

# Sheep and Goat Production, Challenges and Opportunities in Southern Ethiopia

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## Abstract

The study was conducted in Gedeb, Bule, Amaro, Gelana, Abaya and Dilla Zuria of southern Ethiopia to identify and describe Sheep and Goat production systems, production potentials and challenges. After a pilot survey, study districts were stratified based on agroecology and their potential. From each stratum, six districts were selected randomly and three kebeles were selected from each district; finally 180 households participated in data collections. The overall mixed farming system was dominant and the average landholding per household was more than 4 hectares; the mean landholding per household in Gelana and Abaya districts was significantly higher ( $P < 0.05$ ) than those of other districts. Sheep production was dominant in Bule (33.3%) followed by Gedeb (30%), while Goats were slightly dominant in Amaro and Gelana, overall mean was significant ( $P < 0.05$ ) across the districts and breed. The number of the animal was significantly different in all districts. Almost all respondents were kept small ruminant for income generation. Grazing of natural pasture and crop residue were common in Bule and Gedeb, while communal land grazing and browsing were common for Abaya and Gelana. Overall most of the respondents were kept their animal adjacent to their family house (37.8%) followed by a separate room (27.8%) and living with family (24.4%). Lack of extension and credit support (21.7%) was a major problem across the district followed by disease, parasite, Lack of input and technologies and market problems (17.2%). Conducive environment, animal productivity and human population growth were major opportunities of small ruminant production in the study area. All respondents were responded small scale enterprises were not established. This study concludes that even if the environment of study areas were conducive for production of small ruminants, the production system is still backyard and there are no small scale enterprises engaged in small ruminant production, thus, extension service and credit should be facilitated and establishment of small scale on small ruminant production must be established in study districts.

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## 1. INTRODUCTION

Ethiopia has 1.13 million square km of land with suitable climatic conditions for crop and livestock production (NBE, 2011). The socio-economic significance of livestock is basic for most of the Ethiopian populations and widely recognized. The livestock sector is a source of draught power, nutritionally rich foods, fertilizer, industrial raw materials and foreign currency. The overall livestock sector contributes up to 25% of agricultural GDP and 11% of the total Ethiopian foreign exchange earnings (Behnke and Fitaweke, 2011).

The total livestock population in Ethiopia in 2012 was estimated at 54 million cattle, 25.5 million sheep and 24.1 million goats (CSA, 2013); this stock number is placing Ethiopia first in Africa and ninth in the world. However, the stock number is high the production and productivity are very small. Ethiopia's annual exports of cattle and sheep meat were valued at USD 79.13 million in 2012 (ECRA, 2012); this is due to several factors. For instant investments in modern animal husbandry are limited, inadequate veterinary services, feed shortages, poor infrastructure, insufficient financial services and low levels of technical inputs are well documented (Solomon *et al.*, 2010).

Sheep and Goats are important livestock sub-sector and mainly kept for income generation of smallholder family, source of meat, skin, milk and wool throughout Ethiopia. Farmers considered small ruminants as a source of insurance and regulation of financial instabilities, source of risk mitigation, security, investment, saving and socio-economic and cultural functions due to high fertility, short generation interval, need low inputs and adaptability to a harsh environment. Thus, Sheep and goats provide about 12% of the total livestock products consumed and 48% of the family income generated at farm level and are accountable for about 25% of the domestic meat consumption and 58% of the national annual hide and skin production

However, little is known about the existing small ruminants' production systems and small scale enterprises engaged in small ruminant production, opportunities and challenges related to the small ruminant production in the study area. Understanding the existing production potentials and identifying of prevailing problems in the study area vital to devise appropriate development interventions to improve small ruminant production and small scale enterprises in the production of Sheep and Goats in the study area and the aim of the current study was

- ✓ To characterize sheep and goat production system, major opportunities and constraints in southern Ethiopia.

## 2. MATERIALS AND METHODS

### 2.1. Study Area

The study was conducted in Gedeo zone (Bule, Gedeb and Dilla Zuria districts), West Guji Zone (Abaya and Gelana districts) and Amaro special district of southern Ethiopia. The study areas were selected purposively based on the small ruminants' production potentials.

