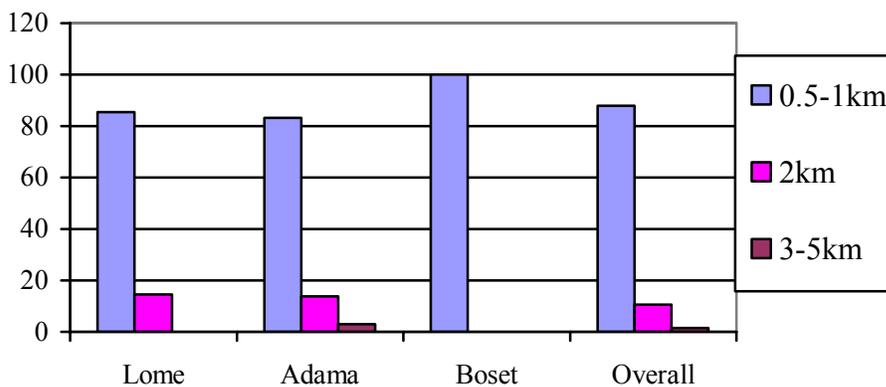


Figure 4. Distance moved by the animal for searching water sources

Table 13. Source of water, watering frequency and method of delivery for the beef cattle

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------------------------|-----------------------|-------------------|--------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Source of water | | | | | |
| Pipeline | 18.8 ^b | -- | 53.6 ^a | 18.1 | *** |
| River | 29 | 33.3 | -- | 23.9 | ns |
| Pond | 13 ^b | 34.8 ^a | 23.2 ^{ab} | 26.4 | ** |
| Pipeline and pond | 1.4 ^b | 31.9 ^a | 23.2 ^a | 22.1 | *** |
| River, pipeline & wells | 26.1 ^a | -- | -- | 6.5 | *** |
| Frequency | | | | | |
| Once a day | 7.2 ^a | -- | -- | 1.8 | ** |
| Twice a day | 92.8 ^b | 100 ^a | 100 ^a | 98.2 | *** |
| Method of delivery | | | | | |
| Transport the water | 1.4 | 1.4 | -- | 1.1 | ns |
| Bring the animal to the source | 98.6 ^a | 47.1 ^b | 88.4 ^a | 70.3 | *** |
| Transport and bring the animal | -- | 51.4 ^a | 11.6 ^b | 28.6 | *** |

*Means in the same row with different superscripts are significantly different ($p < 0.05$), N= Number of respondents; ns= not significant, ** $p < 0.01$, *** $p < 0.001$*

4.2.6. Cattle breeds and breeding techniques

4.2.6.1. Breeds

In Ethiopia according to CSA 2003, 99.4 % of the total cattle populations in the country are local breeds and the remaining are the hybrids and the exotic breeds that accounted for about 0.5 % and 0.1 %, respectively. During the current study out of the 276 respondents interviewed only (33%) of them owned the cross-breeds, and the rest 181 (65.6%) and 4 (1.4%) own local/indigenous and multiple responses (local and exotic breeds), respectively (Figure 5).

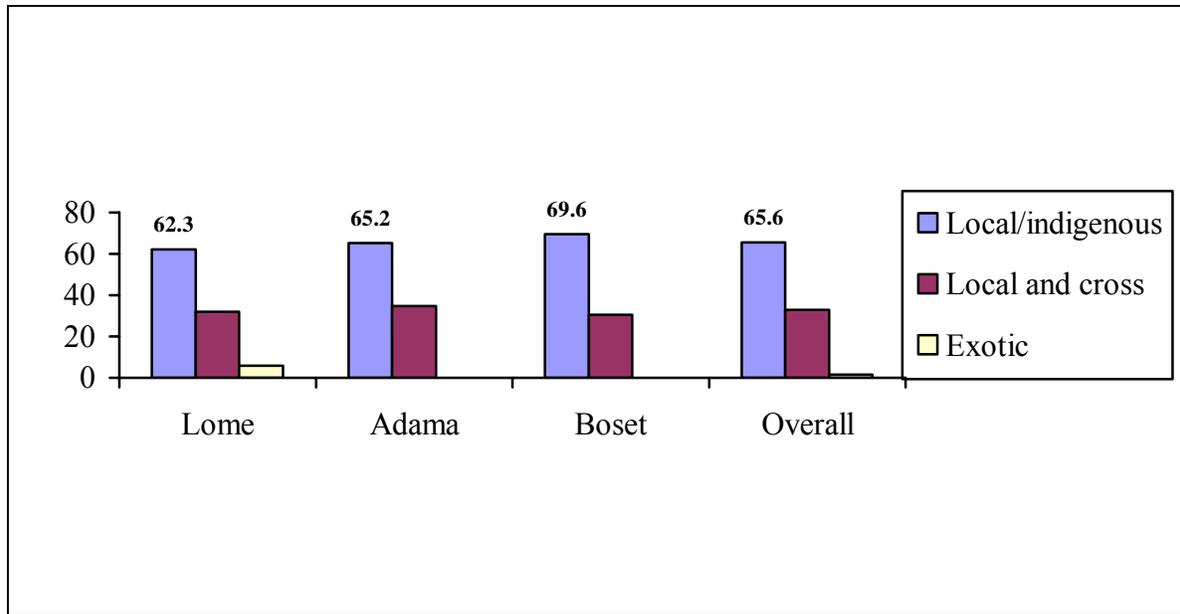


Figure 5. Types of cattle breed kept by the cattle fattening participants

Indigenous cattle have been naturally selected for adaptive rather than for productive traits. Selection takes a long time and requires sustained effort to make substantial genetic progress and impact on productivity. However, due to high genetic variability among those indigenous animals, there is a potential to select for productive traits. There are some individual animals with relatively high beef/milk production. Indigenous cattle are preferred to exotic/introduced animals for their robust adaptive attributes. Subsistence smallholders select particularly female breeding animals for a range of desirable attributes of their animals, but some of them attributes are related to behavior and body form of animals, which are not necessarily direct related to production functions (Bondoc *et al.*, 1989, Dereje, 2005). Based on the present study most of the farmers (43.8%) select local/indigenous animals because of their easiness for management.

4.2.6.2. Breeding techniques

Breeding techniques in the study area are of two types. They are natural mating and artificial insemination.

4.2.6.2.1. Natural mating

Bulls can be used for two main types of natural breeding, either free mating in the range or controlled hand mating. In the former system heat detection is carried out by the bull and cows in heat are usually mated several times during each heat period. One bull can cover 40-50 cows per year, provided there is no market seasonability in the occurrence of heat. In the large herds several bulls may have to be used in rotation, since it is often impossible to introduce two or more bulls at the same time due to aggressive behavior towards one another. In hand-mating systems heat detection and timing of service is carried out by the farmer and each cow is mated once or twice during each heat period. In this situation a bull can be used to mate three to four cows per week or 150-200 cows per year. If a bull is used after a period of sexual rest exceeding two weeks, the first ejaculate is usually poor quality and therefore a repeated mating should always be done after several minutes (Flavey *et. al.*1999). In the current study (Table 14) most of the farmers (35.5%) use natural mating.

Table 14. Types of breeding techniques used by the cattle fattening participants

| Factors | District, Average (%) | | | Overall (N=276) | p |
|----------------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Breeding techniques | | | | | |
| AI | 5.8 ^b | 21.7 ^a | 26.1 ^a | 18.8 | ** |
| Natural mating | 58 ^a | 30.4 ^b | 23.2 ^b | 35.5 | *** |
| AI and natural mating | 34.8 | 47.8 | 50.7 | 45.3 | ns |

*Means on the same row with different superscripts are significantly different (p<0.05), N= Number of respondents, AI=Artificial insemination; ns= not significant; **p<0.01, ***p<0.001*

Development and spread of AI programs has many advantages. As indicated above on table (14), overall out of 276 respondents only a few respondents i.e. 53 (19.2 %) bred their cows with artificial insemination, highest in Boset 26.1% followed by Adama Zuria 21.7% and Lome 7.2%. This may be due to the fact that most of the *kebeles* in Adama and Boset were closer to Adama and Welenchiti town, which has a better access to private and government veterinary services. The remaining 125 (45.3%) use both artificial insemination and natural mating.

4.3. Beef Cattle Marketing System

4.3.1. Types of markets

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;).

Primary markets are district town markets where the sells volume does not exceed 500 animals per week. The major sellers are producers 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. Based on the above classification, the available livestock markets in the study area are composed of three primaries, four secondary and two terminal markets.

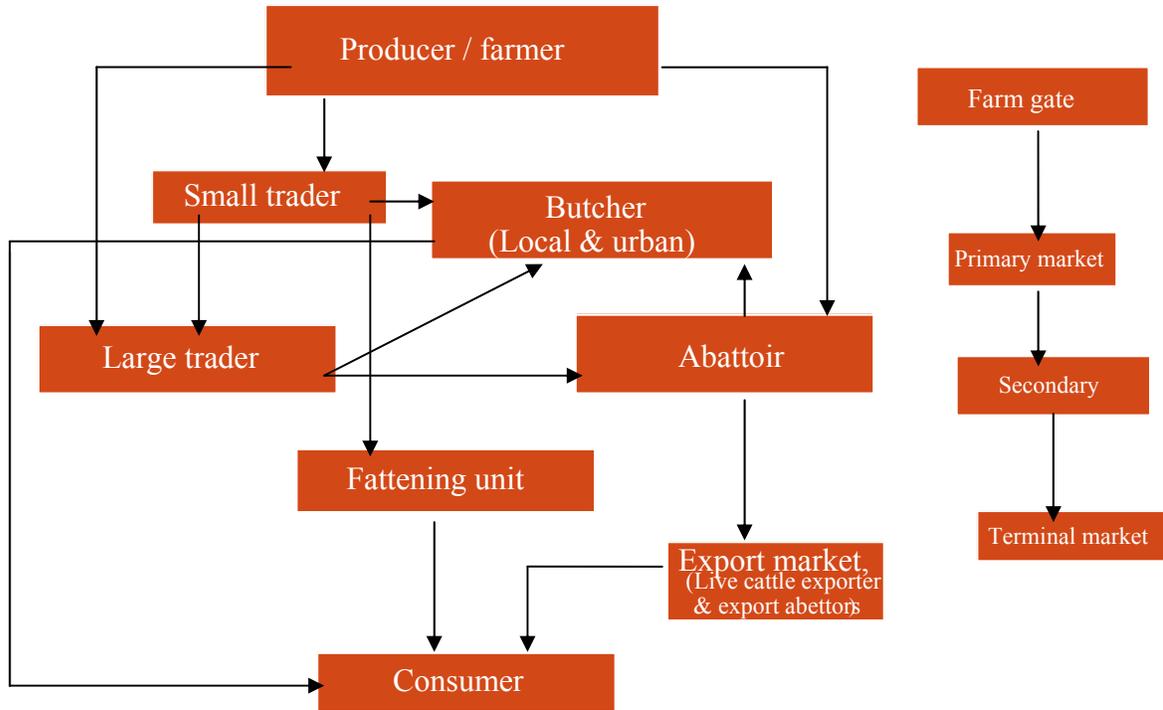
4.3.2. Market chain and marketing actors

The market for beef cattle is classified into three groups: consumers, processors and institutional buyers. The last group includes hotels, restaurants, burger joints, fastfood chains, cafeterias, supermarkets and hospitals. In this study, different types of market participants were observed in each of the markets surveyed. These include farmers/producers, traders, butchers, brokers, hotel owners, brokers/commission agents and consumers.

