

Sheep and Goat Production Systems in Degehabur Zone, Eastern Ethiopia: Challenge and Opportunities

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Abstract

Background: Unlike the large potential of small ruminants in the country their productivity is low. There are various factors that contribute for low productivity. The objectives of this study were to assess sheep and goat production systems, and to identify challenges and opportunities for small ruminant production.

Methodology: The study was conducted in Birkot, Guna Gado and Degehabur Districts of Degehabur Zone of Somali Regional State, Ethiopia. Results are based on survey of 120 sample households (40 household from each district) selected by using purposive sampling and rapid appraisal of major sheep and goat production.

Result: Sheep and goats are primarily kept to generate income (53.3%) and milk production (24.3%) and majorities (96.6%) of goat owners extensively milk their flock for household's consumption. From the interviewed Households, 42.2%, 20%, 11.1%, 8.9%, and 4.4% of them utilize communal grazing, private grazing, roadside grazing, indigenous browser and riverside grazing are the major feed source for sheep and goat, respectively. Flock water are largely comes from ponds water (33.3%), harvested water (28.9%) and deep well (17.8%). The main lambing and kidding periods occurred in the main feed availability season. Deaths of small ruminants were reported by households over the last 12 months. The average mortality rate of suckling age groups for male lamb 1.9 ± 0.31 , female lamb 2.02 ± 0.34 and male kids 1.36 ± 0.27 , female kids 1.93 ± 0.29 for sheep and goat, respectively at household levels. The major constraints for small ruminant production system were: diseases and parasites (31.1%), drought (31.1%), feed and grazing land shortage (11.1%), water shortage (11.1%), and marketing problems (2.2%).

Conclusion: Interventions covering flock health, identification of alternative feed resources and strategic feeding management, water development, improve marketing efficiency, and production technologies/inputs could help farmers to build their flock and improve productivity.

Keywords: Sheep; Goats; Feed; Production; Constraints

Introduction

Ethiopia has one of the largest livestock population in Africa with the estimated domestic animal number of 52.13 million cattle, 24.2 million sheep, 22.6 million goat, 2.5 million camels, 44.89 million poultry, 1.96 million horses, 0.37 million mules and 6.4 million donkeys [1,2]. Livestock play an important role in providing export commodities in a form of live animals, hides and skins [3]. Despite the large livestock population with high potential for meat and milk production, a number of factors hindered the development of livestock sector in Ethiopia. These include poor genetic potential of the indigenous animals, inadequate veterinary services, shortage of animal feeds as well as the absence of good management [4].

In pastoral and agro-pastoral areas like Degehabur zone, sheep and goats are important components of the farming system, which benefit small holder farmers in generating cash income as well as milk. Despite their potential in the area, productivity of sheep and goat remained quite low. Therefore, it is crucial to systematically describe the production systems in order to plan and design appropriate research and development interventions that are relevant to the specific systems. Therefore, the aim of this study was to assess small

ruminant productions systems and to identify challenges and opportunities for small ruminant production in Deghabour zone.

Materials and Methods

Description of the study area

The study was conducted in Degehabur, Birkot and Guna Gado district of the Degehabur Zone. The Zone has a total population of 478,168, of whom 268,006 are men and 210,162 women. While 62,584 or 13.01% are urban inhabitants, a further 223,778 or 46.8% were pastoralists. Livestock, particularly cattle, shoats and camel are important integral components of rural livelihood systems in the zones [5].

Sampling method and sample size

Initially discussions were held with district livestock experts; secondary data were collected; published and unpublished information were assessed. Based on the information gained, 3 districts were selected based on the dominancy of sheep and goat production. Accordingly, Degehabur, Birkot and Guna Gado were selected. 40 households from each district (a total of 120 households) were selected

randomly by using purposive sampling i.e. who have more sheep and goat to participate in production system and marketing study.

Data collection

Data were collected by interviewing the pastoral communities and to address the objectives of the study formal (diagnostic) survey by using semi-structured questionnaire used to collect data on the following variables: socio-economic characteristics of households, purposes of keeping sheep and goats, feeds and feeding, reproductive performance of sheep and goat, problems and constraints, housing, diseases and parasites, veterinary services, input in sheep and goat production, labor and its distribution in sheep and goat production, fattening practices. Before the start of survey the questionnaire were pre-tested on two non-sampled households from each study district.

