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Sheep Breeding Practices and reproductive performance in Lagambo District, South Wollo Zone, Amhara Region in Ethiopia

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Abstract

This study was aimed to assess breeding practice and reproductive performance of indigenous sheep breed in Lagambo district based on household survey. A total of 289 households (130 in highland and 159 in midland) were interviewed for the household survey data collected. Data was analyzed using SPSS version 20 and then described by descriptive statistics. According to the study the average sheep flock size per household was 9.5 in highland and 7.86 in midland of study areas. The main reasons of keeping sheep in the study area were for cash income, meat production and for saving purpose. Most (58%) of sheep owners in the study area practiced uncontrolled type of mating. Growth rate, body appearance, litter size and color were most important traits in study area to select breeding ram and ewe. The overall mean age of male sheep at sexual maturity and female sheep at first service in the study area was 7.31 and 7.54 months, respectively. Age at first lambing, average number of litter per ewe life time, average lambing interval and average reproductive lifespan of ewe were 12.96 months, 11.63, 8.46 months and 8.34 years, respectively. In the study area, the main breeding practice used was more uncontrolled. Therefore, to improve the productivity of sheep in the study area, using improved breeding practices by selecting appropriate ewe and ram is important.

Keywords: Breeding practice, indigenous sheep, reproduction performance, South Wollo Zone

1. Introduction

Small ruminant production is a major component of the livestock sector in Ethiopia; farmers and pastoralists depend on small ruminants for much of their livelihood often to a greater extent than on cattle, because sheep and goats are generally owned by the poorer sectors of the community (Gizaw, 2011). Small ruminants account on average for 40% of the cash income and 19% of the total value of subsistence food derived from all livestock production. They also 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 (Mengesha, 2012).

According to CSA (2017), the number of sheep reported in the country is estimated to be about 30.7 million, of which about 72.14% are females and 27.86% are males. Sheep production is considered to be advantageous compared to cattle production, due to their high fertility, short generation interval, adaptation in harsh environment and their ability to produce in limited feed resource (Tsedeke, 2007).

Knowledge of traditional animal breeding practices and reproduction performance are important to develop sustainable genetic improvement schemes under smallholder situations. Lack of such knowledge leads to the setting up of unrealistic breeding goals in the design of livestock genetic improvement programs and the consequence of which can put in danger the conservation of indigenous animal genetic resources (Zewdu et al., 2006).

Many researches were done in different parts of Ethiopia on breeding practice and reproductive performance of indigenous sheep breed. In South Wollo Zone there is research done on herd management and breeding practices of indigenous sheep population with taking non representative sample from Lagambo district. Besides to this, issues of agro ecological factors on herd management and breeding practices of indigenous sheep population didn't get attention (Nurilign *et al.*, 2017). Although, documentation of traditional animal breeding practices and reproductive performance are very essential for genetic improvement, it is scanty in Lagambo District of South Wollo Zone Amhara National Regional State. Therefore, this study was designed to assess the breeding practice and reproductive performance of indigenous sheep breed in Lagambo district.

2. Materials and Methods

2.1. Description of the study area

The study was conducted in Lagambo district of south Wollo Zone Amhara Regional State of Ethiopia. Its capital town is Akesta and it is far from Addis Ababa by 501km. It is located at 39'00° North Latitude and 11'00°E East. Lagambo district is one among 22 districts of the south wollo zone Amhara regional state and consists of 38 rural kebeles. The district is bordered on the south by Lagahida and Kalala, on the west by Borena, on the northeast by Dessie Zuria and on the southeast by the WaraIlu. It is characterized by two agro ecological zone highland and midland settings with an altitude of 1500 to 3700 meters above sea level. It receives 700–1200 mm rainfall per annum and annual temperature ranges from 0°C to 13°C (LDAO, 2018).

2.2. Sampling Technique and Sample Size Determination

2.2.1. Sampling technique

For this study, sampling technique was implemented to identify sample households. In the first step, Lagambo district was purposely selected considering sheep production potential of the district and agro ecological representations. Secondly, from this district, six kebeles were purposively selected based on relatively large number of sheep population and agro-ecology representations. Thirdly, from each sample kebele, households were stratified according to their ownership of sheep; sheep owners (households who have at least two sheep). Finally, from the total sheep owner households, representative sample households were randomly selected for the interview of their breeding practices and reproductive performance of indigenous sheep breed.

