SHEEP FATTENING AND MARKETING SYSTEMS IN ANGOLLELANA TERA DISTRICT, NORTH SHEWA ZONE, ETHIOPIA

A Thesis Submitted to the Department of Animal Science, College of Agriculture and Natural Resource Science, School of Graduate Studies

DEBRE BERHAN UNIVERSITY

In Partial Fulfillment of the Requirement for the Degree of Master of Science in Animal Production

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Debre Berhan, Ethiopia

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This is to certify that the thesis entitled sheep fattening and marketing system in Angolelana tera district ,North Shewa Zone, Amhara Regional State, Ethiopia , submitted in partial fulfillment of the requirements for the degree of Master of Science with specialization in Animal Production of the graduate program of the department of animal science, college of agriculture and natural resource sciences, Debre brehan University is a record of original research carried out by Getahun Bezabh, ID:PGE/132/11 under my supervision, and no part of the   thesis has been submitted for any other degree or diploma.

The assistance and help received during the course of this investigation have been dully acknowledged Therefore, I recommend it to be accepted as fulfillment the thesis requirements.

Dereje Tadesse (Ph.D.)   ----------------------------   ---------------------------------

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Certification of the final thesis

I hereby certify that all the correction and recommendation suggested by the board of examiners are incorporated in to the final thesis ''Sheep **Fattening and Marketing System in Angolela Tera district , North Shewa Zone, Amhara Regional State, Ethiopia''**

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ACKNOWLEDGMENTS

STATEMENT OF THE AUTHOR

I declare that this thesis is my genuine work, and that all sources of materials used for this have been deeply acknowledged. This thesis has been submitted in partial fulfillment of the requirement for Master of Science (Msc) at Debre Berhan University and it is deposited at the university library to be made available for users under the rule of the library. I powerfully pronounce that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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Name: Getahun Bezabh Signature: --------------------------
Place: College of Agriculture and Natural Resources Science, Debre Berhan University
Date of submission: ---

DEDICATION

I deeply wish that God would give them peaceful rest forever. This piece of work is dedicated to my mother Wozero Yimenashu Gebrehana, my wife Wesen Demise for nursing me with care and love and for their devoted partnership in the success of my life.

LIST OF ABBREVIATION AND ACRONYMS

AEZ	Agro Ecological Zone
ANRS	Amhara National Regional State
CF	Crude Fiber
CSA	Central Statistical Agency
DA	Development Agent
DOARD	District Office Agriculture and Rural Development
EARO	Ethiopia Agriculture Research Organization
ESAP	Ethiopia Society of Animal Production
ESGPIP	Ethiopia Sheep and Goat Productivity Improvement Program
FAO	Food and Agriculture Organization
GDP	Growth Development Production
ILRI	International Livestock Research Institute
LRRD	Livestock Research for Rural Development
MOA	Ministry of Agriculture
PAS	Peasant Association
SE	Standard Error
SPSS	Statistically Package For Social Science
TR	Total Return
TVC	Total Variable Cost

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ABSTRACT

The study was conducted in Angolelanatera district Northshewa Zone, with the objectives of assessing sheep fattening and marketing systems evaluate the economic benefit of on farm sheep fattening . Out of the total of 21 Kebeles in the district 4 Kebeles (Cheki, Seriti, Chefanen and Qitalegn) was selected purposively based on their sheep fattening Practice. In this study, a total of 120 households were interviewed both primary and secondary data were collected about sheep fattening and marketing system by using semi-structured questionnaire The data was analysed by using statistical package for social science (SPSS version. 24) software and micro soft excel program. Data were arranged, summarized and analysed by using simple descriptive statistics like percentage, mean and frequencies and presented by using tables. The general husbandry issues such as, major feed resources, management practice, major constraints and marketing system were assessed. The most fattening system were traditional, This was due to most of households are less informed and they have no awareness on modern fattening system and marketing in representative kebeles. Profitability of sheep fattening in the study area 4977.93 , number of fattened sheep in the last one year 4.5 ,total selling price of all sheep (birr) 20693.5,estimated buying price of fattening sheep per hh(birr)10470.17 ,amount of purchased feed used per all sheep (kuntal) 155kg , cost of purchased feed consumed by all sheep (birr) 2219.85 , total estimated cost of other roughage feed consumed by all sheep (birr)2407.26 ,cost of medicament used for all sheep birr (618.29),total estimated expenditure of sheep fattening per HH (birr)15717.12 , estimated profit of sheep fattening per HH(birr) 4977.93 in the study area sheep fattening activities more profit at all of per fattening period. The study area was used to fattened a few sheep based on available inputs targeting sales during festive holidays, New Year's. This is based on limited scientific and technical knowhow in feeding systems and husbandry practices.

Generally, in the study area the sheep fatteners were lead traditional sheep fattening practice and they use different activities to increase their profile by utilizing locally available feed resources especially local brewaring residue (atela), crop residue, hay and a little bit concentrated supplementary feed and irrigated green feed to use. The marketing system of sheep was predominantly local market place characterized as producer consumer and followed by producer, local trader consumer in some area. As farmers should practice supplementation of available feed

and production of green feed even if the distribution of the land is too small. Sheep producers should have no access to market information, so as to adjust their marketing activities.

Key words: *Sheep fattening, Constraint, Marketing*

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1. INTRODUCTION

In Ethiopia, more than 80% of the human population depends on agriculture for their livelihoods (Azage, 2005) and usually keep livestock as pastoralists or in mixed crop livestock systems. Ethiopia has one of the largest livestock populations in Africa with the estimated domestic animal number of 65 million cattle, 40 million sheep, 51 million goat, 8 million camels, and49 million poultry, 2.1 million horses, 0.4 million mules and 7.88 million donkeys (CSA, 2020a).

Livestock play an important role in providing export commodities in a form of live animals, skins and hides. The total annual meat production are cattle (63%), sheep (25%) and goats (12%).At the national level, sheep and goat account for about 90% of the live animal/meat and92% of skin and hide export trade value. Sheep and goats represent an important component of the farming system by providing about 12% of the value of livestock products consumed and 53.3% of the cash income generated at the farm level (FAO, 2012).

It has been long recognized that the limitation to increase sheep development (increasing fattening practices and their productivity) in Ethiopia are multi-dimensional. Constraints can be grouped into socio-economic limitation (infrastructure: Ethiopia has one of the lowest density of roads of any country, those forcing sheep in almost all cases to walk long distance; policy issues: sheep fattening and natural resources management are influenced by absence of sheep fattening policy, pricing policy, community organization and participation), and technical limitation: feed quantity and quality, breeds of sheep and goat, and pests and disease (Alemayehu, 2002).

In Ethiopia, there is still a gap of information available on sheep fattening practices. Therefore, to plan and develop improved sheep fattening practices in the subsector, it is very important to investigate the existing sheep fattening practices and marketing systems.According to Belachew and Jemberu (2003), a relatively huge number of exportable surplus livestock, proximity to the export market especially to the Middle East countries and other factors give the country a comparative advantage in livestock trade. The country has 1.02 million heads of surplus and exportable sheep annually. Poor marketing system affects the country's foreign exchange earnings.

Livestock production and productivity and producers' benefits from livestock production are far below expectations. There are also variations in the performance of different breeds of sheep in Ethiopia. The lack of current and location specific information on production and marketing

systems is often a major limitation to productivity and production improvement activities in sheep in Ethiopia (Ayele et al., 2003).

Fattening has been defined as intensive feeding of highly nutritious feed to promote fast growth and fat deposition to achieve desired carcass growth and quality (Alemu, 2007). Such systems can be applied to sheep as they` can easily adapt to an intensive system of production under feedlots (Pasha, 2006). Fattening programs aim to realize maximum growth rate and higher carcass yields in a minimum period of time, which would raise production per unit of land and the value of the livestock. Fattening is generally profitable because the value per kilogram of live weight increases as both weight and condition increase ESGPIP (2012).

1.1. Statement of the Problem

Fattening of ruminant animals in general and small ruminant in particular, as a business is not common in Ethiopia. Farmers in the highlands give no or little efforts to fattening practices. Grazing is the major way of fattening animals particularly fattening sheep. Small ruminants are usually reproduced on the farms and are sold around holidays and/or when cash is required. Recently regional government has given particular attention to the promotion of fattening development. The plan is aimed at transforming the subsistence mode of agricultural production system into market oriented production system. The plan views improved livestock and products marketing as an important regional development strategy to increase both rural incomes and foreign exchange. Fattened animal production and marketing has, therefore, been included as one of the intervention areas. This study therefore intends to assess the sheep fattening and marketing systems in the study area with the following objectives.