Data analysis

Data collected were managed in such a way that the qualitative as well as quantitative variables were selected. The data collected by using semi-structured questionnaire were entered in to Microsoft excels (Microsoft Corporation, Redmond, Washington, USA) and imported to SPSS (version 16) software (IBM Corporation, Armonk, New York, USA) and also coded for analysis. Descriptive statistics were used to describe quantitative factors. Standard error of mean \pm (SE) is used to describe means while percentage is used for describing qualitative characteristics. The data was analyzed one way analysis of variance (one-ANOVA).The results were expressed in percentage and mean \pm SD of the results from the questionnaire.

Result and Discussion

Socio-economic characteristics of the households

Household characteristics: In the study area, the majority of the small ruminants owning households were male headed (73.3%) while only small proportions (26.7%) were headed by females (Table 1). The average family size of the households was 11 ± 0.6 (ranging from 5-24) and it is higher than the average values at the national (5.2) levels [6]. This is attributed to low awareness of family planning. Having many members of the family seems to be considered as an asset and security in times of retirements.

There were 11 ± 0.6 household members in the house from which 4.69 ± 0.46 , 4.13 ± 0.40 , 1.94 ± 0.24 and 0.33 ± 0.11 are 0 to 15, 15 to 40, 40-60 and above 60 years, respectively. According to the report of Central Statistics Authority [7], the average household member in the region is 5.0 which are comparable with the current results. A wide difference in the rate of literacy was noted between the male and female. The number of household members who were in elementary and high schools were 33.3% and 8.9%. Considering both sexes, it is slightly below half of household members.

Land holding and allocation

The average land holding per household in the study area was 3.68 ± 0.23 ha. Cereal and grazing occupy about 1.02 ± 0.10 and 1.57 ± 0.19 ha respectively (Table 2). The farmers in the study area allocate larger proportion of their land for grazing. According to key informants, there is indirect relationship between small ruminant holding and amount of land allocated for grazing.

Descriptor	Mean \pm SEM	
Family size	11 ± 0.55	
Family member <15 years	4.69 ± 0.46	
Family member 15-40 years	4.13 ± 0.40	
Family member 40-60 years	1.94 ± 0.24	
Family member >60 years	0.33 ± 0.11	
Educational level	Frequency	Percent (%)
Illiterate	69	57.8
Elementary	40	33.3
High school	11	8.9
Preparatory school	0	0
Higher institution	0	0
Male headed households	88	73.3
Female headed households	32	26.7

Table 1: Socio-economic characteristics of households in the three studied District of Degehabuhr zone (Based on data from of the selected study households).

The lands allocated for cultivated forage by household were 0.40 ± 0.08 ha. This allocation of very small land for livestock feed may be due to communal grazing areas commonly used for grazing. Fallow land which can also be a source of grazing constitutes only about 0.13 ± 0.06 ha. There is a positive and significant correlation between total land and grazing land holding ($P < 0.05$) indicating that households with larger land holding allocate more land for grazing of their livestock. On the other hand, total land holding had positive but insignificant correlation with sheep holdings sites, and total land holding had positive but insignificant correlation with sheep holding sites (Table 2).

Land allocation	Mean \pm SE
Total land holds (ha)	3.68 ± 0.23
Land for cereal crop (ha)	1.02 ± 0.10
Land for forage (ha)	0.40 ± 0.08
Land for grazing (ha)	1.57 ± 0.19
Land for fallow land (ha)	0.133 ± 0.06
Land for natural wood (ha)	0.56 ± 0.11

Table 2: Mean (standard error) for land holding and its distribution for grazing and crop by small ruminant density groups.