2.2.2. Sample size determination for household

For accomplishing the study, determination of sample size is must; so that it was calculated as the following. Sample size of the households was determined according to the formula given by Cochran's (1977).

$$n = \frac{z^2(p)(q)}{e^2} \text{.....Eqn (1)}$$

n = sample size
Z = standard normal deviation (1.96 for 95% confidence level)
P = 0.25 (estimated population variability proportion, 25%)
q = 1-P i.e. (0.75)
e = level of precision (0.05)

Based on the formula,

$$n = \frac{Z^2 \times p(q)}{e^2} = \frac{[(1.96)^2 \times 0.(1-0.25)]}{(0.05 \times 0.05)} = \frac{3.8416 \times 0.2464}{0.0025} = 289.$$

Therefore, 289 respondents were selected.

2.3. Data Types and Methods of Data Collection

In this study, both quantitative and qualitative data were collected and analyzed. In order to generate these data, both primary and secondary data sources were used. Questionnaire and group discussion were used to collect primary data about breeding practice and reproductive performance of indigenous sheep breed.

A questionnaire was prepared by adopting a questionnaire developed by ILRI (International Livestock Research Institute) for survey of livestock breeds. The questionnaire was re-arranged, and corrected in accordance with respondent perception. Then, it was administered to the randomly selected household heads by enumerators recruited and trained for the purpose with close supervision by the researcher.

Focused group discussion was made with elder farmers, women sheep owners, village leaders, and socially respected farmers who are known to have better knowledge on the present and past social and economic status of the study areas.

Secondary Data sources: secondary data were collected from the respective district office of livestock and Fishery resource to complement the production system along with the climatic data, vegetation cover, topography, geographical location, and human and livestock demography.

2.4. Data Analysis and Presentation

All collected data were entered to Microsoft Office Excel 2010 computer software and analyzed using different types of statistical analysis depending on the nature of the data. Descriptive statistics were employed to summarize and describe categorical variables. Data generated from questionnaire was analyzed by SPSS statistical package (SPSS version 20). Chi-square (x^2) test was carried out to assess the statistical significance among categorical variables using agro-ecology as fixed effect.

An index was calculated to provide overall ranking for qualitative data such as selection criteria of female and male sheep by the following formula: Index = Σ of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] given for particular qualitative variable divided by Σ of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all qualitative variables considered.

4. Results and Discussion

3.1. Sheep flock size and structure

The proportion of the different classes of animals reflects the management decision of the owner which in turn is determined by their production objectives (Solomon, 2010). Flock size and structure of sheep in the study area are presented in Table 1. Breeding ewe takes a major portion(43% and 27%) in highland and midland agro -ecological zone, respectively, followed by female lamb<6 month (11.4% in highland and 17.8% in midland. According to the reply of the respondents, large proportion of breeding ewe in the study area was due to the desire of farmers to have more number of lambs. The higher proportion of females in the flock in the present finding is consistent with sheep flock structure for Menz sheep reported that breeding ewes were dominant with taking a major portion from the flock (Getachew *et al.*, 2010). In the study area, the ratio of breeding ram to breeding ewe was 1:5 in highland and 1:3 in midland. The overall ratio of breeding ram to breeding ewe was 1:4 in study area.

Table 1: Average sheep flock size per household and structure in each agro-ecology

Sheep flock structure	Agro-ecology			
	Highland	Midland	Overall	p-value
	Mean ±SE	Mean ±SE	Mean ±SE	
Male lambs<6months	0.81±0.04	1.08±0.03	0.96±0.03	0.00
Female lambs <6 month	1.2±0.08	1.6±0.11	1.44±0.07	0.08
Male 6-month-1 year	0.93±0.07	1.1±0.07	1.04±0.05	0.02
Female 6-month-1 year	1.2±0.09	1.1±0.09	1.12±0.09	0.16
Breeding ram	0.91±0.06	0.87±0.06	0.89±0.04	0.97
Breeding ewe	4.48±0.19	2.39±0.1	3.38± 0.19	0.00
Castrated	1.0±0.08	0.83±0.06	0.90±0.05	0.02
Total	9.5±0.9	7.86±0.22	8.5±0.12	
ram: ewe	1:5	1:3	1:4	