In the study area, different cattle marketing channels were identified in exchange functions between producers/farmers, market actors and finally to consumers.

1. Producers/farmers -small/medium traders -large traders –butchers -consumers;
2. Producers/farmers - small/medium traders -butcher -consumers;

3. Producers/farmers -large traders -butcher -consumers;
4. Producers/farmers -small/medium traders-large traders-export market
5. Producers/farmers -large traders -export market



Source: Survey result (own formulation)

Figure 6. Cattle marketing channel of the East Shewa Zone (2011/2012)

4.3.3. Beef cattle selling practices and market preferences

Results of the study (Table 15) revealed that 40.9% (N=113) of the respondents prefer to sale their cattle at Adama cattle market (terminal market) and 20.3% preferred to sale at Walanchiti cattle market (secondary market), while the remaining 20.3%, 13.8% and 4.7% of the producers preferred to sale at Mojo, Wonji and at farm get/local markets, respectively.

Table 15. Markets where mostly the producer sales their beef cattle

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Place of market | | | | | |
| Adama cattle market | -- | 72.5 ^a | 18.8 ^b | 40.9 | *** |
| Wonji cattle market | -- | 27.5 | -- | 13.8 | |
| Walanchiti cattle market | -- | -- | 81.2 | 20.3 | |
| Mojo cattle market | 81.2 | -- | -- | 20.3 | |
| At farm get/local market | 18.8 ^a | -- | -- | 4.7 | |

*Means on the same row with different superscripts are significantly different ($p < 0.05$), N= Number of respondents; *** $p < 0.001$*

The result of the study (Table 16) showed that, the major buyers of the beef cattle from the farmer/producer (45.7%) are traders; being highest in Boset (59.4%) followed by Adama (46.4) and 30.4% in Lome. And the remaining 11.6%, 10.9% and 31.9% are local butcher, abattoir and multiple responses (traders, local butcher and abattoir), respectively.

Table 16. Major buyers of the beef cattle from the producers

| Factors | District, Average (%) | | | Overall (N=276) | p |
|---------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Major buyers | | | | | |
| Traders | 30.4 ^b | 46.4 ^a | 59.4 ^a | 45.7 | *** |
| Abattoir | 34.8 ^a | 4.3 ^b | -- | 10.9 | *** |
| Local butcher | 5.8 ^b | -- | 40.6 ^a | 11.6 | *** |
| Multiple responses | 29 ^b | 48.8 ^a | -- | 31.9 | *** |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; *** $p < 0.001$*

The main reasons for preference of the above markets by the respondents were (46.7%), the relative advantage of prices given in those markets, (44.9%) of the respondents preferred a particular market mainly because of its relative advantage of prices and proximity of the market and the remaining (8.3%) of the respondents preferred a particular market mainly because of its proximity (Table 17). Similar findings by Daniel (2008) in Borena region reported that; the main reasons for preference of the above markets were (45.0%) of the respondents proximity of the markets and the prices given in those markets.

Regarding the period of selling of cattle, overall 129 (47.8%) of the respondents stated that they sell their beef cattle when the market price is high. The other (37.3%) stated they sell their beef cattle when there is high selling price at the markets, during the harvest seasons and when need arise, while the remaining 8.7% and 6.2% mostly sell only if need arises at the household and during the harvest seasons, respectively. This finding was less than the results of Daniel (2008) that revealed, in Borena region most of the producer 61.2% stated that they sell their beef cattle when the market price is high.

Table 17. Reasons of preference to sell cattle at a particular market and season of sell

| Factors | District, Average (%) | | | Overall (N=276) | p |
|-----------------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Reasons | | | | | |
| Relative advantage of price | 59.4 ^a | 57.2 ^a | 13 ^b | 46.7 | *** |
| Proximity of the market | 4.3 ^b | 3.7 ^b | 21.7 ^a | 8.3 | *** |
| Proximity and price | 36.2 ^b | 39.1 ^b | 65.2 ^a | 44.9 | *** |
| Season of sell | | | | | |
| When price is high | 50.7 | 46.4 | 47.8 | 47.8 | ns |
| During harvest season | 7.2 | 8.7 | -- | 6.2 | ns |
| When need arises | 8.7 | 7.2 | 11.6 | 8.7 | ns |
| Multiple responses | 33.3 | 37.7 | 40.5 | 37.3 | ns |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); Multiple responses; when price is high, during harvest season and when need arises; N= Number of respondents; ns=not significant, ** $p < 0.01$; *** $p < 0.001$*

4.3.4. Transportation systems

According to the result of the study (Table 18), that 97.1% of the respondents trek their cattle to primary, secondary and to the near terminal markets, except in Adama *woreda* (5.8%) of the respondents use truck to transport their cattle to the market. This finding is supported by 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, the producers (64.2%) trek their animals by themselves; overall (16%) use hired labour to trek their cattle to the market; (18.7%) trek their cattle by themselves and neighbors; 0.7% trek by relatives and the remaining 0.4% trek with neighbors. In the study areas producer who hire labour spend on average 15.29 ETB per head of cattle and it was not significantly different ($p < 0.05$) among the three *woredas*.

Table 18. Transportation of beef cattle to the market

| Factors | District, mean (ETB) | | | Overall (N=276) | SE | p |
|--------------------------|----------------------|-------------------|--------------------|--------------------|-------|----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | | |
| Price for hired labor | 15.00 (%) | 15.65 (%) | 15.15 (%) | 15.29 (%) | 0.049 | ns |
| Transportation | | | | | | |
| Trekking | 100 ^a | 94.2 ^b | 100 ^a | 97.1 | | * |
| Use truck | -- | 5.8 | -- | 2.9 | | * |
| Trekking by | | | | | | |
| Themselves | 53.6 ^b | 73.8 ^a | 56.5 ^{ba} | 64.2 | | * |
| Relatives | 2.9 ^a | -- | -- | 0.7 | | * |
| Hired labor | 13 | 13.1 | 24.6 | 16 | | ns |
| Neighbors | 1.4 | -- | -- | 0.4 | | ns |
| Themselves and neighbors | 29 ^a | 13.1 ^b | 18.8 ^{ba} | 18.7 | | * |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; SE= Standard Error of Mean; ns= not significant; * $p < 0.05$*

4.3.5. Market information

The lack of market information reduces the efficiency of the marketing system. Producers do not maximize their returns as they do not get optimum prices. They also do not respond to price changes resulting from supply and demand variations. The lack of market transparency restricts the development of the livestock economy through hampering planning and policy-making. The availability of market information would help producers, traders and exporter to plan production operations and marketing decisions. It would also make a valuable contribution towards better overall government planning and policy-making for the livestock sector (Asfaw, 1994). Sources, reason for selecting the sources and frequency of getting market information are presented in table (19).

Table 19. Sources and frequency of getting market information

| Factors | District, Average (%) | | | Overall (N=276) | p |
|-----------------------|-----------------------|--------------------|-------------------|--------------------|----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Sources | | | | | |
| Relatives | 8.7 | 5.1 | -- | 4.7 | ns |
| Cooperatives | -- | 6.5 | -- | 3.3 | * |
| Own market visit | 30.4 | 26.1 | 31.9 | 28.6 | ns |
| Multiple responses | 36.2 | 28.2 | 34.8 | 31.9 | ns |
| No market information | 24.6 | 34.1 | 33.3 | 31.5 | ns |
| Frequency | | | | | |
| Weekly | 40.4 ^a | 29.7 ^{ab} | 13 ^b | 28.6 | * |
| Fortnightly | -- | 7.7 | 4.3 | 4.8 | ns |
| Sometimes | 59.6 ^b | 62.6 ^b | 82.6 ^a | 66.7 | ** |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); Multiple responses; DA, relatives, cooperatives, neighbors and market visit, N= Number of respondents; ns=not significant, * $p < 0.05$, ** $p < 0.01$*

According to the results above on table (19) market information sources, among 276 interviewed respondents 189 (68.5%); get destination market information before they went out to sell their cattle. Overall, out of 189 respondents 122 (64.6%) of them choose the specified source of information because of its reliability. Regarding sources of market information, most of the respondents (28.6%) preferred own market visit, while the other groups (31.9%) mentioned in addition to market visits they have multiple information sources such as, extension agents, cooperatives and relatives. 4.7% and 3.3% of them mentioned relatives and cooperatives as a source of information, respectively. The remaining 31.5% of the respondents reported that, they do not have destination market information before they went out to sell their cattle. Most of the

respondents (66.7%) in the study area get information some times as required, (28.6%) and (4.8%) of them obtain weekly and fortnightly, respectively.