Gedeo zone is located at 90km from Hawassa, the capital of South nation, nationalities and People region of Ethiopia. The zone has six districts namely, Bule, Gedeb, Dilla Zuria, Wonago, Yirgachaffe and Kochore with two urban (Dilla and Yirgachaffe). Geographically, the Zone is located North of Equator from 5°53'N to 6°27'N Latitude and from 38°8' to 38°30' East, Longitude. The altitude ranges from 1500 to 3000m and has sub-humid tropical climate receives mean annual rainfall 1500mm. The rainfall pattern is bimodal, with short rain season between March and May accounting for 30% of total rainfall and a long rainy season between July and October accounting for more than 60% of total rainfall. The Zone has three distinct agro ecologic Zone namely highland/Dega (30%), mid highland/Woyina dega (67%) and low land/Kola (3%). The mean monthly temperature is 21.5°C (CSA, 2007).

Amaro special district is found between 6°5'N Latitude and 38°2'E Longitude, bordered on the south by Burji special district, on the southwest by Konso special districts, on the west by Derashe special district, on the northwest by Gamo Gofa and Lake Chamo and on the north and east by West Guji zone of Oromia. The district constitutes highland/dega (30%), mid-highland/woyina dega (38%) and low-land/kola (32%).

West Guji zone is located between 5°26' and 5°52' North Latitude and 37°56' and 38°31' East Longitude and an altitude between 1500 and 2400meters above sea level (West Guji Zone land and environment protection office, 2017). The zone is divided into three agro-ecology zones, namely the highland/dega (34%), mid-highland/woyina dega (55%) and low-land/kola (11%). The rainfall pattern is bimodal, high rainfall between March and May as well as a relatively good amount from September to November.

### 2.2. Sampling techniques

After a pilot survey on the study area and identifying the possible areas, stratified sampling technique based on the agro-climatic zone of the study areas was used in selecting districts to cover those all districts with different altitudinal ranges, production systems and fair accessibility. From each district households were stratified into strata based on who had engaged in small ruminant production and not engaged and from those who had small ruminant households representative households were selected by simple random sampling techniques.

### 2.3. Data Collection Techniques

Before conducting the formal survey, group discussion was made with key informants such as elders and experts in the office of districts' livestock and fisheries to have an overview about small ruminants' production system in the study areas. To obtain primary data of the small ruminants' production system, a semi-structured questionnaire was developed and pre-tested. Finally, the formal survey was conducted by trained enumerators under close supervision and participation of the researchers.

Data were collected on the small ruminants' production systems of the areas, the small ruminant management practice, role of small ruminant production in household economic condition and small scale production enterprises, comparative feeding and nutrition and strategies for development, constraints and opportunities related to small ruminant production. Moreover, data concerning the traditional measures taken by small ruminant producing societies to solve problems associated with livestock husbandry practices.

### 2.4. Data Analysis

The quantitative and qualitative data were coded and analyzed using the means and frequency procedures of Statistical Package for Social Sciences (SPSS, 2013). Chi-square test was used to examine differences between levels of significance of different quantitative variables among districts and analysis of variance (ANOVA) using the general linear model procedure of SPSS. Least Significant Difference (LSD) test was made for mean separation when there was a significant difference among districts.

## 3. RESULTS AND DISCUSSION

### 3.1. Household Characteristics

The majority of small ruminant holders (81%) were male-headed similarly across the study districts ( $P > 0.05$ ) table 1, this observation suggested that men take the lead to initiate and have the small ruminants, which is similar in most of the Ethiopian small ruminant producing areas (Dhaba *et al.*, 2012). However, all household members, whether be it male or female, youth or adults were taking care of the animals; in keeping, providing them with a feed and ensuring their safety. Some respondents were responded as; the production of a small ruminant is suitable for female producers and most of the scholars argued as sheep and goat production is easier than keeping cattle.

About 31.8% of the producers fell between the age of 31 and 40 years, which indicates most of sheep and

goat producers across the study districts, were in productive age. According to current finding, most (30%) of respondents' family size was fail between 7 and 9 members per household; which was similar with results reported by Dhaba *et al.*, (2012) and higher than the results reported by Belay *et al.*, (2012).

Most of the respondents (45.6%) were illiterate, followed by elementary (between 1 and 4) school (40%) and only (2.2%) of them had a higher education certificate. Almost all (63.3%) of farmers of Gelana district were significantly ( $P < 0.05$ ) have completed elementary school (1-4), followed by Dilla Zuria (46.7%), Abaya (40%), Gedeb (40%) and Amaro (33.3%); while almost all (80%) of respondents from Bule were significantly illiterate. This implies most of the small ruminants' producers were keeping their animal in backyard system, had not entrepreneurship mind and difficult to give them some training to enhance their ability.