SE = Standard Error

2.5. Breeding objective

Knowledge of reasons for keeping animals is a prerequisite for deriving outfitted breeding goals (Jaitner *et al*., 2001). Under the current study, the purpose of keeping sheep by the respondents in the study area is presented in Table 2 below. In this finding, in highland and midland of study area, the primary reason of rearing sheep by sheep owners was income generation (I = 0.42 for highland and I=0.45 for midland of study area). The income generated from sell of sheep was spent on school fees, purchase of food & clothes, farm investment, medication, social activities and re-stocking. In agreement with the current study, there is finding that indicates sheep are reared in many parts of the country mainly for income generation (Gebrekidan, 2018). Keeping sheep for meat purpose were the secondary objective of sheep owners with an index value of 0.28 and 0.27 for highland and midland of study areas, respectively. Sheep keeping for saving purpose was found the third ranked objective of sheep owners in highland and midland of study areas. Functions like ceremony, manure, wealth status and hide took relatively low ranking among the reasons for keeping sheep in the study areas. The results of this survey revealed that sheep play multi-functional roles in the study area. The primary purpose of keeping sheep reported in this study was in line with the result of Hizkel (2017) who reported that most farmers in both agro ecologies keep sheep primarily as source of income followed by saving purpose in Bensa District, southern Ethiopia.

Table 2: Breeding objective of sheep in the study area

Purpose of keeping	Agro-ecology								
	Highland				Midland				Overall
	R1	R2	R3	I	R1	R2	R3	I	I
Income	90	24	7	0.42	122	28	4	0.45	0.44
Meat	21	52	54	0.28	26	68	45	0.27	0.28
Saving	18	42	55	0.25	7	40	78	0.19	0.22
Ceremony	1	1	0	0.01	0	11	6	0.03	0.02
Manure	1	9	10	0.04	4	9	20	0.05	0.05
Wealth	0	2	0	0.01	0	0	2	0.00	0.00
Hide	0	1	2	0.01	0	3	4	0.01	0.01

R=rank, I=Index = sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular purpose divided by sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all purpose.

2.6. Sheep breeding practice

Sheep breeding practice in the study area is presented in Table 3 below. Majority (58%) of sheep owners in the study area used uncontrolled type of mating. In midland agro ecology, the proportion of sheep owners practiced uncontrolled mating was (46.5%) which is less compared with the proportion of sheep owners (68.5%) in highland agro ecology. The reasons could be more than a house hold sheep were grazing together in the same grazing land in highland agro ecology than midland agro ecology.

From the farmers who practiced uncontrolled mating, majority of them (68.7%) could not identify the sire of a lamb and some of respondents (31.3%) could identify only by its color and body size. The reason of respondents practiced uncontrolled mating system was that mostly more than a house hold sheep were grazing together in the same grazing land. In addition, majority of sheep owners indicated that there was no separate housing and herding for male and female sheep (male and female sheep were housed and herded together throughout the year) in the study area. The result of this study was similar with the result of Admasu *et al.*, (2017) who indicated that, most of sheep owners in Wolayita Zone practice uncontrolled mating system. On the other hand, 17.7% of respondents in highland and 28.3% in midland indicated that they practiced semi-controlled mating system for breeding their sheep.

Most of the respondents (62.3%) in the study area allow their ewes to any ram for free serve which may be due to the households have no or less knowledge about inbreeding and its impact on productive and reproductive performance of sheep. More of the households in the study areas (69.6%) do not have breeding rams and they use neighbor ram to serve their ewes. As this result indicates, most of the respondents (44.3%) keep their rams for mating purpose whereas (36.6%) keep for both mating and fattening and (19.3) keep for fattening only. The purpose of keeping ram in this study was in line with the result of Fekerte (2008) who reported that most of farmers keep rams (70.6%) for mating purpose, (13.8%) for fattening and (15.6%) for both fattening and mating purpose. Most (87.5%) of respondents in this study area select their breeding rams and ewes for breeding purpose.