Small ruminant production system

Flock structure and production objectives: The distribution by age almost follow similar trend for both sheep and goats except for age 3-6 months and breeding males. Ewes and does represent larger proportion while suckling group are the second largest age group in the flock at household level; and the castrates represent the lowest

proportion in the flock for both species. From the sheep flock in the household level, 21.5 ± 2.5 , 11.9 ± 1.95 , 11.3 ± 1.6 , 10.8 ± 1.9 , 10.1 ± 1.4 , 7.1 ± 0.91 , and 5.7 ± 0.96 are represented by ewes, ram lambs (3-6 months), ewe lambs (3-6 months), ewe lambs (6-12), ram lambs (6-12), rams, and castrates, respectively. There are 22.24 ± 3.54 , 13.3 ± 2.8 , 10.2 ± 1.7 , 9.6 ± 1.2 , 9.6 ± 1.4 , 8.9 ± 1.2 and 5.3 ± 0.86 are does, doe kids (3-6 month), bucks, buck kids (3-6 month), doe kids (6-12), buck kids (6-12) and castrates, respectively (Table 3).

Purpose	Frequency	Percent (%)
Income	64	53.3
saving	0	0
meat	8	6.7
milk	29	24.3
Social function	16	13.3
scarification	3	2.2
Total	120	100

Table 3: Purpose of keeping the small ruminants and ranked by owners in the study area.

The higher proportion of females may be attributed to the prevalent practice of retaining females for breeding while males are either

castrated in order to fetch higher price or sold when they reach market age. The higher proportion of females in the flock followed by suckling age group for both species was in agreement with report [8] and higher proportion of females than males in national small ruminant structure stated [7].

About 53.3% of the small ruminant keepers keep them mainly for income generation purpose. In agreement to this finding, small ruminants are reared in many parts of the country mainly for income generation [9,10]. The second main reason for keeping small ruminant in the study area is for milk production. For most pastoralist and agro-pastoralist, however, their economic profitability is highly limited by various factors. In most cases, there is fluctuation of the amount of milk marketing of cattle due to drought and disease; so pastoralist and agro-pastoralist nowadays keep small ruminants as source of cash income.

Feeds and feeding systems

Major feeds available and their utilization: Grazing is the common feed source for small ruminants in the study area (Figure 1). Communal grazing land, roadside grazing, private grazing, riverside grazing and indigenous browser are the major types of grazing for sheep and goats. From the interviewed Households, 42.2%, 20%, 11.1%, 8.9%, and 4.4% of them utilize communal grazing, private grazing, roadside grazing, indigenous browser and riverside grazing, respectively. Although there is difference in utilization across months of the years, communal grazing lands are utilized throughout the year.



Figure 1: Major feed resource sheep and goat.

Similarly many reports [8,11] indicated that natural pasture is the main feed resource for small ruminants and cattle. The availability and quality of forages are not favorable and uniform in nutrient quality all year round. As a result, for animal that is not supplemented the gains made in the wet season is totally or partially lost in the dry season [12]. Indigenous browses are other sources of feed in the study area especially for goats while concentrates are not common. Yeshitila [13]

reported the utilization of indigenous browses as feed resources for livestock in alaba districts.

In this study area, sheep and goats spend most of (95.6%) their time grazing and browsing. On average they only spent about 6.4 hours in days grazing/browsing during the day time. They are under close supervision throughout the day and in all seasons of the year to protect them from predators. In lowlands areas, where goats are dominating and grazing lands are relatively larger they are also protected from

wild animals. Whereas, in the highlands where sheep are dominant there is small grazing time; small ruminants are protected from cropland and from predators. There is no significant ($p < 0.05$) variation across the three districts in allowing grazing or browsing time for sheep and goats (Table 4). From the interviewed households of them 93.3% sheep and goats together, and 6.7% herd sheep alone while grazing. The tendency of keeping small ruminants with large ruminant is lower, this because of their feeding behavior. According to key informant, pastoralist and agro-pastoralist prefer feeding sheep alone instead of gazing/browsing them with goat. This may be due to the fact that sheep are slow grazer and goats have the ability to browsing many plant species within short period and less time is required to fill their gut than sheep.

Particulars	Frequency	Percent (%)
Grazing ways		
Sheep alone	8	6.7
Goat alone	0	0
Sheep and goat alone	112	93.3
Sheep and goats with other livestock	0	0
Grazing/Browsing in dry season		
Free grazing	107	89.9
Tethered grazing	0	0
Cut and carry	13	11.1
Free grazing and Cut and carry	0	0
Grazing/Browsing in wet seasons		
Free grazing	120	100
Tethered grazing	0	0
Cut and carry	0	0
Free grazing and Cut and carry	0	0

Table 4: Grazing management of sheep and goats by small ruminant density groups.