The mixed farming system was common (32.8%), followed by the production of livestock (30%), especially in Gedeb districts almost all (70%) of respondents depended on livestock- crop production system, followed by respondents from Bule (33.3%), Dilla zuria (33.3%) and Amaro (30%). The farmers of Abaya (56.7%) were significantly participated in only a livestock production system, followed by Gelana (43.3%).

Table 1: Households' Characteristics in Study Area (%)

Descriptions	Study Districts						Total	P-value	
	Gedeb	Bule	Amaro	Gelana	Abaya	Dilla Zuria			
Sex	Male	83.3	80.0	80.0	83.3	80.0	80.0	81.0	0.99
	Female	16.7	20.0	20.0	16.7	20.0	20.0	19.0	
Age	≤ 20 years	16.7	13.3	10.0	10.0	6.7	13.8	11.7	0.01
	21-30 years	26.7	16.7	10.0	0.0	16.7	27.6	16.2	
	31-40 years	33.3	36.7	30.0	40.0	33.3	17.2	31.8	
	41-50 years	6.7	16.7	36.7	23.3	0.0	13.8	16.2	
	51-60 years	10.0	6.7	10.0	6.7	30.0	20.7	14.0	
	≥ 60 years	6.7	10.0	3.3	20.0	13.3	6.9	10.1	
Family size	1-3	3.3	6.7	20	26.7	26.7	16.7	16.7	0.02
	4-6	30.0	23.3	36.7	16.7	36.7	30.0	28.9	
	7-9	20.0	36.7	36.7	40.0	23.3	23.3	30.0	
	➤ 9	46.7	33.3	6.7	16.7	13.3	30.0	24.0	
Level of education	Illiterate	33.3	80.0	33.3	30.0	46.7	50.0	45.6	0.001
	Grade 1-4	40.0	20.0	33.3	63.3	40.0	46.7	40.6	
	Grade 5-8	16.0	0.0	3.3	0.0	3.3	3.3	4.4	
	Grade 9 – 12	10.0	0.0	26.7	0.0	6.7	0.0	7.2	
	Higher education	0.0	0.0	3.3	6.7	3.3	0.0	2.2	
Source of income	Livestock and crop farm	70.0	33.3	30.0	13.3	16.7	33.3	32.8	0.001
	Livestock and day labourer	6.7	26.7	20.0	16.7	10.0	10.0	15.08	
	Livestock and Trade	3.3	10.0	0.0	16.7	10.0	13.3	8.9	
	Livestock alone	6.7	16.7	36.7	43.3	56.7	20.0	30.0	
	Livestock, crop and trade	13.3	0.0	0.0	10.0	0.0	13.3	6.1	
	Livestock, crop and day labour	0.0	13.3	13.3	0.0	6.7	10.0	7.2	

### 3.2. Land Holding and Land Use System

A majority (41.1%) of respondents in the study area had more than 4 (four) hectares per household table 2. About 11.7% of households were holding less than 1 hectare. This shows that producers of small ruminants can keep enough animals for the establishment of small scale enterprises if they may be supported and enhanced their entrepreneurship ability. The mean land holding per household in Gelana and Abaya districts was significantly higher ( $P < 0.05$ ), respectively, than those of other districts, which means these districts are more suitable for the establishment of small scale enterprises engaged in sheep and goat production.

Table 2: Landholding and land-use system (%) responded by farmers of the study area

Description	Study districts							Total
	Gedeb	Bule	Amaro	Gelana	Abaya	Dilla Zuria		
Landholding	≤ 1 hectare	23.3	0.0	0.0	0.0	0.0	46.7	11.7
	2-3 hectare	23.3	20.0	26.7	6.7	10.0	33.3	20.0
	3-4 hectare	33.3	36.7	43.3	13.3	23.3	13.3	27.2
	more than 4	20.0	43.3	30.0	80.0	66.7	6.7	41.1
Land Use	Livestock& cash crop	23.3	16.7	33.3	20.0	30.0	43.3	27.8
	Cereal and livestock	36.7	53.3	16.7	10.0	13.3	10.0	23.3
	Livestock and pasture	16.7	16.7	33.3	63.3	36.7	26.7	32.2
	Enset & livestock	23.3	13.3	16.7	6.7	20.0	20.0	16.7

An overall of about (32.2%) of respondents reported that land was used majorly for livestock rearing and natural pasture, while most (27.8%) of respondents were allocated their land for livestock and cash crop production; especial farmers from Dilla Zuria (43.3%) were significantly used the land this purpose. Majority of Gelana (63.3%) and Abaya (36.7%) districts' farmers were significantly ( $P<0.05$ ) used their land for livestock and pasture, respectively, which implies most farmers of Gelana and Abaya districts' farmers are allocated larger proportion of their land for grazing, while most (53.3%) farmers of Bule district were significantly used their land for cereal and livestock followed by Gedeb district (36.7%), which means farmers of Bule and Gedeb districts' farmers are practising crop-livestock farming system.

