ASSESSMENT OF PRODUCTION PRACTICE, FEED RESOURCE AVAILABLITY AND MARKETING SYSTEM OF SMALL RUMINANTS IN BONA ZURIYA DISTRICT SIDAMA RIGION ETHIOPIA

MSc THESIS

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ADVISOR APPROVAL SHEET (SHEET-1)

This is to certify that the thesis entitled Assessment of production practice, feed resource availability and marketing system of small ruminants in Sidama highlands is submitted in partial fulfillment of the requirements for the degree of masters of sciences in Animal & Range Sciences with specialization in Animal Production at the School of Animal and Range Sciences, Hawassa college of Agriculture, and is a record of original research carried out by Teshome Tafese Shura ID No PGAPr 025/10 under our 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 duly acknowledged. Therefore, I recommend that it be accepted as fulfilling the thesis requirements.

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We, the undersigned members of the Board of Examiners of the final open defense, have read and evaluated Teshome Tafese‟s thesis entitled “Assessment of production practice, feed resource availability and marketing system of small ruminants in Sidama highland” and examined the candidate. This is therefore to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree of: Master of Science in Animal Sciences with specialization in Animal Production, Hawassa College of Agriculture

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DEDICATION

I dedicate this thesis manuscript to both my late beloved mother Almaz Shiferaw and my wife Meseret Getu who passed away when I was a kid.

DECLARATION

I declare that this thesis is my bona field work and that all sources of materials used in the preparation of this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment to the requirements for MSc degree in Animal Production at Hawassa University, College of Agriculture, School of Graduate studies, Animal and Range Sciences, and deposited at the University's Library to be made available to borrowers under rules of the Library. I truly declare that this thesis or dissertation is not submitted to any other institution anywhere for the award of any academic degree, diploma or certificate. Brief quotations from this thesis are allowable without special permission provided that accurate acknowledgement of sources is made. Requests for this manuscript in whole or in part may be granted by the head of the major department or the Dean of the School of Graduate studies when in his or her judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

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TABLE OF CONTENS

LIST OF TABLES

ACRONOMYS

ANOVA	Analysis of Variance
CACC	Central Agricultural Census Commission
CCPP	Contagious Caprine Pleuropneumonia
CSA	Central Statistical Agency
DA	Development Agents
EARO	Ethiopian Agricultural Research Organization
FAO	Food and Agriculture Organization of the United Nations
GOs	Governmental Organizations
ILCA	International Livestock Center for Africa
ILRI	International Livestock Research Institute
LIVE	Livestock & Irrigation Value-chains for Ethiopia Small holders
IPMS	Improving Productivity and Market Success of Ethiopian Farmers
MASL	Meters above sea level
MOA	Ministry of Agriculture
MT	Metric Tons (MT)
NGOs	Non-Governmental Organizations
OoARD	Office of Agriculture and Rural Development
RMA	Rapid Market Appraisals
SARI	Southern Agricultural Research Institute
SAS	Statistical Analysis System
SPSS	Statistical Package for Social Sciences
TLU	Tropical Livestock Unit
UNIDO	United Nations Industrial Development Organization

Assessment of production practices, feed resources available and marketing systems of small ruminant in bona zuriya district, Sidama Rigeon, Ethiopia

By Teshome Tafese
Major advisor: Mohammed Beyan (PhD, Ass Professor)
Co-advisor: Mestawet Taye (PhD)

ABSTRACT

This study was conducted to assess production practices, feed resources availability and marketing systems of small ruminant in Bona zuriya district, Sidama regional state, Ethiopia. Results are based on survey of 126 households. Sites were stratified into mixed sheep-goat flock, goat dominating and sheep dominating. Average family size in the study area was 6.7. With respect to livestock holdings more than half of the total TLU was accounted for sheep and goats. Small ruminant was primarily kept for sale to generate cash and majorities (98.9%) of small ruminant owners extensively milk their flock for household consumption. Sucking young (22.8% lambs; 26.7% kids) and breeding female (39.3% ewes; 39.4% does) dominate the flock. Respondents reported that grazing on crop stubble (13.4%), private pastures (13.3%) and road sides (13.2%), weeds (11.6%), tillers and fillers (8.9%) from crop fields, cut-and-carry of browse species and grasses (9.1%) and communal pastures (9.4%) was major feed resources of sheep and goats. Drinking water for flock largely comes from rivers (55.2%), artificial ponds (21.9%), trough and harvested water. Diseases and parasites cause losses of flocks (34.6%). Rate of loss was higher in young (35.0% lambs; 35.5% in kids) and mothers (42.9% in ewes; 30.6% in does). Losses by predators were noticeably higher in sheep and goats dominating site. Body conformation, physical characteristics (coat color, horn and tail), age were the major criteria household considers in selecting small ruminant for castration and fattening. Smallholder farmers make targeting the seasonal holiday markets. Major destination of fattened flocks was the Bona, Bensa Daye, Hula, Bursa, Xexicha, Aleta Wondo and Hawasa Markets. Consumers demonstrated high preferences to animals from study areas and evidently pay higher prices. This is largely exploitable opportunity for development of smallholder small ruminant production. Small ruminant production is constrained by outbreaks of disease and parasite, predators, feed and water shortage, lack of production technology and seasonality of markets. Interventions covering health, feed production and managements, marketing, and extension supports delivering the necessary training and production technologies/inputs could help farmers to build their flock and improve productivity.

Key words: Small ruminants, feed resource, Marketing System, production

1. INTRODUCTION

Small ruminants are among the major economically important livestock species Ethiopia (ESGPIP, 2008). According to the recent central statistical agency report 30.70 million sheep and 30.20 million goats in Ethiopia (CSA, 2017) are found widely distributed across the different agro-ecological zones of the country (EARO, 2000). Small ruminant are owned by smallholder farmers as an integral part of the livestock sub-sector (Tekelye and Kasali, 2007; Workneh, 2009). Areas with high human and livestock population density practice intensive cultivation and therefore land for livestock is scarce (Regional Atlas, 2009). As population pressure increases further, farm sizes decrease, the role of large ruminants reduces and small ruminants that constitute less competition for arable land predominate (Jahnke, 2008).

Small ruminants, kept in the vast geographical locations, diverse socio economic and cultural settings and a range of farming practices in the Sidama region play immense role in the livelihoods of rural farms. The lack of up-to-date and location-specific information on production and marketing systems is often a major limitation to productivity and production improvement endeavors in small ruminant (Peters and Horpew, 1999; Ayele et al., 2008).

To design improvement measures relevant to specific systems and thereby properly respond to the growing domestic and foreign small ruminant requirements, systematic description of the production and marketing systems is indispensable. The district has immense small ruminant population potential which is considerably higher than flocks in adjacent district (CACC, 2008). The adjacent Bensa dayye and hula district are remarkably known in small

ruminants production and marketing. In Bona Zuria distirct, small ruminant's production is an integral part of the farming systems and provides enormous contribution to the livelihood of the smallholder farmers. Next to chicken, small ruminant are the most important marketable livestock. However, information on the smallholder small ruminant's production situations, marketing systems, feed resources, production constraints, opportunities and improvement options which are required for appropriate intervention are not available. This study is, therefore, designed to fill this gap by assessing the small ruminants' production situations in Bona Zuria district. The small ruminants of the country have great potential to contributing more to the livelihoods of the people in low-input / low-output small-holder crop livestock and pastoral production systems (Kosgey and Okeyo, 2007). Small ruminants are small-sized animals, which require small initial investment compared to other class of livestock except poultry. Their small size, together with early maturity, makes them suitable for meeting the demand of smallholder sheep keepers. Moreover, the increased demand for small ruminant meat in the country increased their importance both in the highland and lowland pastoral areas as a source of cash income and food security (Adane et al., 2008).

According to FAO (2004) in Ethiopia the total annual meat production comes from cattle (63%), sheep (25%) and goats (12%). At the national level, small ruminant account for about 90% of the live animal/meat and 92% of skin and hide export trade value (FAO, 2004). In the lowlands, small ruminant with other livestock are the mainstay of the pastoral livelihoods. Small ruminants are also a form of investment. In countries where there are no banking facilities and individual farmers do not own land, wealth is stored in the form of livestock.

Small ruminants derive most of its diet from natural pasture and crop residues. However, the quality and supply of these feed resource is seasonally variable. Moreover, the availability of natural pasture, both in quantity and quality, in the highland is diminishing due to increase in cropping land associated with increasing human population and poor grazing land management, which has led to poor productivity and low nutritional quality (Yoseph et al., 2015; Adugna, 2007). On the other hand, bush encroachments and overgrazing have tremendously reduced the availability of grazing resources in the pastoral areas (Quinn et al., 2007). Thus, grazing animals in tropical region suffer from under nutrition and, consequently lose body weight and body condition, especially during the dry season (Entwistle, 1983).In tropical countries such as Ethiopia, the length of dry season varies from year to year and influences the quality and quantity of available feed resources. Young growing animals suffer most during these periods of feed shortage, and their body growth is affected. Investment in sheep avoids losses due to high inflation rates found in the unstable economies of many less developed countries, and small ruminants can be sold quickly when cash is needed (Ruth, 1995). Improving carcass yield results in more meat available for domestic consumption/export and directly increases producer incomes. Therefore, short term intensive feeding using locally available feed-stuffs is a strategy that can be employed to increase animal live weights and subsequent carcass yields.

Short-term intensive feeding prior to sale is economically more feasible than traditional systems where animals are kept for long periods of time on maintenance level feeding. Cost benefit analysis of short term fattening compared to maintenance feeding for extended periods show that short-term fattening can be a viable business venture (Alemu, 2009). Short term small ruminant fattening requires supplementation with energy and protein sources from locally available feeds.

1.1. Statement of the problem

Human population growth in Ethiopia is forcing the conversion of grazing areas into croplands needed for increased food production. Raising large ruminants is becoming increasingly difficult as a result of lack of grazing areas. Land holdings in densely populated areas are below 0.5 ha. In such places, the necessity of small ruminants production is very important. In Sidama region, Bona Zuria district, there is good tradition of small ruminants production. Therefore; to assess production practice feed resource availability and marketing systems is designed to fill the gaps.

1.2. General objective

The general objective of this study was to investigate the prevailing smallholder small ruminants' production and marketing systems of bona zuriya district.

1.3. Specific objectives

- To assess the smallholder small ruminants production system and associated constraints in the study area
- To assess the small ruminants marketing system
- To assess feed resources availability for small ruminants production in the study area

2. LITRATURE REVIEW

2.1. Small ruminant production system in Ethiopia

Livestock production system and the relative importance and potential for increased production by livestock species in varied areas differ markedly due to differences in resource endowment, climate, population, disease incidence, level of economic development, research support and government economic policies (EARO, 2000). Rely on the level of the small ruminant production, their contribution to the community and the type of crop production enterprises, there are two major small ruminant production systems in Ethiopia: mixed crop livestock and pastoral and agro-pastoral (Alemayehu, 2006) that can be distinguished mainly through the three production factors: land, labor and capital.