4.3.6. Development/extension agents' participation

In the study area 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 shown on table (20), 81.5 % (N=276) of the respondents do not have any information from these development/extension agents' operating in the area. Only 51 (18.5%) respondents have certain knowledge on quality of cattle for market from these agents; among this (N=51) respondents, (9.1%) and (2.9%) of them got certain knowledge on quality of beef cattle produced for market and the right time of sale, respectively. The remaining 6.5% of the respondents have acquired knowledge on the time of sale, on quality of beef cattle produced for market and price of cattle at different markets; by the participant development or extension agents in the study area.

Table 20. Advice received from development/extension agents'

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------------------|-----------------------|-------------------|-------------------|--------------------|----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Aspects of advice | | | | | |
| On quality of beef | 14.5 ^a | 4.3 ^b | 13 ^{ab} | 9.1 | * |
| On the time of sale | 10.1 ^a | -- | 1.4 ^b | 2.9 | ** |
| Multiple responses | 1.4 | 6.5 | 11.6 | 6.5 | ns |
| No advice | 73.9 ^b | 89.1 ^a | 73.9 ^b | 81.5 | ** |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); Multiple responses; on quality of beef, time of sale and price, N= Number of respondents; n=not significant; * $p < 0.05$, ** $p < 0.01$*

4.3.7. Price determination

In beef cattle marketing and transactions at the study area (N=276), 73.9% of respondents the determination of the price at the market places were through the negotiation between the

sellers/producers and the buyers (Table 21). The remaining 26.1% of the producers indicated that they are the decision makers on selling of their cattle at the markets. Hence, in the producers survey, 65 (23.6%) of the respondents stated that the brokers do not have any influence when they sell their cattle, but 211 (76.4%) of the respondents stated that brokers influence through lowering the price only by agreement with traders and fluctuating the cattle price in the market. Thus, the roles of the brokers in the study area are often lowering the transaction costs and increase the number of successive negotiations, through lowering the marketing margins of the sellers.

Table 21. Price determinations at market places and broker participations

| Factors | District, Average (%) | | | Overall (N=276) | p |
|------------------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Who determine? | | | | | |
| Seller | 46.4 ^a | 18.8 ^b | 20.3 ^b | 26.1 | *** |
| Seller and buyer | 53.6 ^b | 81.2 ^a | 79.7 ^a | 73.9 | *** |
| Influence of brokers? | | | | | |
| Yes | 20.3 ^b | 94.9 ^a | 95.7 ^a | 76.4 | *** |
| No | 79.7 ^a | 5.1 ^b | 4.3 ^b | 23.6 | *** |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; *** $p < 0.001$*

4.3.8. Seasonal price variations and reason for cattle price variation

According the result of the study (Table 22) about 85.9 % (N=237) of the respondents stated that cattle prices increase during the dry seasons, mostly from January to May. Thus, the number of cattle in the market declines and prices increase. The relatively decreased availability of grass in the range causes the amount of cattle decreased in the market and as result of public holidays this seasons are preferred.

During the rainy (wet) season, mostly July to August the amount of cattle from different producers brought to the market increase the number of cattle in the market and price decrease. As result of the study 228 (82.6%) of the respondent do not prefer to sale their cattle in this seasons. The major reasons for the cattle price variation across months/seasons as stated by the producers in the three study districts; were the seasonal feed and water availability and the socioeconomic factors (fasting periods, holidays). Delay of onset of rainy season results in prolonged dry season and severe drought also causes increased production cost and the number of cattle in the market declines and prices increase. In such an event, grass fails to grow; livestock are deprived of feed and loose their productivity. Working time (summer seasons) and environmental conditions were also among the reasons which play a role in cattle price variation across months.

Table 22. Seasonal price variation in three districs of east shewa zone

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------------|-----------------------|-------------------|-------------------|--------------------|----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| High price | | | | | |
| January-May | 97.1 ^a | 81.2 ^b | 84.1 ^b | 85.9 | ** |
| April | 2.9 ^b | 18.8 ^a | 15.9 ^a | 14.1 | ** |
| Lower price | | | | | |
| July- August | 97.1 ^a | 78.3 ^b | 76.8 ^b | 82.6 | ** |
| July | 2.9 ^b | 21.7 ^a | 23.2 ^a | 17.4 | ** |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; ** $p < 0.01$*

Regarding to the trend of cattle price in the study area (Table 23), Overall the majority, 92.4% (N=255) of the producers believed that the trend for cattle price in their area is increasing and 1.8% stated that the trend is decreasing, while 5.8% of the respondents stated that there is no major change.

Table 23. Trend of cattle price in the study area

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------|-----------------------|------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Trend | | | | | |
| Increasing | 85.5 ^b | 100 ^a | 84.1 ^b | 92.4 | *** |
| Decreasing | 7.2 | -- | -- | 1.8 | * |
| No change | 7.2 ^b | -- | 15.9 ^a | 5.8 | *** |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; *** $p < 0.001$*

4.3.9. Impact of selling cattle on animal ownership and decision making

In rural parts of Ethiopia most decisions on livestock's and other income sources of the household is made by man (husbands). Results of the survey revealed that, in the households (48.6%) of the decision making on purchase or sale of cattle in a family unit is done by man (husbands) and (27.2%) is by the negotiation of the whole family. But the role of the women (wife) (24.3%) is still important (Table 24).

During the survey, producers were asked whether there is any impact of selling cattle on production and on animal ownership or not. All (100%) the respondents stated that selling cattle does not have any impact on their production. Regarding impact on animal ownership during sales of cattle by the sample households, 57.2% and 10.9% of the respondents mentioned that they buy other cattle as a replacement stock and/or raise another, respectively. But the remaining 1.4% and 30.4% of the respondents stated that they lose there status in the society and at home and decrease in number of cattle do not have significant effect on animal ownership, respectively.

Table 24. Decision making on purchase or sale of cattle in family and impact of selling cattle

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Decision making | | | | | |
| Husband | 72.5 ^a | 43.5 ^b | 34.8 ^b | 48.6 | *** |
| Wife | 11.6 ^b | 34.1 ^a | 17.4 ^b | 24.3 | ** |
| Negotiation | 15.9 ^b | 22.5 ^b | 47.8 ^a | 27.2 | *** |
| Impact of selling | | | | | |
| Nothing | 24.6 | 27.5 | 42 | 29.7 | ns |
| I lose my status | 5.8 ^a | -- | -- | 1.4 | ** |
| I will buy another | 69.6 | 72.5 | 58 | 68.9 | ns |

Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; n= not significant, ** $p < 0.01$; *** $p < 0.001$

4.3.10. Beef cattle consumption trends

According to the result of the study, beef consumption trend in the study area, 276 (100%) of the respondents slaughter or share slaughtered cattle with neighbors in a system locally called *kirtcha* and consume beef at home frequently. In the study, the period of consumption is not specific (Table 25), and 166 (60.1%) respondents consume beef during festivals, 63 (22.8%) respondents have multiple responses such as during festivals, during unknown times (anytime). And the remaining (17%) consume beef during unknown times (anytime).

Table 25. Time of beef cattle meat consumption at home

| Factors | District | | | Overall | SE | p |
|--------------------|-------------------|-------------------|-------------------|---------|-------|----|
| | Lome | Adama | Boset | | | |
| Consumption/month | 1.86 ^a | 2.17 ^b | 1.84 ^a | 2.01 | 0.377 | * |
| | (%) | (%) | (%) | (%) | | |
| Time | | | | | | |
| During festivals | 75.4 ^a | 52.9 ^b | 59.4 ^b | 60.1 | | ** |
| Any time | 4.3 ^b | 21.7 ^a | 20.3 ^a | 17 | | ** |
| Multiple responses | 20.3 | 25.4 | 20.3 | 22.8 | | ns |

Means on the same row with different superscripts are significantly different ($p < 0.05$), N =Number of respondents; SE = Standard Error mean; ns= not significant, * $p < 0.05$, ** $p < 0.01$

Regarding the frequency of beef consumption per household per month, overall among 276 respondents from the three districts consume beef on average 2.01 times per household per month, in which Adama *woreda* significantly differ from Lome and Boset *woredas* at ($p < 0.05$); being highest in Adama *woreda* (2.17 times/ household/ month) and followed by Lome and Boset *woredas* 1.86 and 1.84 times per household per month, respectively.

4.4. Constraints of Beef Cattle Production System

As per the result of semi-structured interview supported with focus group discussions and field observations held in each of the study kebeles, the major constraints that hindered the performance of cattle fattening activity in all districts were mentioned as lack of capital, high feed price, shortage of land, lack of improved forage, lack of improved breed, lack of market, disease and high medication cost (Table 26).

Among these problems, lack of capital, high feed price and shortage of land for grazing and forage development were ranked as first, second and third major beef cattle production problems with an index of 0.250, 0.193 and 0.109, respectively. In Lome *woreda* high feed price, lack of capital and lack of improved forage were ranked as first, second and third major beef cattle production problems with an index of 0.310, 0.238 and 0.249, respectively. In Adama and Boset *woredas* lack of capital, high feed price and shortage of land were ranked as first, second and third major beef cattle production problems with an index of (0.245, 0.159 and 0.134) and (0.271, 0.142 and 0.111), respectively.

