



**St. Mary's University
School of Graduate Studies**

**Production and Economic Analysis of Beef Cattle Production. The
Case of Adama District East Shewa, Ethiopia**

**By
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**February, 2016
Addis Ababa, Ethiopia**

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Case of Adama District East Shewa, Ethiopia**

**A Thesis Submitted to School of Graduate Studies of St. Mary's
University in Partial Fulfillment of the Requirement of Masters of
Science in Agricultural Economics**

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ACRONYMS

MoFED	Ministry of Finance and Economic Development
UNDP	United Nations Development Program
GDP	Growth domestic product
NEPAD	New Partnership for Africa's Development
CAADP	Comprehensive African Agriculture Development Program
NGO	Non-governmental organization
USAID	United States Agency for International Development
FLDP	Fourth Livestock Development Project
ACDI	Agricultural Cooperative Development International
VOCA	Volunteers in Overseas Cooperative Assistance
LMA	Livestock Marketing Authority
CSA	Central Statistical Agency
FGD	Focus Group Discussions
KII	Key Informant Interviews
SPS-LMM	Sanitary and Phyto sanitary Standards and Livestock and Meat Marketing Program
SPS	Sanitary and Phytosanitary
MMT	Million Metric Tons
RVF	Rift Valley Fever
DM	Dry Matter
CWE	Carcass weight Equivalent
WFP	World Food Program

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ABSTRACT

The study examined the cost and return of beef fattening in Adama town, Oromia region, which focused on profitability of the beef fattening and factors militating against beef fattening in the study area. Data were collected from a random sample of 112 beef fatteners through stratified sampling technique to which questionnaires were administered. The data were analyzed using descriptive statistics to describe the constraint associated with beef fattening, and Gross Margin was used to determine the profitability of beef fattening. The fattening cost consisted of variable and fixed cost. The cost of various inputs such as feed, veterinary care, labor, and transportation, water cost and miscellaneous were considered as a variable cost. Fixed costs included the cost of the beef, and construction of cowshed. The average fattening costs per farm were 384172birr, 481058birr, and 838950 birr for small, medium and large farms respectively. The average fattening costs per cattle were 14228 birr, 13744 birr, and 14981 birr for small, medium and large farms respectively. The major problems facing the farmers included high cost of feeds, inadequate credit facilities, and inadequate veterinary service. The calculated benefit cost (B:C) ratio were 1:1.08, 1:1.12, and 1:1.13 for small, medium and large farms respectively. Furthermore, the finding of this study indicated that beef fattening business was revealed to be profitable and worth venturing into as a source of income. A policy and research emphasis should be geared toward feeds production at affordable price to the fatteners and fatteners should be educated on how to formulate local feeds to reduce cost and access to feeds for better efficiency. On top of that, farmers should be enlightened on the availability of credit in order to increase their capital base to expand their scale of production.

Key words: Beef fattening, gross margin, cost and benefit, feed, credit....

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Agriculture is the backbone of an Ethiopian economy, which accounts for more than 44% of gross domestic product (MoFED, 2012), 80% and 85% of exports and employments respectively (MoFED, 2010). The livelihood of the growing population is directly related with the performance of the sector. Although the country managed to achieve rapid and consecutive economic growth since 1998, Ethiopia was ranked 173 out of 187 countries in the 2012 United Nations Human Development Index (Optimal Solutions Group, 2013) and 80 out of 84 in the Global Hunger Index (WFP, 2011). Moreover, while 29% of Ethiopian households live below poverty line (Beshir, Emanu, Kassa, & Haji 2012), chronic food insecurity has been a defining characteristic of the poverty that affected millions of Ethiopians of which the vast majority of these poor households live in rural areas and heavily depend on subsistence rain-fed agriculture (Subbarao & Smith, 2003; Mussa et al., 2012, Prof & Lansink, 2014).

Ethiopia is the first in Africa and tenth largest livestock producer in the world comprising of about 52 million cattle, 33 million sheep, 30 million goat and 2.5 million camels. The livestock sub-sector plays an important role in the economy and contributes to an estimated 12% of the total national GDP, over 45% of the agricultural GDP and about 16% of total exports. The contribution of livestock to the regional economy, however, is very far below the potential while a number of factors are attributable to the problem. The inadequate quality of animal feedstuffs is the most important constraint and causes a shortfall into the livestock's productivity of about 40% (Land O'Lakes, Inc., 2010). Due to this, the country is characterized by a high livestock population but low productivity, at least in terms of conventional products such as meat and milk. Livestock is the mainstay of rural livelihoods contributing to essential services such as traction and manure for arable production as well as forming a key source of financial security for many poor smallholder farmers. Although

this multifaceted form of livestock keeping dominates Ethiopia's mixed farming systems, pockets of intensification and market orientation exist and are on the increase.

However, as (Ajibefun,2002) noted, poverty alleviation objectives among smallholder farmers require improvement in the productivity and efficiency of resource use to increase income, attain better standard of living and reduce environmental degradation. According to (Asogwa et al., 2011), in order to alleviate poverty and achieve sustainable development, resources should be used efficiently by giving attention to the elimination of waste. Generally, the achievement of broad based economic growth depends mainly on the ability of economy in utilizing available resources efficiently. Thus, raising production efficiency in smallholder agriculture could be the basis for achieving universal food security and alleviating poverty particularly among the rural households in Ethiopia (Prof & Lansink, 2014).

In order to improve production and productivity, an efficient use of production inputs has to be adopted by smallholder farmers. Hence, there is a need to know the actual situation of resource utilization to design and implement appropriate policies to raise efficiency. Therefore, the purpose of this study is to evaluate economic analysis of beef cattle production and point out the major problems of the district.

1.2. Statement of the Problem

According to (Chavas et al., 2005), a number of researchers investigated the economic analysis of farm households in different parts of Ethiopia, though there does not seem to be any promising document on economic analysis of fattening activities in Adama district. Due to this, most of beef cattle producers simply participate to gain unsatisfactory profit from the farm. The present study intends to generate baseline information on socio demographic profiles of cattle rears, general features of cattle rearing, level of input use and its pricing, costs and returns, and the socioeconomic factors affecting the productivity of household cattle rearing in Adama. In this regard, a few hard data are available for making any meaningful plan and suggestion, and taking appropriate measures for the overall development of cattle fattening. No comprehensive economic study of this type was

conducted previously in this area, and hence a study on household beef cattle fattening appears to be of paramount importance to acquire the relevant information on the profitability of household beef cattle fattening practices of the study area which may help to device effective national planning for the development of this sector.

Recently, several large scale meat processing abattoirs have been established in Ethiopia in response to the emerging meat export opportunities to the Middle East and North African countries. These developments are in the right direction to increase Ethiopia's foreign exchange earnings and to improve the livelihoods of livestock producers and other actors engaged in the livestock related activities. One of the major challenges facing the meat export abattoirs was the competitiveness of these firms in which the domestic and export markets were limited by the underutilization of their meat processing capacities. It was observed that the live animal input is inadequate and as a result the existing meat processing facilities operate at less than 50% of their operational capacities (MIDROC, 2004; NEPAD-CAADP, 2005; Filip, 2006). This is apparently due to the inadequate supply of the required quality live animals for meat processing by the export abattoirs which make them less competent in the global or regional meat market. The export abattoirs are competing for the domestic supply of live cattle with the demand for domestic consumption for live cattle and formal and informal (cross-border) trade.

Though, the study area is estimated to have huge supply of crop-residues, there may be mishandling and lack of awareness about crop-residue improvement strategies and the alternative feed source in time of scarcity. As a result, utilization efficiency is very low. Besides, there may be lack of proper selection of fattening cattle, lack of market information, poor management, inadequate feeding system, healthcare, housing, watering, etc., which may lower the performance of beef cattle production. Hence, the producer may not get sensible benefit from their fattening activity unless appropriate improvement strategies were introduced. This study is expected to come up with useful findings for better practicing and policy making in the field of beef cattle production and fattening activities.

Objectives of the study

1.2.1. General Objective

- General objective of the study is to evaluate economics of beef cattle production.

1.2.2. Specific Objectives

- To identify the socioeconomic characteristics of cattle fattening farmers
- To assess the major constraints and opportunities of cattle fattening
- To determine the cost benefit analysis of small scale cattle fattening farms

1.3. Significance of the study

This study contributes to agricultural economics and agribusiness literature in many ways. First, it seeks to estimate the economic analysis of different beef cattle production systems in Adama district and assess factors that might influence cattle fattening.

The study provides analytical insights that should guide policies aimed at improving the efficiency of cattle production in Ethiopia particularly in Adama and inform strategies that contribute towards increased beef production. Moreover, economic analysis of beef cattle across different production systems is essential for targeting investments to meet policy needs in various localities. This view is informed by concerns that, generally, there are relative disparities in socio-economic aspects. In addition, there are results and recommendations made available at zone level, and hence beef producer farmers can use it for their day to day activities to increase farm productivity. The target people in the study area those engaged in cattle fattening activity will be the primarily beneficiaries. Moreover, other concerned NGO's, different government organizations and private companies will use the documents as baseline information to define the prospects for future interventions in developing market oriented cattle fattening program.