Although the practice of supplementing sheep and goats with concentrates is not common, certain agro-pastoralist supplement their sheep and goats with some feed supplements. 44.4% of the respondent is not practicing supplementation. Among the none-supplemented group, the reasons of not supplementation are lack of accessible (20%), expensiveness of feed (31.1%), and not want to supplement at all (6.7%).

The majority of respondents usually provide supplements breeding ewes and does to enhance milk production and fertility rate. In the current study, supplement salt, cultivated fodder leaves, maize Stover, wheat bran for all age, this is in line with the report of Yeshitila [13]. Majority of the farmers supplemented small ruminant during dry season (40%) followed by both seasons (4.4%) and no supplementation in the wet season. According to key informants, in these sites relatively better feeds are available in wet season. In most cases, the farmers supplement sheep and goats daily, whenever available and twice a day (Table 5).

Feed shortage

A marked seasonal variation in the quantity and quality of feed supply and the acute problem of feed supply during dry season found in this study is in agreement [14]. From the interviewed households, almost all of the respondents reported feed shortage in the area.

Particulars	Frequency	Percent (%)
Season of supplementation		
Dry season	48	40
Wet season	0	0
Both	5	4.4
Frequency of supplementation		
Daily	29	24.4
Twice	8	6.7
Whenever available	16	13.3

Table 5: Season and frequency of supplementation of small ruminants.

Shrinkage and decline yield of grazing lands driven by increase livestock population and drought was reported to be the leading reasons for feed shortage across all the study sites. Increases of human population and Decline carrying capacity of grazing land are also mentioned to cause feed shortage (Table 6).

Particulars	Frequency	Percentage
Shrinkage and Declining yields of grazing land	42	35.6
Increase of livestock population	32	26.7
Drought	21	17.8
Increase of human population	11	8.9
Declining carrying capacity of grazing land	11	8.9
Cultivation of grazing lands	3	2.2

Table 6: Reported reasons for feeds shortage.

In low land areas, relatively higher proportion of households reported the problem of rainfall shortage as a limitation for low fodder production. This may be due to low and erratic nature of rainfall in lowlands than in relatively wetter highlands. Farmers in study area have limited practice of feed conservation. Only about 11.1% of the interviewed households reported for practiced feed conservation in the form of hay while other feed conservation methods like silage are not known in the area. The major reason for not practicing feed conservation techniques were lack of awareness, skill and experience (4.4%) and absence of surplus feed to be conserved feed (22.2%).

About 91.1% of the total households reported that they encounter water shortage for their flocks. The main reasons are drying water source (33.3%), lack of rainfall (31.1%) and far distance of water source from homestead (28.9%). Pond water is used by about 33.3% of total flock owning households and constitutes the major source of flock water. Most respondents use pond water for their flocks as rivers are found in close distance (1.4 ± 0.89 km) from homestead. Some

households (28.9%) uses harvested water for their flock but the used of rain fall water is not frequent or seasonal (Table 7).

Particular	Frequencies	Percent (%)
Goat dry season		
Any time	5	4.4
Once a day	5	4.4
Twice a day	16	13.3
Every other day	94	77.8
Goat wet season		
Any time	67	56.6
Once a day	35	28.9
Twice a day	3	2.2
Every other day	15	13.3
Sheep dry season		
Any time	3	2.2
Once a day	5	4.2
Twice a day	16	13.3
Every other day	96	80.0
Sheep wet season		
Any time	61	51.3
Once a day	40	33.3
Twice a day	3	2.2
Every other day	16	13.3

Table 7: Watering frequency (%) of sheep and goats.

Deep well are communal resources utilized and managed by community-set local by-laws and regulations. Significant proportion of households (17.8%) use deep well water for family and livestock, particularly during the dry season when other water sources dry up. Water is a limiting factor in the current study area, which is in line with For Kereyu pastoralists [15] also indicated that water is a limiting factor in livestock production and Relatively smaller time (on average 9 minutes) was reported for traveling to main water in the area and 7.7 minute travel to ponds in the study area.