Table 26. Major constraints for the beef production in the study area (%)

| Constraints | Districts, index value(mean) | | | | | | | | | | | | | | | |
|---------------------------|------------------------------|------------|------------|--------------|------------|------------|------------|--------------|------------|------------|------------|--------------|------------|------------|------------|--------------|
| | Lome | | | | Adama | | | | Boset | | | | Overall | | | |
| | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index |
| Feed and water shortage | -- | -- | -- | --- | 5.1 | 8 | 2.2 | 0.056 | 7.2 | 10.1 | 4.3 | 0.077 | 4.3 | 6.5 | 2.2 | 0.047 |
| High feed price | 43.5 | 23.2 | 9.1 | 0.310 | 11.6 | 23.9 | 13 | 0.159 | 8.7 | 21.7 | 15.9 | 0.142 | 18.8 | 23.2 | 12.8 | 0.193 |
| Disease | -- | -- | 4.5 | 0.008 | 2.2 | 6.5 | 9.4 | 0.048 | 1.4 | 8.7 | 11.6 | 0.055 | 1.4 | 5.4 | 8.8 | 0.040 |
| High medication cost | -- | -- | 3 | 0.005 | 1.4 | 3.6 | -- | 0.019 | -- | 5.8 | 1.4 | 0.022 | 0.7 | 3.3 | 1.1 | 0.016 |
| Lack of improved forage | 21.7 | 34.8 | 15.2 | 0.249 | 0.7 | 4.3 | -- | 0.018 | 4.3 | 7.2 | -- | 0.046 | 6.9 | 12.7 | 3.7 | 0.083 |
| Lack of capital | 24.6 | 24.6 | 19.7 | 0.238 | 39.9 | 9.4 | 8.7 | 0.245 | 46.4 | 7.2 | 8.7 | 0.271 | 37.7 | 12.7 | 11.4 | 0.250 |
| Inadequate health service | -- | -- | -- | --- | 0.7 | 2.2 | 4.3 | 0.018 | 00.0 | 4.3 | 2.9 | 0.019 | 0.4 | 2.2 | 2.9 | 0.014 |
| Lack of market | -- | 4.3 | 6.1 | 0.025 | 6.5 | 7.2 | 5.8 | 0.066 | 4.3 | 4.3 | 2.9 | 0.042 | 4.3 | 5.8 | 5.1 | 0.049 |
| Man power | 1.4 | 8.7 | 25.8 | 0.079 | 10.1 | 8 | 23.9 | 0.117 | 2.9 | 10.1 | 26.1 | 0.092 | 6.2 | 8.7 | 24.9 | 0.102 |
| Lack of improved breed | -- | -- | 7.6 | 0.013 | 1.4 | 13 | 23.2 | 0.091 | 2.9 | 10.1 | 17.4 | 0.077 | 1.4 | 9.1 | 17.9 | 0.067 |
| Shortage of land | 7.2 | 4.3 | 4.5 | 0.058 | 18.8 | 9.4 | 5.1 | 0.134 | 17.4 | 4.3 | 5.8 | 0.111 | 15.6 | 6.9 | 5.1 | 0.109 |
| Poor extension service | 1.4 | -- | 4.5 | 0.015 | 1.4 | 4.3 | 4.3 | 0.029 | 4.3 | 5.8 | 2.9 | 0.046 | 2.2 | 3.6 | 4 | 0.030 |
| Total | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 |

Index= sum of [3 for rank 1 + 2 for rank2 + 1 for rank 3] for each factors divided by sum of all the factors

4.4.1. Feed problems, months of feed shortage and coping mechanisms

East Shewa zone is among the major industry area in Ethiopia now a day. As result, for the intensification of factories in the area farmers are forced to minimize there land by giving compensation. The result of the study (Table 27) shown that, 55 (43%) of the respondents mention lack of insufficient land and 16.4% mentioned insufficient inputs as a major reason for not growing forage crops for their cattles. The remaining 39.8% reported multiple responses (shortage of land, labor and lack of information) as a major problem for forage cultivation.

Table 27. Reasons for not growing forage crop and for feed shortage

| Factors | District, Average (%) | | | Overall (N=276) | p |
|-------------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Not growing | | | | | |
| Insufficient land | 50.7 ^a | 4.3 ^b | -- | 14.9 | *** |
| Insufficient labor | 1.4 | -- | -- | 0.4 | ns |
| Insufficient inputs | -- | 15.2 | -- | 7.6 | *** |
| Multiple responses | 34.8 ^a | 5.1 ^b | 30.4 ^a | 18.8 | *** |
| Feed shortage | | | | | |
| Draught | -- | 18.8 ^a | 10.1 ^b | 12 | *** |
| Land shortage | 39.1 ^a | 14.5 ^b | 2.9 ^c | 17.8 | *** |
| Poor feed conservation | 15.9 | 14.5 | 21.7 | 16.7 | ns |
| Lack of improved forage | -- | 9.4 ^a | 8.7 ^a | 6.9 | * |
| Multiple responses (2) | 40.6 ^b | 41.3 ^b | 60.9 ^a | 46 | * |

*Means on the same row with different superscripts are significantly different ($p < 0.05$); N= Number of respondents; ns= not significant; * $p < 0.05$, *** $p < 0.001$*

Regarding the time of feed shortage the main reasons for the feed shortages are presented on table (27). Result of the study prevailed that; shortage land for grazing and forage development (18.2%) is the major reason for the feed shortages in the study area. (16.8%), (12%) and (7.7%) of the respondents stated poor feed conservation method, draught and lack of improved forage seed for the feed shortages. The remaining (45.3%) stated multiple reasons (Poor feed conservation, lack of improved forage, land shortage and Draught) as the major reasons for the feed shortage.

Thus results of this study (Table 28) revealed that to cope up with the feed shortage, overall 195 (70.6%) respondents use multiple coping mechanisms (conserve crop residue, use small amount of feed and purchase crop residue) to alleviate the feed shortage. The remaining 21%, 7.2% and 1.1% of them conserve crop residue, use small amount of feed and purchase crop residues in the feed shortage seasons, respectively.

Table 28. Strategies used to alleviate feed shortage

| Factors | District, Average (%) | | | Overall (N=276) | p |
|--------------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Strategies | | | | | |
| Conserve crop residue | 49.3 ^a | 3.6 ^c | 26.1 ^b | 20.7 | *** |
| Use small amount of feed | 11.6 | 8.7 | -- | 7.2 | ns |
| Purchase crop residue | 1.4 | -- | 2.9 | 1.1 | ns |
| Multiple responses | 37.7 ^a | 88.4 ^b | 71 ^c | 71.4 | *** |

*Means on the same row with different superscripts are significantly different ($p < 0.05$), Multiple responses; conserve crop residue, use small amount of feed and purchase crop, N= Number of respondents; ns= not significant; * $p < 0.05$, *** $p < 0.001$*

4.4.2. Problems on water sources

Among the 276 respondents, 99 of them (35.9%) reported that mainly during the dry period scarcity is the major problems, thus (34.8%) indicated that there is no water related problems in there area. As a result of factory (tanners) in sum *kebeles* around Mojo town and around Adama; the major water source for the cattle are exposed for pollution. (7.2% and 15.6%) of the respondents reported that unhygienic or impurity of water source and multiple responses (scarcity, unhygienic/impurity and closeness of the road to the water source) as a major water related problems, respectively.

Closeness of the road to the water source could also be a problem for cattle production, if the water source is close to the road rates of accidents will increases, in the study area (6.5%) of the respondents' mansion scarcity and closeness of the road to the water source as major water related problems (Table 29).

Table 29. Main water related problems

| Factors | District, Average (%) | | | Overall (N=276) | p |
|-----------------------|-----------------------|-------------------|-------------------|--------------------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | |
| Problems | | | | | |
| Scarcity | 18.8 ^c | 34.8 ^b | 55.1 ^a | 35.9 | *** |
| Unhygienic/impurity | 4.3 ^b | 12.3 ^a | -- | 7.2 | ** |
| Closeness to the road | -- | 13 | -- | 6.5 | *** |
| Multiple responses | 14.5 | 15.2 | 17.4 | 15.6 | ns |
| No problem | 62.3 ^a | 24.6 ^b | 27.5 ^b | 34.8 | *** |

*Means on the same row with different superscripts are significantly different (p<0.05), Multiple responses; scarcity, unhygienic/impurity and closeness of the road to the water source, N= Number of respondents; ns= not significant; **p<0.01, ***p<0.001*

4.4.3. Diseases challenges and weak veterinary service deliveries

Beef producers listed a number of economically important cattle diseases in the area and ranked them according to their importance (Table 31). Overall, on the three districts Pasteurellosis, Internal parasites and Anthrax were ranked as first, second and third major prevalent diseases with an index of 0.334, 0.270 and 0.235, respectively. Accordingly the result indicated that Pasteurellosis was the first prevalent diseases in Adama Zuria and Boset *woredas* with index of 0.319 and 0.447, respectively, being third prevalent diseases in Lome *woreda* with index of 0.165. Internal parasites were the first prevalent diseases in Lome *woreda*, second in Adama Zuria *woreda* and third in Boset *woreda* with an index of 0.379, 0.282 and 0.196, respectively. Blackleg was ranked second in Boset *woreda* and third in Adama Zuria *woreda* with index 0.273 and 0.245, respectively. FMD were ranked as the second prevalent diseases Lome *woredas* with an index of 0.169. Blackleg, Mastitis and Brucellosis were some of the diseases mentioned by the producers but ranked least. The identification and ranking of diseases in the area warrants to devise livestock disease prevention strategies in the district.

Efficient and reliable animal health services constitute an essential prerequisite to livestock development in East Shewa zone. From the survey results (Table 30) on animal health services, 71% use government services only, 28.3% of the respondents use the government institution and private veterinary service and only the remaining 1.1% use private veterinarians services.

Table 30. Health services for cattle in the study areas

| Factors | District | | | Overall (N=276) | SE | p |
|-----------------------------|-------------------|-------------------|-------------------|--------------------|-------|-----|
| | Lome (N=69) | Adama (N=138) | Boset (N=69) | | | |
| Distance | 1.31 ^a | 1.80 ^b | 0.86 ^c | 1.44 | 0.049 | *** |
| | (%) | (%) | (%) | (%) | | |
| Source (institution) | | | | | | |
| Government | 87.1 ^a | 54.3 ^b | 89.9 ^a | 68.5 | | *** |
| Private | 3.2 | -- | -- | 0.7 | | * |
| Multiple responses | 8.7 ^b | 45.7 ^a | 10.1 ^b | 27.5 | | *** |

Means on the same row with different superscripts are significantly different ($p < 0.05$), N= Number of respondents; Multiple responses; Government institution and Private veterinary services; SE = Standard Error Mean; * $p < 0.05$, *** $p < 0.001$

Even though the study areas have a great number of livestock populations especially cattle the veterinary services were not sufficient enough. The medicines supplied by the MOA were not satisfactory even in the time when the diseases were more prevalent so that the farmers were buying the medicines from the private drug vendors with expensive prices. As result of the study among 230 respondents (45.7%) reported that veterinary cost is the major problem in there area and 15.2% stated that absence of regular visit is also main problem. The remaining 39.1% reported multiple responses; the number of skilled manpower in the discipline was not also enough to give the service efficiently, long distance to the animal health service, no regular visit by the veterinarians and high veterinary cost as a major problem. Distance of the veterinary service is also critical, overall in the study *woredas* on average the farmers were trekking their cattle 1.44 kilometers to get the health service and it was significantly different ($p < 0.05$) among the three *woredas*, being highest in Adama (1.80 kilometers) and followed by Lome (1.31 kilometers) and Boset (0.86 kilometers) (Table 30).