Table 3: Sheep breeding practices of farmers in the study areas

Breeding Management	Agro-ecology					
	Highland		Midland		Overall	
	No	%	No	%	No	%
Mating Systems						
Uncontrolled	89	68.5	74	46.5	163	58
Controlled	18	13.8	40	25.2	58	19
Partially controlled	23	17.7	45	28.3	68	23
X^2						14.89*
If uncontrolled could you able to identify the sire of a lamps						
Yes	34	38.2	18	24.4	52	31.3
No	55	61.8	56	75.6	111	68.7
X^2						2.78^{ns}
Do you allow your ewe to be served by any rams						
Yes	90	69.2	89	56	179	62.6
No	40	30.8	70	44	110	37.4
X^2						1.71^{ns}
Do you have local breeding rams						
Yes	30	23.1	58	36.5	88	30.4
No	100	76.9	101	63.5	201	69.6
X^2						6.07*
Do you allow your ram to serve ewe other than yours						
Yes	23	76.7	35	60.3	58	65.9
No	7	23.3	23	39.7	30	34.1
X^2						2.34^{ns}
Purpose of keeping ram						
Mating only	12	40	20	34.5	32	36.4
Fattening only	7	23.3	10	17.2	17	19.3
Mating and fattening	11	36.7	28	48.3	39	44.3
X^2						1.15^{ns}
Source of breeding ram						
Born in the flock	39	65	31	56.4	70	60.9
Purchased in partner	15	25	10	18.2	25	21.7
Purchased in private	6	10	14	25.5	20	17.4
X^2						4.91^{ns}
Do you practice selection of breeding ram and ewe						
Yes	117	90	136	85.5	253	87.5
No	13	10	23	14.5	36	12.5
X^2						1.31^{ns}

Breeding Management	Agro-ecology					
	Highland		Midland		Overall	
	No	%	No	%	No	%
Mating Systems						
Uncontrolled	89	68.5	74	46.5	163	58
Controlled	18	13.8	40	25.2	58	19
Partially controlled	23	17.7	45	28.3	68	23
X^2						14.89*
If uncontrolled could you able to identify the sire of a lamps						
Yes	34	38.2	18	24.4	52	31.3
No	55	61.8	56	75.6	111	68.7
X^2						2.78^{ns}
Do you allow your ewe to be served by any rams						
Yes	90	69.2	121	76.1	211	73
No	40	30.8	38	23.9	78	27
X^2						1.71^{ns}
Do you have local breeding rams						
Yes	30	23.1	58	36.5	88	30.4
No	100	76.9	101	63.5	201	69.6
X^2						6.07*
Do you allow your ram to serve ewe other than yours						
Yes	23	76.7	35	60.3	58	65.9
No	7	23.3	23	39.7	30	34.1
X^2						2.34^{ns}
Purpose of keeping ram						
Mating only	12	40	20	34.5	32	36.4
Fattening only	7	23.3	10	17.2	17	19.3
Mating and fattening	11	36.7	28	48.3	39	44.3
X^2						1.15^{ns}
Source of breeding ram						
Born in the flock	39	65	31	56.4	70	60.9
Purchased in partner	15	25	10	18.2	25	21.7
Purchased in private	6	10	14	25.5	20	17.4
X^2						4.91^{ns}
Do you practice selection of breeding ram and ewe						
Yes	117	90	136	85.5	253	87.5
No	13	10	23	14.5	36	12.5
X^2						1.31^{ns}

N=Number of household, X^2 = chi-square value

2.7. Selection Criteria of Breeding Ram and Ewe in the Study Area

Selection of parents for the next generation from both rams and ewes was very common in the study area and the selection criteria in the study area are presented in Table 4. Growth rate, body size/appearance and color were the most important traits and given first, second and third ranks respectively in the study area to select breeding rams. Rams which grow at faster rate and have large body size with white color are the most preferred by most of the farmers in the study area.

For selecting ewes, growth rate, age at first lambing, lambing interval and litter size were most important traits. In the highland and midland agro ecologies, growth rate, age at first lambing, lambing interval and litter size were the 1st, 2nd, 3rd and 4th as ranked by sheep owners to select their breeding ewes, respectively. However, in highland agro ecology lambing interval is ranked first and was the primary criteria to select breeding ewes, whereas age at first lambing was ranked first in midland agro ecology. This may be because of the objectives of the farmers in the study areas.