2.1.1. Mixed crop-livestock production system

Crop-based mixed farming system is often found in the highland agro-ecological zones where the altitude ranges between 1500 and 3000 m.a.s.l and the climate is favorable for farming of crops and raising of livestock. In this production system, livestock production is secondary to crop production and it usually comprises of small ruminants with very small flock sizes as a means to generate cash income from sale of animals and produce meat (Solomon et al., 2014). Sometimes, manure is returned to the system (nutrient cycling) to benefit vegetable gardens, food and cash crops. Due to Lebbie, 2004, mixed species (cattle, sheep, goats and other livestock) grazing system has been predominantly practiced and livestock were freely grazed on communal pastures and seasonally on fallow crop lands with no extra-supplement. However, due to human population growth and urbanization, there is shrinkage of grazing lands from time to time (Workneh, 2000). Hence, in some areas, free grazing is limited and small ruminants are now tethered though they are herded in others to graze and browse on communal lands (Tegegne, 2012). In addition, due to a

gradual shift from keeping large to small ruminants, the relative importance and population of small ruminants is increasing and feeding animals in a limited available grazing lands, crop residues, forages, bushes and shrubs, home left overs and industrial by-products are becoming the features of mixed crop-livestock production system. Accessibility of water is not a limiting factor in most areas under this production system and goats are housed within the family house or in separate housing (Dhaba et al., 2012). However, the system is characterized by low productivity due to recurrent drought, nutritional stress, severe resources degradation and internal and external parasites (EARO, 2000).

2.1.2. Pastoral and agro-pastoral Production system

The pastoral production system is based on wide ranging communal grazing lands primarily using natural vegetation where thorny enclosures are common while the agro-pastoralists, on the other hand, are characterized by a combination of pastoral and mixed crop-livestock production systems with periodic use of crop residues. The majority of small ruminants are concentrated in the pastoral and agro-pastoral areas kept under extensive systems which make them major sources of livestock products for the Ethiopian export market (Legese and Fadiga, 2014). In this production system, there is relatively lighter human pressure on natural resources and higher land holding per households than that observed in the mixed farming system. As the arid and semi-arid agro-ecological zones, within altitudes below 1500 m.a.s.l, receive low moisture in most of the time and feed is scarce in the dry season, pastoralists and agro-pastoralists travel long distances with their animals in search of feed and water. The system is either transhumant or sedentary (Solomon et al., 2008).

2.2. Feed resources and their seasonal availability for small ruminants

Feed resources commonly available and utilized by farmers in the study area across the different seasons. Natural pasture or grazing was the major feed resource in rainy season across the studied altitudes which include road and fence side grazing, private or communal land area grazing, free roaming on waste disposal and purchase grasses from different sources and use private grazing reserved lands by contractual agreement was common. Similar feed resources were reported from Bonke district of Gamogofa Zone (Guyo, 2016).

According to the survey result, 46.7 % of respondents are using natural grass and enset, leaf (false banana) as the major feed resource in rainy season and 44.2 % of the survey participants were using , enset (different part ... leaf, stem) as a feed in addition to crop residue during dry seasons in the study area. This result is consistent with Ermias (2014). However, the farmers‟ also use improved forage and household waste especially during dry season. During study period, they reported that they also use maize stover, and suger cane top and leaf, bamboo leaf, forage trees.

2.3. Grazing system in different season and the current status of the grazing

The common grazing system practiced in rainy season was controlled grazing as confirmed by 55.6% of the respondents. However, about 33.3 % of the respondents use all grazing systems. According to controlled grazing and tethering were used heavily especially during the wet (rainy) season. The main reasons for tethering during the wet season are to prevent crop damage or disturbance, followed by optimal usage of labor and predators. This system mostly practiced. controlled grazing system were practiced in district this could be related to more crop cultivation This study also revealed that 70.3% of the respondents gave witness that during dry season free grazing were commonly practiced Next to this 32.3%,

5.6% of the interviewee practiced mostly cut and carry and tether grazing system, practiced, especially During the interview, majority of respondents (98.4%) described that the current status of grazing area were in decreasing manner from time to time. This is because of the increment of population number, land was covered by perennial crops like Enset, coffee and due to that reason, and grazing land shortage was created. On the other hand, most of the communal lands were given to jobless youngsters by the government officials for crop and livestock development purpose. Previously, grazing natural pasture was the major feeding practice but it is now shifting to zero grazing because of continuing shrinkage of grazing land. Animals are grazing around homestead and are supplemented with weed, by-products of enset and crop residues. Communal and private grazing lands were gradually decreased due to the expansion of crop cultivation.

2.4. Culling of small ruminants

Culling of animals from a flock is determined by many factors like age, Color, poor body condition and conformation. Similarly literatures list a number of reasons for culling in both altitudes of the district. Poor body condition, poor productivity, and older age were the major culling reason in highland and midland altitudes of the district. (Endeshaw, 2007). The fertility problem and unwanted physical character were the major culling reasons (Belete, 2008).

2.5. Marketing system of small ruminants

Marketing includes moving products from producer to consumers and comprises exchange activates designed to give the product increased time place and formality and the associated functions of financing, risk bearing and dissemination of information to participants in the

marketing process (Jabber el al., 2001). Livestock marketing as live animals and livestock products of milk, meat, skins, wool and hides for cash or goods in kind (ILCA, 1990).

The ultimate goal of intervention aimed at enhancing productivity of small ruminants need to consider the market aspects simultaneously. Farmers need to be aware of the preferred characteristics of animals as well as price patterns so that they can plan breeding and fattening programs and breed selections (Matawork M., 2016). Alleviating constraints the export market and domestic trade and market structure increases the welfare of the small holder producers, urban consumers and improve the national balance of payments (Ayele et al., 2003). Population growth, urbanization, income growth, fully increases of the meat and milk consumption and create avertable livestock revolution (Matawork M., 2016). This revolution presents now and expanding market opportunities for small holder livestock producer (McPeack, J., 2003). An important aspects of production and its response to demand and its supply is knowledge of markets and marketing systems to shift production from substance to a more commercial outlook is especially important to describe and intervening aspects of marketing infrastructure and facilities, market channels and their meats, major market players government intervention and role of the private sector (McPeack, J., 2003).

Small ruminant marketing involves the sale, purchase or exchange of products such as live animals, milk, wool and hides for cash or goods in kind. Livestock marketing services include provision of market information, quality control and grading of meat or milk, operation of auction markets, facilitation of marketing systems themselves, provision of marketing and processing facilities, and transport of small ruminants or of raw milk (Seada, 2012). Small ruminant production is important due to the fact easily managed, require a

relatively small initial investment and their short generation interval lends itself to a fast return on investment, (Assefa, 2011).

In Ethiopia, smallholder farmers raise small ruminant as a major source of meat and immediate cash income. The demand for small ruminant meat is increasing. There is a rising demand for small ruminant meat in Ethiopia and there are chances of being exported. Demand and prices for small ruminant meat show an increasing trend due to urbanization and increased income in the cities and increased demand in the countries. Small ruminant sector is not making a satisfactory contribution due to market and management related problems. Thus, understanding these problems and the socio-economic and marketing of small ruminants is vital for future improvement of the sector (Adane, 2008). small ruminants contribute a quarter of the domestic meat consumption; about half of the domestic wool requirements; about 40% of fresh skins and 92% of the value of semi-processed skin and hide export trade. It is estimated that 1,078,000 sheep and 1,128,000 goats are used in Ethiopia for domestic consumption annually. Ethiopia can export 700,000 sheep and 2 million goats annually, and at the same time supply 1,078,000 sheep and 1,128,000 goats for the domestic market.

The annual meat consumption per capita in Ethiopia is currently very low. For urban areas, it is about 7kg of meat per person annually; while in rural areas it is just 2kg/person/year. The meat consumption usually increases during the religious holidays and falls afterwards. Demand for small ruminant meat has been rising due to increased local consumption and the growing export market. The peak meat consumption periods are: Easter, Christmas, Meskel, Ed Al fetir and Arafa.

2.5.1. Season of marketing small ruminants

Yadeta (2016) reported that perusal sale of small ruminants was related to the seasonal holiday markets in like Easter, Christmas, Ethiopian New Year, Epiphany and Meskel festivals. Thus farmers take advantage of this opportunity as they get more returns. The present results were in agreement with earlier findings by Ehui (2000) who reported that in Addis Ababa households are more likely to buy live sheep and goat during the quarters in which the Ethiopian new year and Easter; Tsedeke (2007) in Alaba southern Ethiopia; Belete (2009) in western Ethiopia who reported that marketing and consumption of small ruminants was targeted to holidays of the year rounds and Gemeda *et al*. (2012) also reported that there was little/no evidence of strategic production of sheep and goat for marketing except sales targeted to traditional Ethiopian festivals.

2.5.2. Market channels

The major marketing channels linking producers with end users were identified. in the present study. These different channels represent the full range of available outlets through which small ruminants move from the different collection points in major production areas to terminal markets to meet end-users needs (Yadeta, 2016).

Channel 1	Producer	Produce		
Channel 2	Producer	Small trade	Hotel	
Channel 3	Producer	Small trade	General consumer	
Channel 4	Producer	General consumer		
Channel 5	Producer	Large trader	General consumer	
Channel 6	Producer	Small trade	Large trader	
Channel 7	Producer	Small trade	Large trader	General consumer

2.6. Production and marketing constraints of small ruminants

2.6.1. Scarcity of feed

There is great seasonal variation of quality and quantity of feed resources in most part of the country where most of cultivated area and high human population are located (Sisay, 200).The problem of quality and quantity feeds observed in low land where pasture lands seems relatively abundant. There excessive supply of feed during the rainy season that is usually does not have experience for farmers to conserve surplus green forage for the coming dry season. On the other hand the allocation of crop residues as alternative feed particularly in the small holder production system. In central rift valley feed shortage was reported as one of limiting factors in small ruminant (Abule, 1998). In some areas where are few rainy season with limited rainfall of erratic nature feed production for small ruminants is inadequate. However goats thrive due to their browsing nature. In the southern part of the country although the degree of shortage varies with in farming systems agro-ecologies feed shortage is reported as a major constraints for small ruminant production (Endeshaw, 2007).