Table 31. Ranking of economically important cattle disease by smallholder farmers in the different study areas (%)

| | Districts, index value(mean) | | | | | | | | | | | | | | | |
|--------------------|------------------------------|------|------|-------|---------------|------|------|-------|--------------|------|------|-------|-----------------|------|------|-------|
| | Lome (N=33) | | | | Adama (N=138) | | | | Boset (N=69) | | | | Overall (N=240) | | | |
| | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index | R1 | R2 | R3 | Index |
| Pasteurolosis | 21.2 | 16.1 | 3.2 | 0.165 | 54.3 | 6.5 | 15.2 | 0.319 | 84.1 | 5.8 | 4.3 | 0.447 | 58.3 | 7.6 | 10.5 | 0.334 |
| Anthrax | -- | 16.1 | 32.3 | 0.108 | 8.7 | 51.4 | 18.1 | 0.245 | 2.9 | 71 | 13.0 | 0.273 | 5.8 | 52.5 | 18.5 | 0.235 |
| FMD | 9.1 | 12.9 | 48.4 | 0.169 | 4.3 | 21.0 | 27.5 | 0.137 | -- | -- | 44.9 | 0.075 | 3.8 | 13.9 | 35.3 | 0.124 |
| Brucellosis | -- | -- | -- | --- | 0.7 | -- | 1.4 | 0.006 | -- | -- | -- | --- | 0.4 | -- | 0.8 | 0.003 |
| Mastitis | -- | 3.2 | 12.9 | 0.032 | -- | 0.7 | 5.1 | 0.011 | -- | -- | 5.8 | 0.009 | -- | 0.8 | 6.3 | 0.013 |
| Internal parasites | 42.4 | 48.4 | 3.2 | 0.379 | 31.9 | 20.3 | 32.6 | 0.282 | 13 | 23.2 | 31.9 | 0.196 | 27.9 | 24.8 | 28.6 | 0.270 |
| Blackleg | 27.3 | 3.2 | -- | 0.147 | -- | -- | -- | --- | -- | -- | -- | --- | 3.8 | 0.4 | -- | 0.020 |
| Total | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 | 100 | 100 | 100 | 1.000 |

Index= sum of [3 for rank 1 + 2 for rank2 + 1 for rank 3] for each factors divided by sum of all the factors

5. SUMMARY AND CONCLUSION

5.1. Summary and Conclusion

The specific objectives of the study were to characterize beef cattle production systems, to assess of beef and beef cattle marketing systems and determinants of market choices and to identify constraints and opportunities for beef cattle production and marketing in the study area. To achieve these objectives, secondary and primary data were used. Producers interview were sources of primary data. Producers' survey was done the East Shewa zone of Oromiya Regional State. For primary data of field (producers/ herders) survey, three Woredas were included and these were Lome, Adama Zuria and Boset. From Lome three PA's (Biyo bisiqe, Tsade and Dibandiba), Adama Zuria three PA's, namely (Kechema, Kuriftu and Mermersa) and from Boset three PA's, namely (Digalo Wanga, Merqo and Tiri) were selected. To see the marketing channel and routes, four sample markets were included from East Shewa zone (Adama, Mojo, Wonji and Walanchiti) markets.

As reported by 220 (79.7%) of the producers/farmers; the major cattle production system in the study area was mixed crop and livestock production system that are based (65.6%) on local/indigenous cattle. With average holding of cattle 10.39 heads per household in study area, beef cattle were kept by (83%) of the herd owners for farming purposes and to generate cash income from the sell.

Indigenous cattle have been naturally selected for adaptive rather than for productive traits. Selection takes a long time and requires sustained effort to make substantial genetic progress and impact on productivity. In the study area most of the farmers (43.8%) select local/indigenous animals because of there easiness for management. Most of the farmers (35.5%) use natural mating and only (19.2%) bred their cows with artificial insemination, highest proportion was found in Boset 26.1% followed by Adama Zuria 21.7% and Lome 7.2%. The remaining (45.3%) use both artificial insemination and natural mating.

In the study area cattle were tethered either on the communal grazing land or in fences near the homestead during summer months. They tether the cattle in the homestead and nearby farmlands to use the cattles' dung for fertilization purposes. Overall, 116 (42%) of producers/farmers house their cattle and this did not differ between Adama and Boset woredas but better housing was found in Lome woreda 52.2% of the respondents house there animal, where as the rest (54.7%) and (3.3%) of them tether the animal in the yard and did not house cattle, respectively. Due to the present result; most of the conflicts in the neighbors (71.4%) results from animals entering the yard of others. As reported by (32.2%) producers/farmers the resolving mechanism is negotiate by the help of elders and giving compensation for the loss or damages. Most of the farmers (44.8%) use grass as a roofing material and (93.8%) use mud as flooring material to made the house for there cattle, comparatively better use of corrugated iron and plastic as roofing materials and concrete as flooring material is found in Adama and Lome woredas. The management of the cattle is poor even in some kebeles there was no cattle housing which really further exposes the cattle to cold stress which directly affects the productivity of the animals.

Regarding the feed resource, from the total respondents (76.4%) of the respondents used own products and purchased feeds for there cattle. In the study area the major feed resources ranked first, second and third were crop residue, natural pasture and oil seed cake. In dry seasons feed shortage is the major problem in the study area. As reported by 124 (45.3%) of the respondents this feed shortage result from insufficient land, inputs (forage seed and fertilizer) and information. Generally there were different challenges on beef production in the district. These include lack of capital, high feed price, shortage of grazing land, lack of improved forage, lack of improved breed, lack of market, disease and high medication cost. Among these problems lack of capital, high feed price and shortage of land for grazing and forage development were ranked as first, second and third major beef cattle production problems. From the total respondents 114 (41.3%) of the respondents spent 200-300 ETB per month for the purchase of feed.

Ponds and rivers are the major sources of water in the study areas. Overall, (35.9%) of the respondents reported that mainly during the dry period scarcity is the major problems, thus (34.8%) indicated that there is no water related problems in there area. As a result of factory (tanners) in sum kebeles around Mojo town and around Adama; the major water source for the

cattle are exposed for pollution. (7.2% and 15.6%) of the respondents reported that unhygienic or impurity of water source and multiple responses (scarcity, unhygienic/impurity and closeness of the road to the water source) as a major water related problems, respectively. Closeness of the road to the water source could also be a problem for cattle production, if the water source is close to the road rates of accidents will increase, in the study area (6.5%) of the respondents' mention scarcity and closeness of the road to the water source as major water related problems.

Information is a base to increase productivity in the small scale production. Some farmers got information about improved beef production from the kebeles extension agents and (18.8%) mass media (radio and newspaper) who were giving extension services around on the contrary. Most farmers did not get any information about beef production and perhaps that is why involvement of the farmers in beef production in study area was very low. Out of 276 respondents 33.7% and 34.4% of them follow traditional way and used indigenous knowledge from their parents about the rearing techniques, respectively. There are also few NGO's giving a kind of extension services on beef production; the contribution from development agent, farmer association and NGO's in the study area was only 13%.

According to 87% of the respondents there is cattle health problem in the study areas. Overall, on the three districts Pasteurellosis, Internal parasites and Anthrax were ranked as first, second and third major prevalent diseases with an index of 0.334, 0.270 and 0.235, respectively. Thus, producers/farmers manage the animals' health problem either traditionally from the fellow producers or using modern techniques (71%) and (0.7%) both from the government institutions and private veterinary service, respectively. In the study area on average the farmers were trekking their cattle 1.44 kilometers to get the health service.

In the study, different cattle marketing channels were identified in exchange functions between producers/farmers, 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 Djibouti border market (mostly to Arab countries) and the other to Adama and Addis Ababa terminal market (domestic market).

The main reasons for preference of markets by the respondents were (46.7%), the relative advantage of prices given in those markets, (44.9%) of the respondents preferred a particular market mainly because of its relative advantage of prices and proximity of the market and the remaining (8.3%) of the respondents preferred a particular market mainly because of its proximity. Majority (97.1%) of the respondents trek their cattle to primary, secondary and to the near terminal markets, except in Adama woreda (5.8%) of the respondents use truck to transport there cattle to the market. In the study areas producer who hire labour to trek their cattle to the market spend on average 15.29 ETB per head of cattle.

Regarding market information sources, (68.5%) 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 limited thus, 81.5% of the respondents do not have any advice from these agents or NGO's operating in the area.

5.2. Recommendations

The constraints of cattle production system of sample households at the study area were lack of capital, high feed price, shortage of grazing land, lack of improved forage, lack of improved breed, lack of market information, disease and high medication cost. 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.

- Government or non government organization need to establish cooperatives who rent working capital with minimum interest rate for organized fattener group in order to exploit the potential of the area and to improve the life of the producer/farmer.
- Needs to control the private retailers by continuous assessment. Moreover, considering the suitability and experience of farmers on maize and wheat production, if grain

processing plant is established in the woreda, the byproducts will be used as potential feed supplement and the residues could be utilized more efficiently as the feed supplement enhances utilization efficiency of the ruminant cattle for poor quality roughages feed source.

- Considering the irrigation potential especially with Awash and Mojo rivers, if modern irrigation scheme is to be constructed and improved forage seeds are supplied the feed problem will be solved.
- Training and extension advice are urgently required in selection, feeding, healthcare, and market information to improve the performance of cattle fattening practice in the study area and also to disseminate the practice in to other areas having similar agro-ecology and resources.