General objective

❖ To assess fattening management practices and the marketing system of fattened sheep.

1.2 Objectives:

- To assess fattening management practices of sheep in the study area
- To assess the marketing system of fattened sheep
- To estimate the profitability of sheep fattening practices of households

2. LITERATURE REVIEW

Small ruminants are playing an important role in the economy of farmers in Ethiopia. In Ethiopia, sheep and goats are accountable for about 25% of the domestic meat consumption and 58% of the national annual hide and skin production. However, attempts to improve their performance under the prevailing condition must take into consideration in order to increase their specific purpose in the production and fattening system and their potential under varyingand skins (FAO, 2014).

Sheep and goat fattening in Ethiopia have been recognized as a potential profitable activity that enhances the income of smallholder farmers (Pasha, 2006). In spite of the large population of sheep and goat, and the role of sheep and goat both to the livelihood of resource-poor farmers and the national economy at large; the current level of on-farm productivity in the smallholder production systems is low; with off-take rate 33% and average lamb carcass weight of 10 kg (EPA, 2002). Different research report presents the characteristics of the prevailing sheep and goat fattening activities in Ethiopia as described by stakeholders across various regions, the challenges likely to slow productivity and the prospects for improving sustained productivity (Getachew and Jane, 2014).

2.1 Sheep Production System in Ethiopia

Mode of livestock production in Ethiopia is broadly classified into pastoral, agro-pastoral and mixed crop-livestock, peri-urban and urban production systems (Solomon *et al.,* 2010). There are a number of basic classification criteria for sheep production systems in Ethiopia. Its usual to classify production systems as intensive, semi-intensive, extensive based on the develop inputs and intensify of production and based on agro-ecology, length of growth period and relation to land and type of commodity to be produced , there are five sheep and goat production systems, the three are major production systems such as high land sheep barley system, mixed crop livestock and pastoral and agro-pastoral production systems; whereas the minor production system are ranching and urban and per-urban production systems (Solomon and Girma, 2008)

2.2 Constraints of Sheep Production

Adane and Girma (2008) reported that sheep production and productivity in Ethiopia are constrained by many factors. The major ones are; scarcity of feed, lack of infrastructure

(transport facility), high mortality rates, inadequate veterinary coverage, long marketing channels and lack of market information, lower product quality (live animals and meat) for export market penetration, inadequate provision of credit services and low average reproductive rates .

2.3 SheepBreed in Ethiopia

Indigenous sheep genetic resources have developed specific adaptations to survive and produce under adverse local environmental conditions and to perform better under low input system (IBC, 2004; Markos, 2006). There are about 14 traditionally recognized sheep populations in Ethiopia. These populations are called sheep types in some literatures. They are also designated as breeds according to some definitions of 'breed'. These are *Menz*, *Sekota*, *Semen*, *Tukur*, *Wollo*, *Farta*, *Washera*, *Adilo*, *Arsi-Bale*, *Horro*, *Bonga*, BHS, *Afar* and *Gumz*, (Solomon, 2009).

2.4 Sheep Fattening System

Sheep fattening is a common practice in different parts of the country, though the degree of fattening and resource base differs markedly. Less than 39.0% of the farmers owning small ruminants practice some form of fattening before marketing and majority of the farmers sale their animals early before attaining optimum market weight (Solomon *et al.*, 2005; Getahun, 2008). Sheep fattening practice should consider the general husbandry practice issues like major feed resources, management practice, records and marketing system (Shitahun, 2009).

2.4.1 Traditional fattening systems

This system generally depends on grazing natural or planted pastures with variable degrees of supplementation. Animals require a long period of time to attain market weight and condition. It is also associated with huge fluctuations in the weights and conditions of the animals depending on feed availability. This system can be improved to supply animals of acceptable condition to slaughterhouses for ultimate export. The conditioned animals may also go into a finishing operation targeted to supply the local market (Alemu, etal., 2007).

Traditionally, farmers in Ethiopia are used to fatten a few sheep based on available inputs targeting sales during festive holidays. This is based on limited scientific and technical knowhow in feeding systems and husbandry practices. Shapiro, *etal*. (1993). Sheep fattening and breeding practices are owned smallholder farmers as an integral part of the livestock sub sector and contribute to both subsistence and cash income generation EARO (2000);Ehui*etal*. (2000).

2.4.2 Agro-industrial by product-based fattening

Fattening of sheep based on agro-industrial by products is practiced in different areas of the country. Though the contribution to the total animal feed resource is limited (1.45%), agro-industrial by-products are one of the important feed resources available in Ethiopia (CSA, 2003). Agro-industrial byproducts produced in Ethiopia include; by-products from flour milling, oil processing, sugar factory and brewery by-products. These products are mainly used for dairy and fattening animals (Alemayehu, 2004). Oil seed meals are produced from a variety of crops that have seeds that are high in oil (Kellems and Church, 2002). Oil seed cakes are rich in protein and most are valuable foods for animals (Mc Donald *et al*., 2002).

2.5 Management Practice and Risks Associated with Sheep Fattening

The fattening program should be started after the necessary feed supplies are secured. Underfeeding and incorrect timing are the most common causes of failures in fattening activities. The objective in a fattening operation is to convert as much of the feed to body tissue as possible. It is, thus, necessary to minimize the movement of animals during the fattening period. The success of a finishing operation depends on the first two weeks after arrival of animals. They may have traveled long distances and will be stressed, hungry, and thirsty.

They are generally gathered, sorted; often stand for a long time without feed and water. It is recommended that the following guidelines be followed under such circumstances: Rest the animals for a few hours in a dry, clean, sheltered area with access to fresh water after arrival. Then offer grass hay or mixed grass-legume hay. Hand feed salt during the first two weeks; then provide trace mineral salt in a separate feeder. Afterwards, these supplements can be mixed in the complete diet, but salt should continue to be provided *ad libitum* (free choice). Animals should have feed available at all times including evenings. If there is no feed left in the morning, feed supply should be increased for the following day (Alemu, n.d2007).

2.5.1 Housing system and hygiene

Housing for fattening sheep varies from fattener to fattener. In sheep houses are attached to the side of the main house. Most of the peri-urban and urban sheep fatteners use a separate house for fattening sheep Cooperative fatteners' use separate housing for sheep and goat. Most housing is unclean, poorly ventilated; lacks proper floor bedding and stocking rates are sometimes too high. This is due to lack of awareness and lack of understanding on the space requirement of fattening sheep and goats by most producers (Animut and Jane, 2014).

2.5.2 Feed resource and feeding practice

Feeds can be classified according to some of their general properties. The classification used hears is typical of that used in the feed industry. Feedstuffs can be classified as either concentrates or roughages (Birhanu*et al.,* 2009).

The availability of feed resource in the highlands of Ethiopia depends on the mode and intensity of crop production as well as population pressure. The major basal feed in the highlands of Ethiopia are a natural pasture, crop residue and stubble grazing, and their contribution to the total feed resource vary from area to area based on cropping intensity (Seyoum*etal.*, 2001).

2.5.2.1 Roughages

A wide variety of roughages can be fed to growing and finishing lambs. The amount of roughage to feed depends on the objective of feeding the roughage. Roughages are bulky feeds that contains relatively large amount of poorly digestible materials. It contains more than 18% CF. They can be of two categories, namely dry and succulent roughages based up on their moisture content. Succulent feeds usually contain more than 75% moisture and it includes pasture, cultivate fodder crops, grasses, tree leaves and silage available for fattening animals. Dry roughages contain only 10-15 moisture includes hay and crop residues (A black and Smith, 2003).