2.6.2. Disease and parasites

It is another serious constraint for small ruminant production in Ethiopia has been the prevalence of amongst kids and lambs diminish the benefit of their high productive performance (Markos, 2006). Abortion and still births cause further losses other disease that have limited the productivity of small ruminants in Ethiopia include pneumonia, contagious caprinepleuropheumonia, Ecthymacaeoushyphadenits and brucellosis (Yacob L. 2013*)*. Diseases and parasites hamper small ruminant production by causing high mortalities especially among suckling animals. From interviewed households, 60.6%

indicated that diseases and parasites among the major constraints for small ruminant production in the area *(Belete, 2009).*

3. Materials and Methods

3.1. Description of the study area

The study was conducted in Bona zuria district which is among the 36 administrative districts of Sidama Region. The district is located 127 km east of Hawassa city, the capital of the region. The predominant agricultural system of the area is mixed crop-livestock production system. The district lies within the rift valley, with altitudes ranging from 1700 to 2400 meters above sea level (masl). It receives an annual rainfall of 700–950 mm, and has an annual temperature range of 11- 22^{O}C.The study district has a total area of 33,720 ha of land of which 2,757 ha is covered by grazing land (BZDLFRO, 2018).Total population of the district is 121,236 of which 61,001 are male while 60,235 are female (CSA, 2017). The district comprises 25 kebele administrations of which one kebeles is urban, 24 are rural kebeles. The district is bordered by Bursa district in the North, B/Daye districts in the South, Hula district in the East and Arbegona district in the West. In Bona Zuriya district more than 90% of the population earns their living from agriculture and livestock raring and the rest (less than 10%) earn a living from petty trade and other livelihood activities. There are two cropping seasons. These are short rainy season (starting from February to May) and long rainy season (starting from June to September).The 17 kebeles in the district are categorized as mid-altitude (68%) and the rest 8 have high-altitude (32%) agro-ecology. Enset (Enset eventricosum), maize (Zea mays), teff, sweet potato and haricot bean (Phaseolus vulgaris), potato are the major crops in the district. While other crops like wheat, barley avocado and sugar cane are also grown at small scale. Coffee and chat are the major cash crops grown in both altitudes of the district. In the district maize is the dominant crop which covers 3781 ha followed by sweet potato (693ha), potato (142 ha) and enset (BZDLFRO, 2018).

These major crops grown by farmers are used both for household consumption and also as sources of cash income. Enset and maize are the major staple food crops for the households in the area (BZDLFRO, 2014).

3.2. Sampling Techniques and Data Collection Procedures

In order to decide on the study site, sampling techniques, sample size and data to be collected, discussions was held with district livestock experts; secondary data: published and unpublished information was also collected. Furthermore the district was visited for better understanding of the agricultural practices mainly focusing on small ruminant production activities. Based on the information gathered multi- stage sampling techniques was used to select target HHs. In the first stage, 6 representative kebeles were selected from the two agro-ecologies (mid- land and highland) purposively based on their potential for small ruminant production, marketing potential and proximity from main market point. Accordingly Olons/keka, Boreta/woyo & Melgano/wotiko from (Highland), and Suke/bonbe, Melgano/sade, and Worancha from mid-landand. In the second stage, households who have at least a mixture of two sheep and two goats and have a minimum of one year experience in small ruminant production were selected purposively. In the third stage, HHs required for the survey was selected randomly by applying probability proportional to size. For this purpose the following formula developed by Yamane (1967) was used to determine the sample size with the possibility of using precision level (variability) of ±3, ±5, as decimal. A confidence level of 93% (giving you an alpha level of ±5) was chosen as it can yield sufficient amount of sample size and suits for the time and budget constraints. HHs used for the survey were randomly selected based on the following formula developed by Yemane (1976) based on the proportion of the population of sheep and goat producers.

$n = \frac{N}{1+N(e)^2}$ Where n is the sample size N is the population size, e is the level of precision.

n = 684
1+684(0.05)2
= 684
1+684(0.0025)
= 684
1+1.71
= 684 = 252 = 50% = 126
2.71

Where n is required sample size, N is the population size, and e- is the level of precision.

Based on the above formula, sample size for this study was 126 samples.

So we have 126 households as a sample and to find the sample size of each kebele level (Kothari, 2004) is: $n(kebele) = \frac{N(kebele) \ x \ n(all\ kebele)}{N(all\ population)}$

Where, n (kebele) = is the sample size of each kebele

N (kebele) = is the population of small ruminant producer size at kebele.

n (all kebele) = is the sample size of all six kebeles together

N (all population): is the household number of small ruminant's producer households through which the survey was conducted.

Based on the above formula, specific sampled kebele will be included until the total sample size (126) achieved. Proportionality of Sample sizes will be determined through sampling with proportional to size technique following Kothari (2004) formula:

Pi = ni = 126 = 0.18
N 684

Where; pi = proportion included producer households in stratum

ni = the number of elements or sampled size and

N = Total number of the population.

Table 1. Distribution of Peasant association.

Agroecologies Midland (ML) 17 kebeles (68%) and High Land (HL) kebele (32%) 8 kebeles

Mid Land (68%)			High Land (32%)		
Suke Bonbe	**M/sade**	**Worancha**	**O/Keka**	**B/woyo**	**M/wotiko**
B/cico	M/kawado	Becha	O/hore	B/gute	M/doya
A/kararo	Odahe	Gowacho	Barre	M/kolisho	
A/odola	B/01	D/sunka			
D/ciracha	B/qiqe	Miride			
	M/Waco	B/da'lo			

Table 2. Sample size distribution in the sample selected kebeles

	Kebele	Total pop[n]	Total HH headed	small ruminants producer	Proportion	Sample HHs
HL	O/Keka	3122	594	106	0.18	20
	B/woyo	2748	547	114	0.18	**21**
	M/wotiko	2816	560	103	0.18	20
ML	Suke Bonbe	3266	624	128	0.18	23
	M/sade	3352	711	109	0.18	20
	Worancha	2955	589	124	0.18	22
	Total	**18259**	**3625**	**684**	0.18	126

Population source: District health office, and small ruminants' producer households from Bona Zuriya District livestock and fishery resource development office (2019).

Table 3. Stratification and staging of study Kebeles and households

Bona Zuriya District (25 rural Kebeles)					
High Land			Mid Land		
O/Keka	B/woyo	Wotiko	S/Bonbe	M/Sade	Worancha
20	21	20	23	20	22
Total	61		65		

61+65 = 126

Based on this information, total of 61 & 65 households were randomly selected from each agro ecology of the six selected Kebeles giving up 126 households.

3.2.1. Household survey

Informal and formal survey tools were employed to gather information on sheep and goats production and marketing details. Discussions using checklists were held with District livestock experts, development agents in all the selected kebeles to collect relevant information on almost all aspects of livestock production in the district. The questions were framed in such a way that farmers could provide information that is most recent and easy to recall. The questionnaire covered various aspects of all species of livestock with more details on assessment of production practices, feed resources available and marketing systems of small ruminant. The questionnaire was pretested and then translated into Amharic DAs working in the district who speak the Sidamic language were recruited, intensively trained and administered the questionnaire to the 126 selected households under the close day-to-day supervision of the researcher.

2.2.2. Marketing systems

All possible sheep and goat market chains to and from Bona were identified. Seasonality of animals supplied, demanded and prices were assessed. Bona zuriya (in Bona town) were visited during major festivals and none-festival periods to comprehend the types of animals marketed, demands, prices, major market participants and routes of animals to and from these markets. the larger traditional consumer of animals originated from the study areas were assessed during festival markets. Collection, processing and marketing operation of small ruminant skins at Bona legally registered skin business centers were observed and assessed.

3.3. Data management and analysis

The survey and relevant secondary data were organized, summarized and analyzed using SPSS statistical package (SPSS 12.0, 2003). One way ANOVA (Zar, 1996) were employed in data analysis. Mean and percentage values of various parameters were compared across the studied areas of the district (mixed flock site, small ruminant dominating site). Accordingly, values of parameters that differed among the studied area were separately presented, whereas, in case of parameters that did not differ among them; (two altitudes), values combined and overall estimates were reported for the district. Data from household survey (most recent and easy to recall) were used to estimate mortality, reproduction period of time extending from November/December 2019 to November/December 2020.

Statistical model

- Wherever ANOVA test were employed, the following single factor ANOVA model was used.

$$Yij\ (i) = \mu + \varepsilon ij$$

Yij (i) = Production and marketing parameters

μ = Overall mean

j (1) = 1, 2… 61 (small ruminant dominating area of highland altitudes)

j (2) = 1, 2,…, 65 (small ruminant dominating area midland altitudes)

Eij = Random variation among individual subjects

4. RESULTS AND DISCUSSION

4.1. Small ruminants production system

4.1.1. Purpose of keeping small ruminants in study area

The purpose of small ruminant keeping in the study area is presented in Table 4. Farmers rear small ruminant for many reasons; the major reasons were rearing for sale as a source of income generation, meat (home consumption), milk (especially for children), socio-cultural functions, as means of saving money (wealth) and using their feces as manure. Accordingly, income generation was primary reason for small ruminant production 56.9% in mid altitude area and 54.0% in highland altitude. This finding was agreeable with the report from Gamogofa zone (Nigatu, 2017), Southern Ethiopia (Estefanos, 2010) and the same is true with the research report from Southern Ethiopia (Ermias, 2014). This was followed by meat consumption with 13.8% in mid-land and milk consumption with higher (13.1%) next to income generation in highland area. But as the study shows the purpose of keeping small ruminant for sale (cash income), meat production, milk production and used small ruminant manure as fertilizer to crop production by descending orders; in mid altitudes was cash income, milk production, meat production and for manure respectively.

Table 43. Purpose of keeping small ruminant in the study area

Variable	Altitude		Overall
	Highland	Midland	
Sale (cash income)	33(54.0)	37(56.9)	70(55.6)
Meat production	14(22.9)	9(13.8)	23(18.3)
Milk Production	8(13.1)	11(16.9)	19(15.0)
Manure	6(9.8)	8(13.3)	14(11.1)
Total	65(100%)	65(100%)	126(100%)

4.1.2. Feed resources and their seasonal availability for small ruminants

Feed resources commonly available and utilized by farmers in the study area across the different altitudes are given in Table 5. Enset and wheat bran was the major feed resource in rainy season in the districts which include road and fence side grazing, private or communal land area grazing, free roaming on waste disposal and purchase grasses from different sources and use private grazing reserved lands by contractual agreement was common. Similar feed resources were reported from Bonke district of Gamogofa Zone (Guyo, 2016).

According to the survey result, 56.3 % & 59.5% of respondents are using Enset (leaf, corn, srem) as the major feed resource in rainy season & Dry season and 16.7 % of the survey participants were using enset, wheat bran, crop residue was major feeds during both dry and wet seasons in the study district. This result is consistent with Ermias (2014). However, the farmers' also use food left over and crop residue especially during dry season.