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7. APPENDICES

7.1. Appendix I. Analysis of Variance and Other Tables

Appendix Table 1: Sampled *woredas*, *kebeles* and market places from each study districts

| Agro ecology | <i>woredas</i> | <i>kebeles</i> (PA's) | HH | Place of market |
|---------------------|----------------|-----------------------|-----|-------------------|
| Highland | Lome | Biyo bisiqe | 23 | Mojo market |
| | | Tsade | 23 | |
| | | Dibandiba | 23 | |
| Midiumland | Adama Zuria | Kechema | 46 | Adama market |
| | | Kuriftu | 46 | Wonji market |
| | | Mermersa | 46 | |
| Lowland | Boset | Digalo Wanga | 23 | Walanchiti market |
| | | Merqo | 23 | |
| | | Tiri | 23 | |
| Total sample | | | 276 | |

PA= Peasant association, HH= Household

Appendix Table 2: ANOVA test on family size per household among the study districts

| Source of variation | SS | DF | MS | F | Sig. |
|---------------------|----------|-----|---------|--------|------|
| Agro ecology | 257.576 | 2 | 128.788 | 17.713 | *** |
| Errors | 1984.986 | 273 | 7.271 | | |
| Total | 2242.562 | 275 | | | |

SS= Sum of Squares, Ms= Mean Square, Sig. = Significant value; *** $p < 0.001$.

Appendix Table 3: Sex, education, religion and ethnic group of respondents in the study area

| Age structure | District | | | | | | | | Test | |
|---------------------|-------------|---|---------------|---|--------------|---|-----------------|-----------------------------------|---------------|------------|
| | Lome (N=69) | | Adama (N=138) | | Boset (N=69) | | Overall (N=276) | | F-value | P-value |
| | Range | Mean \pm SE | Range | Mean \pm SE | Range | Mean \pm SE | Range | Mean \pm SE | | |
| HHH age | 25-63 | 48.98 \pm 0.75 ^a | 27-58 | 43.40 \pm 0.57 ^b | 35-71 | 46.92 \pm 0.84 ^c | 25-71 | 45.68 \pm 0.42 | 17.729 | *** |
| Female (1-15) | 0-4 | 2.08 \pm 0.12 ^a | 0-4 | 1.54 \pm 0.07 ^b | 0-4 | 1.97 \pm 0.12 ^a | 0-4 | 1.78 \pm 0.57 | 9.886 | *** |
| Male (1-15) | 0-7 | 1.89 \pm 0.13 ^{ab} | 0-5 | 1.64 \pm 0.09 ^a | 0-6 | 2.13 \pm 0.15 ^b | 0-7 | 1.83 \pm 0.07 | 4.706 | * |
| Female (15-30) | 0-3 | 1.35 \pm 0.08 ^a | 0-3 | 1.09 \pm 0.05 ^b | 0-4 | 1.43 \pm 0.09 ^a | 0-4 | 1.24 \pm 0.04 | 6.649 | ** |
| Male (15-30) | 0-4 | 1.50 \pm 0.10 ^a | 0-4 | 1.08 \pm 0.06 ^b | 0-5 | 1.32 \pm 0.12 ^{ab} | 0-5 | 1.25 \pm 0.05 | 5.809 | ** |
| Above 30 | 1-4 | 2.33 \pm 0.07 ^a | 0-6 | 2.14 \pm 0.08 ^a | 1-8 | 2.81 \pm 0.17 ^b | 0-8 | 2.35 \pm 0.06 | 9.299 | *** |
| Total family | 4-15 | 9.18 \pm 0.25^a | 1-15 | 7.50 \pm 0.22^b | 5-19 | 9.64 \pm 0.40^a | 1-19 | 8.46 \pm 0.17 | 17.713 | *** |

Means on the same row with different superscripts are significantly different ($p < 0.05$), N= Number of respondents; SE = Standard Error; HHH = Household head; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix Table 4: Land holding of cattle fattening participants

| Area under | District | | | | | | | | Test | |
|---------------------------|-----------------|--------------------------------|-----------------|--------------------------------|---------------|--------------------------------|------------------|--------------------|---------------|-----------|
| | Lome (N=69) | | Adama (N=138) | | Boset (N=69) | | Overall (N=276) | | F-value | P-value |
| | Range | Mean ± SE | Range | Mean ± SE | Range | Mean ± SE | Range | Mean ± SE | | |
| Annual crop owned | 1-5 | 2.74 ± 0.10 ^a | 0-3.5 | 1.52 ± 0.06 ^b | 0-3.5 | 1.63 ± 0.11 ^b | 0-5 | 1.85 ± 0.05 | 57.112 | *** |
| Annual crop rented | 0-8 | 1.24 ± 0.15 ^a | 0-2 | 0.64 ± 0.05 ^b | 0-2 | 0.84 ± 0.07 ^b | 0-8 | 0.84 ± 0.06 | 12.384 | *** |
| Total annual crop | 1.5-9 | 3.98 ± 0.17 ^a | 0.25-4 | 2.17 ± 0.07 ^b | 0.5-5 | 2.43 ± 0.13 ^b | 0.25-9 | 2.69 ± 0.08 | 67.288 | *** |
| Perennial crop owned | 0-4 | 0.31 ± 0.08 | 0-1.5 | 0.30 ± 0.03 | 0-1.5 | 0.39 ± 0.05 | 0-4 | 0.33 ± 0.03 | 0.848 | ns |
| Perennial crop rented | 0-0 | 0.00 ± 0.00 | 0-1 | 0.03 ± 0.01 | 0-0.75 | 0.03 ± 0.01 | 0-1 | 0.02 ± 0.01 | 2.088 | ns |
| Total perennial land | 0-4 | 0.30 ± 0.04 | 0-2 | 0.33 ± 0.04 | 0-1.5 | 0.41 ± 0.05 | 0-4 | 0.34 ± 0.30 | 0.741 | ns |
| Pasture land owned | 0-1.5 | 0.15 ± 0.04 ^a | 0-2 | 0.13 ± 0.03 ^a | 0-2 | 0.34 ± 0.06 ^b | 0-2 | 0.19 ± 0.02 | 7.073 | ** |
| Pasture land rented | 0-0 | 0.00 ± 0.00 | 0-0 | 0.00 ± 0.00 | 0-0 | 0.00 ± 0.00 | 0-0 | 0.00 ± 0.00 | -- | -- |
| Total pasture land | 0-1.5 | 0.15 ± 0.04 ^a | 0-2 | 0.13 ± 0.03 ^a | 0-2 | 0.34 ± 0.06 ^b | 0-2 | 0.19 ± 0.02 | 7.616 | ** |
| Total land holding | 1.5-9.12 | 4.30 ± 0.19^a | 0.25-5.5 | 2.63 ± 0.09^b | 0.75-6 | 3.15 ± 0.17^c | 0.25-9.12 | 3.18 ± 0.08 | 38.918 | ** |

Means on the same row with different superscripts are significantly different ($p < 0.05$), N= Number of respondents; SE = Standard Error; ns= not Significant; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix Table 5: ANOVA test on land holding per household among the study districts

| Source of variation | SS | DF | MS | F | Sig. |
|---------------------|---------|-----|--------|--------|------|
| Agro ecology | 129.303 | 2 | 64.651 | 38.918 | *** |
| Errors | 453.513 | 273 | 1.661 | | |
| Total | 582.815 | 275 | | | |

SS= Sum of Squares, Ms= Mean Square, Sig. = Significant value; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix Table 6: ANOVA test on cattle holding per household among the study districts

| Source of variation | SS | DF | MS | F | Sig. |
|---------------------|----------|-----|---------|--------|------|
| Agro ecology | 723.775 | 2 | 361.888 | 36.640 | *** |
| Errors | 2696.384 | 273 | 9.877 | | |
| Total | 3420.159 | 275 | | | |

SS= Sum of Squares, Ms= Mean Square, Sig. = Significant value; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix Table 7: Types of water sources in the study area

| Types | District | | | | | | Overall | Test | | |
|---------------------------|----------|------|-------|------|-------|------|---------|------|-----|---------|
| | Lome | | Adama | | Boset | | | | P | P-value |
| | N | P | N | P | N | P | | | | |
| Pipeline | 13 | 18.8 | -- | -- | 37 | 53.6 | 50 | 18.1 | *** | |
| River | 20 | 29 | 46 | 33.3 | -- | -- | 66 | 23.9 | | |
| Pond | 9 | 13 | 48 | 34.8 | 16 | 23.2 | 73 | 26.4 | | |
| Pipeline and pond | 1 | 1.4 | 44 | 31.9 | 16 | 23.2 | 61 | 22.1 | | |
| River, pipeline and wells | 26 | 37.6 | -- | -- | -- | -- | 26 | 9.4 | | |

N= Number of respondents, P= Percent; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix Table 8: Types of feed supplement and ways of supplementation

| | District | | | | | | | | Test P-value |
|-----------------------|----------|------|-------|------|-------|------|---------|------|-----------------|
| | Lome | | Adama | | Boset | | Overall | | |
| | N | P | N | P | N | P | N | P | |
| Types | | | | | | | | | *** |
| Amole (salt) | 31 | 44.9 | 97 | 70.3 | 43 | 62.3 | 171 | 62.0 | |
| Maize | 8 | 11.6 | 10 | 7.2 | -- | -- | 18 | 6.5 | |
| Sorghum | 5 | 7.2 | -- | -- | -- | -- | 5 | 1.8 | |
| Industrial by-product | -- | -- | 5 | 3.6 | -- | -- | 5 | 1.8 | |
| Multiple responses | 25 | 36.2 | 26 | 18.8 | 26 | 37.7 | 77 | 28 | |
| Ways | | | | | | | | | *** |
| As its natural source | 6 | 8.7 | 20 | 14.6 | 12 | 17.4 | 38 | 13.8 | |
| Supplied as a mix | 43 | 62.3 | 107 | 77.5 | 37 | 53.6 | 187 | 67.8 | |
| As its natural source | 20 | 29 | 11 | 8 | 20 | 29 | 51 | 18.5 | |
| And as a mix | | | | | | | | | |