The watering frequencies of sheep and goat in dry and wet seasons are shown in Table 7. Long watering frequencies were used to water sheep and goats in the study area. This may be due to inaccessibility of watering points in close distances in most part of the district. In dry season 78.8% of households watered goats every other day. The proportions of households that water their goats once a day and twice in a day are 4.4% and 13.3%, respectively. Watering frequency any time they required is small. This is because in major goat distributed areas water source is far away from the homestead. Besides, goats are better adaptive to water scarcity than sheep [16]. Sheep in the area are watered every other day (80%) and twice a day (13.3%) in the dry season.

Small ruminant management and husbandry

Small ruminant housing: About 46.6%, 31.1% and 22.2% shelter their sheep and goats for reasons of protecting from bad weather, predators, and to provide supplement in the evening respectively (Table 8). Small ruminants are sheltered for protection in most rural communities such as, in central rift valley [17] and however, places of sheltering and type of house were varying.

Particular	Frequency	Percentage (%)
Bad weather	56	46.6
Predators	37	31.1
Supplementation	27	22.2

Table 8: Reasons of housing small ruminants by households (%).

Sheep and goat sheltered in most cases in separate house. Places of confinements are given in Table 9. Flocks are kept in house at night and during the day when the heat intensity is high. Young animals are kept around the homestead until weaning to avoid walking long distances in search of feed and water and to minimize exposure to predators. From the interviewed households, 64.4%, 26.7% and 8.9% of households shelter their animals in separately constructed house, main house and grazing area, respectively (Figure 2). Housing of flocks in the main house is more common than other reports in the country [18]. In Borena pastoralist, Corrals used for adults while family house used for lamb/kids reported by Coppock D Layne [19]. Confining of flocks together with family has zoonotic health implications, nevertheless, to reduce predator and theft losses household for long held the tradition of sharing the same roof with their flocks.

Particulars	Frequency	Percentage (%)
Main house	32	26.7
Grazing area	11	8.9
Separated constructed house	77	64.4

Table 9: Types of houses where small ruminants are confined during night for protection.

Small ruminant culling, castration and fattening practices: About 37.8% respondents are practice culling of small ruminants due to various reasons and 62.2% of the respondents are not practicing culling. The major reasons include physical defect (22.2%), sickness (8.9%), old age (4.4%), and unwanted physical characteristics (2.2%), (Table 10). Culling of small ruminants was due to either old age or infertility or during financial problem [20].

Age has been one of the criteria in selecting small ruminants for castration. Age is important during castration because very young animals can't recover easily and go to the fattening stage (fat deposition). Therefore, farmers select stronger animals with good body confirmation. Majority of the respondent 71.1% and 66.7% of sheep and goat are castrating greater than 12 months ages respectively. Tsedeke [8] reported 1.1 year for sheep which is comparable with current report for sheep and 1.6 years for goats which is slightly higher than the current results.

Castration is a widely used practice for adding value to the animals. In the study area farmers mostly took their animal to castrate by

burdizzo (28.8%) while 66.2% used traditional methods and the rest use veterinary service center (Table 11). In line with Tsedeke [8]

reported traditional methods of castration as the major method accustomed in Alaba district and only 10% use burdizzo.



Figure 2: Sheep and goat housing system.

Consumption of small ruminant and their products: Sheep and goat are slaughtered for household meat consumption. However, the time is mostly restricted to holidays and some occasions like weddings, births in a family, Guests, Circumcision and funerals (Table 12). Major slaughter are made during festivals, weddings and births in the family events representing total slaughter of 42.2, 20 and 15.6%, respectively contribute to considerable flock off-take.

Reasons	Frequency	Percentage (%)
Old age	5	4.4
Sickness	11	8.9
Lambing and kidding problems	3	2.2
Physical defects	27	22.2
Unwanted physical characteristics	0	0

Table 10: Reasons for culling sheep and goats by household in the study area (%).

Practices	Frequency	Percentage (%)
Methods of Castration		
Traditional methods	75	62.2
Burdizo	35	28.8
Veterinary service center	10	10

Table 11: Method of castration by households in the study area.