2.5.2.2 Concentrate

Concentrates have low fiber content and a high content of either protein or energy or both. Cereal grains for example are considered as primary energy sources but also contribute a significant amount of protein. Energy source concentrates: are includes cereal grain (corn, sorghum and buck wheat), grain milling byproducts (wheat bran and corn gluten meal), root and tubers (cassava and potatoes), food processing byproducts (molasses, bakery waste, citrus pulp distiller and brewers by-products), industrial by-products such as wood molasses. Protein source concentrates: Protein supplements generally are products with more than 20% crude protein. Some of these feeds are; oil seed meals (soybean, cottonseed, rapeseed, canola, and linseed, peanut, sunflower and sunflower meals), grain legumes (beans, peens and lupines) and animal protein (meat meal, tank ages, fishmeal's and whey (Birhanu*et al.,* 2009).

2.5.3 Watering Practice

The water intake of fattening animals depends on environmental temperature, the temperature of drinking water itself, the activity of fattening animals; the moisture content of the feed and the amount of feed per day. Most fatteners give waters for fattening animals twice a day and once a day respectively. These are due to the shortage of water for small scale fatteners (Nelson, 2000).

2.5.4. Healthcare practices

An important environmental challenge as a party of fattening animal health program is the control of internal and external parasites. In general, any problems associated with animal health can largely prevent if proper management practices are followed. Therefore, the veterinarian involved in sheep and goat health management program should have the necessary depth of knowledge about the elements that must be addressed in crucial on animal health control (FAO, 2020).

Prevention of disease is a key aspect of minimizing health risks in your herd. Strict sanitation is necessary to prevent disease outbreaks. Although sanitation requires time and money, it is time and money well spent since prevention of the diseases is more economical than treatment.
The housing for small ruminants, feed and water must be kept fresh and sanitary (Heidi and Chelsey, 2010).

Internal parasites are one of the biggest disease issues for small ruminants. Parasites can not only kill both young and old sheep and goats, but also contribute to poor growth rates, an unthrifty appearance, coughing, diarrhea and other digestive problems. Depending on your operation (grazing density, past history of dewormer use, other health issues) a deworming schedule should be developed with help from a consulting veterinarian. Some deworming products may have poor efficacy against some types of internal parasites that affect small ruminants. Your veterinarian can assist you with conducting fecal examinations for worm eggs, and help you make critical decisions when selecting a dewormer that will be effective for your operation (Heidi and Chelsey, 2010).

2.6 Fattening Cycle of Sheep

For most rural and peri-urban and urban sheep fatteners, the fattening activities are seasonal. This is mainly associated with market demand seasons for fattened sheep and to a smaller extent due to feed availability for fattening. Informants from regional research offices and Bureau of Agriculture or Livestock Development Agency of the Amhara region, Wollega, Keffa, and Woliata Zones noted that 2 to 3 fattening cycles to be commonly used by rural farmers. The dominantly 2 fattening cycles practiced by majority of rural, peri-urban and urban fatteners in the country target two peak demand seasons for fattened sheep that are highly profitable (Animut and Jane, 2014).

The peak demand is during the Ethiopian Easter (April) and New Year (September). The third fattening cycle practiced by some producers considers Ethiopian Christmas (January). It has been noted by many fatteners that demand for fattened sheep and goat is highest in Easter followed by New Year and then by Christmas. In Muslim dominated areas like Afar, ED Al Adeha (*Arefa*), a religious ceremony, is the high peak demand time for fattened sheep for the live animal exporters.

The length of sheep fattening varies depending primarily on the availability of sufficient and quality feed for fattening. Generally, the length of the fattening period is dictated by feed availability and partly on market. If there is good management, sheep takes three rounds of fattening in a year (90 days are required for each round). Considering a minimum fattening length of 2 months, a maximum of 4-5 annual fattening cycles can be achieved (Animut and Jane, 2014).

2.7 Risks Associated with Sheep Fattening

The main risk associated with sheep fattening activity is the loss of animals. This could be due to disease, predators or theft. Price fluctuation is another risk associated with sheep fattening. To minimize risks associated with disease there is a need to enhance the service delivery system and ensure availability of enough health services. Strategic deforming and proper vaccination must be developed and in place. Risks associated with predators and theft can be minimized using proper housing (Animut and Jane, 2014)

2.8 Socio-Economic Importance of Sheep

Animal genetic resources in the Tropics play an important role from food product supply, manure (fertilizer and fuel), wool, hides and skin to transport and traction service beside to their socio-cultural relevance (Rege and Gibson, 2003). In addition to this, they are very vital as cash reserves and means of insurance in risk aversion for farmers with subsistence oriented traditional farming system (Kosgey et al., 2004). In most developing regions there has been a rise in the importance of livestock, those livestock form key components of the livelihood strategies of the world's poorest people. In Ethiopia, 80% of the smallholder farmers own cattle while only about 31-38% and 21-33% of the smallholder farmers own sheep and goat, respectively (Asfaw and Jabbar, 2008).

The annual national mutton production is 78 thousand metric tons, because of the high average off-take rates which were estimated to be about 35% (Workneh, 2006). Furthermore, sheep contributes 20.9% of the total ruminant livestock meat output and 13.9% of the total domestic meat production, with live animal and chilled meat export surpluses. Per capita consumption of small ruminant meat (Kg/person/year) in Ethiopia is 2.1 kg (EARO, 2000).

2.9 Sheep Marketing System in Ethiopia

Sheep rearing is one of the main cash income sources for the farmers in most of our country (Abebe et al., 2013). According to Ayele et al. (2003) funding several studies in high lands concluded that livestock account for 37-87% of the total farm cash income of farmers. In addition, the livestock sub-sector in Ethiopia contributes from 12-16% of the total and 30-35% of agricultural GDP. Farmers in Ethiopia rear sheep for two reasons, to get cash and for home consumption. They slaughter their sheep for festivals like Easter, New Year and Christmas (Abebe et al., 2013).

According to EstefanosTadesse et al. (2015) funding about 72.5 % of sheep marketing was based on eye estimation of the weight and on the traditional evaluation of condition score of the sheep. 21.7% of sheep markets based on live weight using scales. The remaining, 5.8 % of sheep marketing uses both live weight and estimation. Moreover, most purchasers like this method than price setting based on live weight. Marketing of sheep is characterized by strong seasonality and subject to fluctuation.

Demand and price increases during festival periods. Factors affecting market supply, as measured by the number offered, include high demand during religious festivals, lambing season, quality and quantity of grazing, as well as cash needs for crop inputs and, later, for food purchase before harvesting (EARO, 2000).There are sheep marketing channels in Ethiopia. A marketing channel refers to the sequence of enterprises and markets by which produce is moved from producer to consumer.

Sheep marketing agents include producers, country buyers (farmers, cooperatives, small traders, butchers, etc.), big traders (wholesalers), export abattoirs, live animal exporters, brokers/agents and consumers. In fact, there are also brokers, transport owners and other market agents who have direct and indirect roles. The marketable live sheep and goats in the hands of farmers reach consumers largely following a 3-tiered system consisting of small, medium and large markets (ESGPIP, 2011).

2.10. 1 Structure and performance of small ruminant markets

Animals are sold on a per-head basis and price agreement reached by a long one-on-one bargaining between a seller and a buyer. Under such circumstances, prices paid will reflect buyers' preference for various animal characteristics (weight, sex, age, condition, breed, and color), the purpose of animals purchased (for resale, slaughter, fattening or reproduction), the season of the year (occurrence of religious and cultural festivals) and the bargaining skills of buyers and sellers (Ehui*et al.,* 2000).

According to Ayele*et al.,* (2003), the livestock marketing structure of Ethiopia follows a four-tier system. The main actors of the 1st tier are local farmers and rural traders/rural assemblers who transact at farm level. Those small traders from different corners bring their animals to the local market (2nd tier). Traders/wholesalers purchase a few large animals or a fairly large number of small animals for selling to the secondary markets. In the secondary market (3rd tier), both smaller and larger traders operate and traders (wholesalers or retailers) and butchers from terminal markets come to buy animals.

In the terminal markets (4th tier), big traders and butcher (wholesalers or retailers) transact larger number of mainly slaughter type animals. Consumers get meat through purchase of the animals from terminal markets and slaughters at home or they may get meat from markets or they may access from butchers who process the meat via abattoirs. Marketing of sheep and goats is characterized by strong seasonality and subject to fluctuation. Demand and price increases during festival periods. Factors affecting market supply, as measured by the number offered,

include high demand during religious festivals, lambing season, quality and quantity of grazing, as well as cash needs for crop inputs and, later, for food purchase before harvesting (EARO, 2000).