Multiple responses: Amole (salt), maize, sorghum and industrial by-product, N= Number of respondents, P= Percent; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix Table 9: ANOVA test on distance traveled to the health service in km in the study districts

| Source of variation | SS | DF | MS | F | Sig. |
|---------------------|---------|-----|--------|--------|------|
| Agro ecology | 42.898 | 2 | 21.449 | 41.249 | *** |
| Errors | 141.340 | 273 | .518 | | |
| Total | 184.238 | 275 | | | |

SS= Sum of Squares, Ms= Mean Square, Sig. = Significant value; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix Table 10: ANOVA test on beef cattle meat consumption per month among the study districts

| Source of variation | SS | DF | MS | F | Sig. |
|---------------------|---------|-----|-------|-------|------|
| Agro ecology | 7.022 | 2 | 3.511 | 4.418 | * |
| Errors | 216.964 | 273 | .795 | | |
| Total | 223.986 | 275 | | | |

*SS= Sum of Squares, Ms= Mean Square, Sig. = Significant value; *p<0.05; **p<0.01; ***p<0.001*

Appendix Table 11: Types of housing and Roofing and flooring materials used

| | District | | | | | | | | Test P-value |
|--------------------------|----------------|------|------------------|------|-----------------|------|--------------------|------|-----------------|
| | Lome (N=44) | | Adama (N=113) | | Boset (N=37) | | Overall (N=194) | | |
| | N | P | N | P | N | P | N | P | |
| Type of housing | | | | | | | | | NS |
| In a house | 36 | 52.2 | 55 | 39.9 | 25 | 36.2 | 116 | 42 | |
| Tethered in the yard | 31 | 44.9 | 76 | 55.1 | 44 | 63.8 | 151 | 54.7 | |
| Not housed at all | 2 | 2.9 | 7 | 5.1 | 0 | 0 | 9 | 3.3 | |
| Roofing material | | | | | | | | | *** |
| Corrugated iron | 13 | 29.5 | 14 | 12.4 | 4 | 10.8 | 31 | 16 | |
| Grass | 10 | 22.7 | 56 | 49.6 | 21 | 56.8 | 87 | 44.8 | |
| Plastic | 13 | 29.5 | 43 | 38.1 | 12 | 32.4 | 68 | 35.1 | |
| Multiple response | 8 | 18.1 | 0 | 0 | 0 | 0 | 8 | 4.1 | |
| Flooring material | | | | | | | | | NS |
| Concrete | 5 | 11.4 | 7 | 6.2 | 0 | 0 | 12 | 6.2 | |
| Mud | 39 | 88.6 | 106 | 93.8 | 37 | 100 | 182 | 93.8 | |

*Multiple response; Grass, iron and plastic; N= Number of respondents, P= Percent; NS=Not Significant; *p<0.05; **p<0.01; ***p<0.001*

Appendix Table 12: ANOVA test on animal lost the last one year because of diseases in the study districts

| Source of variation | SS | DF | MS | F | Sig. |
|----------------------------|-----------|-----------|-----------|----------|-------------|
| Agro ecology | 6.728 | 2 | 3.364 | 5.193 | * |
| Errors | 176.848 | 273 | .648 | | |
| Total | 183.576 | 275 | | | |

*SS= Sum of Squares, Ms= Mean Square, Sig. = Significant value; *p<0.05; **p<0.01; ***p<0.001*

6.2. Reading and write (not attending formal education)

6.3. Grade 1-8 _____

6.4. Grade 9-12 _____

6.5. Higher education _____

7. Who is the head of the households /family?

1. Male 2. Female

8. Ethnic group of the respondents

1. Oromo 2. Amhara 3. Tigre 4. Others

9. Position of household head in the community

1. Political leader 2. Spiritual leader 3. Elder 4. Other specify

10. What are the sources of income for living?

1. Crop production 2. Livestock production 3. Wage labour

4. Crop and livestock production 5. All 6. Other _____

11. Have you been involved in cattle production?

1. Yes 2. No

12. Why do you rear cattle?

1. Selling 2. Farming 3. Other (specify) _____

18. Who is the head of owner ship in the family?

1. Husband 2. Wife 3. Husband and wife

4. The family 5. Other

19. Who takes care of fattening animals in regard to?

| | | |
|---|---------|---|
| | | 1. Mother 2. Father 3. Daughters 4. Sons |
| A | Selling | |

| | | |
|---|----------|--|
| B | Herding | |
| C | Feeding | |
| D | Watering | |

20. What are your reasons for fattening beef cattle?
1. To increase the household income
 2. To safeguard the family against risk such as drought
 3. from the sale of beef to cover some expenses
21. 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 _____
22. is there farmers' association in your area?
1. Yes
 2. No
23. If yes, are you a member?
1. Yes
 2. No
24. If you are a member what benefits do you get?
1. Credit Service
 2. Input Supply
 3. Both
25. Do you receive any help from a government and non-government Organization?
1. Yes
 2. No
26. If yes, what institutional service you get
1. Credit
 2. Health services
 3. input supply (fertilizer, forage seed, vaccines)
 4. Technical advice on cattle production
 5. All
27. Have you ever participated in any beef development project?
1. Yes
 2. No
28. How do you get information to improve your cattle production most of the time?
1. From radio
 2. From extension agents
 3. Simply I follow traditional way
 4. From family back ground
 5. From farmer associations
 6. I read news paper

29. Did you have any formal training cattle production?

1. Yes 2. No

30. If yes, for how long time did you take the training?

1. For a few days 2. For a few weeks 3. For a month

31. Where did you take the training?

1. At *Woreda* level 2. At the Zone level 3. At region level

Herd Structure

32. What type of animal are you keeping?

| Type of animals | Amount in number | | | Remark |
|-----------------|------------------|-------|--------|--------|
| | Local | Cross | Exotic | |
| Milking cows | | | | |
| Dry cows | | | | |
| Oxen | | | | |
| Calves | | | | |
| Young heifer | | | | |
| Bull | | | | |
| Goats | | | | |
| Sheep | | | | |
| Donkeys | | | | |
| Horses | | | | |
| Mule | | | | |
| Poultry | | | | |

Land holding structure

33. How much land do you have under control in hectares?

| | Owned | Rented | Total |
|--------------------------------|-------|--------|-------|
| Area under crops | | | |
| Area under pasture | | | |
| Perennials (cash crop, fruits) | | | |
| Total | | | |

Housing and waste Management

34. Do you house/confine your animal?

1. Yes
2. No

35. How do you house your animals?

1. in a house
2. Tethered in the yard
3. Not housed at all

36. If you house your animal, what is the roof made up of?

1. Corrugated iron
2. Grass
3. Plastic

37. If you house your animal, what is the floor made from?

1. Concrete
2. Mud

38. Do you have any conflict with your neighbors because of your livestock activities?

1. Yes
2. No

39. If yes, what is the source of conflict?
1. Pollution from the manure
 2. Animals entering the yard
40. How do you resolve the conflict?
1. Negotiate by the help of elders
 2. Giving compensation for the loss
 3. re building the damaged/cracked yard or fence
 4. 1 and 2
41. Are you disposing the dung from the barn?
1. Yes
 2. No
42. How do you dispose the cattle dung from the barn?
1. By drainage system
 2. By manual labor
43. How many times are you disposing manure from the barn?
1. Once per day
 2. Twice per day
 3. Every two days
 4. Every three days
 5. Every for days
 6. Every five-seven days
44. How are you utilizing it most of the time?
1. I do not use it at all
 2. It is made in to cow dung cake
 3. It is used for soil fertilization
 4. It is used for construction purposes
45. Do you sell the animals dung?
1. Yes
 2. No
46. If yes, where do you usually sell you dung?

1. at the farm gate
2. On the near by market

47. What is your labor source in the dairy/or beef cattle production?

1. Family labor
2. Hired labor
3. Both

48. When is your high labor demand?

1. during the peak of lactation
2. during finishing time
3. during hay harvest
4. during cow dung collection and preparation
5. Changing the barn place

Feeds and feeding

49. Grazing land ownership?

1. Communal
2. Private
3. Both

50. What type of grazing system are you using for dairy animals?

1. Zero grazing
2. Semi-grazing
3. Full grazing
4. 1 and 2

51. What type of grazing system are you using for beef animals?

1. Zero grazing
2. Semi-grazing
3. Full grazing
4. 1 and 2

52. What is the source of your cattle feed?

1. Own production
2. Purchased
3. Both

53. What are your major feed resources for your animals?

Rank them in order of importance

54. Which crop residues being used for feed?

1. Teff straw
2. Barley straw
3. Rice straw
4. Maize stalk
5. Others

55. For what other purpose do you use crop residues?

1. Use as source of fuel wood
2. Used for construction purposes
3. To make household materials
4. others (specify)

56. Do you grow forage crops?

1. Yes
2. No

57. If yes, which forage crops?

1. Grass
2. Forage legume
3. Tree legume

58. What are your major reasons for not growing forage crops?

1. Insufficient land
2. Insufficient labor
3. Insufficient inputs (seed, fertilizer, and cash)
4. Insufficient draft animal power
5. Feed for animals is adequate
6. Insufficient information

59. Are you buying any feed supplements for your animals?

1. Yes
2. No

60. Which feed supplements are you buying?

1. Amole
2. Rice
3. Maize
4. Sorghum

61. For which animals you buy these feed supplements most of the time?

1. for lactating cows
2. For pregnant cows
3. For male calves
4. for female calves
5. For beef cattle

62. What are the ways of supplementation

1. as its natural source
2. Supplied as mix
3. Others (specify)

63. What kind of concentrate are you usually using to feed your cows and/or beef cattle?

1. _____
2. _____
3. _____

64. From where do you buy your concentrate feeds?

1. From the farmers' association
2. From the ministry of agriculture
3. From private retailers
4. From the industries

65. How much do you spend on feed per month?

1. 50-100 birr/month
2. 100-200 birr/month
3. 200 - 300 birr/month
4. >300 birr per month
5. Nothing

66. For how long do you fatten your beef cattle?

1. 1-3 months
2. 4-6 month
3. 7-9 month
4. 10-12 month
5. 13-15 month
6. > 16 month

