Research Article

Husbandry Practices of Indigenous Goats Types in South West Shewa Zone, Oromia, Ethiopia

Murtessa Negesse Elala[1, *], Tesfaye Getachew[2], Wondimu Woyamo[3]

[1]Department of Animal Science, Mizan Agricultural Vocational and Educational Training (AVET) College, Mizan Aman, Ethiopia

[2]Department of Animal Science, International Center of Agricultural Research in the Dry Area (ICARDA), Addis Abebe, Ethiopia

[3]Department of Animal Science, Mizan Tepi University, Mizan Aman, Ethiopia

Abstract

This study was conducted in South west Shewa zone, to identify Husbandry practices in Tole and Becho districts. Data were collected through questionnaire and, focal group discussion. A total of 180 households were selected for interview. Data collected via questionnaire were summarized with descriptive statistics and analyzed using SPSS, V.21. Chi−square test was employed for categorical data. Indices were calculated to provide ranking. Castration was primarily practiced to improve the fattening potential and acquire better price by selling fattened goats. Most of castration carried out at the age of >6months. Majority of respondents use shelter constructed in the main house and the remaining respondents use separate house. The primary feed resource during dry season was natural pasture followed by Shrubs and during wet season the primary feed resource was Shrubs and bushes followed by natural pasture. Majority of the respondents herd their goats separated from kids adult mainly to protect kids from attack by predators and to protect the does from losing their weight. The primary source of water during dry season River followed by spring and the primary source of water during wet season was Rain water followed by river. The primary disease affects goats were Orf followed by Foot root. The primary cause of death for goats was disease followed by accident. Generally, goats play a significant role for farmers as source of income generation and home consumption throughout the year. The primary feed resource during dry season was natural pasture followed by Shrubs, to increase production productive the goats in the study its better if focused on improving feed source and concentrated feed.

Keywords

Castration, Feed Source, Water Source, Orf, Foot Root, Natural Pasture

1. Introduction

Small ruminants are among the major economically important livestock in Ethiopia. There are about 32.74 million heads of goats [5] in the country, playing an important role in the livelihood of resource-poor farmers. Goats are kept in a wide range of agro-ecological zones and production systems. They are found in small herds on mixed farms all over Africa,

from humid coastal zones in West Africa to the highlands of Ethiopia [2]. There is high demand for live animals as well as meat from small ruminants by consumers in the Middle East, north and West African countries. Like all other livestock species, goats in Ethiopia are kept under traditional extensive systems with no or minimal inputs which resulted in characteristically low productivity. Goat are largely produced in mixed crop-livestock, specialized pastoral and agro pastoral systems. Market-oriented or commercial production is almost non-existent [10].

However, the current molecular study on the domestic goats by [6] does not support the former classifications of the indigenous goat populations. After detailed analysis of the goat population based on production systems, agro-ecologies, goat families, admixture and phylogenetic network analyses classified the 12 Ethiopian goat populations in to six goat types.

Even though the information is lacking in the study area existing husbandry practices of indigenous goats' type breed. Thus, more comprehensive information specific to Husbandry practices of indigenous goats' type breed should be made available. Therefore, this study was aim to assess husbandry practices of indigenous goat type in the study area.

2. Materials and Methods

Description of the Study Area

The study was conducted in South west Shewa, which is one from 24 zones of Oromia region in Ethiopia. According to the data from the South West Shewa Zone Agricultural Office the Zone, lies between 8^0 37'33'' North latitude and 38^0 14' 7'' East longitudes with an elevation ranging 1600-3576 meters above sea level. The wide range of agro-ecology (highland, midland and lowland) found in the zone. The mean annual temperature of the zone ranges between 10℃ and 35℃ and the mean annual rain fall ranges 900-1900mm. The climate of the area is characterized by a long rainy season (June-September) accounting for 75% of the annual rainfall having a peak fall in July and August (South West Shewa Zone Agriculture Office, 2020).

Tole district Part of the South west Shewa Zone, the woreda administrative city Bantu is found 77km far away from the zonal city Woliso and 80km far away from Addis Ababa. It is bordered on the south by Sedan sodo, on the west by Becho, on the north by Elu and Sebata Hawas and on the east by Karsa malima. According to the data from the woreda Agricultural Office the district, lies between 8°37′ North latitude and 38°22′ East longitude of with an elevation of 2234 meters above sea level (Tole District Agriculture Office).