2.10. 2 Marketing constraints

Improving marketing success of livestock producers provides incentives to adopt technological interventions that improve livestock productivity, which in turn improves marketing success. Access to local market is the most important economic determinant to adopt technologies (Zelalem 2007) and choice of fattening enterprises. Market locations in primary and secondary markets are usually not fenced; there are no permanent animal routes and no feed and watering infrastructures. Yet, buyers and sellers are subjected to various service charges by the local authorities as well as other bodies (Ayele et al. 2003). Nearly in all parts of the country, there is no regular market information on prices and supplies, nor formalized grades and standards of sheep and goats and other livestock (Kebede and Ray 1992; Ayele*et al.,* 2003).

As a result, there is excess supply of animals beyond demands in some seasons. The more mobile trader is better informed on market prices which combined with excess supply places the trader in a better position during price negotiation. Illegal market in Ethiopia is identified as a constraint to fatteners and traders (Tesfaye, 2009). Traders and exporters are also faced with marketing problems. A survey in IPMS (Berhanu*et al.*, 2007) identified lack of adequate supply of good condition animals, inadequate market places, lack of holding (concentration) places, feed supply, lack of market information, and multiple taxation at checkpoints (especially when animals are trekked or trucked through towns) and lack of efficient vaccination services for export animals as the major problems identified by exporters include lack of adequate supply of appropriate and good quality animals, poor marketing infrastructure, livestock diseases, lack of adequate sanitary and phytosanitary services to support exports, long market channels (usually 3–5 stages between producer and the abattoirs), and problems with airfreight transport services.

3. MATERIALS AND METHODS

3.1 Description of the Study Area

The study was conducted in AngolelanaTera district, North Shewa Zone, Amhara Regional state, Ethiopia. The area is located at about 112 km away from Addis Ababa. The total area of the district is 78,248.67ha out of which 26,998.4 ha is cultivated land, 8,116 ha forest and sub shrubs land, 19224.5ha grazing land and others 2260 ha. The district has 19 rural and 2 urban Kebeles with the total human population of 94, 330.

The altitude ranges from 1385-3500m.a.s.l. The annual rain fall received in area is between 2,200 and 2,800mm. The district has huge total livestock population: 16, 8313 cattle, sheep 194,823, goat 1,585, equine 48,671 and poultry 133,120. The characteristics of the soil and climate are similar to many areas in the highlands of Ethiopia. The area is characterized by two seasons, the wet season from June to September and dry season from October to May. The farming system in the area is crop-livestock production system (district administration office report, 2018).

Figure 1. Location of study district and Kebeles
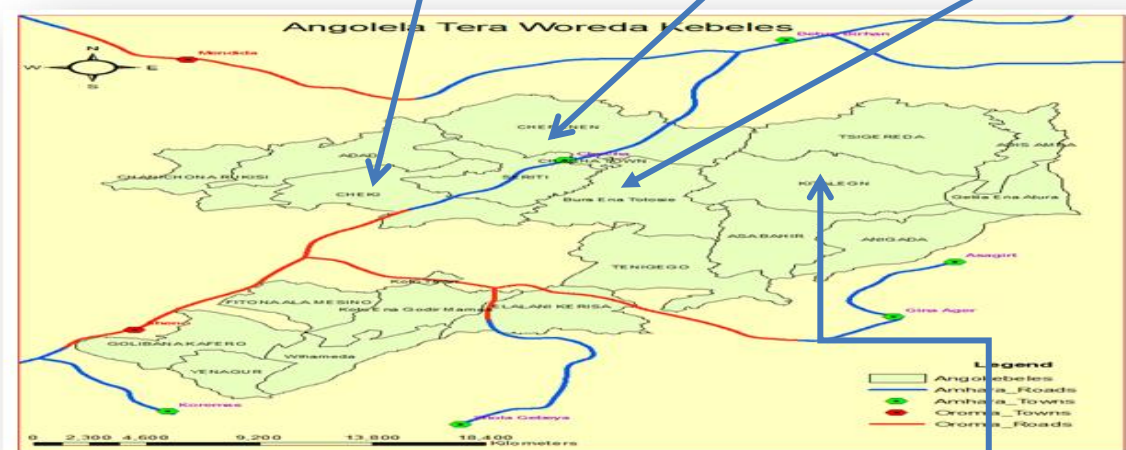
3.2 Sampling Techniques and Sample Size

Four administrative Kebeles (Cheki, Seriti, Chefanen and Qitalegn) were selected purposively based on their sheep production potential and accessibility. A total of 120 households (30

households from each Kebele) were selected using simple random sampling technique. Households were interviewed by using pretested semi-structured questionnaire regarding sheep fattening and marketing practices.

3.3. Data Collection

Both primary and secondary data were collected for the study. The primary data were obtained by preparing semi-structured questionnaire and personal observation whereas the secondary data was collected from written documents and agricultural office of Angolelana Tera district. Focus group discussions were conducted in each Kebele area to complement the information obtained through questionnaire. Participants to be involved in the focus group discussion were elders (men and women), administration members, and livestock experts both at district and peasant administration level.

The major type of data gathered from the questionnaire interview were sheep fattening practices and marketing system; feed sources for fattening; constraints sheep fattening practices. Households were also asked about their expenditures and income of sheep fattening practices over the past one year in order to estimate the income obtained from sheep fattening business.

3.4. Data Analysis

The data were analyzed using SPSS (Version, 24). Descriptive statistics such as means, frequencies and percentages were used to summarize and present the results. Indices were developed to provide the aggregated ranking of some parameters of sheep fattening and marketing system in the study area. The indices were calculated as the sum of single item ranks [(3 for rank 1) + (2 for rank 2) + (1 for rank 3)] divided by the sum of all weighed items mentioned by each group. The income of sheep fattening in the previous one year was estimated by collecting data from selected individuals who participated in sheep fattening in the past one year.

4. RESULTS AND DISCUSSION

4.1. Socio-Economic Characteristics of Households

All the interviewed households were males of which 96.7% were married. Only 5% of the interviewed respondents were illiterates showing majority of the respondent households are literate and at least read and write (Table 1).This is different from other study where about 56.3% of the respondents were reported to be illiterate in Duna Woreda, Hadiya zone, Southern Ethiopia (AberashAsefa and AsratAyza, 2020). The higher proportion of literate households in the present study is an opportunity for easily transferring new fattening technology in the study area.

Majority of the respondents (88.3 %) were within the prime working age range of 25-55 years. The rest 7.5 and 4.2% were within the range of mature working age (56-65 year) and elderly (>66 year), respectively. The higher proportion of working age of households in the present study is also an opportunity for future strengthening of the sheep fattening practice. A comparable result was reported by DeginetHailemeskel&AbiyDefar (2020) inAnlemoworeda, Hadiya Zone, Ethiopia. Both crop and livestock productions were the sole source of income for households in the present study area.

Table 0. Sex, educational level, age group and marital status of household heads

Household heads characteristics		N	%
Sex	Male	120	100
Education level	Illiterate	6	5
	Read and write	41	34.2
	Elementary school	73	60.8
Age Group (year)	25-40	60	50
	41-55	46	38.3
	56-65	9	7.5
	>66	5	4.2
Marital Status	Married	116	96.7
	Divorced	4	3.3
Source of income	Crop and livestock	120	100

N = Number of respondents

4.2. Family Size and Landholding

The average family size of the interviewed households was 5.73, and that of females 2.72and males 3.02(Table 2).This is in agreement with the study of Shewangzaw Addisu *et al.* (2018) who reported the mean family size per household in the Amhara region was 5.22.MamoBelete(2020) also reported average family size of 5.7 for the household respondents. In the study area, about 3.58, 0.84 and 0.05 ha of land were allocated for crop production for grazing and forage crop production, respectively (Table 2). According to Mamo Belete (2020), landholding of household for crop production, grazing and fallow were 2.38, 0.63 and 0.159ha, respectively in Chalia district, West Shoe Zone.