67. Do you have feed shortage during dry season?

1. Yes
2. No

68. If yes, what are the reasons for the feed shortage?

1. poor feed conservation
2. Lack of improved forage seed
3. Land shortage for grazing
4. draught

69. What are the strategies used to alleviate feed shortage during dry season

1. conserve crop residues
2. Use of small amount of feed
3. Purchase crop residues
4. Sell animals
5. Buy hay
6. Others

70. Do you have feed shortage during wet season?

1. Yes
2. No

71. If yes, what are the reasons for the feed shortage?

1. Poor feed conservation
2. Lack of improved forage seed
3. Land shortage
4. Water logging

72. What is the distance traveled by animals in search of feed

1. 500metre-1 km
2. 2 km
3. 3 -5 km
4. 5-10 km
5. >10 km

Water Resources and its availability

73. What sources of water are you using for your beef cattle?

1. Pipeline
2. River
3. Pond
4. Wells
5. Spring water
6. Lake

74. What is watering frequency of your animals?

1. Twice a day
2. Once a day
3. Once in two days
4. Ad-libitum

75. Do you usually transport the water or bringing the animals to the rivers or pond?

1. Transport the water
2. Bringing the animals to the water source

76. What is the distance moved by animals for searching water sources

1. 500metre-1 km
2. 2 km
3. 3-5 km
4. 6-10 km
5. >10 km

77. What is your main water related problem?

1. Scarcity
2. Unhygienic/impurity
3. Closing of the road to the water source
4. No problem

Breeds and breeding

78. What is the breed of your cattle?

1. Local/indigenous
2. Cross
3. Exotic breeds
4. 1 and 2

79. Do you have cross breed animals?

1. Yes
2. No

80. If yes, do you know the pedigree of cross animals?

1. Yes
2. No

81. If yes, indicate it

1. from the seller's information
2. From Agricultural offices
3. from animal agencies

82. Why do you keep crossbreed animals in your farm?

1. They produce higher amount of beef.
2. They produce calves faster
3. They grow better and faster.
4. All

83. Why do you mainly keep local beef cattle in your herd? (Only one answer)

1. They are easy to manage
2. They are resistant to disease

3. I have no access to get crosses and exotic

4. I don't know other means

84. What kind of breeding technique do you use?

1. Artificial insemination 2. Natural mating 3. None

85. Do you have experience to use AI?

1. Yes 2. No

86. If yes, why do you use AI?

1. I do have access to AI service

2. It is simpler than raising a bull

3. It is more economical than a bull service

4. I do not have a bull

5. All

87. If no, why did not use it?

1. We did not know its advantages

2. We did not have interest for Crossbreeding

3. Environment will disfavor them

4. I have my own bull

5. I do not want to use AI services because of cultural reasons

6. Technicians are not well trained

88. What are the major problems in getting cross breeding services?

1. Places are too far

2. It is often difficult to get the inseminator

3. Payment for crossbreeding service is too much high

4. I don't hear about crossbreeding

5. No service at all

Major constraints of the area

89. What is the main constraint out of the following constraints for your beef cattle production?

1. Buy from market
2. Buy from neighbors
3. From own herd
4. From relatives

95. If yes, how many times do you fatten the animals (cattle) in a year?

1. Only one time
2. Twice a year
3. three times
4. More than three times

96. If yes, how many animals do you fatten in year? _____

97. If you purchase cattle to fatten what is the average price of the animal

98. Which months in a year do you prefer for selling the beef cattle?

1. September
2. January
3. April
4. Any month

LIVE ANIMAL MARKETING

1. Do you get market information before you sell your cattle?

1. Yes
2. No

2. If yes, from where do you get market information?

- | | | |
|--------------------|----------------------|--------------------|
| 1. Extension agent | 2. Relatives | 3. Cooperatives |
| 4. Neighbors | 5. Own markets visit | 6. Other (specify) |

3. Which source of market information do you prefer?

- | | | |
|--------------------|---------------------|--------------------|
| 1. Extension agent | 2. Relatives | 3. Cooperatives |
| 4. Neighbors | 5. Own market visit | 6. Other (specify) |

4. What is your reason for selecting the specified source(s) of market information?

1. It is accessible 2. It is reliable 3. Other (specify)
5. To what extent is the market information you get is accurate?
1. Very high 2. High 3. Medium
4. Low 5. Very low 6. Other (specify)
6. How frequent do you get market information?
1. Weekly 2. Fortnightly 3. Sometimes
4. Other (specify)
7. Do you get advice on cattle marketing issue form development/extension agent?
1. Yes 2. No
8. 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)
9. Where do you mostly sell your cattle?
-
10. 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)
11. 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
12. How do you take your cattle to the market?
1. Trekking 2. Trucking 3. Both
13. Who trek your cattle to the market place?
1. Yourself 2. Relative 3. Hired labor
4. Neighbor 5. Other (specify)
14. If you hire labor, how much do you pay?
1. For nearest market-----birr/head
2. For farthest market-----birr/head

15. To whom do you sell your cattle?

- 1. Trader
- 2. Abattoir
- 3. Local butcher
- 4. Other (specify)

16. Do you think that there is road/ transportation problem to access market in your area?

- 1. Yes
- 2. No

17. What is your suggestion to improve physical market access? -----

18. Who determine the price at the market place?

- 1. Seller
- 2. Buyer
- 3. Broker
- 4. Negotiation b/n seller and buyer
- 5. Other (specify) -----

19. Do you think that there is cattle price difference across different markets in your area?

- 1. Yes
- 2. No

20. If yes, in which market is the cattle price is higher and lower?

- 1. Better /higher price at -----market
- 2. Lower price at -----market

21. 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) _____

22. 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 |
|-----------------|---------------------|-----------------|--------------------|
| ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- |

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

24. What are cattle price determinant factors at the market place?

- 1. Color 2. Age 3. Sex
- 4. Weight 5. Time of sale 6. Other (specify)

25. What is your feeling/perception on the prevailing cattle price in your area?

- 1. Very good 2. Good 3. Poor 4. Other (specify)

26. Do the brokers have an influence on you while you sell your cattle?

- 1. Yes 2. No

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

28. What is the trend of cattle price in your area?

- 1. Increasing 2. Decreasing 3. No change 4. Others

29. Are you happy with the prevailing cattle price in your area?

- 1. Yes 2. No

30. If no, what do you think is the solution to improve cattle price in your area?

Mention
.....

31. 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)

32. When do you mostly sell your cattle?

- 1. When price is high 2. During harvest season 3. When need arises
- 4. Other (specify)

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

- 1. Husband 2. Wife 3. Negotiation
- 4. Other (specify) _____

34. What happened on animal ownership after you sold your cattle?

- 1. Nothing 2. I lose my status 3. I will raise another

4. I will buy another

5. Other (Specify) _____

35. Is there any impact of selling cattle on herd structure in your compound?

1. Yes 2. No

36. If yes, mention _____.

37. Do you consume beef cattle meat at your home?

1. Yes 2. No

38. If yes, at what time?

1. During festivals 2. Any time 3. Other (Specify)

39. How many times? _____ per month.

Beef cattle diseases

1. Do you have any animal health problems? 1 = Yes 2 = No

2. If yes, what is the main disease mainly affects your cattle production? Please rank in order of importance

1. Anthrax
2. Blackleg
3. Foot and mouth disease
4. Brucellosis
5. Mastitis
6. Internal parasites
7. Trypanosomiasis
8. Pasteurolosis

3. Do you have any chance of having health clinic in near by your residence?

1. Yes 2. No

4. If yes, how many km you will go to get this health clinic? ----- Kms

5. Do you have incidence of human beings infected with any of the diseases?

1. Yes 2. No

6. If yes, which disease indicate it _____

7. Do you use any traditional or herbal remedies for your cattle?

1. Yes 2. No

8. If yes, what are the local plants used for medication to livestock?

9. If yes, why you use these traditional medicines?

1. Veterinary services are not available
2. Veterinary costs are high
3. Veterinary medicaments are not effective for such disease
4. No regular visit by veterinarians
5. Long distance to animal health stations

10. Do you use a combination of veterinary services and traditional medicines?

1. Yes 2. No

11. From where do you get veterinary Services?

1. Government institution
2. Private veterinary services
3. NGOs extension services
4. 1 and 2

12. How many animals did you lose the last one-year because of diseases? Number them?

1. Calves _____
2. Heifers _____
3. Milking cows _____
4. Steer _____
5. Oxen _____

6. Beef cattle

13. Cause of the death

| Types cattle | Causes of the death of animals | | | | | Total |
|--------------|--------------------------------|----------|-----------|--------------|--------|-------|
| | Disease | Accident | Predators | Human attack | Others | |
| Beef cattle | | | | | | |
| Calves | | | | | | |
| Heifers | | | | | | |
| Milking cows | | | | | | |
| Steer | | | | | | |
| Oxen | | | | | | |
| Sub total | | | | | | |

Phase Two. FOCAL GROUP DISCUSSION CHECKLIST

1. History of beef cattle production in the area?
2. How cattle are herded across different seasons?
3. Communal land utilization and management?
4. Trend in grazing land?
5. Occurrence and frequency of disease, drought, conflict, flood and other disasters?
6. Copping mechanism during these problems?
7. Indigenous knowledge in managing beef cattle breeds?
 - 7.1 Breed identification
 - 7.1.1. Special qualities of the breed
 - 7.1.2. Good and undesirable character of cattle compared with other livestock
 - 7.1.3. Trait preference
8. Management problems
 - 8.1. Major feed resources during different seasons?
 - 8.2. Major water resources during different seasons?
 - 8.3. Housing system?
9. Major cattle production constraints?
10. The most common cattle diseases and measures taken?
11. Type of services in cattle husbandry?
12. Cattle population trend in the last 10 years?
13. Cattle marketing system
 - 13.1. Major problems in marketing finished beef cattle?
 - 13.2. Beef cattle selling practices?
 - 13.3. Types of markets?
 - 13.4. Cattle marketing actors?
 - 13.5. Cattle marketing channels and routes?
 - 13.6. Availability of information in the marketing processes?
14. View on the future size of cattle production/population?