Becho district Part of the South west Shewa Zone, the woreda administrative city Tulu bolo is found 29 km far away from the zonal city Woliso and 85km far away from Addis Ababa. It is bordered on the south by sedan Sodo on the west by Woliso, on the north Dawo, and on the east Elu and Tole. According to the data from the woreda Rural Development Office, the woreda, lies between 8°40′N latitude and 38°13′E longitude with an elevation of 2193 meters or 7195 feet above sea level (Becho District Agriculture Office).
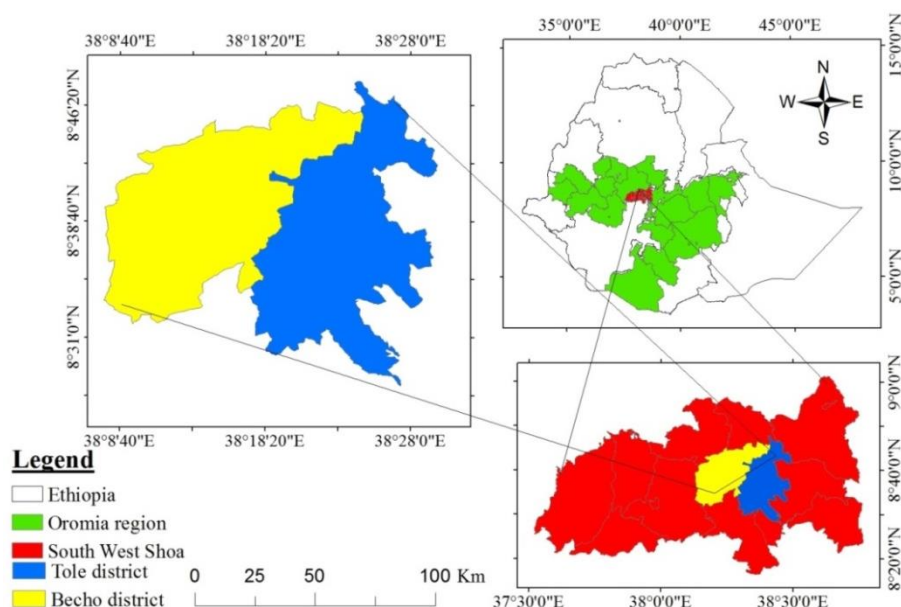

Figure 1. Map of the study areas.

Sampling Techniques and Data Collection Procedures
Sampling Techniques
The study districts (Tole and Becho) are found in South west Shewa administrative zones. Three kebeles were selected in each woreda purposively based on their goat production potential. A total of 180 households (30 households

from each kebeles) were selected randomly for interview within the selected kebeles by using Cochran (1963) formula.

$$n = z^2 * p\, q / e^2$$

Where: n= the number of sample size
z= confidence level (95%)
e= acceptable error margin (0.05)
p= proportion of sampled population (0.14)
q= 1-p
Data collection producers
Structured questionnaire, focus group discussions, and secondary data sources were carried out to collect necessary raw data during the current study.
Data management and statistical analysis
Data management
Data collected from each site were coded and entered into the computer (Excel 2016 and SPSS, V21, 2013) computer software to facilitate for analysis. Data collected through questionnaire and, group discussions were analyzed using SPSS, V21, 2013. All qualitative data and quantitative data were analyzed using the descriptive statistics.

Index was calculated to provide overall ranking for qualitative data such as feed source, water source, disease occurred, reason of culling and cause of death according the following formula: Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons (attributes).

3. Results and Discussions

Husbandry Practices of Indigenous Goats in the Study Area
Castration and Culling
As summarized in Table 1 Castration and Culling carried out in the study area. There was significance difference be-

tween districts in case of castration *P (0.001)*, reason of castration *P (0.017)*, Age of castration *P (<0.001)*, and method of castration *P (0.001)*. About 58.3% of respondent's carried out castration in the study area and from them 16% castrate their goats for control breeding and about 42% of respondents castrated to improve fattening. As indicated from result, castration was primarily practiced to improve the fattening potential and acquire better price by selling fattened goats. The other reason was to avoid unnecessary mating even though the respondents were small. Similar to this study, [11] described that fattening was the most important reason of castration in western lowland goat keeper of Amhara region.

The age of castration in study area was 3-6 months (10.6%) and >6months (47. 7%). As shown from results most of castration carried out at the age of >6months. At age of >6months the goats might be reach for sexual maturity, and disturbed the flock especially during night, releasing bad smell from the body and loss from the flock for mating another flock were the most reason for castration at this age. In the study area most of the respondents were providing their castrated goats with supplementary feeds like food waste, wheat bran, grain, salt and local brewery by-products ("*Attela*") for about 1-2 weeks. The reason of the farmer providing supplementary feeds for castrated goats to healing the wound immediately after castration because at this time castrated bucks difficult to browsing so far go.

The methods of castration carried out in the study area were modern (48.6%) and Traditional (9.4%). As indicated from result the majority of farmers use modern method using Burdizzo for castration and the rest used traditional methods using Marasha and *Jifu* (the metal attach to the end of stick). Likely, with the current result [4] reported that farmers mostly took their animal to nearby veterinary clinic to be castrated by burdizzo in Bale zone. On the other hand [8] reported that about 80.9% farmers in Konso and Meta robi district use traditional castration method to castrate their buck which is different from the finding.