In the study area, HH members had different responsibility in routine practices of sheep fattening. Though all HH members involved in routine sheep fattening practices such as cleaning barn, and feeding and watering, the share of responsibility of the husbands and wives was higher (i.e. 57.5 for cleaning barn and 60.8% for feeding and watering). On the other hand, about 92 and 72% of animal marketing and animal health care were done by husbands in the study area (Table 3). According to Getachew Molla*etal.*(2017),herding and watering of fattening sheep were done mainly by children (<15 years) and youths (>15years). As reported by Derbie Geyimu (2009), children (80%) were the most responsible HH members for herding (80%), while women were most responsible for harvesting grasses, cleaning barn and milking does (59%). They also reported that animal health care and traditional animal treatment was carried out by male and female household heads (95%) with high proportion (97%) of males (97%) in marketing and making decision about the income of households.

Table 2 Average family and landholding sizes of households

Parameters	N= 120	Mean	SD
Family size (No)		5.73	1.909
Male		3.02	1.347
Female		2.72	1.132
Land for crop production (ha)		3.58	1.946
Land for grazing (ha)		0.84	0.799
Land for forage crop production (ha)		0.05	0.219

SD = standard deviation

Table 3 Proportion of HH members engaged in different routine practice

HH members	Cleaning barn	Marketing	Health care	Feeding and watering
Husband	20	90	71.7	5
Wife	9.2	0	2.5	5.8
Husband and wife	57.5	10	24.2	60.8
Children	0.8	0	0.8	0.8
All members	12.5	0	0.8	27.5

4.3. Types of Sheep Preferred For Fattening

The types of sheep used for fattening purpose in the study area were mature rams (60.8%), young rams (26.7%) and unproductive ewes (12.5%).The selection criteria mostly used for buying sheep for fattening was body size or conformation, but coat colour, sex, presence of horn and breed were also used as selection criteria). According to ESGPIP report (2012), farmers considered body condition, skeletal frame, castration, breed, sex, weight and age of animals as selection criteria of fattening sheep. In many places, castration of fattening sheep is practiced with the intention of making the animals docile; make them grow faster and fatter. About68.3% of respondents in the present study area used castrated rams for fattening (Table 4).Demand for castrated and fattened sheep in the present study area is high. Lower proportion of castrated rams (22%) was reported to be used for fattening in Fogera District, Amhara National Regional State, Ethiopia (Getachew Molla*etal.*, 2017).The reason for the discrepancies between the two studies could be because of the difference in the demands of the market in the two study locations.

Some households (22.5%) had experience of fattening female sheep of which 63% of them preferred to fatten barren ewes that were not used for replacement or production. This indicates that farmers have knowledge or experience for fattening animals and used to increase their income or profit. DirbaTaye*etal.*(2021) indicated that rams are mainly used for fattening, even though culled females are also fattened. Rams are fattened because they grow faster.

Farmers also recognized that castration at an early age could result in stunted growth in the animal, thus recommended castration to be done for grown animals. Most respondents across the survey area preferred sheep older than one year for sheep fattening. Ages of sheep preferred mostly for fattening in the study area were between 2 and 4 years old (86.7%) followed by age group between 1 and 2 years old. Sheep older than 4 year were less preferred for fattening. In other parts of Ethiopia such as Washera, Bonga, Horro, Wolita and Afar, use of young sheep (between 1 and 2 years old) for fattening has been reported (Animut, G. and J. Wamatu., (2014). Almost all respondents stated that they did not have a targeted market weight.

Table 1 Type of Sheep Preferred For Fattening in the Study

Parameters		N	%
Types of male sheep	Castrated	82	68.3
	Uncast rated	13	10.8
	Both type	25	20.8
Use of female sheep for fattening	Sometimes	19	15.8
	Always	8	6.7
	Not at all	93	77.5
Types of female sheep	Gimmer	1	3.7
	Barren ewes	17	63.0
	Old ewes	9	33.3
Preferred age of sheep(year)	1-2	13	10.8
	2-4	104	86.7
	>4	3	2.5

4.4. Source of Sheep for Fattening

The major sources of sheep used for fattening purpose in the study area were homebred (39.2 %) and purchased sheep (25%) from nearby local market during the time of fattening. The rest of the HH (35.6%) obtained fattening sheep either from homebred and market (Table 5). Similar results were also reported by Yilkal T. (2015)in southwestern Ethiopia and by Abreham H.(2017) in Western Tigray. In another study (Getachew Molla*etal.*, 2017), large proportion of HH (60.2%) in Fogera district of Amhara Region used homebred sheep for fattening purposes. In the current study area sheep marketing is widely practiced and this could be the reason for HH to depend largely on buying sheep used for fattening. Similarly, Solomon *et al*. (2017) reported, it was suggested that market is an important source of the flock in starting sheep fattening foundation stock in Ethiopia

Table 2 Source of Sheep and Criteria Used to Select Sheep for Fattening in the Study Area

Parameters		N	%
Source of sheep	Purchase	30	25
	Homebred	47	39.2
	Purchase &homebred	43	35.8
Buying criteria of sheep	Color	5	4.2
	Size/conformation	79	60.8
	Sex	28	26.7
	Horn size	2	1.7
	Breed	6	5

4.5. Feed Sources and Feeding System

The major basal feed in the highlands of Ethiopia are a natural pasture, crop residue and stubble grazing, and their contribution to the total feed resource vary from area to area based on cropping intensity (Seyoum*ete*, 2001). The major feed resources of sheep in the study area were natural pasture, crop residue (cereal and legume straw) and hay. Apart from these feed resources, fattening sheep were supplemented with homemade feed (Atela, screenings from cereals and legumes, kitchen leftovers) and purchased feeds (local brewery by-products, nougcake, and wheat bran) (Table 6). According to the respondents, availability of hay is decreasing from time to time due to the increasing use of the land for pasture production to crop production. According to Belete Shenkute (2009) 59.4%, 23.5%, 19.4% and 32.1% of households utilized communal grazing, roadside grazing, riverside grazing and grazing aftermath, respectively. In wet season of the year when the major feed source is communal grazing, households use herded grazing system so that sheep do not go into crop fields.

Table 6 Major Feed Source, Feeding Time and Time of Critical Feed Shortage for Sheep

	Parameters	N	%
Major feed source	Home-produced	34	28.3
	Purchase and home-produced	86	71.7
Type of grazing land	Privately owned	80	66.7
	Communally owned	12	10
	Both private and communal	28	23.3
Critical feed shortage	October –December	3	25
	January- march	24	20
	April –June	73	60.8
	July – September	1	0.80
	March –July	19	15.8
Coping mechanisms	Purchase feed	94	78.3
	Move sheep from place to place	25	20.8
	Decrease number of sheep	1	0.80

The type of concentrates used for sheep fattening vary depending on availability, accessibility and cost of the ingredients. In this study it is observed that access to oil seed cakes and brans of cereals for fatteners was limited in areas like Angolelana Tera or Chacha and Debrebrehan, Kotu marketing areas and was non-existent in some kebeles like Chefanan, Seriti, Cheki, Kitalegn. However, farmers said that they were willing to pay for supplemental feeds if the feed are

available in the market. In district, farmers travelled as far as 20 km to `zone towns like Debre Brean to buy supplemental feeds such as Noug seed cake, wheat bran.

4.6. Ownership of Grazing Land

Although animals grazed on communal grazing lands throughout the year, grazing land is the common source of feed in wet season; whereas crop residues are the common feed sources in dry season. Majority of the households (66.7%) in the study area owned private pastureland from which they prepare hay and graze their animals during cropping seasons. Belete Shenkute (2009) reported from the interviewed households that 59.4%, of the households utilized communal grazing as source of feed for sheep and other animals which is different from the current result where communal grazing land is limited.

4.7. Housing for Fattening Sheep

Housing for fattening sheep varies from fattener to fattener. Most of the respondent's farmers (55.8%) in AngolelanaTera district had separate barn for sheep being fattened. About 44% of the HH used simple shades for fattening sheep. Less than 1% of them kept the sheep in their living houses. Most housing were unclean, poorly ventilated; lacked proper floor bedding and stocking rates were sometimes too high. This is due to lack of awareness and understanding on the space requirement of fattening sheep by most producers. Different from this study Getachew Molla *etal.*(2017) and Judish Mosses (2006) reported higher proportion of HH to use their living houses as place of sheep fattening in different areas of Amhara National Regional State. In cooler parts of the country like in the present study areas, the practice of keeping sheep in the living houses are said to be common but the result of the present study does not confirm this.