Table 5. Major feed resource used by small ruminant producers and seasonal availability

Feed Resource	Percent of respondents	
	Wet Season n=126(%)	Dry season n=126(%)
Wheat bran	21(16.7)	14(11.1)
Crop residue	18(14.3)	21(16.7)
Enset (leaf, corn)	71(56.3)	75(59.5)
Root & tuber	9(7.0)	11(8.7)
Food left over	3(2.4)	2(1.6)
Fodder leaves	4(3.2)	3(2.4)

4.1.3. Grazing system in different season and the current status of the grazing

The common grazing system practiced in rainy season is presented in Table 6, was controlled grazing as confirmed by 55.6% of the respondents. However, about 33.3 % of the respondents use 5all grazing systems have shown in Table 6. Controlled grazing and tethering were used heavily especially during the wet (rainy) season. The main reasons for tethering during the wet season are to prevent crop damage or disturbance. This system mostly practiced in selected kebeles of the district.

Controlled grazing systems were practiced in high land kebele than mid land kebele of the study area. This could be related to more crop cultivation in high land than mid land. This study also revealed that 70.3% of the respondents gave witness that during dry season free grazing were commonly practiced in both high land and mid lands. Next to this 32.3%, 5.6 % of the interviewee practiced mostly cut and carry and tether grazing system, respectively, especially in high land. During the interview, majority of respondents (98.4%) described that the current status of grazing area were in decreasing manner from time to time. This is because of the increment of population number, land was covered by perennial crops like Enset, coffee and due to that reason, grazing land shortage was created. On the other hand, in the districts most of the communal lands were given to jobless youngsters by the government officials for crop and livestock development purpose. Previously, grazing natural pasture was the major feeding practice but it is now shifting to zero grazing because of continuing shrinkage of grazing land. Animals are grazing around homestead and are supplemented with weed, by-products of enset and crop residues. Communal and private grazing lands were gradually decreased due to the expansion of crop cultivation.

Table 6. Grazing system in different season and the current status of the grazing area in the districts (number and % respondents)

Particulars	Agroecologies (Altitude)		
	Highland	Midland	Overall
	N (%)	N (%)	N (%)
Wet season			
Controlled grazing	20 (32.8)[b]	50(76.9)[a]	70(55.6)
Tethering	2(3.3)	4(6.2)	6(4.8)
Cut & carry	8(13.3)	3(4.6)	11(8.7)
All are practiced	36(59.0)[a]	6(9.2)[b]	42(33.3)
Tethering & cut and carry	3(5.9)	2(3.1)	5(3.96)
Total	61(100)	65(100)	126(100)
Dry season			
Free grazing	51 (80)[a]	38(58.5)[b]	89(70.3)
Tethering	0[b]	7(10.8)[a]	7(5.6)
Cut & carry	3(1.7)[b]	18(27.7)[a]	21(32.3)
All are practiced	7(18.3)[a]	2(3.0)[b]	9(7.1)
Total	61(100)	65(100)	126(100)
Current status of grazing land			
Decreasing	61(100)	63(96.9)	124(98.4)
Increasing	0	2(3.0)	2(1.6)
Total	61(100)	65(100)	126(100)

4.1.4. Method of selection for production and purchase preference

The dominant small ruminant breed used for production in the study area was local small ruminant. According to the findings, 44.4% of the farmers prefer to look on the body conformation (shape & structure) & physical characteristics as selection criteria to small ruminant for production in the study area. This was common in high land (67.2%) compared to mid land. In this study, According to Animut et al., (2014), the body conformation of the animal is the key attribute during selection of small ruminant production. Wide and deep body frame, height and length, as well as coat color are attributes considered when buying small ruminant for production. In study area farmers said that during purchasing time mostly they prefer horned sheep and goat if available. Because they locally belief that horned rams are graceful, regarding color preference, no one can prefer black color sheep even though it has a good body conformation more than

others. Therefore, 30.1 % of the respondents used body length & height as best criteria to select the sheep & goat for fattening purpose and this are more practiced by highland farmers. Using conformation & physical characteristics as criteria to select sheep and goat for fattening purpose. Next to that, 27.7% of the interview chooses the color and horn of the small ruminant as good criteria to select the small ruminant for production but as the result of the survey, these selection criteria were equally used in both study area.

Table 7. Method of selection of Small ruminants for fattening and purchase preference

Selection criteria	Altitude		
	High land	Midland	Overall
Physical characteristics	2(3.3)[b]	27(41.5)[a]	29(23.0)
Body Conformation	12(19.7)	19(29.2)	31(24.6)
Breed	0	1(1.5)	1(0.8)
Conformation & Physical characteristics	41(67.2)[a]	15(23.0)[b]	56(44.4)
All of the above are used	6(9.8)	3(4.6)	9(7.1)
Physical Characteristics			
Color	13(18.3)	17(26.1)	30(23.8)
Horn	2(1.7)	0	2(1.6)
Tail	4(1.7)	2(3.0)	6(4.8)
Body length & height	2(1.7)[b]	36(55.4)[a]	38(30.1)
Color& horn	9(18.3)	9(13.8)	18(27.7)
All the above are used	31(55)	1(1.5)	32(25.4)
Total	61(100%)	65(100%)	126(100%)

4.1.5. Reason of castration sheeps and goats in the study area

Castration is the removal of testicles from the ram/buck. In most cases, non-breeding males and males not slaughtered at a young age need to be castrated. Castration was done to control mating by preventing inbreeding and inferior males from breeding or for production of fattened carcass (Girma and Alemu, 2008). According to the survey result 67.5% of the respondents were not practicing castration of small ruminant during fattening time, (Table 8.) During discussion with farmers the reason for not practicing castration was the animals suffer more due to the castration and it takes time to fatten. They were interested in short cycle fattening. But the rest 31.7% of the respondents report that they were practice

castration during fattening program. But still the farmers who castrate their sheeps and goats have the following reason, the sheeps and goats become out of breeding due to the castration and this will help to fatten easily and sale immediately and also they believe that carcasses from castrated sheeps and goats have more fat tissue. In addition to that, they practice to tame animal and to control unwanted breeding.

According to the interviewee (20.6 %), they castrate the sheeps and goats for all the above reasons but 77.8% of the respondents castrate the sheeps and goats to fatten easily and sale. Castration was more practiced in midlands than that highland in the study area. The reason, in highland area the communities prefer to eat more fatty meat than red meat to overcome the cold weather condition.

Table 8. Reason of castration sheeps and goats in the study area

Castration		Altitudes		
		Highland N (%)	Mid-land N (%)	overall N (%)
Castration of sheep	Yes	14(22.9)[b]	29(44.6)[a]	41(31.7)
	No	47(77.0)[a]	36(55.4)[b]	85(67.5)
	Total	61(100)	65(100)	126(100)
Reason of castration				
Fatten and sale		53(86.9)[a]	45(69.2)[b]	98(77.8)
Control unwanted breeding		0	2(3.0)	1(0.83)
To tame animal		1(1.6)	2(3.0)	1(0.83)
For all above reason		7(11.5)	16(24.6)	26(20.6)

4.1.6. Culling of small ruminants from the flock

From the participants of the survey 89.7% of them have the experience of culling small ruminant is given in (Table 9). The reason for culling of small ruminant from the flock in the study area was; reproductive problem, physical defect, old and sick. This also confirmed in survey result of Geremew (2011).But from the above listed reasons, most of the respondents (20.6%) practicing culling if the sheeps and goats were having reproductive problem, physical defect and sick. But according to the respondents, more focus was given

for culling if the animals have reproductive Problems (27.8%).Culling should be stringent and used as a means of improving the genetic quality and productivity of the flock.

Table 9. Reason of culling small ruminant from the flock in the study area

Particulars	Altitudes		
Culling	Highland	Midland	Overall
Yes	57(93.4)	56(86.2)	113(89.7)
No	4(6.6)	9(13.8)	13(10.3)
Total	61(100)	65(100)	126(100)
Reason of culling			
No culling	5(8.2)	11(16.9)	16(12.7)
Old	0[b]	2(30.0)[a]	2(1.6)
Sick	2(3.3)[b]	13(20)[a]	15(11.9)
Reproductive Problem	12(19.7)[b]	23(35.4)[a]	35(27.8)
Physical defect	2(3.3)	6(9.2)	8(6.3)
Unwanted physical Characteristics	0	3(4.6)	3(2.4)
Sick, Reproductive Problem and Physical defect	20(32.8)[a]	6(9.2)[b]	26(20.6)
All the above are culling reason	20(32.8)	1(1.5)	21(16.7)
Total	61(100%)	65(100%)	126(00%)

4.1.7. Small ruminants exit from the flock in past 12 month in the study area

There were more reasons for the small ruminant left from the flock in the past 12 months. These are; by selling, slaughtering for home consumption, death, theft, predator also for gift and share arrangement. But the result of the survey shows that almost half of the respondents (51.6%) witnessed that small ruminant exit from the flock due to sale for different purpose for example, to buy farm inputs for agriculture, to pay school fee for children, for family & animal health treatment, purchase of foods for home and pay back credits. Next to that according to 12.3% of the respondents, in addition to selling they also used for home consumption purpose. The small ruminants also left due to death (9.5%) by different disease present in the area. Finally, thefts and predators are not that much a problem in the past 12 months in the area as a reason to leave the small ruminant from the flock.

Table 10. How small ruminant exit from the households in the study area

Variables	Altitude		
	Highland	Mid land	Overall
Not left	0	0	4(3.3)
Sale	23(37.7)[b]	43(61.2)[a]	65(51.6)
Death	8(13.1)	4(6.2)	12(9.5)
Home consumption	7(11.5)	3(4.6)	11(8.7)
Theft	3(4.9)	1(1.5)	4(3.1)
Predator	1(1.6)	0	1(0.8)
Gift	2(6.5)	3(4.6)	5(3.9)
Share arrangement	2(3.3)	8(12.3)	10(7.9)
Sale and for home consumption	15(24.6)[a]	3(4.6)[b]	18(12.3)
Total	61(100)	65(100)	126(100)

4.1.8. Small ruminants purchase and Market place in the study area

About 62.3% the research participants purchased small ruminant from local market in the past 12 months (Table 11), They purchased the small ruminant the reasons has to fattening the small ruminant sale during holidays (35.7%), for breeding purpose to increase their flock size (3.9%), to celebrate different ceremonies (5.6%) and also to slaughter for different festivals (3.9 %) in descending order of importance. According to the respondents in the survey, the local market place for the farmers in the study district varies with both altitudes. The farmers which present in study area purchase small ruminant from Bona market (35.7%) and the same is true from neighboring markets (4.8%). But during group discussion the farmers said besides using the local market in Bona, they also going to hula & bursa Melgano kebele to purchase sheep and goat especially for fattening.