### 3.3. Household Ownership of Different Livestock

The livestock holding of study districts are summarized in table 3, shows that there was significant ( $P<0.05$ ) difference among study districts by most of the livestock species, but chickens were insignificantly ( $P>0.05$ ) distributed similarly. Overall average cattle species were the most dominant (9.97 heads per household) livestock owned by respondents, followed by Goats (7.5 heads/household) and Sheep (5.85 heads per household).

Cattle holding of Abaya district ( $17.5\pm 2.78$ ) was significantly higher ( $P<0.05$ ) followed by Gelana ( $15.57\pm 2.41$ ) and while significantly lower ( $P<0.05$ ) in Dilla Zuria ( $2.43\pm 0.56$ ). The results show that Dilla Zuria farmers are keeping very limited cattle than other areas. Goats holding was significantly higher ( $P<0.05$ ) in Gelana ( $13.9\pm 1.79$ ) followed by Abaya districts ( $10.67\pm 0.9$ ), while lower holding was found in Gedeb district ( $1.8\pm 0.62$ ). Sheep were significantly dominant in Gedeb ( $7.9\pm 0.99$ ) followed by Bule ( $7.57\pm 0.655$ ) and Dilla Zaria ( $7.57\pm 0.655$ ). Based on these results, Gelana and Abaya districts are found in semi-desert agro-ecology where Goats are commonly produced than Sheep; while Gedeb and Bule districts are slightly found in high altitude why Sheep production is dominated than Goat production.

### 3.4. Small Ruminants' Size and Structure

Table 4, shows that the average Goat flock per household was 7.3. The average number of Goat/household was significantly ( $p<0.05$ ) higher in Gelana (13.87) followed by Abaya (10.76) and Amaro (9.3), respectively; while significantly lower in Gedeb (1.76). This is due to landholding capacity, environment and availability of feed for Goat production. The mean number of Does were significantly higher ( $2.22\pm 0.14$ ) and castration of Goat was slightly not common ( $0.99\pm 0.13$ ) across study districts, which means producers are selling the male Goats before castration and fattening than Does.

The average number of Sheep per household was 5.79heads table 4. The Mean flock size of Sheep/household was significantly higher in Gedeb (7.87) and Bule (7.56), respectively and lower in Gelana (3.83) districts. This result shows that Sheep are preferred high altitude to mid-altitude. Overall Ewes were more dominant ( $2.08\pm 0.13$ ) than other sheep structures, which reveals farmers were preferred to sell male sheep than male. Farmers during group discussion informed that matured and fattened Rams were selected by buyers than Ewes and young animals.

Table 3: Livestock holding (Mean ± SE)

Description	Study Districts						Total	P-value
	Gedeb	Bule	Amaro	Gelana	Abaya	Dilla Zuria		
Cattle	8.03±0.89 <sup>a</sup>	6.17±0.75 <sup>ad</sup>	10.13±1.24 <sup>ab</sup>	15.57±2.41 <sup>b</sup>	17.5±2.78 <sup>bc</sup>	2.43±0.56 <sup>d</sup>	9.97±0.77	0.00
Sheep	7.9±0.99 <sup>a</sup>	7.57±0.65 <sup>ab</sup>	3.5±0.98 <sup>bc</sup>	4.1±1.16 <sup>bc</sup>	5.17±0.85 <sup>b</sup>	6.8±0.62 <sup>ab</sup>	5.85±0.38	0.01
Goat	1.8±0.62 <sup>a</sup>	2.67±0.58 <sup>a</sup>	9.43±1.05 <sup>bc</sup>	13.9±1.79 <sup>d</sup>	10.67±0.9 <sup>b</sup>	6.8±0.52 <sup>c</sup>	7.5±0.52	0.00
Chickens	5.17±0.71	5.13±0.6	6.67±0.75	2.57±0.71	4.97±0.88	5.13±0.62	4.94±0.3	0.06

Superscripts with different letters across the rows differ significantly ( $p<0.05$ )

Table 4: Sheep and Goat size and structure (Mean ± SE)