1.4. Scope and Limitation of The Study

This study is used to assess the cost benefit analysis of fattening farm. The study was limited or bound to 112 fattening farms that are found in Adama district. Accurate, reliable, sufficient and good quality data were the critical problems that were encountered during the study because maintaining records by the farmers were not commonly practiced. Additionally almost all beef cattle fatteners were not willing to share their real data due to the fear of income tax from government. To fill this gap, the study employed primary data based on the recall of the beef fattener's and this may not be accurate. Moreover, because of time and financial resource constraints, it was difficult to cover the whole farms.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Review

2.1.1. An Overview of Livestock Production and Marketing in Ethiopia

Cattle fattening is usually perceived by Ethiopian households as an income-generating activity for the period when they are not involved in crop-production activities. Opportunity cost of family labor involved in the fattening operations was the same as the opportunity cost of labor during the crop-production period, indicating that the households that already practice livestock fattening perceive it as a full-time activity that provides income to the family when crop production is not possible (Getachew, Hailemariam, 2008).

Ethiopian farmers have a long tradition of animal husbandry. It is estimated that Ethiopia possesses the largest number of livestock in Africa, comprising about 59 million cattle, 35 million sheep, and 31 million goats (Negassa, Rashid, & Gebremedhin, 2011). Given the total Ethiopian population of 93 million people, the per-capita livestock holding is still very low (about 1.3 animals per capita). The livestock holding per capita in Kenya, for example, is 1.43 animals. The number of livestock at the smallholder level also remains low. The majority of smallholders in Ethiopia are engaged in some sort of animal husbandry, but they usually do not specialize in any specific branch of livestock production (Negassa et al., 2011). Small-scale farmers, including those who are chronically food insecure, treat their livestock as a resource that yields multiple benefits, including: additional cash income that comes from the sales of live animals, wool, or hides/skins, natural fertilizer resource (manure and dung), food in the form of milk and meat, a risk-management and safety-net resource when drought or crop failure occurs (a “walking bank”), and a hedge against inflation (a wealth-accumulation resource in the absence of available financial institutions, or a “walking savings account”).

2.1.1.1. Beef Cattle Production in Ethiopia

Beef production is a way of fattening cattle for profitable production of meat. Cattle fattening package is a four-steps rearing program of male and/or infertile female emaciated cattle for harvesting their compensatory growth within a period of 60 to 120 days (Sarma & Ahmed, 2011). Collection of animals considering their body characteristics followed by deworming and feeding cost effectively up to a profitable rate of live weight gain and marketing them readily are the four major factors to make the fattening package profitable. It is an easy and profitable system of cattle rearing to alleviate poverty, unemployment and generate income both for the rural and urban people (Sarma & Ahmed, 2011).

➤ Fattening Systems

According to (FLDP,1989) cited by (Belay, 2009) in Ethiopia, there are three types of fattening systems. These are traditional, by-product based, and the Hararghe type of fattening.

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 (Belay, 2009).

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 Nazerate, where the market is suitable for both the fattened cattle and molasses resulted from the surrounding sugar factories.

In the Hararghe fattening system, livestock depends 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.

Beef cattle feeding systems

Beef cattle are ruminant animals that can utilize both roughages and concentrates. The roughage: concentrate ratio depends on the age of the animals and stage of feeding and decreases towards the final stage of the finishing operation. If a body weight gain of higher than 1 kg/day is desired, roughages should not make up more than 15-20% of the ration (Tolera, 2008). In order to obtain higher level of body weight gain, high energy feeds such as maize should be fed in place of roughages. As the daily rate of gain increases, the net energy of gain increases while the net energy of maintenance remains the same.

The feed ingredients used by most feedlots in Ethiopia (agro-industrial byproducts, hays or crop residues) are low in calcium. On the other hand, the agro-industrial byproducts contain more phosphorus than calcium, a condition that is very likely to cause calcium deficiency. Limestone is an excellent source of calcium and it can be included at the rate 1-1.75% of the ration to avoid the problem (Tolera, 2008). Rations must be formulated and updated regularly to avoid underfeeding or overfeeding of nutrients. Underfeeding can cause impaired performance of animals whereas overfeeding would increase feed cost and decrease profitability. Proper ration formulation requires analysis of feeds that are highly variable from batch to batch such as forages and by-product feeds.

Beef cattle health services

Livestock health service is an important input for livestock production. The major support for smallholder farmers in this regard comes from local government agricultural offices. However, the services fall short of expectations due to shortages of drugs in the health posts of study area; thus farmers are forced to search for private veterinary services in the town which are expensive and far from their areas (Tegegne, Gebremedhin, & Hoekstra, 2006).

Beef Cattle Housing

In all commercial farms, fattening animals were fed and drunk in group because there had no compartment with a specific dimension in both feeding and watering troughs during physical observation of the farms. Most feeding troughs are made up of woody materials but few from cement concrete. Furthermore, most of shelters are exposed to sun, rain and wind without overhead shed but, there were sheds for watering and feeding troughs. In few farms isolated house is not available for patient livestock (Teklebrhan & Urge, 2013).

Beef Cattle Watering

Distribution and types of watering facilities varied and influenced the frequency of watering and distance travelled in search of water bodies. The survey result indicated that major sources of water for livestock are city Pipelines Rivers, springs/streams and temporary water in order of importance. The main sources of water in the highlands during the dry season were streams ranked followed by river, temporary water and ponds. In midland river ranked followed by stream, ponds and temporary water and there was no practice of hand dug watering. For lowland areas river ranked followed by streams and temporary water and similarly also no practices of using pond and hand dug in lowland. However, during the wet season, temporary water ranked followed by streams was the main source of water in all altitudes (own survey)

2.1.1.2. Beef Cattle Marketing

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 unfavorable 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). However, 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. Farmers also failed to meet the quality required by the different markets for their live animals. This is associated with the absence of critical support services that can ensure strong link between producers and the various participants along the marketing chain.

➤ **Beef Cattle Marketing System and Channels**

In Ethiopia, the marketing process in general follows a three-step system with primary, intermediate and terminal markets through which marketable animal and animal products pass from producers to small traders and on to large traders and/or butchers. However, most producers' sale their stock and livestock products at local markets directly to consumers or small traders at relatively low prices (Tewodros, 2008). Without exception markets are open places in villages and towns. Distance from the market, poor trekking routes and lack of holding grounds create unfavorable conditions for producers forcing them to sell their stock at low prices

2.1.2. Challenges and Opportunities for The Beef Cattle Production

2.1.2.1. Livestock Production Challenges

Ethiopia has the lowest livestock-production rate among the least-developed countries and one of the lowest anywhere in the world (Negassa et al., 2011). There is not much specialization in the livestock sector, which lowers its productivity potential. Any observed productivity growth happens because of increases in the total number of animals, not because of increases in the efficiency of livestock-production methods. The commercial off-take rate is only about 8 percent for Ethiopia, which indicates that households keep animals for other purposes (such as prestige, social status, or liquid investment) rather than to sell them (Belay, 2009).

The highlands of Ethiopia are characterized by mixed crop and livestock systems. The livestock feed supply depends mainly on crop residues, natural pastures, and other agricultural by-products, such as thinning and leaf stripping from such crops as maize and sorghum or the enset leaves of sweet-potato vines, depending upon the locality (Belay, 2009). The contribution of natural pastures, however, has declined over time, as most of the available land is cultivated for crop production. The use of animal feed mixes (oilseed cakes, wheat bran, etc.) is still very low, mainly because of high prices and low availability. The use of agro-industrial by-products is also very limited due to the scattered settlement of the farmers.

Feed costs account for 60 percent to 70 percent of the total cost of livestock production. Feed shortages and the high price of feed ingredients negatively affect the productivity and profitability of commercial livestock operations (Getachew, Hailemariam, 2008).

There is a significant regional productivity difference as well as a productivity difference between various livestock breeds. Ethiopian small-scale farmers cater their livestock production largely to the domestic markets. The majority of sales are made in the local markets, usually without the establishment of advanced contractual agreements (Negassa et al., 2011).

2.1.2.2. Livestock Market Related Problem

(Dayanandan, 2011) 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. One of the major challenges facing the beef cattle marketing was the competitiveness of these firms in the domestic and export markets, which was limited by the underutilization of the processing capacities. It was observed that the live animal throughput is inadequate resulting in the existing meat processing facilities operating at less than 50% of their operational capacities (Filip 2006). This is apparently due to inadequate supply of the required quality live animals for meat processing by the export abattoirs which makes them less competitive in the global or regional meat market. The export abattoirs are competing for the domestic supply of live cattle with the demand for live cattle for domestic consumption, and for formal and

informal (cross-border) trade. According to (2006b),(Jama, Macopiyo et al. ,2009) location advantage, proximity to the strategic cattle markets and sea ports; ethnic similarities, same languages, social and cultural relationships with the people across the borders and weak economic and market bondages within the country have created conducive situations for illegal market links across the borders. The neighboring countries bordering these areas either consume locally or re-export to other countries mainly to Middle East countries (Birhan & Manaye, 2013).

Challenges with Exports

The annual outflow of beef cattle from Ethiopia through illicit (informal) market is huge. The immediate destinations of this illicit export are Djibouti, Somalia, Sudan and Kenya which are further re-exported to the Middle East countries after meeting domestic demands (Birhan & Manaye, 2013). 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 to be as high as 320,000 cattle (Workneh 2006). This being the potential for export, the actual performance has remained very low, leaving most (55 to 85%) of the projected livestock off take for the unofficial cross-border export and the domestic market. According to (Birhan & Manaye, 2013) the main sources for this illegal channel are mainly Somali region and Borena of south east and southern Ethiopia, respectively.

Beef cattle is brought to market primarily from three sources: from farmers which produce the beef cattle, small scale to large scale producers organized in the form of cooperatives to fatten the cattle and some brokers which buy either from directly from producers and fattening cooperatives. Those animals brought to the market are exported legally by small and medium scale exporter and illegally by small scale exporter and farmers (Tewodros, 2008).