Table 11. Reason for small ruminant purchase and market place in the study area

Particulars	Altitude		
	Highland	Midland	Overall
Purchased small ruminants past 12months			
Yes	33(54.1)[b]	46(78)[a]	79(62.3)
No	28(45.9)[a]	19(29.2)[b]	
Total	61(100)	65(100)	
Reason for purchasing			
Slaughter for Festivals	2(3.3)	3(4.6)	5(3.9)
For Ceremonies	1(1.6)[b]	6(46.2)[a]	7(5.6)
Breeding	1(1.6)	4(6.2)	5(3.9)
Fattening	23(37.7)	22(33.8)	45(35.7)
All the above are reason	6(9.8)	0	6(2.4)
Market place			
In the same village	1(1.6)	2(3.1)	3(2.4)
In nearby town	1(1.6)	3(4.6)	4(3.2)
Bona market	24(39.3)	21(32.3)	45(35.7)
Neighboring market	2(3.3)	4(6.2)	6(4.8)
Total	61(100)	65(100)	126(100)

4.1.9. Reasons of marketing problem and source of market price information

Majority of the respondents, (94.4%) replied that they have access to market price information from different sources in the two agroecologies about nearby market prior to sell their small ruminant, as presented in Table 12. The information sources for farmers to purchase or sale small ruminant in the local market were from other farmers, their neighbors, rural traders, local brokers and cooperative development agents (DAs). The result of the survey shows mostly the farmers have got market price information from farmers (48.4%). Next to that they also got information from small ruminant merchants and brokers found in the surrounding (40.5%).

The respondents said they face problems during purchasing and selling of small ruminant in local market in the districts. The detail of market problems in the study area was; unfair tax burden, illegal broker disorder and seasonality of market demand & price fluctuation. The role of brokers in marketing small ruminant in the area was perceived in different

ways. Some people describe them as causing problems in marketing, because they are the ones who mainly decide on the price and in the contrary, others look them favorably, because they facilitate transaction between buyers and sellers. Currently, there is lack of an integral and systematic connection between the stakeholders involved in the production and marketing chain. The majority of sheep and goat producers in Ethiopia are smallholders that are not producing and selling their produce in an organized manner. Moreover, they are economically poor and thus lack the resources to invest on their businesses. This has allowed middlemen (brokers) to enter the market chain and take undue profits at the expense of poor producers (Alemayehu, 2003). Therefore the result of the survey shows that 36.5% of the respondents indicated that the main problem they faced during sheep purchasing and selling was illegal broker disorder in market place in the two districts.

The other problem that mentioned was unfair tax burden (11.1%). Marketing of livestock is not determined on the basis of their weight and quality, but by direct tiresome bargaining between sellers, buyers and 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). The price of sheep and goats was also determined by the interplay of demand and supply which may vary weekly, seasonally as well as for particular religion festivals and holidays. Under a given supply situation, prices may vary among small ruminant within a market day arising from differences in animal characteristics (sex, age, body condition, color, and breed type) and a buyer's skill, bargaining ability, access to price information and purpose of buying (reproduction, resale or consumption) (Adane, 2008). Among the constraints identified in small ruminant marketing lack of market information service, small ruminant market price fluctuation

during some months of the year, lack of market infrastructure and remoteness of markets to the producers that sell small ruminant were the main ones (Yenesew et al.,2013).

Table 12. Reasons of marketing problem and source of marketing price information

Particulars	Altitude		
	Highland	Midland	Overall
Obtain Market Price information			
Yes	57(93.4)	62(95.4)	119(94.4)
No	4(6.6)	3(4.6)	7(5.6)
Total	61(100)	65(100)	126(100)
Source of market price information			
Das	7(11.5)	5(7.7)	12(9.5)
Government organization	0	0	0
NGOs	0	0	0
Farmers	35(53.4)[a]	26(40)[b]	61(48.4)
Merchants & Brokers	17(27.9)[b]	34(52.3)[a]	51(40.5)
DAs & Farmers	2(3.3)	0	2(1.6)
Market problem			
Yes	58(95.0)	60(92.3)	118(93.7)
No	3(4.9)	5(7.7)	8(6.3)
Total	61(100)	65(100)	126(100)
Marketing problem (Details)			
Tax burden	3(4.9)[b]	11(16.9)[a]	14(11.1)
Broker disorder	18(29.5)[b]	28(43.0)[a]	46(36.5)
Seasonality of market demand & price	4(6.6)	6(9.2)	10(7.9)
Tax burden & Broker disorder	15(24.6)	16(24.6)	31(24.6)
All the above are problems	21(34.4)	4(6.2)	26(20.6)

4.1.13. Small ruminants marketing channels and routs in the study area

The major actors involved in small ruminant marketing in the study area included small ruminant producers, traders, brokers, hotels/restaurants and individual consumers. Livestock markets are categorized into primary, secondary, and terminal markets based on types of major market participants, volume of supply per unit of time and the purpose of buying (Guyo, 2016). In the study areas during discussion with key informant and physical observation of the market four main market channels were identified for selling and buying of small ruminant. Marketing agents or participants involved in small ruminant trades are producers, country buyers. big traders (wholesalers), brokers, and finally consumers. The main channels are:

Channel 1- Producer=>Producer: This marketing channel connect the small ruminant owners directly with the other small ruminant producer which the farmer take their animal to local or village market and sell directly to neighboring producer.

Channel 2- producer => consumer: This marketing channel connect the small ruminant owners directly with the consumers in which the farmer take their animal to local or village market and sell directly to consumers. This may happen either in the farm-gate or local market.

Channel 3- Producer => Hotel/Restaurant=> Consumer: This channel involves 3 actors connecting producer with consumers through hotel/restaurant. In this case some hotelier in Bona city or the nearest district Bensa-Daye purchase rams for slaughter either from the market or from local collectors directly and sell mutton by roasting /cooking to different consumers after value addition. There is no butcher in the two districts who sell mutton or chevon by slaughtering sheep and goat.

Channel 4- producers=> local small traders=> Hotel/Restaurant =>consumers: In the 3rd channel all small traders purchase fattened rams or young male sheep (ram lambs) from producer farmers in the rural areas and transport them to city like Bensa Daye, kewalanka (Bona) and Kokosa market (Oromiya region) and sell to hotels and restaurants which then after they supplied to consumers either by roasting or cooking after slaughter.

Channel 5- producers=>small traders=>medium traders=>large traders=>consumers: In the above marketing channel, small traders purchase small ruminant from smallholder small ruminant producers at local market and trekked them to secondary market and sold to medium traders. Then after, medium traders transport the rams or ram lambs to terminal domestic markets like Tula (a big market that have access to

large number of animals) and Hawassa market which is 110 km far from Bona district, and hand over to big traders or retail by themselves to consumers. Tula is the largest and well known fattened small ruminant market (distributive market) visited by terminal traders in the SNNPR. The same is true for Alelu livestock market (Shashemene-Oromya). It was a terminal domestic market which has got small ruminant from secondary market Tula and Kokosa (Oromya). From Bona market the small ruminant were transported to Aleta wondo then to Tula and also from Bona to Bensa and these market was supplied with small ruminant from local surrounding small ruminant market like Melgano kebado or Worancha kebeles and also from nearby kebeles of Bona District (Olonso keka, Olonso Hore and Beshiro gute, becha) and bursa district xugo, also to xexicha district. Hula districts getama kebele and also to cirone districts.

Generally in Bona districts, farmers‟ sale or purchase small ruminant at farm gates or the nearest local/primary markets. Farmers use all markets in their localities regardless of political boundaries and ethnic and cultural differences. Farmers and rural assemblers from different local markets supply animals of varying sex, age and weight to Bona secondary markets. Exceptionally fattened male animals mostly supplied during holidays. Then after, finally the entire sold small ruminant reaches the terminal market: local market Hawassa, Shashemene, Addis Abeba and Export market (Export abattoirs).

4.1.14. Small ruminants health management aspects

The result pertaining to the health care of small ruminant was presented in Table 13, is the altitudes that 84.1% of the participant of the survey reported that they have access to veterinary service, but with its limitation. The distance of veterinary clinic and animal health post on average 1.5 km far from locality. This will help the farmers not expose to

expire and forgery medicine. The farmers take different actions when their small ruminant sick in the study area. These are; they take the small ruminant to veterinary center or animal health post for treatment or as a choice treat them by ethno-veterinary practice by themselves, others treat their small ruminant by purchasing medicine from private drug store or illegal drug vendors found in the local market. On the other hand some of farmers said that, they will sale immediately or slaughter the sheep and goat if they have seen sign of disease. According to the result of the survey almost half of the respondents (52.4%) said, they will take the small ruminant to veterinary clinic or animal health post to get veterinary service. Next to that, the farmers also used ethno-veterinary practice and use medicine from illegal drug vendors (42.0%). As the result of the survey shows 42.9% of the respondents said that most of the veterinarian offered service in development agent office because of absence of health post. Others (53.8%) respondents said they use animal health posts that were constructed by the Government with participation of the community. Few peoples were using private institution or drug venders in urban area to get health service to their animals. When discuss with district health experts about the small ruminant health aspects, In midland of the district the major disease that affect all age groups were; Ovinepasteurellosis, Salmonellosis, Actionbacillosis, Ovine TB and the internal parasite mostly affect the small ruminant were; Haemonchus, Ostertagia, Nematodirus. Whereas external parasite were; Ticks, Lice, mange mite and small ruminant ked. On the other hand in highland area of the district the major disease that affect the small ruminants were; Ovine pasteurellosis,Salmonela,black leg, foot & mouth disease, LSD (Lumpy Skin Disease),CCPP (Contagious Caprine pluro Pneumonia) and faciola hepatica and major internal parasite were liver fluck,lung worm and hook worm and external parasite are ticks and lice.