Table 7 The Types of Housing System in the Study Area

No	Types of house system	N	%
1	Homestead shades	19	15.8
2	Farmyard shads	33	27.5
3	In living rooms with the family	1	0.8
4	Barn	67	55.8

4.8.   Source of Water and Watering Frequency

The water intake of animals depends on environmental temperature, the temperature of drinking water itself, the activity of fattening animals; the moisture content of the feed and the amount of feed per day. The results of water sources and watering frequency for sheep fattening in the district are presented in Table 8. Majority of sheep fatteners (63.3%) used spring as source of water sources for sheep followed by tape water (20%) and river (15%). Water was provided for sheep mainly twice a day (61.7%) and once a day (32.5%). This shows that water for animals is not scarce in the study area. In another study (Aberash Asefa And Asrat Ayza, 2020), it was reported that 52.5 % and 35% of the households used river as source of water for animals and 77 of them provided water for animals at least once in a day in Duna Woreda, Hadiya zone, Southern Ethiopia.

Table 4.8 Source of Water and Watering for Sheep in the Study Area

	Parameters	N	%
Source of water	Spring	79	63.3
	River	18	15
	Pound	2	1.7
	tap water	24	20
Watering frequency	Once a day	39	32.5
	Twice a day	74	61.7
	Once every two day	7	5.83

4.9.   Time, Duration and Frequency of Fattening

Majority of the fatteners (42.1%) in the study area had 4-6 years of fattening experience. About 29.8% of them had experience ranging between 1 and 3 years. Most of the fattening practices were conducted targeting religious holidays such as Easter, Christmas, Eid Alfetir, . Because of this reason most of the respondent households fattened sheep from June to December (51.7%) followed by March to June (27.5%). In order to maximize income, majority of the households (86.7%) fatten sheep two or three times per year. Similar result is reported by MamoBirhanu (2020) who reported about 88.7% of them fatten at least two time per year in Asella, Ethiopia. Respondents in the current study also reported that about 68.3% the households used 3 to 4 sheep for fattening. Animut, and Wamatu (2014) reported that smallholder rural farmers fatten on average of less than 5 sheep fattened per cycle.

Table 9 Seasons and Frequency of Sheep Fattening in the Study Area

	Parameter	N	%
Months of fattening	June to august	3	2.5
	Sept to December	15	12.5
	January to march	7	5.8
	March to June	33	27.5
	June to December	62	51.7
Frequency of fattening	Once a year	16	13.3
	Twice	84	70
	Three times	20	16.7
Fattening experience (year)	1-3	36	29.8
	4-6	51	42.1
	>6	33	27.3
Number of sheep per cycle	One	12	10
	Two	25	20.8
	Three	52	43.3
	Four	30	25
	>4	0	0

4.10. Decision and Future Plan on the Fattening Practice

In study area, most of the households (53.3%) decided the end of fattening period by considering the anticipated current and future price of the fattened sheep. The rest considered feeding length, body size change(Table10). However, in the report of Getachew Molla*et al*.(2017) it is indicated that 88.7% of the households used body weight change to consider end of fattening duration. Because of feed scarcity now and in the future, most of the fatteners (61.7%) in the current study area reported that they will likely to stop fattening practices sometimes in the future. This needs urgent response to solve the problems feed in the study area.

Table 10 Decision and Future Plan on the Fattening Practice

Parameters	N	%
How to decide end of fattening sheep		
calculating the feeding length	24	20
considering the body size	32	26.7
anticipating current and future price	64	53.3
Do you intend to stop fattening		
Yes	74	61.7
No	46	38.3
Reasons to stop fattening		
Not profitable	1	1.4
Feed shortage	68	91.8

Lack of money	5	6.8

N = number of respondent

4.11 . Source and Type of Support on Sheep Fattening

Majority of the households (61.7%) in the study area got support regarding sheep fattening practices from Agricultural office of the district and the other households (33.3%) got from other farmers in their vicinity. However, most of the respondent households (70%) said that the technical supports they obtained from these sources were not enough. About 87.5% of the technical supports were regarding the general sheep management practices such as feeding, health care and marketing. Training on sheep fattening practices were limited in the study area (Table 11). To enhance the performance of sheep fattening activity in the district, some development interventions were made like introduction of credit service; supplement feed (oil seed cake, rice bran) and feeding and watering troughs in few sites.

Table 11 Source and Type of Technical Support on Sheep Fattening

Parameters	N	%
Source of support		
Agricultural office	74	61.7
Fellow farmers	40	33.3
Meeting	6	5
Is the support enough?		
Yes	36	30
No	84	70
Type of technical support		
Feeds and feeding	12	10
Marketing	3	2.5
General sheep management	105	87.5

4.12. Marketing Systems

Prices and sheep are known to be affected by season or months of selling, colour, sex, age, body condition, castration status and health status of the sheep to be sold (ESGPIP, 2012). In the current study, it was reported by the households that selling price of sheep in the area were mostly influenced by body condition (33.3%) and time of selling (33.3%). Because of Easter in April, New Ethiopian Year in September and Ethiopian Christmas and Epiphany festivities in December, selling prices of fattened sheep were high in these months. However, April was

(Easter) reported as the most preferred month/festival for selling fattened sheep when demand and price reach the highest.

Respondents noted that they preferred to sell their fattened sheep in order to better price and better profit. This is in line with the study by Amare Haileslassie*et al.* (2011) who reported that the major selling months December to January (Ethiopian Christmas and Epiphany), According to the authors, demands for fattened sheep are low in Ethiopia during the months of July to September and January to march due to fasting period. August to September (Ethiopian New Year) and April (Ethiopian Easter). Chacha and Kotu were mentioned as marketplaces with relatively higher selling prices compared to other marketplaces in and around the study area (Table 12).

Table 12 Price of Fattened Sheep and Factors affecting it in the Study Area.

Parameter	N	%
Marketplace with high selling price		
Chacha	50	41.7
DebreBrehan	20	16.7
Sheno	20	16.6
Kotu	30	25
Months with high selling price		
September	7	5.8
December	19	15.8
April	68	56.7
July	26	21.7
Factors affecting price		
Color	3	2.5
Age	12	10
Sex	20	16.7
Body condition	40	33.3
Health condition	5	4.2
Time of sale	40	33.3

4.13. Market Places and Sources of Information

Most of the households (90.8%) got information about sheep marketing (selling prices) mainly by visiting the marketplaces (41.3%) or asking the extension agents (38.5%). In terms of price and proximity, Chacha, DebreBerhan and Kotu were the most preferred marketplaces for selling fattened sheep in the study area (Table 13).

Table 13 Source of Market Information and Place of Market for Selling Fattened Sheep

Parameter	N	%
Do you get market information?		
Yes	109	90.8
No	11	9.2
Source of market information		
Extension agent	42	38.5
Relatives	5	4.6
Cooperatives	6	5.5
Neighbors	11	10.1
Own marketing visit	45	41.3
Preferred marketplaces		
Chacha	44	36.7
DebreBerhan	3	2.5
Chacha and DebreBerhan	28	23.3
Kotu	36	30
Chacha and kotu	9	7.5
Criteria for selecting marketing place		
Relative advantage of price	58	48.3
Proximity of the market	10	8.3
Both price and proximity advantages	52	43.3

4.14. Major Buyers and Means of Transportation

Most households (53%) took their fattened sheep to the marketplaces mainly by trekking them and only few percent of the households (4.2%) transported their sheep only by truck (Table 14). They reported that trekking is the major cause for loss body weight at the market. According to the respondents, major buyers of fattened sheep at the marketplaces were traders (62.5) and local butchers (32.5) and few abattoirs (5%). They also said that selling prices were mainly determined by negotiation (60%) followed by the sellers themselves (30.8%). The involvement of brokers at the marketplaces of the current study area was low (1.7%).