Table 4: Selection criteria of breeding ram and ewe in the study area

Selection Criteria	Agro-ecology								
	Highland				**Midland**				Overall
	R1	R2	R3	I	R1	R2	R3	I	I
For Ram									
Color	16	9	70	0.20	37	23	44	0.21	0.16
Growth rate	46	44	20	0.35	37	52	26	0.28	0.31
Size/appearance	42	46	14	0.33	48	41	32	0.29	0.31
Docility	1	2	1	0.01	1	5	8	0.02	0.02
Libido	1	1	1	0.01	0	5	0	0.01	0.01
Horn presence	3	7	10	0.05	1	6	3	0.02	0.03
Family History	7	7	1	0.05	10	4	24	0.14	0.10
For ewe									
Color	8	15	0	0.08	21	31	18	0.17	0.13
Growth rate	20	48	19	0.25	30	25	19	0.19	0.22
Age at 1st lambing	19	17	8	0.14	35	25	39	0.24	0.19
Litter size	6	10	19	0.10	22	29	44	0.20	0.15
Size/appearance	15	0	53	0.14	17	10	2	0.09	0.04
Family history	1	8	3	0.03	8	2	6	0.04	0.04
Lambing Interval	47	20	6	0.27	4	14	9	0.06	0.16

Index= sum of (3 X selection criteria ranked first + 2 X selection criteria ranked second + 1 X selection criteria ranked third) given for each districts divided by sum of (3 X selection criteria ranked first + 2 X selection criteria ranked second + 1 X selection criteria ranked third) for both agro-ecology, I=index, R=rank.

2.8. Castration and Fattening

Sheep castration practice, castration reason, castration methods, fattening practice and types of sheep for fattening in the study area are summarized in Table 5. About 53.3% and 58.9% of respondents in highland and midland agro ecologies respectively did carryout castration practice. The reason that most of respondents did practice castration in the study area was to improve fattening, control breeding and better temperament (42.9%, 40.8% and 16.3%) respectively. Usually better rams with good body conformation and having potential for fattening are subjected to castration. Contrary, to those who practice castration, 46.7% and 41.1% of respondents in highland and midland agro ecologies, respectively did not carry out castration practice because of male sheep were sold before reaching for castration age. About 47.7% of the respondents in study area practiced modern castration method, which was made by animal science experts at animal health station or veterinary clinic. On the other hand, 52.3% of the respondents in study area apply traditional castration method by selected farmers those use traditional material (smooth river-stone and wood) and the type of castration they practiced was close castration. Most of respondents reported that the main age of castration was from one year to two years (61.2%) followed by less than six months (20.4%) and greater than two years (18.4%) in study area.

The result of this study showed that, majority of respondents in the study area did practice traditional fattening system (90.8% in highland and 71.1% in midland agro ecologies), while the remaining sheep owners (9.2% in highland and 28.9% in midland) did not practice fattening. According to the respondents, the reasons why they practiced traditional fattening were lack of information about fattening methods, no enough feed resource, and lack of market access in the study areas. In contrast to this finding, Hizkel (2017) reported that in Bensa District, southern Ethiopia, the majority of farmers in highland (71.9%) and mid-altitude (78.1%) do not fatten sheep.

Types of sheep those were commonly used for fattening in the study area were old female and castrated male. Those sheep owners who carryout fattening preferred castrated male and old female. None of the sheep owners used young female sheep for fattening because they mostly used them for breeding purpose.

Type of feed resources used for fattening was natural pasture and few farmers used food left over in addition to natural pasture for fattening of sheep. Fattening usually practiced following the end of the main rainy season and in the beginning of dry season due to the availability of good quality and quantity of natural pasture, better forage production and aim to specific market (holiday market).

Table 5: Fattening and castration practices of sheep in the study area

Activities	Agro-ecology					
Fattening and castration practices	Highland		Midland		Overall	
	N	%	N	%	N	%
Castration practice						
Yes	16	53.3	33	58.9	49	57
No	14	46.7	23	41.1	37	43
Castration reason						
Control breeding	5	31.2	15	45.5	20	40.8
Improve fattening	9	56.2	12	36.4	21	42.9
Better temperament	2	12.5	6	18.2	8	16.3
Castration methods						
Modern	7	43.8	17	51.5	24	47.7
Traditional	9	56.2	16	48.5	25	52.3
Age of castration						
<6month	3	18.8	7	21.2	10	20.4
1-2 year	10	62.5	20	60.6	30	61.2
>2 year	3	18.8	6	18.2	9	18.4
Fattening practice						
Yes	118	90.8	113	71.1	231	79.9
No	12	9.2	46	28.9	58	20.1
Category of animal to be fatten						
Old female	29	24.6	11	9.7	40	17.3
Castrated male	89	75.4	102	90.3	191	82.7