Furthermore, several factors influence the low livestock-productivity status in Ethiopia includes: Livestock feed and water shortages, Diseases combined with weak or unavailable veterinary services, Predators and parasites, Poor market information and lack of marketing

outlets, and Poor livestock feeding and management at the farm level due to lack of training and financial resources to obtain improved livestock feed (Belachew and Jemberu, 2003).

2.1.2.2. Opportunities For the Beef Cattle Production

High Demand of Animals by the Local Abattoirs

The export abattoirs are required to ensure a consistent and continuous supply of meat in order to meet the demand of the customers in the importing countries. Thus, there is an urgent need for export abattoirs to devise alternative strategies to ensure adequate market supply of quality live animals to meet their processing needs in order to improve their efficiency and competitiveness (Birhan & Manaye, 2013). stated that there are seven abattoirs in Ethiopia which processed canned meat products mainly for the army, domestic market and some exports. These abattoirs are located in Addis Ababa, MelgeWondo, Dire Dawa, Kombolcha, Gondar and DebreZeit. Of these plants, MelgeWondo is to some extent preparing frozen beef and that of DebreZeit abattoir produced chilled beef, sheep and goat meat for both domestic and export markets. With policy reformations after government change in 1991 in response to the available potential for meat export and the liberalization policy, the number of export standard abattoirs has increased.

Official Exports

The exports of meat and live animals have dramatically increased in 2010-2011 Ethiopian fiscal. Ethiopia exported 16,877 tons of meat and 472,041 head of live animals, recording a 69 % increment from last year's export revenue (Belay, 2009). Ethiopian revenue and customs authority reported that live animal export in 2010 contributed 70% of the earnings while 30% was obtained from meat export (Trade bulletin, 2011). Chilled sheep and goat carcass accounted for 80%, beef 9% and offal 11% of the exported meat. Of the number of exported live animals, cattle accounted for 46%, sheep 35%, camels 13% and goats 6%. In terms of revenue, cattle contributed 67%, camels 25% and sheep and goats 8% to the revenue generated. There is also the possibility of expansion to Asian markets such as

Malaysia, which require hals-slaughtered, frozen, skin-off carcasses with less stringent hygienic regulations.

Domestic Consumption

The domestic meat demand is believed to increase with increasing literacy and family income. Meat consumption is often an indicator of the economic status of a country or an individual. People with a higher social or economic status demand a greater amount of high-quality meat products. The per capital consumption of meat in developed/industrialized countries is much higher than in developing countries. Countries whose population consumes the least amount of meat are located in Africa and Asia. Developed countries consumed a consistent level of 77 kg of meat per capita annually, while developing countries struggled to maintain a diet with only 25 kg of meat per capita annually. Ethiopians remained slightly below the meat intake of all low-income countries and consuming 9 kg per capita annually (Abbey, 2004).

Feed Resources Availability

Tolera, (2008) states, natural pasture and crop residue to be the major feed resources for highlands of Ethiopia. In Ethiopia highlands the natural pasture, crop residues, and stubble grazing are the major sources of feed (Alemayehu, 2004).

The availability of feed resources in Ethiopia depends on the mode and intensity of crop production as well as population pressure. The major basal feed resources in these areas are natural pasture, crop residues and stubble grazing, and their contribution to the total feed resource base vary from area to area based on cropping intensity (Seyoum et al., 2001), cited by (Belay, 2009). The availability of feed resources in Ethiopia interacts with rainfall amount and distribution pattern, and season of the year (Belay, 2009). Though, limited supplies are obtainable during the dry season on unusual patches of land and along riverbanks, the reliability of natural pasture as a feed source is restricted to the wet season (Zinash et al., 1995). Hence, animals will depend more on crop residues during the dry season. Besides natural pasture, the contribution of stubble and fallow land grazing is significant beginning from the end of cropping season just after harvesting. During this

period, livestock can have free access to grazing of crop fields. Standing hay that is closed during the wet season is also open at the end of the cropping season (FAO, 2001).

The availability of crop residues is closely related to the farming system, the type of crops produced and intensity of cultivation. In integrated crop/livestock systems, the potential of using crop residues for livestock feed is the greatest. As more and more land is put under crop production, livestock feed becomes scarce and crop residues particularly cereal straws remain the major feed source for the animals particularly during the dry period of the year (which spans from November to May period). Some estimates indicate that crop residues provide 40-50% of the annual livestock feed requirement (Daniel, 1988) cited by (Belay, 2009). In the highlands and mid altitude, various food crop residues: cereals (teff, barley, wheat, maize, sorghum and millet), pulse crop residues (faba beans, chickpeas, haricot beans, field peas, and lentils), oil crop residues and reject vegetables are providing considerable quantity of dry season feed supply in most farming areas of the country. Currently, with the rapid increase of human population and expansion of arable land and with the steady decrease in grazing land, the use of crop residues is increasing. On average crop residues provide 10 to 15 percent of total feed intake. Solomon (2004) noted that crop-residues and stubble grazing accounted for 74.15% of the total annual feed supply which was the major source of feed starting from harvesting of food crops to the wet periods during the time at which feed from grazing areas is inadequate or almost unavailable in the study area. Livestock, therefore, depend on the straw from cereal crops, especially during dry periods when there are limited feed supplies from grazing lands. Similarly, in most intensively cultivated areas, crop residues and aftermath grazing accounts for about 60 to 70% of the basal diet, particularly, wheat straw is the dominant feed in wheat-based farming system (Seyoum et al., 2001).

Different research works point out different percentage on the contribution of crop residues as livestock feed. This may be due to the wide range of ecological variation between different localities in the country and also variation in time which in turn results with variation in crop species and cropping intensity. So location and time specific feed resource assessment is required in order to know the feed gap between feed supply and feed requirement within specified animal production level.

Market Accessibility and Applicable Environment for Fattening Activity

Marketing of livestock and livestock products is an important activity all over the country; Farmer's sale livestock and livestock products to cover household cash expenses and to purchase crop inputs. Live animals are marketed through traditional marketing routes (channels) developed over the years. Livestock passes from primary markets (collection centers) to secondary and tertiary markets to reach the consumer. Cross-border exports are also common in the southeastern, southern and northwestern parts of the country (Azage, 2006). Marketing of livestock products such as milk, egg, hide and skin is also considerably high; fresh milk and egg is directly sold after meeting family needs at farm level though production is carried out at subsistence level. Surplus production and supply is usually higher in urban areas due to market orientation and urbanization, which creates better demand for products (Tegegne et al., 2006).

In Ethiopia, government arrangements in livestock marketing activities have taken various organizational forms. The Livestock and Meat Board was the first one established to develop livestock production and marketing in the country. A number of other development projects also dealt with livestock marketing issues over the years. The most recent one was the Livestock Marketing Authority (LMA) which took national responsibility for the promotion of livestock marketing until it was dissolved in 2004. Currently, livestock marketing is organized under the Agricultural Marketing and Inputs Sector of the MoARD (Azage, 2006).

Providing credit/loans for the purchase of livestock, feed, and health services and insurance against the loss of valuable productive assets play an important role in encouraging new investments in the sector and also in coping with difficult problems such as drought and disease. In Ethiopia, where financial and insurance services are not well developed, the provision of loans/credit/micro-credit and insurance for animal loss are nonexistent. Some NGOs have attempted such an intervention with very little or no success (Azage 2004; (Tegegne et al., 2006).

2.2. Empirical Studies on Economic Analysis

Bakhshineja, (2015) (Boby, 2013) employed simple descriptive statistical tools to examine economic analysis of small scale cow fattening in Iran; furthermore, the cost benefit analysis was modeled in term of direct, indirect cost and returning variables and other factors considering of cattle fattening farm. In particular the research objective was identifying the socioeconomic characteristics of cattle fattening farmers and determinate the economics efficiency of small scale cattle fattening farms; accordingly he found out that Livestock are important in supporting the livelihoods of the poor throughout the developing world. They provide an appreciating asset, a source of income, food, insurance, as well as important farm inputs such as manure and draught power. Livestock provide high quality nutrients in meat, milk and eggs in areas where malnutrition is common. Livestock can provide employment and stimulate trade at all levels.

Maina, (2013) examined the technical efficiency of sheep fattening in the Gombi Local Area of Adamawa State. The regression model of Cobb-Douglas production function was used to determine the relationship between variable inputs and output and also efficiency of resources used. The analysis showed that medication and labor are highly significant while feed, salt-lick; water and length of fattening are also significant respectively. The analysis also revealed that medication and salt-lick were under-utilized while feeds were over utilized and labor were efficiently utilize. Furthermore, they found out the major problems facing the farmers include high cost of feeds, inadequate credit facilities, and high cost of medication.

Umar et al. (2008) study and investigated the economics of small-scale cow fattening enterprise in Bama LGA of Borno State. The analytical tools employed were descriptive statistics and net margin analysis. The result shows that the inputs used for cow fattening were feeder cow, feed, drugs/vaccines, labor, water and potash/salt. The net margin was N40, 528.58 per cow that is, for every one naira invested in cow fattening business; 67 kobo was realized as net margin. The study shows that small scale cow fattening enterprise is profitable.