Small ruminants' size and flock structure	Study District						Overall	Sign.
	Gedeb	Bule	Amaro	Gelana	Abaya	Dilla Zuria		
Goat	1.76	2.63	9.37	13.87	10.76	6.78	7.53	
Kids<6months	0.13±0.10 <sup>a</sup>	0.27±0.13 <sup>a</sup>	1.17±0.40 <sup>b</sup>	2.37±0.44 <sup>c</sup>	2.43±0.38 <sup>c</sup>	0.77±0.24 <sup>ab</sup>	1.19±0.14	0.00
Kids 6-12 months	0.13±0.07 <sup>a</sup>	0.53±0.19 <sup>ac</sup>	2.00±0.30 <sup>b</sup>	2.57±0.36 <sup>b</sup>	2.17±0.30 <sup>b</sup>	0.97±0.18 <sup>c</sup>	1.39±0.12	0.00
Does	0.70±0.24 <sup>a</sup>	1.07±0.23 <sup>a</sup>	2.73±0.34 <sup>bc</sup>	3.43±0.53 <sup>b</sup>	3.00±0.23 <sup>bc</sup>	2.37±0.19 <sup>c</sup>	2.22±0.14	0.00
Bucks	0.60±0.24 <sup>a</sup>	0.63±0.16 <sup>a</sup>	2.20±0.25 <sup>b</sup>	3.17±0.45 <sup>c</sup>	1.83±0.19 <sup>b</sup>	1.97±0.18 <sup>b</sup>	1.74±0.13	0.00
Wether /castrates	0.20±0.20 <sup>ad</sup>	0.13±0.13 <sup>ad</sup>	1.27±0.25 <sup>bd</sup>	2.33±0.50 <sup>c</sup>	1.33±0.33 <sup>bd</sup>	0.70±0.23 <sup>d</sup>	0.99±0.13	0.00
Sheep	7.87	7.56	3.44	3.83	5.17	6.87	5.79	
Lambs <6months	1.43±0.46	0.83±0.25	0.37±0.28	0.57±0.25	0.73±0.19	0.60±0.23	0.76±0.12	0.17
Lambs 6-12 months	1.30±0.39	1.60±0.22	0.67±0.22	0.93±0.32	1.10±0.22	1.27±0.23	1.14±0.11	0.23
Ewes	2.87±0.25 <sup>a</sup>	2.73±0.30 <sup>a</sup>	1.20±0.33 <sup>b</sup>	1.33±0.39 <sup>b</sup>	1.67±0.26 <sup>b</sup>	2.67±0.21 <sup>a</sup>	2.08±0.13	0.00
Rams	1.37±0.18 <sup>ac</sup>	1.90±0.24 <sup>a</sup>	0.60±0.16 <sup>b</sup>	0.60±0.17 <sup>b</sup>	1.17±0.23 <sup>c</sup>	1.70±0.22 <sup>ac</sup>	1.22±0.09	0.00
Wether/castrates	0.90±0.27	0.50±0.17	0.60±0.22	0.40±0.19	0.50±0.18	0.63±0.23	0.59±0.08	0.65

Superscripts with different letters across the rows differ significantly ( $p < 0.05$ )

### 3.5. The Role of Keeping Small Ruminants

The current study results revealed that the main purpose of keeping small ruminants was income generation (0.31). This finding is in agreement with that of many scholars' findings (Zelalem and Fletcher, 1991; Tsedeke, 2007; Getahun, 2008,) who reported that the primary reason of small ruminants across Ethiopia is income generation. According to recent studies in the southern part of Ethiopia, Getahun (2008) found out that smallholder farmers in crop-livestock mixed systems kept small ruminants mainly for cash generation.

Moreover, the householders were responded that additional reasons as saving (0.23), home consumption (0.18), risk mitigation (0.17) and Manure (0.11). According to group discussion participants and key informants in the area, coffee is the main cash crop. For most farmers, however, their economic profitability is highly limited by various factors. In most cases, there is a fluctuation of coffee yield; so farmers nowadays keep small ruminants as saving and insurance. Thus, rearing small ruminant with low investment cost is basic for improvement in financial security developing society. Most of the production objectives across Ethiopia agreed with the current finding.

Table5: Purpose of Keeping Sheep and Goats

Description	Rank					Index
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
Income	141	21	10	6	2	0.31
Saving	14	89	58	13	6	0.23
Home consumption	13	37	60	26	44	0.18
Risk mitigation	12	26	41	76	25	0.17
Manure	0	7	11	59	103	0.11
Total	180	182	183	184	185	1

Index = [(5 for rank 1) + (4 for rank 2) + (3 for rank 3) + (2 for rank4) + (1 for rank5)] divided by the sum of all weighted value of mentioned purposes by respondents.