N=Number of household

2.9. Reproductive Performances

Good reproductive performance is a prerequisite for any successful livestock production program. Previous study suggested that differences exist in reproductive performance between indigenous sheep breeds and their variation allow for the selection of suitable breeds for a given environment (Admasu et al., 2017). In any livestock production system, high reproductive performance is a very important attribute and a major component of the overall production efficiency. Reproductive performances like age at first lambing, lambing interval, litter size and reproductive life span of ewes and reproduction rate of the breed are the most important traits of sheep production. Reproductive performances of sheep populations in the study are presented in Table 6.

2.9.1. Age at sexual maturity of male and female sheep

The average age at sexual maturity of male sheep in highland was 7.35 ± 0.07 months while it was 7.23 ± 0.08 months in midland. The result is near to the finding stating an average age of 7.07 months was reported for sheep reread in Bensa District, southern Ethiopia (Hizkel, 2017). The average age at first service of female sheep in highland was 7.43±0.17 months while it was 7.63± 0.12 months in mid-altitude. The age at first service in this study seems to be lower than that reported (9.3 months) previously for Bonga sheep (Zewdu, 2008). According to the respondents, early mating and lambing of very young females could result in slow growth in addition to occurrence of difficult birth that might be associated with lambs and/or ewes mortality.

In a similar manner, male sheep that started service at very early age or exposed to a number of breeding females might not be grown to their full potential and could also produce weak lambs and such rams do not fetch good price if they are sold. They suggested that, the beginning of reproduction very early is not desirable because of the possibility of harm to their body development and future production. Despite these facts, all respondents did not fix age at first mating because of the traditional uncontrolled breeding practices conducted in their situations.

2.9.2. Age at first lambing

The age at first lambing marks the beginning of a female productive life and influences both the productive and reproductive life of the female sheep (Azage et al., 2009). Average age at first lambing of 13.08 ± 0.21 months and 12.86 ± 0.09 months were reported for both highland and midland sheep, respectively from current study. It was found that there was no significant (P>0.01) difference observed between the two agro ecology. The mean age at first lambing (12.96) for both agro-ecologies was fond shorter than the 14.9 months and 13.3 months those were reported for Bonga and Horro sheep, respectively (Zewdu, 2008) and also the average age at first lambing observed in both agro ecologies was smaller than 14.77±1.8 months reported for Dawuro and Konta special woreda sheep (Amelmal, 2011). The shorter age at first lambing of sheep for current study area might be favored due to availability of grazing land and good husbandry practices in this area.

2.9.3. Lambing interval

The interval between two successive parturitions is called lambing interval and it can be affected by season of lambing, number of parity of ewes, management practice, nutritional accessibility and breed (Wilson and Murayi, 1988). It has three phases: the gestation period, the postpartum anoestrus period and the service interval. It has an important influence on a sheep production enterprise (Mengiste, 2008). Lambing interval of 8.5 ± 0.14 months and 8.43 ± 0.09 months were reported for highland and midland in the current study area respectively. The result of the present study was in agreement with the result of (Zewdu, 2008; Amelmel, 2011).

2.9.4. Reproductive life span of ewes

Long living, high fertility, ability to produce more offspring) of dams should be given more importance in selection programs (Zewdu 2008). The results indicated that the reproductive life of ewes in highland was 8.58 ± 0.14 years while it was 8.04 ± 0.13 years in midland. The present finding was higher than 7.9±3.1 and 7.01±0.25 years reported for Horro and East Gojam sheep respectively, (Zewdu, 2008; Michael, 2013). Without any argument life time lamb crop is very important trait to improve sheep productivity and profitability. This will provide a base for selection of better replacement stock.

2.9.5. Average number of lamb/ewe life time

According to the respondents on average ewe can produce 10.86 ± 0.16 in highland and 12.25 ± 0.23 in mid-altitude lambs in her life time. The finding of the present study on life time lamb crop is slightly higher than 9.42 reported by Amelmal (2011) from Dowuro zone and Konta special woreda sheep. Productions of large number of progeny in ewe's life span provide ample scope for selection and genetic improvement other than large numbers of animals for sale.