CHAPTER THREE

MATHEDODOLOGY

3.1. Description of Study Area

Adama town is found in east Shoa Zone, Oromiya Regional State, Ethiopia. Its annual temperature ranges from 11.4°C – 30.1°C. The mean annual rainfall of the area is 1020mm; Adama also known as Nazret or Nazareth is a city in central Ethiopia and the previous capital of the Oromia Region. Adama forms a Special Zone of Oromia and is surrounded by east Shewa Zone. It is located at 8.54°N 39.27°E at an elevation of 1712 meters, 90 km southeast of Addis Ababa. The city sits between the base of an escarpment to the west, and the Great Rift Valley to the east (CSA, 2007)

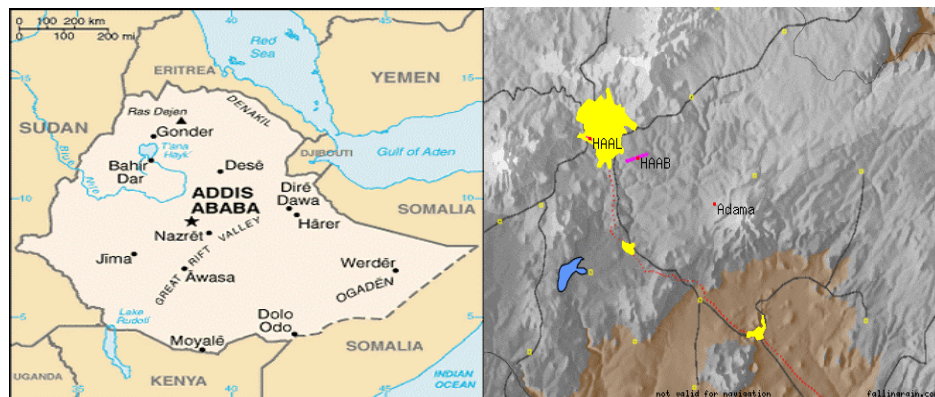


Figure 1: Map of Adama town

Adama is dominated by smallholder producers who utilize an average of 1.75 hectares of land per household. Households are composed of an average of 5 members. The area experiences three seasons: kiremt (rainy), meher (winter) and bega (spring). The main rainfall usually occurs from late bega (June) to late kiremt (September). The main crops grown are Teff (*Eragrostis tef*) and wheat (*Triticum aestivum*), Maize (*Zea mays*), Barley

(*Hordeum vulgare*), Beans (*Phaseolus vulgaris*) and Peas (*Pisum sativum*). A range of fodder crops such as leucaena (*Leucaena leucocephala*), napier grass (*Pennisetum purpureum*), sesbania (*Sesbania sesban*) and naturally occurring pasture-tropical grasses are also grown. Cattle, sheep, goats, donkeys and poultry are kept by the majority of households in the area. The majority of household income comes from agriculture. Livestock and labor (off-farm) activities contribute the remaining income. The area is the major supplier of beef cattle to domestic markets of Addis Ababa and major towns of the surroundings. The major animal feed source is crop residues conserved from a farmers' own land or purchased from the market (CSA, 2007), (Addisu, Solomon & Fantahun, 2012).

3.2. Demographics

Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), Adama has a total population of 220,212, an increase of 72.25% over the population recorded in the 1994 census, of whom 108,872 are men and 111,340 women (CSA,2007). With an area of 29.86 square kilometers, Adama has a population density of 7,374.82; all are urban inhabitants. A total of 60,174 households were counted in this city, which results in an average of 3.66 persons to a household, and 59,431 housing units. The four largest ethnic groups reported in Adama were the Oromo (39.02%), the Amhara (34.53%), the Gurage (11.98%) and the Silte (5.02%); all other ethnic groups made up 9.45% of the population. Amharic was spoken as a first language by 59.25%, 26.25% spoke Oromiffa and 6.28% spoke Guragigna; the remaining 8.22% spoke all other primary languages reported. The majority of the inhabitants practiced Ethiopian Orthodox Christianity (63.62%), while 24.7% of the populations are Muslim, and 10.57% are Protestant. The 1994 national census reported this town has a total population of 127,842 of whom 61,965 are males and 65,877 are females (CSA, 2007).

3.3. Sampling and Data Collection

Purposive sampling was used for selecting the kebeles in which focus group discussions (FGD) was held. Adama woreda 90 km SE of the capital Addis Ababa, is selected based on the existing smallholder beef cattle production practices and its proximity to the market.

Three kebeles Tikur Abay, Wonji Kurftu and Beku was selected through consultation with local experts or Adama agricultural office based on prominence of fattening activities relative to the surrounding kebeles. The participants for the interview discussions were identified by the extension agents to be representative of the range of wealth status in the kebeles, experience on fattening animals and their feed production activities and willingness of the actors to participate is important selection criterion since they would have to be willing to spare time and discuss with the researchers to make the exercise practicable. All smallholder farmers/cooperatives and well organized beef cattle fattening household and industries in selected district is constituted the study population. There is high number of beef cattle producers and some successful private and government farms in the study area are used for this study.

3.4. Study Design

The study employed a mixed approach and generated both qualitative and quantitative data. The qualitative approach is adopted to get more insight on the quantitative data, to generate explanations of the socioeconomic characteristics of cattle fattening farmers and major constraints and opportunities of cattle fattening. The quantitative research approach is adopted to analyze the profitability and cost benefit analysis of the fattening farm. In terms of time frame, the study adopted across-sectional data collection method in which data from the subjects were collected in a snap shot between August and September 2014. It followed descriptive research design; the descriptive design is meant to explain and discuss generate explanations of the socioeconomic characteristics of cattle fattening farmers and major constraints and opportunities of cattle fattening.

3.5. Sample Size and Sampling Method

Systematic (random) sampling techniques were used to select the required sampling frame which is based on high beef cattle production potential and accessibility to road and data collection.

The sample sizes were determined using the formula: $N = (ZS/E)^2$.

Where N= Sample size.

Z= Standardized value

S =Estimate of the population standard deviation and

E =Magnitude of errors.

Taking the Standard Error as 5%, confidence interval 95% and SE value 0.05 the sample size was determined as 112 households. Hence, using proportional sampling procedure 46, 43 and 23 households were randomly selected from Tikur abay, Wonji Kuriftu and Beku “Kebeles”, respectively.

3.6. Data Collection Method

The research approaches involved a combination of primary data collection using survey instruments along with review of secondary data. Combinations of different techniques were applied to collect the data required to analyze beef production in the study area. Key informant interviews (KII) and visual observation was used to collect primary data. Review of different literature sources and information obtained from different government and non-governmental organizations were also used to substantiate data from the primary sources.

3.7. Data Entry and Statistical Analysis

Data were analyzed with SPSS version 20. Descriptive analysis were employed for data analysis which refers ratios, figures, percentages, means, standard deviations and charts in the process of analyzing the data to calculate the benefit-cost ratio and its profitability.

Benefit-cost analysis (BCA) is a technique for evaluating a project or investment by comparing the economic benefits with the economic costs of the activity. Benefit-cost analysis has several objectives. First, BCA can be used to evaluate the economic merit of a project. Second the results from a series of benefit-cost analyses can be used to compare competing projects. BCA can be used to assess business decisions, to examine the worth of public investments, or to assess the wisdom of using natural resources or altering environmental conditions. Ultimately, BCA aims to examine potential actions with the objective of increasing social welfare by calculating profitability index.

Profitability Index (PI) is a capital budgeting technique to evaluate the investment projects for their viability or profitability. Discounted cash flow technique is used in arriving at the profitability index. It is also known as benefit-cost ratio.

A profitability index of anything equal to or greater than 1 is considered good. It means that the project is worth executing. PI greater than 1 indicates that the project is paying something more than the required rate of return of the investor but if the B: C ratio is less than one the project/activity considered as non-profitable or should be rejected.

3.8. Questionnaire Survey

The survey was done using semi-structured interview. Similar questionnaire having open-ended, close-ended and scale response questions is develop with main focus on feed resource availability, cattle fattening performance and marketing system for each interviewing cattle fattener households. Moreover, information on major land use patterns and other livestock structure were also collected to estimate feed availability and livestock feed requirement. Hence, the data was collected as per the annexed questionnaire format (Appendix)

3.9. Farm Visit

Field observation were conducted to enrich the data about beef cattle production husbandry practice, (feeding, watering, housing, and healthcare of the fattening cattle), utilization and management of communal grazing land and crop-residues, and feed resource situation.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1. Socio-economic Characteristics of Beef Cattle Producers

4.1.1. Gender and Age of Respondents

Gender of household head is also an important factor in estimating efficiency of agricultural production. More than 93% of the respondents are male; the rest 6.3% are females. Therefore, the proportion shows that the fattening business is dominated by male households even though women's play a vital role on facilitating beef cattle fattening activities. Furthermore, The overall mean age of household were considered; accordingly majority of the respondent (57.1%) are between the age category of 31-40 years; 20.5% of respondents fall their age between 20-30 years and also the same percent (20.5%) of respondents had the age between 41-50 and the rest 1.8% of the respondents are above 51 years of age (table 4.1).

Table 4.1 Sex and Age classification of respondent

Sex of respondent			Age of respondent		
	Frequency	Percent		Frequency	Percent
Male	105	93.8	20-30	23	20.5
Female	7	6.3	31-40	64	57.1
			41-50	23	20.5
			51-60	2	1.8
Total	112	100.0	Total	112	100.0

Source: own survey

4.1.2. Education Level and Household Size

It is obvious that education is a base for any development; The descriptive results of this study showed that 39.3% of the sampled household heads are second cycle primary , 23.2% of them joined college or university, 22.3% of them enrolled in high school only 11.6% enrolled in first cycle primary and 3.6% attend in meserete timirt. In addition to this the overall mean household sizes were 3.5 persons with 3 and 10 minimum and maximum respectively (Table 4.2).