### 3.6. Small Ruminants' Production System

#### 3.6.1. Local Available Feed Resources and Feeding System

Current study results revealed that locally available feed resources are abundant across study areas. Key informants are informed that area is suitable and conducive for small ruminants' production; because of locally available feed resources like natural grasses, browsing herb, multipurpose trees, roadside and aftermath grazing, and crop residues are found dominantly across districts of the study area. This disagreed with findings of (Endeshaw, 2007; Tsedeke, 2007; Getahun, 2008) stated that feed shortage is a major constraint for small ruminants production in the southern part of the country, although the degree of shortage varies within farming systems/agro-ecologies.

Farmers are mentioned a lot of mainly local natural pasture (natural grasses and browses), Grass species like *Cynodon dactylon* (Sardo/edo), *Cenchrus ciliaris* (Matagudessa), *Pennisetum mezianum* (Bamboo grass/Ogondo), *Digitaria neghellensis* (Elmogori), *Heteropogon contortus* (Saricha), *Eragrostis sp.*, *Chloris roxburghiana* (horse tail) are found. *Cynodon dactylon* (Sardo/edo) is preferred as best feed in Gedeb and Bule followed by *Pennisetum mezianum* (Bamboo grass/Ogondo). *Digitaria neghellensis* (Elmogori) and *Cenchrus ciliaris* (Matagudessa) are valued as best feed at Amaro, Gelana and slightly in Abaya and Dilla Zura districts.

There are browses (shrubs, tree leaves and pods) mainly found in Amaro, Gelana and Abaya districts. Browses species like *Acacia tortilis* (Tadacha/Dadacha), *Acacia seyal* (Wachu), *Acacia mellifera* (Sapensa), *Acacia etbaica* (Alkabesa), *Acacia nilotica* (Burkuke), *Acacia brevispica* (Hamaressa), *Acacia bussei* (Alo), *Balanites aegyptiaca* (Badena), *Commiphora* species and others play a very important role as sources of feed of small ruminants. All respondents are ranked these all browses as best feed and highly palatable by small ruminants. Yeshitila (2007)

also reported the utilization of indigenous browses as feed resources in Alaba district of SNNPR

About 28.3% of respondents were using natural pasture, followed by grazing and browsing (21.1%), while some (15%) of respondents were utilizing aftermath grazing (Table 6). Households from Abaya (53.3%) and Gelana (40%) were significantly ( $P < 0.05$ ) utilizing communal natural pasture grazing land. The use of crop residue was common (33.3%) in Gedeb followed by Bule (26.7%) even if farmers in the study area have a limited practice of feed conservation.

Table 6: Major local feed available and feeding system of small ruminants (%)

Major feed availability	Study District (%)						Total	Sig.	
	Gedeb	Bule	Amaro	Gelana	Abaya	Dilla Zuria			
Natural Pasture	16.7	16.7	33.3	40.0	53.3	10.0	28.3	0.00	
Roadside grazing	10.0	26.7	13.3	13.3	0.0	33.3	16.1		
Grazing and Browsing	13.3	13.3	20.0	23.3	30.0	26.7	21.1		
Aftermath grazing	26.7	16.7	13.3	6.7	10.0	16.7	15.		
Crop residue	33.3	26.7	20.0	16.7	6.7	13.3	19.4		
Non- conventional	Chat leftover	26.7	33.3	16.7	23.3	26.7	13.3	23.3	0.36
	Fruit leftover	23.3	13.3	23.3	30.0	16.7	33.3	23.3	
	Coffee pulp	20.0	6.7	30.0	20.0	33.3	20.0	21.7	
	Enset leaves	30.0	46.7	30.0	26.7	23.3	33.3	31.7	
Do you give a supplement?	Yes	80.0	60.0	70.0	66.7	53.3	76.7	67.8	0.22
	No	20.0	40.0	30.0	33.3	46.7	23.3	32.2	
Type of supplements	Industrial by-product	36.7	26.7	30.0	26.7	10.0	33.3	27.2	0.00
	Local mineral soil	43.3	33.3	40.0	40.0	43.3	6.7	34.4	
	Mixed ration	0.0	0.0	0.0	0.0	0.0	13.3	2.2	
	Salt	0.0	0.0	0.0	0.0	0.0	23.3	3.9	
Period of supplement	Dry period	30.0	36.7	46.7	36.7	40.0	23.3	35.6	0.01
	Wet period	13.3	0.0	0.0	0.0	0.0	16.7	5.0	
	Every when	36.7	23.3	23.3	30.0	13.3	36.7	27.2	