Tables 14. Buyers, Prices and Transportation of Fattened Sheep in the Study Area

Parameter	N	Percent (%)
Means of transportation		
Trekking only	64	53
Trucking only	5	4.2
Both trekking and trucking	51	42.5
Major buyers		
Trader	75	62.5
Local butcher	39	32.5
Abattoir	6	5

Who determine price		
Seller	37	30.8
Buyer	9	7.5
Brokers	2	1.7
By negotiation	72	60

4.15. Estimated Income of HHs from Sheep Fattening

Average income of HHs in the past one year was estimated to be 4977.93 Ethiopian Birr. This shows that sheep fattening practices are profitable, and the profit obtained per animal was about 1106.20 Ethiopian Birr. This was also supported by the response of HHs during the survey. HHs indicated that the cost of feed and sheep prices were the most important factors affecting profitability in the study area. The fact that 92% of HHs reported that sometimes in the future they will consider stopping fattening if price and scarcity feed increases much. The average number of sheep kept for fattening was 4.5 with the gross estimated buying and selling price of 10470.17 and 20693.50 Ethiopian Birr, respectively. On average, they also used about 2219.85 for feed purchasing and 618.29 Ethiopian Birr for medicaments.

In the present study, a cost associated with grazing was not considered. According to Animut and Wamatu. (2014), profit seems high and may be associated with the lack of consideration of some inputs of production. Farmers fail to consider the grazing area in the calculation of profitability, although grazing based fattening is suggested to be more profitable as compared to confined fattening regimes. (ICARDA, 2021).

Table 15 Estimate Average Annual Income of HHs from Sheep Fattening in the Study Area

Parameters	Mean
Average no of sheep fattened per HH in the last one year	4.5
Average buying price of fattened sheep per HH (Birr)	10470.17
Average selling price of fattened sheep per HH(Birr)	20693.5
Average amount of commercial feed purchased per HH(kg)	155
Average cost of purchased feed per HH(Birr)	2219.85
Average cost of roughage feed per HH(Birr)	2407.26
Average cost of medicament per HH(Birr)	618.29
Total estimated expenditure of sheep fattening per HH(Birr)	15717.12
Estimated average profit of sheep fattening per HH (Birr)	4977.93

4.16. Constraints of Sheep Fattening

The first, second and third ranked constraints of sheep fattening as indicated by the respondents in the study area were lack of feed (75%), prevalence of disease (12.3%) and high buying price (4.1), respectively. Lack of feed, in particular, was mentioned as one of the major causes for delayed performance of sheep fattening activity in the study. Death of sheep was reported as major risk associated with sheep fattening activity in the study area due to disease caused by the discharge from the nearby areke (alcohol) industry. According to GetachewMolla*et al.* (2017) the top three constraint of sheep fattening in Fogera district Amhara national regional state, Ethiopia were feed shortage, disease problem and shortage of grazing land. Similarly, it was reported by GizatTeshale (2012) that feed shortage, lack of well-organized marketing condition, inadequate capital were major constraints in their order of importance in Gondar Zuria district. Unlike of these studies, constraint related to lack of capital was not mentioned as major constraint of sheep fattening in the present study area. This could probably be because of availability of credit services in the area.

Tables16 Major Constraint of Sheep Fattening Practices in the Study Area

Constraints	N	%
Shortage of feed	2	1.7
Shortage of water	2	1.7
Lack of feed	91	75.8
Disease	15	12.3
Low selling price	4	3.3
High purchasing price	5	4.1
Shortage of loan	1	0.8

5. SUMMERY, CONCLUSION AND RECOMMENDATION

5.1 Summery

The overall results of the present study showed that the major livelihood of households in the study area is on crop and livestock production. Fatteners using ram for fattening purpose are old, red dalecha coat colour, castrated, non-castrated and sometimes female sheep. The feed sources used for sheep fattening are wheat straw, barely straw and oats straw, hay and oats grain milling mixing to industrial by product (frushika, fagulo). The major fattening practice is starting from mid-September up to December, second round fattening January to April and 3th round fattening cycle June to august (New Year). Their feed sources were crop residues and industrial by-products. The maximum price recorded during the dry season and the lowest price is in wet season.

The major constraints for fattening practices are shortage of feed and water, land shortage, occurrence of disease and lack of awareness. Generally, sheep fattening practices is one means of household livelihood improvement in the district.

5.2 Conclusions

Delineating different sheep fattening systems and characterizing them requires detailed information and sufficient data on production, labour, marketing, and socio-economic issues. The brief survey work for this report was unable to capture adequate data for this purpose. To have more control on the overall management as well as the type/breed of sheep to use for fattening. With efficient use of resources, animal performance and associated product quality, profitability and consequently sustainability of the system would be enhanced. Availability of feed was not sufficient for better sheep production system in the study area.

Generally in the study area, the sheep fatteners were lead traditional sheep fattening practice and they use different activities to increase their profile by utilizing locally available feed resources especially crop residue. But their profit was not suitable because they had no enough awareness about the general husbandry practice of sheep fattening system. In the study area both internal and external parasite controlling method were involved like deforming and spraying. In general any problems associated with animal health can largely be prevented if proper management practice is followed. Finally the marketing system of sheep were predominantly characterized as producer-consumer and followed by producer-local trader-consumer in some extent

5.3. Recommendations

The sheep fattening system in the district is traditional. There appears to be almost no production and management technology packages for fattening sheep in the study area. To make the sheep fattening System productive and sustainable, interventions in terms of research, policy and implementation are needed. This should begin with identifying the priority areas and identifying the actions that need to be undertaken. The major constraints to sheep fattening that demand research, development and policy interventions are more or less similar across the different sheep fattening systems and/or agro ecologies. Based on this information, it is recommended that, the government should give due attention on market channels of fattened sheep in DebreBerhan and Addis Ababa

Extension policies and strategies on fattening practices, feed improvement strategies, credit service, training and extension service (advice on sheep selection, feeding, health care and market information) and further researches on reproductive performance of fattening sheep and carcass quality related to feeding in Angolelana Tera distric should be conducted.

➢ As the result showed that there was feed shortage in the study area, so the government, stakeholder and other concerning body should be support by creating awareness for about feeding, how to treat feed and how to use improved forage.

➢ The district, livestock production and development office and kebele development agent office must be take especial responsibility to develop appropriate activities to improve breed and feed resource to the farmers.

➢ Extension workers should spent time for adjusting the farmer who to formulate good feed ration to be given to the fattening sheep for good quality meat and growth performance.

➢ The sheep fatteners should plant improved grass species that have high biomass yield and conserve some important feeds for the time of feed scarcity.

➢ The farmers should work on feeding requirements of fattening sheep and its management system

➢ To increase the profile obtained from the sheep fattening activity the farmers should be aware before starting the sheep fattening activity.

➢ From the result health problem is one factor of sheep fattening, so there should be adequate veterinary service.

➢ Sheep producers should have access to market information so as to adjust their marketing activities.

➢ Training should be given to small holder sheep fatteners about management practise, feed conservation, feeding system and heath care by extension workers.

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7. APPENDIX

Questionnaire for formal survey on characterization of sheep fattening practices and marketing system <u>Part one:</u> Characterization of sheep fattening practices

Date of interview_____

Woreda**angolelanatera**

Kebele _____

1. Name of house hold head_____

 1. Sex 1. Male   2. Female

2. Marital status   1. Married   2.Single   3.Divorced   4. Other_____

3. Age _____ (years)

4. Education level 1. Illiterate 2. Read and write 3. Elementary school 4. Junior Secondary school

5. Secondary school   6. Above secondary school   7.Spiritual education

5. Number of household members. 1) Male------------ 2) Female------------

6. What are the sources of income for living? 1. Crop production only 2. Livestock production 3.both (1&2) 4. Off-farm activity 5 .Other _____

7. Land holding and land use system 1. Total area of crop land owned by the household _____ha   2. Private Grazing land _____ha   3. Land used for forage crop production _____ha

 Table 17 number of sheep for the house hold

Sheep fluke structure	
Lambing sheep	Total
Weaned ewe	
Ram	
Lamb male	
Lamb female	
Gimmer	
Young ram	

9. Have you been involved in sheep fattening?   1. Yes   2.No

10. If yes, when did you start sheep fattening? -------------------- (Year

11. Table 18 Responsibility of family members in the routine fattening practices

Activities	Husband(1)	Wife(2)	Children(3)	Partner (4)
Cleaning the barn				
Marketing				
Health care				
Feeding and watering				