Table 4.2 Education level and household size of respondent

Education of respondent			Family size		
	Frequency	Percent		Frequency	Percent
Meserete timirte	4	3.6	3	17	15.2
First cycle primary	13	11.6	4	34	30.4
Second cycle primary	44	39.3	5	28	25.0
high school	25	22.3	6	19	17.0
College or university	26	23.2	7	9	8.0
Total	112	100.0	8-10	5	4.5
			Total	112	100.0

Source: own survey

4.1.3. Main Occupation of The Household

Agriculture is the main occupation and major source of income for the respondents. A few selected respondents are engaged in small trading and few of them are serving in government, semi-government or private services, having agriculture as the secondary occupation. Most of these farm families fatten beef cattle as subsidiary occupation. Besides beef cattle, the people also rear goat and poultry. There are no special facilities for employment of destitute women in the selected villages. As presented in Table 4.3, the major (44.6%) sources of household income are farm/ crop and livestock production; 31.3% are participated in trading and 20.5% of sample household are made their livelihood by retired. Only 3.6% are practicing both farming and trading. According to the results of the study, livestock production integrated with all kind of income source is considered as a source of income and survival.

Table 4.3 Main Occupation of respondents

	Frequency	Percent
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Farmer	50	44.6
Retired	23	20.5
Trader	35	31.3
farmer and trader	4	3.6
Total	112	100.0

Source: Own survey

4.1.4. Herd Size

As shown in table 4.4 majorities (42.9%) of the respondents had a herd size of 25 to 30. More than 28% of the respondents had a herd size of 31 to 40 and also 18.8% of the respondents had 41-50 herd size; while only 9.9% of the respondent had more than 50 herd size.

Table 4.4 Herd size

	Frequency	Percent
25-30	48	42.9
31-40	32	28.6
41-50	21	18.8
51-60	5	4.5
400-1000	6	5.4
Total	112	100.0

Source: Own survey

4.1.5. Experience Involved In Cattle Production

Beef cattle production experience refers to the number of years that the producer stayed in cattle production activity. From producers' survey, it was found out that most of the producers had been in cattle production activities for more than 5 years. Out of the 112 surveyed producers, 13.4%, 28.6%, 25.9%, and 32.1% had cattle production experiences of 10-15, 7-10, 2-3, and 4-6 years respectively.

Table 4.5 Year of experience

	Frequency	Percent
2-3 year	29	25.9
4-6 year	36	32.1
7-10 year	32	28.6
10-15 year	15	13.4

Total	112	100.0
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Source: Own survey

4.1.6. Purpose of Rearing Beef Cattle

Livestock are integrated into this system for the purpose of replacing stock, sale, threshing, manure production, tillage, milk production, meat production and cart pulling. Borena breed is the dominant local/indigenous beef breed. This local breed is characterized by high meat production, thus, its major contribution is provision of draught power and manure production. On average, 85% of households keep two draught cattle for tillage, threshing and manure production. When the capabilities of the draught oxen begin to decline, they are sold for slaughter after a short period of fattening.

4.1.7. Major Feed Resources

Feedstuffs are categorized as concentrates or roughages. Concentrates are high in digestible nutrients. Grains and protein supplements are examples of concentrates. Roughages are feed stuffs that are low in digestibility. Examples of roughages include hay, pasture, and silage. The percentage of roughage and concentrate in beef cattle rations depends on the type of animal being fed. For example, feedlot steers are fed mostly grain and a little roughage, while bred cows may be wintered on good-quality roughage alone. As a general rule, beef cattle consume up to 3 kg of feed per day for each 100 kg of body weight. A 300 kg weaned calf, for example, will eat 9 kg of high-quality Lucerne hay per day. Cattle usually weigh 250 to 300 kg before they are placed on a high-grain (high energy) ration. This diet is fed until slaughter weight is achieved (Teklebrhan, 2013).

Crop residues, mainly from teff are the main components in the diet of animals. In Kechemba, the straw is usually fed without any form of processing and sometimes mixed with concentrates. In Wonji Kuriftu, the straw is fed by mixing it with purchased concentrate feed. Crop residues constitute a major proportion of dry matter (DM) and metabolisable energy (ME) of the diet they are the predominant feed during the year except during the rainy season when animals are grazed and fed green forage. However, there is minimal grazing but more green forage in Wonji Kuriftu. Feeds such as wheat bran, noug

cake, linseed cake and a commercially formulated mixed ration are the main concentrate feeds purchased. These constitute the bulk of protein supply to the livestock diets.

All commercial feedlots were depending on purchased feed sources for fattening because of shortage of land for feed production as shown in Table 5. Accordingly, native grass hay was purchased from Sululta, and straws from Welenchiti. Agro-industrial by products was also bought from the factories in and around East Shewa. This could be mainly because almost all commercial farms were found around this areas and this gives them easy access to agro-industrial byproducts which form a major portion of the concentrate mix fed to feeder livestock.

Table 4.6 Feed source

	Frequency	Percent
crop residue	4	3.6
purchased feed	3	2.7
natural grazing and crop residue	2	1.8
crop residue and improved feed	8	7.1
crop residue purchased feed and crop after maths	12	10.7
crop residue brewery product and hay	10	8.9
crop residue purchased feed and hay	4	3.6
crop residue purchased feed and improved feed	6	5.4
crop residue purchased feed and atela	18	16.1
crop residue, purchased feed, improved feed, crop after maths, atela and hay	16	14.3
All	29	25.9
Total	112	100.0

Source: Own survey

4.1.7.1. Roughage

Roughage feeds are characterized by relatively higher fiber content and lower energy and protein contents than concentrates. The source of roughage used for commercial feedlot includes crop residue (teff straw, wheat straw) and native grass hay. In this study, teff straw was usually utilized by most of feedlot operators whereas the other roughages were rarely utilized in the study areas. According to the information obtained from the fatteners the type of roughage used was directly related with cost effectiveness and availability of the roughage near to fattening units. Discussants noted that the availability of crop residues is closely related to the farming system, type of crops produced and intensity of cultivation.

4.1.7.2. Agro Industrial By-Products

Agro-industrial by-products widely used as source of livestock feed include those resulting from flour mills, oil processing factories, and sugar factory. The agro- industrial by-products (concentrate) feeds are used as energy and/or protein sources. Accordingly, they are classified as energy or protein sources or sources of both energy and protein.

The source of concentrate feeds commonly used in the study area includes wheat bran, wheat middling, whole cotton seed, cotton seed cake, noug seed cake, soybean, haricot bean bran and haricot bean shorts. However, sorghum and maize grains were utilized by few farms. Similarly, the grains and agro-industrial by products were utilized as concentrate feed sources in feedlot industries. Most feedlot farms used wheat bran, wheat shorts, whole cotton seed and its cake noug seed cake, soybean and wheat middling; however, sorghum and maize grains were utilized as an ingredient to the compound concentrate feed by few farms.

Table 4.7 Kinds of concentrate

	Frequency	Percent
oil seed cake	40	35.7
TMR	2	1.8
oil seed cake and formulated ration	20	17.9
whear short and bran and oil seed cake	11	9.8
wheat short and bran oil seed cake and formulated ration	39	34.8
Total	112	100.0

Source: Own survey

4.1.8. Feeding Systems

With regards to feeding procedure, initially animals were not weighed and feed was provided by common sense. Moreover, the ratio of concentrate to roughage was not known in all commercial farms as a general.

The daily feeding frequency followed by almost all commercial farms was twice and only few farms were followed three times of feeding. In addition, almost all farms followed the classical daily feeding procedure that is initially gave the roughage and then concentrate on the top of roughage. Generally, all farms provided roughage and concentrate at mix which is uncommon in the trials usually conducted in stations. Large number of feedlot owners

provides roughage as an adlibitum. In some of farms roughage offered was restricted. As a common procedure of commercial farms roughage was provided twice a day at the morning and evening before provision of concentrate in both cases. This result also noted that by all feedlot farms no attempt had been done to improve the nutritional value of the roughage feeds. All feed lot farms provided concentrate twice a day.

Usually all farms offered concentrate mix, though the ratio of mixing of ingredients was so variable or not uniform across the farms. Concentrate was offered every day throughout the fattening period. The amount of concentrate mix provided was different from farm to farm as shown in Table 6. Most feed lot farms offered 9 - 10 kg of concentrate mix per head/day followed by 7 - 8 kg. Whereas, few feedlot farms reported that least amount of daily concentrate was offered (11 - 12 kg/head/day) as revealed in Table 6.

Feed was given by common sense in all feedlot farms without considering whether the traditional ration meets the nutritional requirement of feeder or not. Therefore, generally livestock were provided feed without knowing the age and body weight of the animal.

Table 4.8 Feed offer per kg per day per animal

	Frequency	Percent
6	1	.9
7	4	3.6
8	15	13.4
9	24	21.4
10	36	32.1
11	30	26.8
12	2	1.8
Total	112	100.0

Source: Own survey

4.1.9. Water Sources and housing System

Water resources in the study area are dominated by city pipe line water. Next to pip line, rivers are the most important water sources. In the study area beef cattle producers mostly use pip line for their animals and some of them use local transport to fetch water from nearby rivers. In all commercial farms, fattening animals were fed and watered in group

because there had no compartment with a specific dimension in both feeding and watering troughs during physical observation of the farms. Most feeding troughs were made up of woody materials but few from cement concrete. Furthermore, most of shelters were exposed to sun, rain and wind without shed but there were sheds for watering and feeding troughs. In few farms isolated house made not available for seek livestock. Moreover, in major feedlot farms there were no drainage systems and the out late for the waste materials produced (Table 4.9)

Table 4.9 Water source and housing type

Water source			Housing type		
	Frequency	Percent		Frequency	Percent
city pip line	98	87.5	adjoining house	6	5.4
nearby river	14	12.5	separately constructed house	62	55.4
Total	112	100.0	back yard	44	39.3
			Total	112	100.0

Source: Own survey

4.1.10. Beef Cattle Health Problem

Cattle of all ages, particularly young, growing cattle, are subject to a variety of ailments. They range from mild conditions to severe infectious diseases that may cause death within 24 hours. The cost of caring for sick cattle can seriously reduce their profit margin. With the increasing need to cut production costs, good herd health care is very important for any beef operation. Prevention is the easiest and cheapest method of disease control. Clean sheds, lots, and feed and water troughs give disease less chance to get started. A sound vaccination program, parasite control, and frequent observation of the herd also help to reduce the occurrence of illness.