The majority (31.7%) of households were feeding enset leaves, followed by Chat leftover (23.3%) and fruit leftover (23.3%) as non-conventional feed. Enset leaves feeding was significantly ( $P < 0.05$ ) common in Bule (46.7%) and Dilla Zuria (33.3%). All key informative during group discussion was stated that non-conventional feed resources are commonly given to small ruminants. Chat leftover, coffee pulp; fruit parts, enset and house leftover are known non-conventional feeds across the study area.

Almost all (67.8%) of respondents were responded that supplementation is not common, which implies feed management is very poor and most (32.3%) of farmers were supplemented additional feeds their animals. The majority (34.4%) of respondents were supplementing local mineral soil called "Bole" obtained from Lake Abaya, followed by supplementing industrial by-products (27.1%). The supplementation was higher (35.6%) during the dry season and most (27.2%) of respondents were giving supplement feed everywhen; mineral supplement like "Bole" was available with cheap price nearby production areas. The availability and quality of feeds are not favourable and uniform in nutrient quality all year round. As a result, for the animal that is not supplemented the gains made in the wet season is totally or partially lost in the dry season (Alemayehu, 2003).

There were no farmers respondents that conserved feed resource inform of silage, hay or any other feed preservation strategies at the area. The farmers hadn't obtained any sorts of training on improved feed conservation and preservation mechanisms.

### 3.6.2. Housing Management

Almost all small ruminant producers provided night shelter, even if the type and place of sheltering vary. The majority (37.8%) of respondents provided night shelter to their small ruminants in adjacent to the family house, separate room (27.8%) and living with the family house (24.4%) with some sort of partition table 7. About 44.4% of respondents housed sheep and goat together, while about 55.6% of respondents housed sheep and goats separately. According to a group discussion with participants, the qualities and standards of houses were very poor; not well cleaned, in most areas the shelters are roofless, and thus, poor housing management can directly or indirectly affect the production and productivity of small ruminants, which observed during the direct survey.

The majority (49.4%) of respondent stated that they provide shelter to protect from predators, followed by protecting unfavourable condition (28.9%). The current results are similar with many other findings ((Endeshew, 2007; Tsedeke, 2007; Belete, 2009), who stated that night time housing of small ruminants through Ethiopia is to protect from predators, unfavourable condition and theft, and housed in adjacent to the family house, within the

family house and in a separate house.

Table 7: Percent of household responded on housing type, means of confining and reasons for sheltering Small ruminants during night

Description	Study Districts						Total	P-value	
	Gedeb	Bule	Amaro	Gelana	Abaya	Dilla Zuria			
Housing system	Living with family house	26.7	30.0	20.0	23.3	10.0	36.7	24.4	0.00
	Partition adjacent to the family house	40.0	36.7	53.3	30.0	30.0	36.7	37.8	
	Separate room	33.3	33.3	26.7	16.7	30.0	26.7	27.8	
	Separate shed/fence	0.0	0.0	0.0	30.0	30.0	0.0	10.0	
How to confine	Sheep alone	46.7	66.7	0.0	13.3	26.7	26.7	30.0	0.00
	Goats alone	3.3	0.0	60.0	33.3	33.3	23.3	25.6	
	Sheep and Goats together	50.0	33.3	40.0	53.3	40.0	50.0	44.4	
Why provide shelter	To protect from the unfavourable condition	20.0	36.7	30.0	23.3	23.3	40.0	28.9	0.00
	To protect from predators	66.7	63.3	53.3	33.3	36.7	43.3	49.4	
	To provide convenient climatic condition	10.0	0.0	16.7	0.0	13.3	0.0	6.7	
	To protect from theft	3.3	0.0	0.0	43.3	26.7	16.7	15.0	

### 3.6.3. Major Constraints of Small Ruminants Production

The major constraints in small ruminants' production in the area are summarized in Table 8: Majority (21.7%) respondents responded that lack of extension and credit supports were ranked the first problem that affects the production of small ruminants in small scale enterprise level. Lack of extension and credit supports were significantly higher in Bule district (33.3%) followed by Gelana (26.7%) and Dilla Zuria (26.7%), respectively. This shows that extension and credit services which have a great role in the development of small scale enterprises are not given by governmental and NGOs.