12. Source of sheep for fattening?   1. Purchase   2. Homebred 3. Both (1,2)

13. Have you used female sheep for fattening? 1. Yes, sometimes 2. No

14. If yes, what type of female sheep? 1. Infertile   2. Gimmer 3.Old sheep   3. Other…..

15. What type of male sheep do you prefer most for fattening? 1. castrated   2. Non- castrated   3. Both. Why _____

16. Do you use the sheep ram for mating before fattening?   1. Yes   2. No

17. If yes, why_____

18. Age of sheep you preferred mostly for fattening?_____ (year)

Table 19 which months do you prefer most for fattening? (Rank)Months

3. Table 3 Which months do you prefer most for fattening? (rank)Months	Rank
	1
	2
	3
	4
	5
	6

20. How may time did you fatten sheep per year?1. Once   2. Twice   3. Three times

21. How many sheep did you fatten mostly per fattening period?

1. One   2. Two   3.Three   4.four   5.>Four

22. for how long (month) did keep the sheep in fattening? Minimum____Maximum____Table

20 what are your selection criteria when buying sheep for fattening? (Rank)

Criteria	Rank	Which/Why

Color		
Size/conformation		
horn		
Sex		
Breed		
Origin		

24. What is your future opinion about fattening? 1. I will continue fattening 2. I do want to continue fattening3. I don't know 4.Other_____

25. If you intend to stop fattening, why? 1. Not profitable 2. Scarcity of feed 3.Lack of money 4. I never stop 5. Other_____

26. What type of sheep do you prefer for fattening purpose? (Rank in the order of preference)

 1. Old sheep ____ 2. Matured ram _____ 3. Young ram _____ 4. Unproductive ewe _____

5. . Gimmer____

27. How do you decide the end of fattening period? 1. By calculating feeding length 2. By considering the body size change 3. Anticipated Current and future price

4. Others (specify)_____

28 . What is your source of technical support about sheep fattening?

1. Office of Agriculture 2.From fellow farmers 3.Radio 4.Newspapers and television 5.Conferences of the administration   6. Other_____

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

30. On what issues do you want to get technical support?

1. Sheep health   2.sheep feed 3.sheep marketing 4. All (1,2,3) 5. . Other _____

31. What is your future plan for sheep fattening?

1. Reduce   2.Expand   3. Maintain, as it is   4. It depends   5. Other _____

32. Is the cash income you generate from sheep fattening increasing or decreasing?

1. Increasing 2.Decreasing 3.It varies 4.I don't know 5. Other_____

Part Two: Survey of feeds, feeding system, watering and housing

33. How grazing lands are owned in your area?

1. Individually owned   2. Communally owned   3.Both   4. Other_____

34 . Do you have sufficient grazing land for your sheep?   1. Yes   2. No

35. If no, how do you overcome the shortage? _____

Figure 1 Feeding system sheep fattening

Figure 2 Chefanan   kebele sheep fattening practice

Figure 3 Cheki   kebele sheep fattening

Figure 4seritikebele green feed developed in irrigation

Figure 5Mixed (hay and crop residue) feed
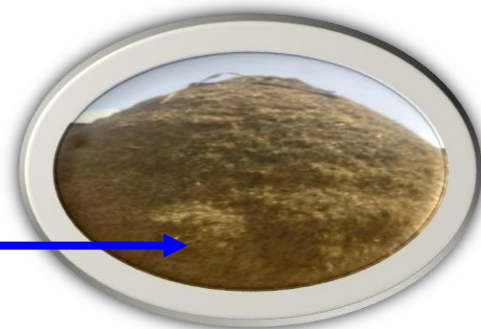
Figure 6 Crop residue

Figure 7 grass hay

Table 21 what are the main feed sources for your sheep? (Rank)

Purchased feed	Feeds from home

37. Do you store feed for your sheep? 1. Yes 2.No

38. If yes, what type of feed you store? 1. crop residue 2. Grass hay 3.Both 4. .Other _____(specify)

Crop residue

39. What do feed your fattening sheep?

1. Cut and carry 2. Grazing 3.Semi-grazing 4. Other _____ (Specify)

40. Do you buy feed for fattening from the market? 1. Yes   2.No

41. Is there night time feeding? 1. Yes 2. No

42. When is feed shortage critical? _____ (write months)

43. What are the sources of water for your sheep fattening?

1. Spring 2. Rivers 3.Ponds 4. Tap water   5. Other _____ (Specify)

44. Watering frequency 1.Once a day   2. Twice 3. Once every two days 4. Other_____(specify)

45. What type of housing system do you use?1. Homestead shades   2. Farmyard shades   3. In living rooms with the   family 4.Barn 5. Other _____ (Specify)

Part Three: Formal survey.

Field survey for Fattened sheep market assessment

46. Do you get market information before you sell your sheep? 1. Yes 2. No

47. If yes, from where do you get market information? 1. Extension agent 2. Relative's 3.Cooperatives 4.Neighbors 5.Own markets visit 6. Other (specify) ---------------------------

48. Which source of market information does you prefer? Extension agent 2.Relative's3.Cooperatives 4.Neighbors 5.Own market visit

6. Other (specify) _____

49. Where do you mostly sell your fattened sheep? Specify------------------------------

50. What is your reason of preference while you decide to sell your fattened sheep at a particular market? 1. Relative advantage of price 2. Proximity of the market 3. Both 4. Other (specify) ---------

51. How do you take your fattened sheep to the market? 1. Trekking 2.Trucking 3. Both

52. To whom do you sell your fattened sheep?

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

53. Who determine the price at the market place?

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

54. Do you think that there is fattened sheep price difference across different markets in your area? 1. Yes 2. No

55. If yes, in which market is the fattened sheep price is higher and lower?

1. Better /higher price at ---market

2. Lower price at --market

56. In which months of the year do you think is the fattened sheep price become higher and lower?

1. Months higher price   2. Months lower price

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57. What factors determine fattened sheep price at the market place? (Rank From buyer side)

1. Colour 2. Age 3.Sex 4.Body conformation___ 5.Health of all body parts____ 6.Time of sale____ 7. Other (specify)_____

58. Do the brokers have an influence on you while you sell your fattened sheep? 1. Yes 2. No

59. What is the trend of fattened sheep price in your area? 1. Increasing 2. Decreasing 3. No change 4. Others --------------------

60. Are you happy with the prevailing fattened sheep price in your area? 1. Yes 2. No

61. What do you do with the money after selling your fattened sheep?

1. To settle government debt 2. To cover school fee 3. To cover health fee   4.To buy food and other house equipment 5. Other (specify) --------------------

62. When do you mostly sell your fattened sheep?

1. When price is high2. During harvest season3.When need arises4. Other_____

63 . Who decides on purchase or sell of fattened sheep/ replacement in your family?

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

64. What is the current purchasing price of sheep for fattening?

Minimum price_____ maximum price_____

65. What is the current selling price of fattened sheep?

Minimum price_____ maximum price_____

66. Major constraints of sheep fattening practices in the study areas (rank)

1. Shortage of grazing land____ 2. Shortage of water____3.Lack of feed____ 4.Disease incidence____5.Low selling price____6. High purchasing price___ 7. Shortage of loan

Table 22 Profitability study

No of fattened sheep in the last 1 yr	Total buying price of all sheep (if not bought estimated price at beginning)	Total selling price of all sheep	Amount of purchased feed used per all sheep	Cost of purchased feed consumed by all sheep	Total estimated cost of other roughage feeds consumed by all sheep	Cost of medicaments used for all sheep

BIOGRAPHY

The Author, Mr.Getahun Bezabh ,Was Boron September 5,1974 , In Ankober WoredaNorth Shewa Zone,Amahara RegionalState,Ethiopia from his father AtoBezabh Gebrhiwotand WoizeroYimenashu Gebrhana.He attended his primary education at BalabarasYilma Woldeyes Primary School and In DeberBrehan Hailemariam Mamo Secondary School, then after he joined AgarfaATVET college in 2003 and obtained his Diploma , in Agriculture (Animal Science) in July 2006 ,soon after his graduation ,he has been working in the AnkoberWoredaAgriculture Extension ,.After working for three years , he joined   Wollo University, Department of Animal Science in November 2009 and obtained his BSC Degree in Agriculture (Animal Science) in November 2011. After graduation he has been working in AnkoberWoredaAgricultural office, in different positions until October, 2018 . In November, 2018, Mr. Getahun joined DebreBerhan Sheep Multiplication and Distribution Center as a Director and in the mean time he joined DebreBrehan University, College of Graduate Studies, Department of Animal Science to pursue his Master's Degree in Agriculture majoring in Animal Production,