Health problems are more common during and after periods of stress, including calving, weaning, shipping, working or moving the cattle, and extreme weather conditions. Stress can reduce an animal's ability to resist infectious agents. In the study area more than foot and mouth, liver fluke, lung worm and black leg cover higher percentage (60%) and followed by ticks and Mite (24%). Other diseases are not much significant in selected Adama kebele's (Table 4.10). Vaccinations and parasite controls are available to control many of the diseases affecting cattle. In addition to this, the choice of remedy and time of

application depend on a variety of things, including the animal's nutritional level and disease prevalence in the herd.

Table 4.10 Health problem

	Frequency	Percent
foot and mouth	4	3.6
black leg	4	3.6
black leg pneumonia and ticks	6	5.4
all except mite	14	12.5
lung worm ticks and mite	24	21.4
foot and mouth liver fluke lung worm and black leg	60	53.6
Total	112	100.0

Source: Own survey

4.1.11. Frequency of Fattening

All livestock species were preferred for fattening industry though there was significant variation among farms on degree of choices as shown in Table 2. For that reason, 89.58% feed lot farms consider cattle as their first choice for commercial fattening. Physical observation also confirmed that except small number of farms, all farms of the study areas were only engaged in cattle fattening enterprises. All discussants, agreed that fattening of cattle was advantageous because of low mortality, better tolerance for some diseases, frequent supply of meat for consumption as well as local and export markets. Most of the respondents engaged in the fattening venture 69% agreed on two cycles of fattening per year, 27% and 16% feedlot fatteners fattened three and one time per year respectively as reported in (Table 4.11).

Table 4.11 frequency of fattening

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	one times	16	14.3	14.3	14.3
	two times	69	61.6	61.6	75.9
	three times	27	24.1	24.1	100.0
	Total	112	100.0	100.0	

Source: own survey

4.2. Major Constraints of Beef Cattle Fattening.

4.2.1. Inadequate Veterinary and Extension Service

Veterinary services are not available in the study area. Overall 46.0 percent of cattle fatteners pointed out that inadequate veterinary care and services were one of the important problems of fattening cattle. There was only few numbers of Veterinary Assistant Surgeon at woreda level and it was a difficult task for them to render services throughout. On the other hand, the supply of medicines and vaccines to the selected Livestock were not sufficient. Furthermore, People of the study area were not aware about cattle health care. They have no sufficient knowledge about cattle fattening techniques. The cattle producers reported that they did not get technical and modern information for fattening method from extension workers.

4.2.2. Shortage of Working Capital

Smallholder farmers need support of working capital if they are to be engaged in cattle fattening and dairy production. Farmers who are willing to involve in fattening and/or dairy production are not able to purchase animals due to lack of capital. Farmers in the Adama selected kebeles who have better experience do not get any credit service from any institution. Microfinance institutions need to review their lending programs to ensure farmers interested in livestock enterprises benefit from their services. Formation of farmers' cooperatives could also be one strategy to pool resources together to have a better voice in accessing credit and such an option need to be explored in the future. In addition to this,

lack of unequal access to up-to-date market information on prices; time-specific demands and quality requirements; poorly developed road networks connecting the livestock supply areas (e.g., pastoralist areas) to the markets; an inadequate number of market centers for live animals with adequate waiting and holding ground, feeding, watering, resting facilities, livestock scales, loading ramps, crushes, etc.; clan conflicts due to competition for limited land and water resources; lack of grades and standards; and a lack of effective value chain coordination/consultation forum among the livestock value chain participants.

4.2.3. Constraints of Export

The rapid growth in demand for meat products in the world represents great opportunities for livestock resource-rich countries like Ethiopia to exploit. However, there are several constraints that limit Ethiopia's exploitation of export potential of livestock and livestock products. The critical constraints as identified based on the Ethiopia Sanitary and Phyto sanitary Standards and Livestock and Meat Marketing Program (SPS-LMM) project and other studies are summarized below: Inadequate information regarding the country's livestock number, annual off-take, productivity, and consumption levels, High domestic demand relative to low supply of export-quality live animals, Insufficient and inconsistent supply of price competitive quality livestock and meat, Prevalence of livestock diseases, Import restrictions based on Ethiopia Sanitary and Phytosanitary Standards (SPS) requirements imposed by importing countries, Inadequate infrastructure supporting domestic and export markets for live animals (e.g., livestock markets, stock routes, resting places, quarantine stations for assembling and transporting livestock are inadequate), Absence of a grading system, a market information system, and promotional activities, and Lack of capacity for cattle slaughter and for cold chain processing and packaging of export.

The annual outflow of beef cattle from Ethiopia through illicit (informal) market is very huge. The immediate destinations of this illicit export are Djibouti, Somalia and Kenya which are further reexported to the Middle East countries after meeting domestic demands (NEPAD-CAAD, 2005 cited by Birhan & Manaye, 2014). It can be argued that Ethiopia would benefit more by exporting meat rather than live animals as there are several

problems in exporting live animals. First, there is limited marketing infrastructure, and feeding and watering facilities en-route to the live animal export markets, which results in high transaction costs and reduces the quality of live animals upon arrival in destination markets. Second, live animal exports have also been observed to enhance the chances of disease transmissions and as a result the exports of live animals have faced frequent bans by importing countries whenever there are animal disease outbreaks within Ethiopia or bordering countries. Import bans have been prevalent in Ethiopia over the last several years; these can be very expensive and disruptive to the livestock sub-sector growth. Furthermore, as discussed above, live animal export trade from Ethiopia is seasonal for sheep and goat, usually concentrated around the time of religious celebrations in Middle-Eastern countries, while the meat export trade could be a year-long activity providing year round employment.

Low levels of export and lack of diversification show the potential growth areas for meat exports in terms of increasing the volume of exports and diversifying into different meat products with more value addition. Export diversification is also important to reduce the risk of the meat export market due to demand and price instability. The chilled whole carcass also has a limited shelf-life which requires fast delivery for timely access to the market through channels such as expensive airfreight.

4.2.4. Poor Transport Condition

Reponses by the export abattoirs indicated that cattle are transported by road, sea and air for purposes of fattening or slaughter. However, there are no live cattle transports Lorries in the country rather they use small trucks from the markets to their holding grounds and used chain trailer to the Djibouti port. Factors involved with “transport stress” include pre-transport management, noise, vibration, novelty, social regrouping, crowding, climatic factors (temperature, humidity and gases), restraint, loading and unloading, time of transit and feed and water deprivation that are stressful or hazardous to the cattle, or that lower carcass and meat quality and weight losses are an important factors to consider.

The processed meat such as chilled meat export has been taking place using the available cargo space in scheduled passenger flights. The limited spaces by the Airline, forces the

abattoirs mostly to operate under capacity. When cargo space is not available, exporters are forced to take back the consignments to their own cold chain facilities. Live cattle export is mainly done by the sea transport through Djibouti, since it is the only port for livestock export from Ethiopia. Although vehicle transport on tarred roads are replacing common methods such as driving on hooves and gravel road in developing countries, Maria et al. (2003) reported that, long transport journeys on tarred roads before slaughter increased the risk of dry cutting beef (DCB). Such defaults can be reduced by resting animals in the lairage for 36 h (Kuzmanvic and Elabjer, 2000). Most of the vehicles used for transporting animals are not roofed and they expose animals directly to the sun radiation.

However, there is no information on the response of animals or on possible alternatives to ensure animal welfare, for cattle transported by transhumance and gravel roads for these methods are still common for transporting cattle to the markets or abattoirs in developing countries, especially in the Sub-Saharan African region. Animals are inevitably transported for long distances from rural markets to urban smallholder abattoirs, lengthy journeys place enormous demands for energy metabolism on the animal and may be the reason of depleted muscle glycogen pre- and post-mortem thus, less lactic acid and consequently high beef pH post-mortem (Maria *et al.*, 2003).

4.3. Opportunities of Beef Cattle Fattening

The global market for beef is driven by the increase in income, population growth and urbanization, not just in the Ethiopia but in Africa and the Middle East. The distribution of the income will be important to impact on a greater number of lower income consumers. These factors are having positive impacts on the rise in consumption of beef in the target markets.

The world demand for beef has been on the rise. For the period of 2005 to 2015 global demand will continue to grow but at a decreasing rate. Meat consumption in 2015 is expected to be 316 million metric tons (mmt), an expected 2 percent growth per year. In 2005, beef is the most traded meat after poultry. Traded beef was 7.4 mmt cwe which includes live trade compared to poultry meat of 7.5 mmt cwe.

The world price is expected to decline from its high of \$350/100kg in 2005 to around \$280/100kg in 2015. In the atmosphere of falling future real prices for beef, then it will be important that there be an emphasis on developing viable commercial industries. The risk of animal disease outbreaks will continue to create added uncertainty in the beef market. Certain trends are becoming evident that will impact on Ethiopia's ability to be competitive.