Table 13.Veterinary service and treatment of small ruminants in the study area

Veterinary service and treatment of small ruminants in the study area

Particulars	Altitude		
	Highland	Midland	Overall
Access to veterinary			
Yes	60(98.4)[a]	46(70.7)[b]	106(84.1)
No	1(1.6)[b]	19(29.3)[a]	20(15.9)
Total	61(100)	65(100)	126(100
Treatment of Sick sheep			
Sale immediately	4(6.6)	3(4.6)	7(5.6)
Use vet clinics	20(32.8)[b]	46(70.8)[a]	66(52.4)
Use medicine from illegal drug vendor	7(6.7)[b]	16(24.6)[b]	53(42.0)
Total	61(100)	65(100)	126(100
Vet-service			
Animal health post	11(18.0)	13(20)	24(19.0)
DA office	21(34.4)[b]	33(50.8)[a]	54(42.9)
Private Drug store	0	0	0
Animal health post and DA office	19(31.1)	16(24.6)	35(53.8)
All except Private Institutions	10(16.4)[a]	3(4.6)[b]	13(10.3)
Total	61(100)	65(100)	126(100

4.1.15. Illegal drug trade in the study area

There were illegal animal drug traders in both highland and midland of the study area. This was confirmed by the survey participants that 41.3% of them were accepting as there was illegal drug trade in the study area was presented in Table 14. But above half of the respondents (58.7%) not agreed that, there was no illegal drug trader in the surrounding. illegal drug trading was more common in midlands 44.6% and 37.7% in highland area of the district respectively. Witness that there is no as such illegal drug trader in the district. This is because of Agricultural office tried more to create awareness and brought attitudinal change on the farmers regarding animal health aspects.

Now days the district offices started to allocate good budget for purchasing animal medicine and also the number of private health institutions increase from time to time by giving legal certificate for animal health experts (especially, for vet.docters). Therefore that will solve the problem of using illegal drugs. As discussed above, there was a trend of

using illegal animal drugs by the farmers. But the reasons for using illegal drug are; the price of the medicines is very cheap (17.4%). Next to that the shortage of veterinary clinics, animal health posts and medicine have play its own role to expose the farmers to illegal drug traders. As we mentioned above also, most of the participants of the survey accepted that they will not use illegal animal drugs. The reasons behind were, as most of the respondents (52.4%) accepted that development agents and animal health experts advised them not to use such drugs by telling them the side effect of the illegal drugs such as toxic effect, stomach problem and most of the time death will happen. In addition, most of the drugs are expired and forged. Therefore, they will not cure.

Table 14. Illegal drug trade in the study area

Variable	Altitude		
	Highland	Midland	Over all
Illegal drug trade			
Yes	23(37.7)	29(44.6)	52(41.3)
No	38(62.3)	36(55.4)	74(58.7)
Total	61(100)	65(100)	126(100)
Why illegal drug trade?			
Cheap	9(14.6)	13(20)	22(17.4)
Not accessible to vet. Center	2(3.3)	1(1.5)	3(2.4)
Not want to use vet. Center	1(1.6)	5(7.7)	6(4.8)
If no veterinarian	1(1.6)	2(3.0)	3(2.4)
If not, why?			
DAs and health experts advised not to use	35(57.4)	31(47.7)	66(52.4)
Expensive in price	10(16.4)	12(18.5)	22(17.5)
Not accessible	3(4.9)	1(1.5)	4(3.1)
Total	61(100)	65(100)	126(100)

4.1.16. Major constraints that hinder production and fattening of small ruminant

There are huge opportunities for small ruminant production in the study area. These included the availability of large number of small ruminant in the study area, experience of small ruminant production, diverse and suitable agro- ecology for fattening, availability of agricultural by-products and cheap labor force. Even though, small ruminant has

contributions to socio-economic development of producers the participation of smallholder farmers in the production activity was yet traditional and hindered by many challenges. Thus, this study indicated that small ruminant production and productivity were very low and producers may not get reasonable benefits from their production activity. Major constraints affecting small ruminant production vary from altitude to altitude in priority.

According to the interviewed producers data, the major constraints and most important problems that hinder the production of small ruminant in mid-land area were; Feed shortage, disease and parasite, inadequate/lack of input, inadequate/lack of extension, problem of marketing and water shortage finally predators in decreasing order of importance. The major drawbacks in the development and expansion of small ruminant production in mid-land agro-ecology and followed by problem of disease and parasite. This result was agreed with Elias (2018) in which higher proportion of respondents (41.6%) argued that scarcity of feed is one of the major factors to affect beef cattle fattening. It also comparable with the result of Guyo (2016).This is especially, true during dry season because of most of the land were covered with permanent crops like coffee, enset. Therefore, based on the current findings, animal feed was the major challenges affecting the small ruminant production in general and the small ruminant production in particular in the study area. So, strong attention should be given to improve the feed access by introducing improved forage crops, and improving the management system of different animal feed sources for better small ruminant production in the study area. Human population growth in Ethiopia was forcing the conversion of many former grazing areas into croplands needed for increased food production (Alemu, 2008).

Health problem (disease and parasite) were rated as the second major problem reported by participant farmers as the economic important constraint in district (mid-land). The rest like: marketing problem, water shortage and predator were identified as miner problems affecting the expansion of small ruminant husbandry. But the result of the high land area was a bit different from that of mid-land and it was disease and parasite, feed shortage, marketing problem, inadequate/lack of input, predators and inadequate/lack of extension, finally water shortage in decreasing order of importance.

Disease and parasite are the major constraint to improve small ruminant production and productivity especially in highland area. Health problem causes high mortality and reduce reproductive and growth performance resulting in reduced output per animal. When there are market problems both in highland and mid land area, it is to say that about export market and also the selling price is low as compared to the farmer's effort.

Table 15. Major constraints that hinder production and fattening of small ruminants

Variable	Altitude		
Major constraints	Highland	Midland	Over all
Feed shortage	10(16.4)	15(23.0)	25(19.8)
Water shortage	2(3.4)	5(7.7)	7(5.6)
Market problems	13(21.3)	7(10.8)	20(15.9)
Lack of input	7(11.5)	11(16.9)	18(14.3)
Lack of extension	4(6.6)	8(12.3)	12(9.5)
Disease and parasite	16(26.2)	13(20)	19(15.1)
Predator	7(11.5)	3(4.6)	10(7.9)
Sex of sheep and goat	2(3.30	3(4.6)	5(3.9)
Total	61(100%)	65(100%)	126(100%)

4.2. Small ruminants marketing system

4.2.1. Market locations (market survey)

Farmers market small ruminants at farm gates or the nearest local/primary markets. Farmers use all markets found in their localities regardless of political boundaries and

ethnic and cultural differences. Farmers of study district found adjacent to the Bensa daye district Oromiya regional state, Gedio zone administrative zones of SNNP enter to their nearest respective markets. Bore and Kibre mengist (Oromia), markets (Gedio Zone, SNNP), Dilla market are the main markets farmers use. Bona 01(kawalanka), bensa daye, bursa, shafamo, hulla, xexicha, cirone are the small local markets found in the districts that farmers in nearby localities use.

However, farmers sale in markets near to their localities to avoid walking long distances, and to minimize transaction costs and personal expenses. For urgent income needs farmers also visit markets in the nearest days in either near or distant locations? except on Sundays, one can find market days throughout the week in near radius areas. Farmers and rural assemblers from different local markets supply animals.

4.3. Small ruminants production constraints and opportunities

4.3.1. Constraints

Smallholder farmers rearing small ruminant confess a range of interlinked technical, socio economic and institutional bottlenecks. Constraints requiring proper and timely intervention towards improved smallholder small ruminant production. Existing and emerging opportunities that tie-up improved production and incentive benefit to producers and traders were also identified.

4.3.2. Opportunities

Modest interventions small ruminant production impediments, for example small ruminant production loss through diseases and parasites control and protection against predators and the local small ruminant production demonstrate remarkable response to the local fattening management practices and possess desirable physical characteristics adding high aesthetic

value. The local feeding management system entirely depended on natural pastures of spicy herbs drawn the preference of urban consumers like the present “organic agricultural products”. There is a growing demand for small ruminant in both the domestic and export markets. Young male small ruminant productions have huge demand of export abattoirs. Rural assemblers and agents for export abattoirs collect these small ruminant productions at farm gates and local markets. Small ruminant productions have high demand and incentive price during seasonal Holiday markets with peak demands in New Year and Easter holidays. Hawassa is a potential market for fattened flocks. Smallholder farmers are aware of the current high market values and demand for small ruminant. Several development partners involved in higher learning, research and development are currently committed to small ruminant production development in the district. These could facilitate entry of intervention (inputs, technology and recommendation). The support of safety-net programme of OoARD is making substantial contribution in building flock holdings targeting women and destitute households. Considering these emerging and existing opportunities, the extension system needs to organize and guide to focus on small ruminant production and marketing in order to improve income and enhance smallholder livelihoods.

5. SUMMAY, CONCLUSION AND RECOMMENDTION

5.2. Summary and Conclusion

This study was conducted to assess feed resource, production and marketing practices, identify and prioritize small ruminants production systems of small ruminants in bona zuriya district of Southern Ethiopia. The major reason of small ruminants keeping in the study area were rearing for sale as a source of income generation, meat (home consumption), milk (especially for children), skin, socio-cultural functions, as means of saving money (wealth) and using their feces as manure.

Accordingly, income generation was ranked as primary reason for keeping small ruminant 54.0% in highland area and 56.9% in midland altitude. The predominant feed resources for small ruminant commonly available and utilized by farmers in the study area across the different seasons. But majority of the respondents (98.4%) described that the current status of grazing area were in decreasing manner from time to time. In addition they are using „enset" leaf ,crop residue, house hold wastes, maize stover, coffee and local areke sludge, sugar cane top and leaf, bamboo leaf, improved forage grasses and trees and using concentrate as animal feed are not common and well developed in the study area due to lack of knowledge and poor accessibility. Farmers in the study area small ruminants mostly for the target market or holidays such as New Year festival, Easter, Christmas holidays and Sidama New year (Fiche Chambalala). But more focused on Easter and Christmas holidays. The farmers" mode of marketing in the study area was not determined on the basis of their weight and quality, but by direct tire some bargaining between sellers and buyers through eye ball estimation and also by guessing the live weight of the animal. The majority of small ruminants producers in the study area are smallholders that are not producing and selling their produce in an organized manner. Moreover, they are economically poor and

thus lack the resources to invest on their businesses. This has allowed middlemen (brokers) to enter the market chain and take undue profits at the expense of poor producers. The major market constraints in the study area were; unfair tax burden, illegal broker disorder and seasonality of market demand & price fluctuation. Disease and parasite are the most limiting constraints in small ruminants production of the study area. Major constraints that hinder production and fattening of small ruminants in the study area were feed shortage, disease and parasite, inadequate/lack of input (improved breeds, forage seeds, feeding practices including fattening packages, veterinary inputs), in adequate /lack of extension, problem of marketing, water shortage and predators. But according to the survey result in mid land area (Bona district) the major constraint was feed shortage or scarcity of grazing land.