2.9.6. Litter size

Litter size is largely determined by ovulation rate but is also modified by fertilization rate and embryonic and fetal losses (Gatenby, 1986). According to the respondents the average number of lambs per lambing was 1.15 ± 0.04 in highland and 1.44 ± 0.03 in midland study areas. The average litter size (1.33) lamb per head in this study area was similar to litter size of Gamo Gofa sheep (1.3) which reported by (Fsahatsion et al., 2013).

Table 6: **Reproductive performance of sheep in the study area**

Reproductive Parameters	Highland	Midland	Overall	P-value
	Mean ± SE	Mean ± SE	Mean ± SE	
Age of males at sexual maturity(m)	7.35 ± 0.07	7.23 ± 0.08	7.31 ± 0.06	0.53
Age of females at first service (m)	7.43± 0.17	7.63± 0.10	7.54 ± 0.09	0.28
Age of females at first lamping (m)	13.08± 0.21	12.86 ±0.09	12.96±0.10	0.28
Reproductive life span of ewe (years)	8.58 ± 0.14	8.04 ± 0.13	8.34± 0.10	0.01
Average number of lamp/ewe life time	10.86±0.16	12.25±0.23	11.63±0.15	0.01
Average number of lamp per lamping	1.15±0.04	1.44±0.03	1.33±0.03	0.01
lamping interval(m)	8.5±0.14	8.43 ± 0.09	8.46±0.08	0.64

5. Conclusion and Recommendations

The average number of sheep per household was different between highland and midland of study areas. These indicate presence of high number of sheep population in highland of study area due to sheep is more adaptive to higher altitude than lower. The primary reasons of rearing sheep in this study are income generation, meat and saving purposes. These imply that sheep play multi-functional roles in improving livelihoods of households. Large number of sheep owners in the study area use uncontrolled type of mating. The reasons could be more than a house hold sheep are grazing together in the same grazing land. Growth rate, body size/appearance and color are most important traits in the study area to select breeding rams; while for breeding ewe, growth rate, age at fist lambing and lamping interval are most important traits in study area. Most of the respondents in this study area do practice castration and fattening. The reasons that most of respondents do practice castration in the study area are to improve fattening, control breeding and better temperament respectively. From these conclusions, the following recommendations are forwarded:

- Training should be provided for sheep owners to focus on economically important traits during selection.
- Creating awareness regarding the importance of castration and fattening is very essential not only for the individual farmer but also it do have significant merit both to the region level as well as to the nation economy.
- To improve the productivity of sheep in the study area, using improved breeding practices by selecting appropriate ewe and ram is important.

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6. References

Admasu, L. Aberra, M. and Banerjee, S. 2017. Traditional Sheep Production Sys-tems and Breeding Practice in Wolayita Zone of Southern Ethiopia. African Journal of Agricultural Research, 12, 1689-1701.

Amelmal, A. 2011. Phenotypic characterization of indigenous sheep types; in Dawuro zone and Konta special woreda of SNNPR, Ethiopia. MSc thesis, Haramaya, Ethiopia: Haram aya University.

Azage, T. Tesfaye, M. Tesfaye, D. Worku, T. Eshete, D. 2009. Transhumance cattle production system in North Gondar, Amhara Region, Ethiopia: Is it sustainable? IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project. Working Paper No. 14. ILRI (International Livestock Research Institute), Nairobi, Kenya p. 73.

Cochran, W. G. 1977. Sampling techniques (3rd ed.). New York: John Wiley & Sons.

CSA (Central Statistical Agency). 2017. Agricultural Sample Survey, 2017/18 (2010 E.C.), Volume II: Report on Livestock and livestock characteristics (Private peasant holdings). Federal Democratic Republic of Ethiopia, Addis Ababa.

Fekerte Ferew, 2008. On-farm characterization of blackhead Somali Sheep breed and its production system in Shinile and Erer districts of Shinile zone. A M.Sc. Thesis Presented to the School of Graduate Studies of Alemaya university of Agriculture, Dire Dawa, Ethiopia. 115p.

Fsahatsion, H. Aberra, M. and Sandip B. 2013a. Traditional sheep production and breeding practice in Gamogofa Zone, Southern Ethiopia. *International Journal of Livestock Production Research (IJLPR)*, 1 (3): 26 – 43.