The domestic demand for beef in Ethiopia has been rising due to the factors of population growth, urbanization, income growth, demographics and a preference for eating meat including beef. Total consumption of beef is estimated at 298,000 mmt in 2002. Consumption has been growing at a rate of 2.6% per year from 1993 to 2000. More recently consumption has been increasing at around 2.25% per year. Estimated per capita consumption is 6 kg/capita in 2002. Based on an estimated average national carcass weight of 108 kg/head low for cattle with lightest non-veal being 300 kg lvwt and increasingly bulls are slaughtered at 400 kg the offtake rate is estimated at 7.8% per year. This offtake rate is lower than in other countries in the region. For example, in Kenya, the off-take rate is estimated at 16.1% per year. The average carcass weight for cattle is estimated at 159 kg per year in Kenya.

The Ethiopian beef market is again being impacted by animal health diseases and SPS problems. This adds to major uncertainty for the beef sector. The outbreak of Rift Valley Fever (RVF) has disrupted trade flows.

Feed availability

Crop residues, mainly from teff are the main components in the diet of animals. In Kechema, the straw is usually fed without any form of processing and sometimes mixed with concentrates. In Wonji Kuriftu, the straw is fed by mixing it with purchased concentrate feed. Crop residues constitute a major proportion of dry matter (DM) and metabolisable energy (ME) of the diet. They are the predominant feed during the year except during the rainy season when animals are grazed and fed green forage. However, there is minimal grazing but more green forage in Wonji Kuriftu. Feeds such as wheat bran,

noug cake, linseed cake and a commercially formulated mixed ration are the main concentrate feeds purchased.

These constitute the bulk of protein supply to the livestock diets the feed resources in the study area were primarily composed of grazing, crop residue (cereals and legumes), and purchased feed, cultivated fodder and naturally occurring and collected fodder.

The study area is characterized as mixed crop-livestock farming system, in which both livestock rearing and crop production are practiced simultaneously as a means of the farmers' livelihoods. In mixed farming system, crop residues are mainly used as source of livestock feeds together with natural pastures. Crop residue was a major component in the diet of cattle in both groups. Animals rely on crop residue throughout the year when grazing material is scarce.

The dominant crop residues available and used as feeding options for livestock production includes straws of wheat, teff, linseed, faba bean and field pea. The main source of crop residues was from own harvest, but in some cases, farmers also buy from the market or other farmers. Preferences for crop residues differ for different crops.

Accessibility of all-weather road in the district as well to the PA: The all-weather road that passes through the district connects it to different cities like Addis Ababa, Shashamane, Assasa, Bale robe and the like. This creates opportunities to supply the livestock products to them and to access inputs easily from this area.

Good policy road map which aimed that for bringing the desired change in the livestock sector. Nowadays more emphasis is given to improve the livestock production and productivity so as to earn more benefits from the sectors. Change of life styles in the urban centers coupled with urbanizations and rapid population growth stimulates for high demand for food particularly livestock products which are rich in protein. The need for livestock products (meat, milk, eggs and milk products) indicates the opportunities regarding livestock production.

4.3. Cost, Return and Profitability of Beef Cattle Fattening

4.3.1. Cattle Population

The number of farms was 112 which is classified as small, medium and large; and each contains a herd size of 25-30, 30-60 and above 60 respectively. Furthermore, the proportion of breed type is dominated by Borena (63.4%) followed by Arsi (28.6%) and Bale (8%) breed cattle which contain 63.4%, 28.6% and 8% respectively. Furthermore, the average number of beef cattle per each farm is 27, 35, and 56 for small, medium and large

scale farms respectively (table 4.12).

Table 4.12 Description of herd size and breed type

Herd size	Number of farm	Percent	Percentage of cattle by breed			Average Number of beef cattle per farm
			Borena	Bale	Arsi	
small	48	42.9	38%	50%	50	27
medium	58	51.8	56.3	50%	43.8%	35
large	6	5.4	5.6%	--	6.3%	56
Total	112	100.0				

Source: Own survey

4.3.2. Annual Fattening Cost

The fattening cost consisted of variable and fixed cost. The cost of various inputs such as feed, veterinary care, labor, transportation, water cost and miscellaneous (rope, salt...) were considered as a variable cost. Feed cost was one of the major cost items of cattle fattening. An attempt was made to estimate feed cost for the cattle in the research. Cost of feed included expenses on teff/wheat straw, green grass/hay, oilcake, bran (rice, wheat and pulse) and salt etc; and Veterinary cost was calculated by taking into account the actual cost incurred by the farmers vet fees and medicine were two major components of the total veterinary cost. Fixed costs include the cost of the beef, and construction of cowshed.

Table 4.13 presents fattening costs of a given farm at different herd sizes. The average fattening cost per farm (variable and fixed costs) were 384172*birr*, 481058*birr*, and 838950

birr for small, medium and large farms respectively. The average fattening costs per cattle were 14228 *birr*, 13744 *birr*, and 14981 *birr* for small, medium and large farms respectively.

Table 4.13 Annual fattening cost of a fattening farm

Items of expenditure	Herd size			<i>All</i>
	Small	Medium	Large	
Variable cost				
• Feed cost	212706	259560	436800	909066
• Labor cost	6942	8508	13002	31452
• Water cost	3240	4140	5400	12780
• Veterinary cost	3714	4290	11000	38004
• Miscellaneous cost (rope...)	500	800	1200	2500
	227102	277298	467402	
Total variable cost				991802
Fixed cost				
• Initial animal cost	151470	196560	340648	688678
• Cow shed and equipment	5600	7200	8900	21700
	157070	203760	349548	
Total fixed cost				708378
Total fattening cost (Fixed cost + Variable cost)	384172	481058	816950	1682180

Source: own survey

4.3.3. Returns of the Fattening Farm

A return to the fattening farm comes from selling of the fattened cattle's. The selling price of the fattened cattle ranges from 11500 to 18000; and the mean selling price was *birr* 15440, 15400, and 16600 for small, medium and large farms respectively. It takes 3 months to fatten and deliver to the market; in some cases it is reduced to 2 months and 10 days if the cattle have got feed which had high calories content. The gross return was the highest for large farms (929600 *birr*) followed by medium (539000 *birr*) and small farms (416880 *birr*). The net returns for large, medium and small farm per cattle were 2011 *birr*, 1655 *birr*, and 1211 *birr* respectively. The net benefit increased as herd size increased because of economies of scale; the large size farms are advantageous for instance in labor size; with the same amounts of labor size with medium and small size farms they had the opportunity to manipulate and manage their farm. The financial solvency of large fattening farms helped them in procurement and better management of better breed beef cattle's to produce

better fattened beef. The calculated benefit cost (B: C) ratio were 1:1.08, 1:1.12, and 1:1.13 for small, medium and large farms respectively. For all farms, B: C ration was 1:1.12, indicating fattening farming was economically profitable in Adama district (table 4.14).

Table 4.14 annual returns for different herd size of fattening farm

	Small	Medium	Large	All
Average herd size per farm	27	35	56	
Average Selling price per cattle	15440	15400	16600	
Total Income from selling of fattened cattle	416880	539000	929600	1885480
Total cost	384172	481058	816950	1682180
Gross return	416880	539000	929600	203300
Net return per farm	32708	57942	112650	
Net return per cattle	1211.41	1655.48	2011.60	
B/C ratio	1:1.08	1:1.12	1:1.13	1:1.12

Source: Own survey

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary

Livestock production provides an asset, a source of income, food, insurance, as well as important farm inputs such as manure and draught power. Livestock provide high quality nutrients in meat milk and eggs in areas where malnutrition is common. Livestock can provide employment and stimulate trade at all levels. In terms of time frame, the study adopted across-sectional research design in which data from the subjects were collected from 112 fattening farms in a snap shot, and the study employed descriptive research design of cost benefit analysis in order to find out the opportunity and constraints of fattening farm; describe socio economic characteristics of fattening farmers and analyze the cost benefit analysis of the fattening farm.

According to the finding, more than 93% of the respondents are male; the rest 6.3% are females. Furthermore, the overall mean age of household was considered. Accordingly, majority of the respondent (57.1%) are between the age categories of 31-40 years; 20.5% of respondents fall their age between 20-30 years and also the same percent (20.5%) of respondents had the age between 41-50 and the rest 1.8% of the respondents are above 51 years of age.

Agriculture is the main occupation and major source of income for the respondents. A few selected respondents are engaged in small trading and few of them are serving in government, or private services, having agriculture as the secondary occupation. Major (44.6%) sources of household income are farm/ crop and livestock production; 31.3% are participated in trading and 20.5% of sample household are retired. Only 3.6% are practicing both farming and trading. In addition to this, majorities (42.9%) of the respondents had a herd size of 25 to 30; more than 28% of the respondents had a herd size of 31 to 40 and also 18.8% of the respondents had 41-50 herd size; while only 9.9% of the respondent had more than 50 herd size.

From producers' survey, it was found out that most of the producers had been in cattle production activities for more than five years. Agro-industrial by-products widely used as source of livestock feed include those resulting from flour mills, oil processing factories, and sugar factory. The agro- industrial by-products (concentrate) feeds are used as energy and/or protein source.

In the study area health problems are more common during and after periods of stress, including calving, weaning, shipping, working or moving the cattle, and extreme weather conditions. Stress can reduce an animal's ability to resist infectious agents. In the study area liver fluke, lung worm and black leg cover the high percentage (60%) and followed by ticks and Mite (24%). Other diseases are not much significant in selected kebele's. Vaccinations and parasite controls are available to control many of the diseases affecting cattle. Most of the respondents engaged in the fattening venture agreed on two cycles of fattening per year but very few feedlot fatteners fattened three and four time per year.

Crop residues, mainly from teff are the main components in the diet of animals it constitute a major proportion of dry matter (DM) and metabolisable energy (ME) of the diet. The main source of crop residues was from own harvest, but in some cases, farmers also buy from the market or other farmers. Preferences for crop residues differ for different crops.