Generally, availability of large number of small ruminant, agricultural by-products, diverse and suitable agro-ecology, and high irrigation potential, recent introduction of some improved forage varieties, cheap labor force and experience in small ruminant production are good opportunities that lead farmers to practice fattening in order to boost their income. However, the fattening practice in the area was hindered by many factors such as shortage of feed and grazing land, disease and parasites, knowledge and extension gap and problem of marketing. In conclusion, the study revealed that smallholder producers were engaged in traditional small ruminant production practices feed resource availability and marketing systems of small ruminant productions. Hence, in future to improved production practice, marketing system and locally available feed resources, prevention of animal diseases and timely small ruminant market information need attention to transform small ruminants production from traditional to market oriented business operation.

5.3. Recommendations

1-The study showed that there is shortage of grazing land in the districts. This is partly because of the fact that most of the land is allocated for crop production. The problem of feed shortage is exacerbated during the dry season where farmers are forced to sell their animals such as small ruminants to overcome the problem. Therefore, locally available feed resources management strategies.

2- Disease and parasite are the core problem in highland agro-ecology and also the major constraint in mid-land areas next to feed shortage. Therefore, improving the animal health extension service delivery, input supply, construction and expansion of health posts is necessary to minimize the problem in sustainable manner which emphasized schemes of small ruminant production.

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7. APPENDICES

Appendix-1 Questionnaire Format

(Questionnaire used for Production Practice, Feed Resource Availability and Marketing Systems of small ruminant survey in Sidama zone Bona zuriya District).

General Background

Enumerators' name _____

1. Kebele: _____

2. Respondent's:

2.1. Name _____

2.2. Sex: 1=Male 2=Female

2.3. Age _____

Code for occupation

1=Farmer 2=House wife 3=Student 4=Herder 5=Trader 6=Handicraft maker Unemployed Government Kebele or employee NGO employee House maid Pensioned (or retire) others

B. Land holding and land use systems

1. How much is your land allocated for the followings? 1=Crop land ____ ha 3=Fallow land____ 2=Grazing/pasture land ____ha 4= others ____ha

C. Purpose of keeping sheep and goat in the three cluster groups of households

1. Why you keep sheep and goats? (Rank) 1=Sale (income source) 2=Meat 3=Milk 4= Manure 5=Sacrifices/rituals 6=Social and cultural functions 7=Saving 8=Distribute benefits/risks with other animals 9=others, specify

SECTION TWO: SHEEP AND GOAT PRODUCTION

A. Feed resources, seasonal availability and feeding managements

1. What are the major basal feed resources of sheep and goats and their availability?

Feed types and sources		Seasonal availability	
		Wet season	Dry season
1	Communal grazing land		
2	Road sides grazing		
3	Grazing aftermath		
4	Grazing in river sides		
5	Private grazing land		
6	Cut grass and browses		
7	Crop residues (straws, stovers)		
8	Indigenous browses		
9	Fodder /improved forages		
10	Enset and banana		
11	Root crops (tubers, leaves)		
12	Weeds		
13	Tillers and fillers		
14	Others, specify		

1. Do you graze your sheep and goats? 1=Yes 2=No

2. If yes, for how long? _____days in a week _____hours a day

3. How sheep and goat graze? 1=Sheep alone 2=Goat alone 3=Both alone 4=Together with other livestock

4. How you practiced grazing your sheep and goats in the dry season? 1=Free grazing2=Partly kept/tethered grazing 3=Fully kept/tethered grazing

5. How you practiced grazing your sheep and goats in the wet season? 1=Free grazing 2=Partly kept/tethered grazing 3=Fully kept/tethered grazing

6. Are there any poisoning grasses and browses that kills or make sick sheep and goats in this area? 1=Yes 2=No

7. If yes, what are they (local and Amharic names)? _____

8. Do you usually provide your sheep and goats with supplementary feeds in addition to grazing? 1=Yes 2=No

SN	Feed types	Classes of flocks							
		Sheep				Goat			
		Young lambs	Ewe	Ram	Castrate	Young kids	Doe	Buck	Castrate
1	Wheat bran								
2	Oil cakes								
3	Maize grain								
4	Haricot bean grain								
5	Crop residues								
6	Leak mineral/stone								
7	Enset (leaf, corm, stem)								`
8	Roots and tubers								
9	Food leftovers								
10	Fodder leaves								

9. If yes, what type of feed and others?
10. When you usually offer your sheep and goats with supplements? 1=Dry season 2=Wet season 3=both
11. In what intervals you offer supplements to your sheep and goats? 1=Daily 2=Twice a day 3=whenever available 4=others, specify
12. If you not provide with supplements, why? 1=Not accessible 2=Expensive 3=Not want to offer sheep and goats 4=others, specify
13. Do you practice tether feeding of sheep and goats? 1=Yes 2=No
14. If yes, why? 1=To avoid crop and vegetation damages 2=Save labor 3=Protect from predators and theft 4=Utilize marginal land and hillsides 5=Prevent breeding 6=Others, specify
15. Is there feed shortage/constraint for your sheep and goats? 1=Yes 2=No
16. If yes, when? 1=Dry season 2=Wet season 3=Both

17. If feed shortage in your locality, why? (Rank) 1=Shrinking and decline in productivity of grazing lands 2=Increase of animal population 3=Cultivation, settlement and protection on grazing lands 4=Drought 5=Increase of human population 6= Others, specify
18. Is there any water shortage/problem to sheep and goats? 1=Yes 2=No
19. If yes, when? 1=Dry season 2=Wet season 3=Both
20. Why shortage of water? (Rank) 1=Drying of water sources 2=Far distant from water sources 3=Not allowed to use sources 4=Provide other livestock than sheep and goats 5=Others, specify

B. Sheep and goats health management

1. What are the common diseases and parasites that affect health and production of sheep and goat?

SN	Local name	Sheep, goat or both affected	Symptoms	Seasons/months
1				
2				
3				

2. What would you do when your sheep and goats sick? 1=Treat with ethno veterinary practices 2=Sales immediately 3=Slaughters immediately 4=Takes to veterinary center 5=Treat with treatments from local traders 6=Others, specify

2. From where you usually obtain veterinary services? 1=OoARD 2=DA offices 3=NGOs 4=Private institutions 5=Open markets
3. Are you accessible to veterinary services in your locality/near distance? 1=Yes 2=No
4. If yes, how far? _____Km
5. How did you obtain services from these institutions? 1=Free of charge 2=Payment 3=Credit 4=Others, specify

6. Did your sheep and goats get vaccine in recent times? 1=Yes 2=No
7. If yes, how? 1=After report of disease cases 2=After certain animals died 3=Before outbreaks
8. Do you use medicines and drugs from open markets/illegal traders for sheep and goats? 1=Yes 2=No
9. If yes, why? 1=Cheap 2=Not accessible to veterinary center 3=Not want to use veterinary center 4=others
10. If not use, why? 1=Not cures 2=DAs and health experts advised not to use 3=Expensive 4=Not accessible 5=others
11. Do you cut and/or brand your sick sheep and goats with hot iron? 1=Yes 2=No
12. If yes, why? 1= Treatment of sick animals 2=Identify/tag the animals 3=Others, specify
13. If not, why? 1=Learnt that it affects quality of skin 2= Reduce price of skin 3=Not to form infection 4=Others
14. Has there been any death of your sheep and goats over the last 12 months? 1=Yes 2=No
15. What were the major causes for death/loss of your sheep and goats? (Rank) 1=Diseases and parasite infections 2=Nutritional deficiency and toxicity 3=Mechanical causes 4=Predators 5=Undetermined 6= Ecto parasite 7=Others, specify
16. Do you practice castration of sheep and goats? 1=Yes 2=No
17. If yes, why? 1=to fatten and sale 2=to control unwanted breeding 3=to tame them 4=others
18. At what age you usually castrate? Sheep _____years (months) Goat _____years/months

8. How you select sheep and goats for fattening? (Rank) 1=Conformation (height, length and appearance) 2=Breed (known local ecotypes) 3=Physical characteristics (color, horn, tail length and width, ear etc) 4=Age 5=others, specify

9. If you practice select with physical characteristics, (Rank) 1=Color 2=Horn 3=Ear 4=Tail 5=Body length and height 6=Others, specify

10. Do offer specific feeding and other management practices for castrated sheep and goats? 1=Yes 2=No

12. What is the common method you castrate your sheep and goats? 1=Local methods (using stone, stick, metal) 2=Burdizzo (OoARD) 3=others, specify

13. Do you practice fattening of sheep and goats for targeted market seasons and market places? 1=Yes 2=No

14. If yes, which season/months (Rank)? 1=New Year festival 2=Easter 3=Christmas 4=Meskel 5=Ed Al Fetir 6=Arefa 7=others, specify

15. Is there and emerging opportunity of increased demand and incentive price for fattened sheep and goats? 1=Yes 2=No

16. Do you practice culling of sheep and goats from flock? 1=Yes 2=No

17. If yes, reasons for culling (rank)? 1=Old 2=Sick 3=Reproductive problem 4=Physical defect 5=Unwanted physical characteristics (black color) 6=others, specify

18. How sheep and goats left from your flock over the last 12 months? 1=Sale 2=Death 3=Slaughter for home consumption 4=Theft 5=Predator 6=Gift 7=Share arrangements 8=others, specify

19. How you replace/own sheep and goats left the household flock in various ways? 1=Home born 2=Share arrangements 3=Gift 4=Purchase 5=Not replace 6=Others, specify

20. If you sale sheep and goats for urgent income needs, which you prefer to sale? 1=Lambs and kids 2=Rams and bucks 3=Ewes and doe 4=Castrates 5=Others

21. How you sale young male sheep and goats? 1=Sale all when reach to marketing age 2=Sale holding some for breeding 3=Sale holding some to castrate and fattening 4=Others, specify

22. Do you cut tail of female sheep/ewe? 1=Yes 2=No

23. If yes, why and when (age, months)? _____

E. Sheep, goats and their products utilizations

1. If you slaughter sheep and goats for home consumption, usually when? 1=For festivals 2=Whenever slaughter age animals available 3=Wedding 4=Births in family 5=For guests 6=circumcise 7=At funeral end 8=Others, specify

2. Which sex of sheep and goats you usually slaughter? 1 Sheep 1=Male 2=Female 3=Both 2 Goats 1=Male 2=Female 3=Both

3. Is milking and use of milk and milk products from sheep and goats common in your area? 1=Yes 2=No

4. If yes, which animals? 1=Sheep 2=Goats 3=Both

5. If no, why? 1=Cultural taboo 2=Religious taboo 3=Not common in the area 4=Others

6. For what purposes you usually use the milk? 1=Children consumption 2=Adult consumption 3=Processing 4=Medicine 5=Others, specify