Major festival of large flock slaughter is during Id Al Fetir fasting periods, and then followed New Year festival. Large volumes of flocks are also slaughtered for Id Al Maulid festivals. About 57.8% goat and 60% sheep owners responded that when available at home they non-selectively slaughter either male or female animal during festivals and events. Of those slaughtering households, 42.2% sheep and 31.1% goat owners commonly slaughter male flock. Female are primarily kept for breeding and seldom slaughtered. Few households (8.9%), they slaughter female goats.

Occasions	Frequency	Percentage (%)
Festivals	51	42.2
Weeding	24	20
Birth in the family	19	15.6
Whenever slaughter age animals available	13	11.1
Guests	3	2.2
Circumcise	3	2.2
At funeral ends	7	6.7

Table 12: Occasions when households consume small ruminant meat in the three areas classified according to small ruminant density.

The majority (96.6%) of sheep and goat keeping respondents milked their flock for household consumption. But goat milk is more common than sheep milk, within the household member children are the most frequent consumers (44.4%) of the goat and sheep milk. However, other reports showed the utilization of sheep and goat milk

in different parts of the country [8,10]. Goat milk is believed to have medicinal value and is more consumed by sick person in the family and aged people. This is in agreements with previous reports by Nigatu Alemayehu [21]. However, key informants affirmed that this is due to the low lactation yield of sheep and they do not produce surplus besides to their offspring.

Productive performances of small ruminants

Months of kidding/lambing: There is increase in kidding/lambing starting from December to February while decrease was observed starting from March to May. It is observed those months of parturition follows similar trends for both species. This indicated that the majority of ewes/does give birth during feed availability season. This may be attributed to the quality of forage and its fluctuation in different times of the year. The higher percentages of partitions for ewes/does were also reported [22,23]. Ewes/does that mated in higher fertility due to body reserve from previous wet season give birth in rainy seasons.

Sheep and goat health managements

The average mortality rate of sheep and goat at household level were 6.8 ± 0.88 over the last 12 months. Overall, 64.4% flock owners rated diseases and parasites are the main cause of mortality (Table 13). Xaarka, dulguba, muqlo, sanbabka, dullinka, kud, caal, furuqa were reported as the most prevalent flock health threats across all the sites. Major diseases and parasites causing mortality and morbidity in this study are in agreement to reports of Markos [24] for goats in Awassa Zuria district and [25] for sheep in south western parts of Ethiopia.

Species	Stricture by age	Mortality (Mean \pm SE)
Sheep	Male lambs (>3 months)	1.9 \pm 0.31
	Female lamb (>3 months)	2.02 \pm 0.34
	Male lambs (3-6 months)	0.51 \pm 0.13
	Female lambs (3-6 months)	0.87 \pm 0.15
	Ewes	0.44 \pm 0.11
	Rams	0.40 \pm 0.12
	Castrated sheep	0.44 \pm 0.10
Goats	Male kids (>3 months)	1.36 \pm 0.27
	Female kids (>3 months)	1.93 \pm 0.29
	Male kids (3-6 months)	0.60 \pm 0.14
	Female kids (3-6 months)	0.93 \pm 0.21
	Does	0.42 \pm 0.10
	Bucks	0.38 \pm 0.10
	Castrated goats	0.27 \pm 0.07

Table 13: Death rate by age structure of sheep and goats as reported by respondent households.

The average morality rate of both sex suckling(less than 3 months) age group was found to be the highest for both species followed by weaning age group (3-6 months). The average mortality rate of suckling age groups for male lamb 1.9 ± 0.31 , female lamb 2.02 ± 0.34

and male kids 1.36 ± 0.27 , female kids 1.93 ± 0.29 for sheep and goat, respectively at household levels while for the post-weaning age group has male lamb 1.9 ± 0.31 , female lamb 2.02 ± 0.34 , and for male kids 0.60 ± 0.14 and for female kids 1.93 ± 0.29 for sheep and goat, respectively (Table 13). The higher mortality among young animals is probably due to the susceptibility of this age group to diseases and parasites, decline in the condition of their dams as a result of parasitic burden that leads to lowered milk production, coupled with parasitic infestation of the lambs themselves. This report is similar with many reports in the country [8,24].