Accessibility of all-weather road in the district as well to the PA: The all-weather road that passes through the district connects it to different cities like Addis Ababa, Shashamane,

Assasa, Bale robe and the like. This creates opportunities to supply the livestock products to them and to access inputs easily from this area.

The fattening cost consisted of variable and fixed cost. The cost of various inputs such as feed, veterinary care, labor, and transportation, water cost and miscellaneous were considered as a variable cost. Fixed costs include the cost of the beef, and construction of cowshed. The average fattening costs per farm were 384172*birr*, 481058*birr*, and 838950 *birr* for small, medium and large farms respectively. The average fattening costs per cattle were 14228 *birr*, 13744 *birr*, and 14981 *birr* for small, medium and large farms respectively.

A return to the fattening farm comes from selling of the fattened cattle's. The selling price of the fattened cattle ranges from 11500 to 18000; and the mean selling price was *birr* 15440, 15400, and 16600 for small, medium and large farms respectively. It takes 3 months to fatten and deliver to the market; in some cases it reduced to 2 months and 10 days if the cattle have got feed which had high calories content. The gross return was the highest for large farms (929600 *birr*) followed by medium (539000 *birr*) and small farms (416880 *birr*). The net returns for large, medium and small farm per cattle were 1211 *birr*, 1655 *birr*, and 2011 *birr* respectively.

The net benefit increased as herd size increased because of economies of scale; the large size farms are advantageous for instance in labor size; with the same amounts of labor size with medium and small size farms they had the opportunity to manipulate and manage their farm. The financial solvency of large fattening farms helped them in procurement and better management of better breed beef cattle's to produce better fattened beef. The calculated benefit cost (B:C) ratio were 1:1.08, 1:1.12, and 1:1.13 for small, medium and large farms respectively. For all farms, B:C ration was 1:1.12, indicating fattening farming was economically profitable in Adama district (table 4.14).

5.2. Conclusion and Recommendation

This study is conducted in pursuit of analyzing the economic analysis of fattening farm in Adama district which is located in East- Shoa of Oromia regional state.

In the study area, cattle fattening plays a vital role in poverty reduction, creation of self-employment opportunities, animal protein supply and means as livelihood activities for most of households in rural and urban areas. From the finding of this study, even though there are a number of basic problems, beef cattle fattening activities was revealed to be profitable and worth venturing into as a source of income. The Benefit- Cost ratio of sample household for small, medium and large shows B:C is greater than one, indicate: the activity is profitable independently the number of animals and fattening input supply. The producers, agreed that fattening of cattle was advantageous and easily practicing activity due to low mortality of beef cattle, better tolerance for some diseases, frequent supply of meat for consumption as well as local and export markets.

5.3 Based on the findings of this study, the following recommendations were adopted:

- Farmers should be enlightened on how to availability credit in order to increase their capital base to expand their scale of production.
- There ought to be a requirement to enlighten fatteners on the significance of weighing their animals at purchase and regular interval until they are finally disposed and they should be abetting to keep regular and suitable record of their fattening enterprises.
- 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 areas.
- It is also recommended that the Government institution address a number of feed issues. Feed costs account more than 70 percent of the total cost of beef cattle production. Feed shortages and associated high prices have dramatic impacts on the profitability of such commercial livestock operations. Alternative improved feed sources such as homemade mixed feeds could significantly reduce feed costs. Therefore there is a need for research and outreach activities to focus on development and utilization of improved cost effective feed which can be produced by industrial by products and crop residues from surrounding.

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Questionnaire

1. Name of the owner_____

Kebele_____

2. Herd size and composition

A, breed type_____

B, Age of breeds' _____

C, Herd size_____

D, Breed: percentage of exotic blood level (0%, 25%, 50%, 75%, >75%)

3. Feeding regime

A, grazing only/pasture based

B, Stall-feeding: Hay (kg)

C, Straw (kg)

D, Type of concentrate and amount allowed for each bull/cow (kg)

4. Sources of water for the farm

Pipeline water

B, Well

C, River

D, others (specify)

5. What is the average number of cattle being fattened per fattening period per household? -----

6. How much the last year average cattle price in the woreda before and after fattening? -----& -----

7. What type of cattle breeds are currently used for fattening purpose in the woreda? --

8. Do you think that animals in the woreda have adequate feed throughout the year? Yes/No. If no, on which kebeleshortages of feed become more severe? (Use kebelescode) - If no, on which months of the year shortage of feed become more severe? -----

9. When there is feed scarcity, what measures have been used by the farmers to alleviate feed Shortage? (Rank in order)

1. Storing the feed during available in the area ----
2. Hay making ----
3. Destocking ----
4. Using browse trees ----
5. Purchasing feed supplement----
6. Traveling long distance for searching feed ----
7. Others (specify) --

10. What type of forage development /feed improvement strategies have been practiced in the Woreda? -----

11. What are the major problems affecting cattle fattening practice in the woreda? -----
--

12. What are the major potentials for improvement of cattle fattening practice in the woreda? -----

Data to be collected from individual HH/ beef producers

1. Sex of Respondent 1) Male 2) Female
2. Age of Respondent _____
3. Educational level 1) No education 2) Meserettimirt 3) Lower primary (1-4) 4) Upper primary (5-8) 5) Secondary (9-12) 6) college or university
4. Marital status: 1) Married 2) Single 3) Divorced 4) Widowed
5. 6. Main occupation of the household head/owner: 1. Farmer 2. Retired
3. Trader 4. 1 and 3
6. Family size of the household
7. Herd size and composition A, breed type _____ B, Age of breeds' _____ C, Herd size _____ D, Breed: percentage of exotic blood level (0%, 25%, 50%, 75%, >75%)

8. How many times you are fattening within a year? 1. One time 2. Two times 3. Three times 4. One time within two years interval

9. What months are preferred for fattening?

10. 11, year of experience on fattening activity/

11. How do you know whether the animals are fattened or not?

1. By weight measurement 2. By physical body conformation.

3. When the skin became shiny 4. When every bone is covered by meat 5.

Others -----

Housing and waste Management

12. How do you house your animals?

1) Together with the household in the main house 2) Adjoining house 3) Separately constructed house 4) Backyard 5) Others, specify _____

13. When do you house your animals?

1) Always housed 2) Partial grazing and housing 3) Only at night 4) Others

14. How do you dispose cattle dung from the barn?

1) By drainage system 2) By manual labor 3) By cart 4) others (specify)

15. For what purposes do you use the dung?

1) To make dunk cake 2) To plaster the house 3) As source of fuel 4) To make composite (used to fertilize farm land) 5) All 6) others (specify) _____

Feeds and feeding

16. Do you allow your fattening cattle to graze? 1) Yes 2) No

. If yes, for how long? _____ Hours

17. How do you practice grazing your fattening cattle during dry and wet season?

1) Free grazing 2) Partly kept/tethered grazing 3) Fully kept/tethered grazing 4) relocate to other places (transhumant type)

18. What is the source of feed for your fattening cattle? (MA)

1) Crop residue 2) Purchased feed 3) Natural grazing plus crop residues 4) Improved forages 5) Crop aftermaths 6) Brewery product (atela) 7) Hay 8) Other (Specify) _____

19. If you use crop residue which crop residue do you use? (Rank)

1. Teff straw---- 2, Barley strw----- 3, Maizstover----- 4, wheat straw----- 5, Sorghum stover ----- 6, others-----

20. In case feed shortage occurs in your area, identify the type of feed and seasons in which feed shortage occur, feed type -----season -----

21. How do you cope up with shortage of feed? 1) By purchasing feed 2) By conserving feed 3) By decreasing livestock number 4) By relocating (moving cattle from feed deficient to feed surplus areas 5) Others specify _____

22. What kind of concentrate are usually using to feed the beef cattle?

1. Wheat short and bran
2. Oil seed cake
3. Formulated ration
4. Bone meal
5. Meat meal
6. TMR

23. How much is the unit price of each types of feed per kg?

24. From where do farmers/ producers buy the concentrate feeds?

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

25. How much the producer spends on feed per month/animal?

1. 100-200 birr/month
2. 201-300 birr/month
3. >300 birr/month

26. On the average, for how long do you fed the cattle to finish its fattening period?

- A. For two months B. For three months C. For four months
- D. For five months E. For six months F. Other (specify) -----

27. How much kilo gram do you offer per cattle per day from each type of feed?

Basal feeds-----

Supplement feeds-----

28. How much it costs the daily feed of one fattening cattle? Both roughages and concentrates in birr -----

Watering the animals

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

1. The city pipeline 2. The nearby river 3. Pond 4. Walls

30. What is the frequency of watering your animals at wet and dry season?

1= Once in a day 2 = Twice in a day 3 = Three times in a day 4 = other
(specify)

31. If you transport water, what is the total cost of daily water consumption per animal per day in birr? 1= 10 birr 2= 15 birr 3= 20 birr 4= if more explain-----

Health condition

32. What are the major animal health problems in your farm? Please rank in order of importance.

1. Foot and mouth 2. Liver fluke 3. Lung worm
4. Black leg 5. Anthrax 6. Pneumonia 7. Ticks
8. Blood urinate 9. Mitch 10. Other specify

Rank: 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

33. How much do you pay on average per month for medication of your cattle? -

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

35. How much is the total veterinary cost per animal per fattening period in birr?

36. What is the initial cost of single cattle in average?

37. Labor cost per cattle in fattening period

38. Land use in m² per cattle in average

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

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

40. How much is your total direct and indirect input cost to fatten one animal?

41. How much is your net profit after fattening and selling your beef cattle in birr?