7. Who in the family consumes milk? 1=Old people 2=Sick 3=Children 4=Others, specify

F. Marketing of sheep and goats, their products and by-products

1. Have you sold sheep and/or goats in the past 12 months? 1=Yes 2=No

2. If yes, why? (Rank) 1= Generate income for farm inputs (fertilizer, seed, others) 2= Generate income for children school 3= Generate income for family and animal health treatments 4= Shortage of grazing land and feeds 5=Generate income to purchase foods 6=To pay back credits 7=Others, specify

19. Where you sold your animals? 1= Farmers in the same village 2= Farmers in nearby village 3= Bona 01 market 4= M/qawado Market 5= worancha market 6= Becha market 7= M/doya market 8= M/kolisho market 9= D/ciracha market 10= B/daye market 11= Getama/Hula market 12= Bursa market 13= Others, specify

20. Have you purchased sheep and/or goats in the last 12 months? 1= Yes 2= No

21. Why you purchased sheep and goats? 1=Slaughter for festivals 2= Slaughter for ceremonies/rituals 3=Breeding 4=Fattening 5=Others, specify

22. If yes, from where you purchased? 1= Farmers in the same village 2= Farmers in nearby village 3= Bona 01 market 4= M/qawado Market 5= worancha market 6= Becha market 7= M/doya market 8= M/kolisho market 9= D/ciracha market 10= B/daye market 11= Getama/Hula market 12= Bursa market 13= Others, specify

23. How many sheep and goats you sold and purchased in the last 12 months and with how much cost?

SN	Structure	Sold				Purchased			
		Number	When/ months	Unit Price	Total price	Number	When/ months	Unit Price	Total price
1	Ewe								
2	Ram								
3	Male lamb								
4	Female lamb								
5	Fatten								
	Goats								
1	Doe								
2	Buck								
3	Male kid								
4	Female kid								
5	Fatten								

24. When in the year you prefers to sale and/or purchase sheep and goats?

SN	When	Sheep		Goats	
1	During festivals (specify				
2	During planting				
3	During harvesting				
4	Others, specify				

25. How you sales your animals? 1= Live weight basis 2= 'Eye ball' estimation 3=Both

26. Why you prefer this mode of marketing? (Selected above) 1= Incentive prices 2= Avoids mischief

3= Most purchasers like this way 4= Saves my time and energy 5= Other, specify

16. Did you ever obtain animal market price information? 1= Yes 2= No

17. If yes, from where? 1= DAs 2= Governmental organizations, specify 3= NGOs 4= Others, specify

18. Do you face any problem in marketing of your animals? 1= Yes 2= No

19. If yes, what? (Rank) 1= Tax burden 2= Unwanted broker disorder and high commission fees 3= Seasonality of market demand and prices 4= Lack of market road from my areas 5= Lack of market and price information 6= Others, specify

20. Do your family sales milk products from sheep and goats? 1= Yes 2= No

21. If not market your products, why not? 1= Not produce at all 2= Produce but consume at home 3= Not fetches reasonable price 4= Don't have any market demand in my locality 5= Others, specify

22 . What you do with the skin(s) of sheep and goats?

22.1 Sheepskin 1= Sales 2= Used for making household materials (seat, bed materials, containers) 3= Used for ride horse/mule seat 4=Prayers mat 5=Home decoration 6=Pomp for metal workers 7=others, specify

22.2 Goat Skin 1= Sales 2= Used for making household materials (seat, bed materials, containers) 3= Used for ride horse/mule seat 4= Prayers mat 5=Home decoration 6=Pomp for metal workers 7=others, specify

23. If sold, how much was the average prices (in the last 12 months)? 1= Sheepskins ____Birr 2= Goatskins _____Birr

24. Do you preserve/process skins at home immediately after flaying? 1= Yes 2= No

25. If yes, what? 1= Apply salts 2= Dry 3= Others, specify

25. After how many days (usually) you take the skins to the traders or collectors? _____days

26. Where and to whom you usually sales skins? 1=Sub-agents in my locality 2=In Bona town for any traders 3=Agents/collector in Bona town 4=Others, specify

27. Did any of your customers have complained on quality of the skins you sold? 1=Yes 2=No

28. If yes, what were the defects they usually complain? 1=Cut during flay 2=Cut during drying 3=Spoiled with bacteria and dirt 4=Too much dried on the sun 5=Others, specify?

29. What are the common problems you encounter in skin production and marketing? (Rank) 1= Lack of market information and markets 2= Lack of capacity building on skin production, preservations and marketing 3= Lack of local organization supports preservation, storage and marketing 4= Animals produce poor quality skins 5= others, specify

G. Sheep and goats production and marketing constraints

1. Do you want to expand sheep and goats flock sizes and production in the future? 1=Yes 2=No

S.N	Reasons to expand	Sheep	Goats	Both sheep and goats
1	High market demand			
2	Incentive market prices			
3	Easy to manage and keep			
4	Distribute benefits and losses			
5	Immediate returns			
6	Appropriate for slaughter and home consumption			
7	Others, specify			

2. If no, why? 1=Shortage of grazing lands and feeds 2=Shortage of labor 3=Prefer another animal species 4=Marketing problem 5=Lack of capital to purchase animals and inputs 6=Others, specify

3. What are major constraints hinder production of sheep and goats in this area? (Rank) 1=Disease and parasites 2=Feed and grazing land shortages 3=Water shortage 4=Labor shortage 5=Drought 6=Predators 7=Marketing problem 8=Inadequate/lack of inputs 9= Inadequate/lack of extension and support 10=Inadequate/lack of technologies and innovations 11=Lack of capital and credits 12=Others

SECTION THREE: SOCIAL, CULTURAL AND ECONOMIC CHARACTERISTICS

A. Gender, labor allocation and decision on benefits from sheep and goats

1. Do you encounter labor shortage in sheep and goat production? 1=Yes 2=No
2. For what major tasks you face labor shortage? 1=Herding and tethering 2=Watering 3=Looking after lambs and kids 4=Construction of shelter 5=Take care of sick animals 6=Others, specify
3. How you overcome the labor shortage? 1=Hire laborer 2=Use family labor 3=Use fence 4=Keep turn by turn with neighbor 5=others, specify
4. Is there any cultural, traditional and religious taboo in the area that prohibits use of sheep and goat products in this area? 1=Yes 2=No
5. Is there any tradition and culture that exceptionally prefers/requires certain sheep and goat color the area? 1=Yes 2=No
6. Do you sacrifices sheep and/or goats for any religious or traditional occasions? 1=Yes 2=No

SECTION FOUR: EXTENSION LINKAGES IN SHEEP AND GOATS PRODUCTION

1. Have you received any improved management practices on sheep and goats? 1=Yes 2=No
2. If yes, where you obtained? 1=Development agents 2=Community leaders 3=Market participant farmers 4=Neighbors 5=Relatives and friends 6=Radio, television, newsletter 7=Others
3. How you received the information? 1=Training 2=Meeting 3=Written pamphlets 4=Heard from friends, relatives 5=Practical visited 6=Others, specify

4. Did you receive training/advice of improved sheep and goat management practice from DAs? 1=Yes 2=No
5. If yes, in what aspects? 1=Feeding (specify: feed production, feed conservation, feeding managements) 2=Health managements 3=Genetic improvements 4=Castration and fattening 5=Lambs and kids rearing techniques 6=Housing of flock 7=Skin production (flaying, slaughter cares, preservation, storage, transportation) 8=Others, specify
6. Did you apply the trainings/advices received to your sheep and goat flocks? 1=Yes 2=No
7. If you applied the trainings/advices, did you achieve any improvements in your flocks? 1=Yes 2=No
8. If not, why? 1=Not affordable 2=Not simple to apply (not understood) 3=Not accessible (not found in my areas) 4=Socially and culturally not acceptable in my area 5=Not relevant to problems of my flock 6=Labor shortage 7=Others, specify

SECTION FIVE: INSTITUTIONS AND INNOVATIONS IN SHEEP AND GOAT PRODUCTION AND MARKETING

1. How you made the share agreements? 1=Share incomes from sale of animals received 2=Share new born animals 3=Share the original animals after certain years 4= Others, specify

2. Is there any cooperative in your area to which you are member? 1=Yes 2=No

3. If yes, in what sector and what services it renders? 1=Crop production (storage, marketing, deliver inputs to members, etc) 2=Livestock (Marketing, deliver inputs, assemble products, etc) 3=Inputs and credits (deliver different inputs, credits, insurance, etc) 4= Others, specify

SECTION SIX: BUILDINGS

1. Where you confine sheep and goats? 1=Main house 2=Adjoin house 3=Separate constructed house 4=Grazing area (open kraals) 5=Others, specify

2. How many houses you have and how they are constructed?

SN	Building (Code1)	Main purposes(Code 2)	Roof materials (Code 3)
1			
2			
3			
4			

Code for 1 1=Main hose 2=Storages 3=Barns 4= Muslim Salat house 5=Others, Specify

Code for 2 1=Resident 2=Storage 3=Animal barn 4= Salat house 5=Kitchen 6=Toilet 7=other houses

Code for 3 1=Grass thatched 2=Iron sheet 3=Roofing tile

Appendix-2 Livestock population in the study area

Livestock type	Sidama Zone	Bona District
Cattle	4,077,752	96,201
Sheep	1,032,134	22,003
Goat	1,441,598	10,461
Donkey	136,327	2,596
Horses	202,533	910
Mule	9,467	598
Chicken	6,792,692	75,814
Beehives	253,605	-

Source: (SZAFPO, 2020).

8. SKETCH OF BIOGRAPHY

I, the author of this thesis, Teshome Tafese Shura was born on Sep 29, 1983 E.C in Bensa Daye town of Sidama Zone. I attended elementary education at Daye Elementary School and my Junior and Secondary school study was at Bensa Daye Kewena Gaxa Junior and Secondary high school from 1994 up to 1997 E.C. After completion of my High School education, I joined the Mizan Tefer Agricultural Technical and Vocational Education Training College (ATVET) in 1998 E.C and graduated with diploma in Animal Science and Technology (ATVET) collage in 2000 E.C. Soon after graduation, I joined at that time, Sidama Zone Bona zurrya Woreda Agricultural Development Office and served as Development agent (DA's) expert 2001 and team leader/Supervisor for 3 rural kebele 2002 up to 2004 E.C. Then I joined the St Marry University, Department of Agricultural Economics BSc study and obtained BSc degree in Agricultural Economics on January 2005 E.C and In the year 2005, I was transferred to Bona Zurya District of Animal and fish production agency/office and served as Animal production and feed management/utlization expert.

In July, 2010 regular program; I joined the School of Graduate Studies of Hawassa University to pursue my MSc Study in Animal Production. In general, I served for 10 consecutive years in the field of animal husbandry.

Name: Teshome Tafesse

Place: Hawassa University

Date of Submission: _____/_____/_____

Signature: _____