There is a common practice of farmers in the study area to treat their sick animals with ethno veterinary (traditional) medicines. From the interviewed households, Majority of the household treated sick animals by ethno veterinary practice (71.1%), 20% were treated with treatments of local Elders and 8.9% use nearby veterinary clinic. Elders are often skilled and experienced in providing the treatments. The Ethno-veterinary treatment in the area includes different parts of some plant species. Similarly, Markos [24] reported the wide application of ethno-veterinary practices to flock and herd with health problem.

Health problems of small ruminant reported in the study areas are given in Table 14. Among the interviewed households, 28.9% reported the spread of disease and parasites causing serious problem. Shortage of diagnostic laboratories and medicaments (24.4%) and lack of veterinary institution (24.4%) is another critical limitation in providing efficient veterinary services for the farmers. Shortage of feed and water, Unaffordable price for service, drought and lack animal health expert was indicated by 4.4%, 4.4% and 4.4% also reported of the households as a cause of small ruminant health problems respectively.

Major constraints	Frequency	Percentage (%)
Wide spread of disease and parasite	35	28.9
Shortage of feed and water	12	8.9
Lack of veterinary institution	29	24.4
Lack of animal health professions	5	4.4
Shortage of medicines	29	24.4
Unaffordable price for service	5	4.4
Drought	5	4.4

Table 14: Major reported causes of health problems by households.

Sheep and goats production: constraints and opportunities

Sheep and goat production constraints: Farmers rearing sheep and goat confess a range of interlinked technical, socioeconomic and institutional bottlenecks. The major constraints in small ruminant production in the area are given in Table 15. About 33.3% of total flock owners across all the study sites reported that diseases and parasites are overriding problems in sheep and goat production. Drought, feed and water shortage were another limiting constraint 31.1, 11.1% and 11.1% in small ruminant production in the study area respectively. Feed shortage in both seasons (dry and wet) limits productivity of small ruminants and it was further worsened due to the absence of awareness and practice of feed conservation techniques. Problems of input supply, credit services and appropriate extension

services constitute 2.2%, 2.2% and 4.4% of the constraints of the interviewed households

Constraints	Frequency	Percent (%)
Disease and parasite	40	33.1
Feed and grazing land shortage	13	11.1
Water shortage	13	11.1
Labor shortage	0	0
Drought	37	31.1
Predators	0	0
Marketing problems	3	2.2
Lack of inputs	3	2.2
Lack extension and support	5	4.4
Lack of technology and innovations	3	2.2
Lack of credits	3	2.2

Table 15: Major constraints of sheep and goat production.

An overall of about 2.2% respondents reported lack of improved technologies and inputs for intensive and market-oriented sheep and goat production. Technological inputs to mitigate the clear and present danger of flock health and nutrition are critical requisite. Lack of capital to build flock holding and purchase production inputs (largely health and feeding) is among limiting factor for about 2.2% of the total respondents.

Opportunities

Modest interventions on the existing flock impediments, such as minimizing flock loss through diseases and parasites control and proper feeding during dry seasons could potentially boost the flock performances. The local sheep flocks 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”. High demand of the small ruminants in the local market as a result of population increase, urbanization, and increase in income (even within a district) can be considered as an opportunity for the small ruminant producers. Nowadays, many abattoirs flourish in the country; so agents and assemblers purchase small ruminant even at farm gate. Several development partners involved in higher learning, research and development are currently committed to sheep and goat development in the zone. These could facilitate entry of intervention (inputs, technology and recommendation).

Conclusion

In the study area, the main reason for keeping small ruminant in the study area is for income generation, milk production, social function, and meat production purpose. They are a source of risk mitigation, security, investment, saving and socio-economic and cultural functions. However, the major constraints in small ruminant production in the area are Disease and parasite, Feed and grazing land

shortage, Water shortage, Drought, Predators, Marketing problems. Therefore, systematically utilization of seasonal available feeds through preservation of grass, crop residues and strategic supplementation with low cost alternatives; and Timely reaction to the disease outbreaks and establishment of low-cost and readily available local veterinary service through trained community members needs to be devised.

Competing interest: The authors declare that they have no competing interest.

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