Table 8: Major problems reported by respondents of small ruminant producers (%)

Description	Districts						Total	P-value
	Gedeb	Bule	Amaro	Gelana	Abaya	Dilla Zuria		
Diseases and parasites	13.3	10.0	33.3	30.0	16.7	0.0	17.2	0.00
Feed and grazing land shortage	16.7	23.3	6.7	0.0	13.3	30	15.0	
Genetic improvement problems	3.3	0.0	0.0	0.0	0.0	0.0	0.6	
Predators	30.0	20.0	16.7	0.0	0.0	0.0	11.1	
Market problems	6.7	13.3	23.3	23.3	16.7	20.0	17.2	
Lack of technologies	13.3	0.0	10.0	20.0	36.7	23.3	17.2	
Lack of extension and credit support	16.7	33.3	10.0	26.7	16.7	26.7	21.7	

Diseases and Parasites, market problems, and Lack of technologies were equally (17.2%) reported by respondents. Moreover, all key informants stated health problem, poor management, lack of credit; marketing infrastructure and seasonal feed scarcity as major constraints in producing small ruminants. During group discussion farmers from Bule district were informed that the government is trying to improve the sheep breed by giving them; "Bonga breed Ram" sheep.

### 3.6.4. Potentials of Small Ruminants Production

Producing sheep and Goat has more opportunities than keeping other livestock. The current study results revealed that most of the producers of small ruminants were benefited from increased demand (33.3%) of small ruminant animals and their products in the domestic and export market (table 10). This is due to expanding emerging export market at the national level, which agreed with the report of Legese *et al.*; (2008) stated that Ethiopian meat is competing with meat from New Zealand, Brazil, India and Pakistan in the Gulf markets.

Table 10: Major opportunities for producing small ruminant responded by households (%)

Description	Districts						Total
	Gedeb	Bule	Amaro	Gelana	Abaya	Dilla Zuria	
Locally available feed	26.7	10.0	13.3	13.3	30.0	26.7	20.0
Expanding emerging internal demand and export market	30.0	33.3	46.7	33.3	16.7	40.0	33.3
Animal breed and reproductive performance	23.3	6.7	13.3	13.3	20.0	10.0	14.4
Conducive Environment	3.3	20.0	6.7	13.3	10.0	10.0	10.6
Low investment cost	6.7	13.3	10.0	16.7	13.3	3.3	10.6
Easy to manage	10.0	16.7	10.0	10.0	10.0	10.0	11.1

The producers also mentioned potentially available feed (20%), best breed and reproductive performance of animal (14.4%), easy to manage (11.1%), conducive environment (10.6%) and low investment cost (10.6%) as best opportunities to produce small ruminants in study areas.

### 3.7. Small Scale Enterprises and entrepreneurship engaged in small Ruminants' Production

All of the householders (100%) were responded that there is neither a small scale enterprise nor smallholder engaged in small ruminants' production. Across the study areas, the Governmental and/or non-governmental organizations were not concerned about awareness creation in generating information and knowledge on enterprise and entrepreneurship, extension services and technology inputs. However, according to Legesse *et al.*, (2008) different NGOs and projects tried to strengthen the small scale sheep and goat enterprises and link them to different market chains, however, none of them is profitable because they could not compete with individual producer and trader.

## 4. CONCLUSIONS AND RECOMMENDATIONS

### 4.1. Conclusions

In the study area, most of the farmers were illiterate. The overall landholding is largely used for livestock, pasture, cash crop, cereals and enset production. Sheep are dominant in Gedeb and Bule, and Goats are dominant in Gelana, Abaya and Amaro, respectively, while both sheep and Goats kept equally in Dilla Zuria. Across study districts, small ruminants are kept primarily for income generation. In the area, production of a small ruminant is well known, easy and productive; because the environment is conducive, locally available feed resources are abundant, animals' reproductive performance is high and demand for small ruminant is increasing. Lack of extension and credit support, diseases and parasites, market problem and lack of production technology are major factors. There is no small scale enterprise engaged in sheep and goat production, this is due to a lack of entrepreneurship ability and lack of awareness to make small scale enterprise or cooperatives.

### 4.2. Recommendations

Based on the above conclusions the following recommendations are made:

- Support should be given to producers by governmental and non- governmental organizations in all management practices of small ruminants.
- Training should be given on awareness creation, skill development, and knowledge sharing
- Market and production chain analysis must be done
- Small scale enterprises must be established

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