Gatenby, R. 1986. Sheep production in the tropics and subtropics. Tropical Agricultural Series.Longman. London and New York.genetic study. *Animal Genetic*, 25: pp 83-85.

Gebrekidan TesfayWeldeslasse. 2018. Sheep and goat husbandry practices in Eastern Tigray, and effects of substitution of mulberry (*Morusalba*) leaf meal for concentrate mix on growth and carcass traits of Tigray highland lambs in barley straw based feeding Ph.D. Addis Ababa University Dissertation.

Getachew, T. Aynalem, H. Markos, T. Sharma, AK. Sölkner, J. Wurzinger, M. 2010. Herd management and breeding practices of sheep owners in a mixed crop livestock and a pastoral system of Ethiopia. Afr. J. Agric. Res. 5(8):685-691.

Gizaw, S. 2011. Characterization and conservation of indigenous sheep genetic resources: A practical framework for developing countries (Vol. 27). ILRI(AKAILCA and ILRAD).

Hizkel, K. 2017. On-Farm Phenotypic Characterization and Consumer Preference Traits of Indigenous Sheep Type as an Input for Designing Community Based Breeding Program in Bensa District, Southern Ethiopia. M.Sc. Thesis presented to School of Graduate Study of Haramaya University. IGAD-LPI (Inter-Governmental Authority on Development-Livestock Policy Initiative). (2011). The contribution of livestock to the Ethiopian economy—part I.

Jaitner, J. J. Soweb, E. Secka-Njieb, and L. Demp, 2001. Ownership pattern and management practices of small ruminants in The Gambia-implications for a breeding programme. *Small Rumin. Res.*. 40:101-108.

LDAO (Legambo District Agricultural Office) 2018. Annual report Legambo District, South Wollo Zone, Amhara Region, Ethioipia. Mengesha M. and Tsega W., 2012.A review of indigenous sheep production in Ethiopia;Iranian Journal of Applied Animal science (IJAAS). 2:311-318.

Mengistie Taye. 2008. On-farm performances of Washera sheep at Yilmanadensa and Quarit districts of the Amhara National Regional State. A thesis submitted to the Department of Animal and Range Sciences, Hawassa College of Agriculture, School of Graduate Studies, Hawassa University Awassa, Ethiopia. 117p.

Michael Abera. 2013. Phenotypic Characterization Of Indigenous Sheep Types And Their Production Systems In East Gojjam Zone Of Amhara Regional State, Ethiopia. M.sc. Thesis, Haramaya University, Dire Dawa, Ethiopia.

Nurlign Mohammed, Kefyalew Alemayehu and Tesfaye Getachew. 2017. Herd Management and Breeding Practices of Indigenous Sheep. Journal of natural science research, 7:11.

Solomon Abegaz. 2007. In situ characterization of Gumuz sheep under farmers' managementsinnorth western lowland of Amhara region. A M.Sc. Thesis presented to the School of Graduate Studies of Alemaya University. Dire Dawa, Ethiopia. 32p.

Solomon Gizaw, AzageTegegne, Berhanu Gebremedhin and Dirk Hoekstra. 2010. Sheep and goat production and marketing systems in Ethiopia: Characteristics and strategies for improvement. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 23. ILRI (International Livestock Research Institute), Nairobi, Kenya. pp58.

Tsedeke Kochito. 2007. Production and Marketing Systems of Sheep and Goats in Alaba, Southern Ethiopia. A Thesis Submitted To the Department Of Animal and Range Sciences, Hawassa College of Agriculture, School Of Graduate Studies Hawassa University, Hawassa, Ethiopia.

Wilson, R.T. and Murayi, T. 1988. Productivity of the Small East African goat and its crosses with Anglo Nubian and the Alpine in Rwanda. *Tropical Animal Health and Production* 20: pp219-228.

Zewdu, W. Workneh, A. and Sölkner, J. 2006. Breeding scheme based on analysis of community breeding objectives for cattle in north-western Ethiopia. Ethiopian Journal of Animal Production 6(2): 53–66.

Zewudu, E. 2008. Characterization of Bonga and Horro Indigenous Sheep Breeds of Smallholders for Designing Community Based Breeding Strategies in Ethiopia. M.Sc. Thesis, School of Graduate Studies of Haramaya University, Dire Dawa.

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