Table 1. Castration and Culling.

Variable	Districts						Test	
	Tole	%	Becho	%	Overall	%	X^2	P-value
Castration							6.6	0.01
Yes	44	48.9	61	67.8	105	58.3		
No	46	51.1	29	32.2	75	41.7		
If yes reason							8.20	0.017
Control breeding	11	12.7	18	20.0	29	16.7		
Improve fattening	33	36.2	43	47.8	76	42.0		
Age of castration							19.5	<0.001

Variable	Districts						Test	
	Tole	%	Becho	%	Overall	%	X^2	P-value
3-6mounth	14	15.6	5	5.6	19	10.6		
>6mounth	30	33.3	56	62.2	86	47.7		
Method of castration							13.9	0.001
Modern	33	36.2	55	61.1	88	48.6		
Tradition	11	12.7	6	6.7	17	9.4		
Culling								
Yes	90	100	90	100	180	100		
No								
Reason of cull							18.5	0.003
Sold	48	53.3	44	48.8	92	51.1		
Slaughter	18	20.0	30	33.3	48	26.7		
Exchange	6	6.7	0	0	6	3.3		
Donated/gift	12	13.3	5	5.6	17	9.4		
Died	6	6.7	5	5.6	11	6.1		
Predator	0	0	6	6.7	6	3.3		

Culling in goat flock is an important tool for the development of a good flock. The majority of farmers in the study area were practiced culling of goats due to various reasons There was significance difference between woredas *P* (0.003) the reason of culling goats. Respondents cull their goats in different ways; Sold (51.1%), Slaughter (26.7%), Exchange (3.3%), Donated/gift (9.4%), Died (6.1%), and Predator (3.3%). The result indicated that most of farmers in study area culling their from the flock by sold.

Housing systems of Indigenous Goats in the study area

As indicated in Table 2, majority of respondents (60.55%) use shelter constructed in the main house and the remaining respondents 39.45% use separate house. This might be due to shelter constructed in main house easily constructed and cheap compared with separate house. The construction of house goat house in the main house might be challenge when zonootic disease happened. Good housing enhances production by reducing stress, disease hazards and making management easier. About 41.1% of respondents' kid housed together with adult goats and 58.9% separate kid housed from adult. 45% of respondents housed together with sheep. There was significance difference within Woreda *P* (<0001). The housing material used in study was Grass/shrubs for roof, wood for wall and earth/mud for floor. Farmers in both districts had good awareness on importance of housing for rearing of goat. They kept their goats in shelter (house) throughout the year in the night to protect them from cold, rain, predators and fear of thefts.

Table 2. Housing system of indigenous Goats.

Variable	Districts						Test	
	Tole (N)	%	Becho	%	Overall	%	x2	P-value
Housing							2.814	0.093
Separate House	41	45.60	30	33.30	71	39.45		
Inside main house	49	54.40	60	66.70	109	60.55		
kid house							5.83	0.016

Variable	Districts						Test	
	Tole (N)	%	Becho	%	Overall	%	x2	P-value
Yes	30	33.33	46	48.90	76	41.10		
No	60	66.70	44	51.10	104	58.90		
House with other animals							16.364	0.0001
Yes	54	60.00	27	30.00	81	45.00		
No	36	40.00	63	70.00	98	55.00		

Feeding and Feed resource of indigenous goat in the study area

As summarized in Table 3, the primary feed resource during dry season was natural pasture (index=0.28) followed by Shrubs (index=0.25), Crop residue (index=0.23), concentrate (index=0.085), fallow land and by product (index=0.08). During wet season the primary feed resource was Shrubs and bushes (index=0.35) followed by natural pasture (index=0.23), Crop residue (index=0.21), Byproduct (index=0.08), concentrate (index=0.08) and fallow land (index=0.06). [3] reported natural pasture, hay (standing hay), shrubs and bushes and crop residue are the main feed resources during dry season and natural pasture and shrubs & bushes are the main feed resources during wet seasons in Shabelle.

Herding of indigenous goat in the study area in the study area

Goat herding in the study area was presented in Table 3. In the study area majority of the respondents herd their goats separated from kids adult (59.4%) mainly to protect kids from attack by predators and to protect the does from losing their weight. This finding was approach to the report of [9], who reported that about 85% of goats in south Gonder keep Kids are separated from adult. There was significance difference between the woreda in the way of herding the goat *P* (<0001). The overall herding way the goats in the area were goat of a household run as a flock (56.7%) and goat of >1HH mix together (43. %). This might be due the majority of the farmers in the study areas had their own private grazing land to keep their goats.

Table 3. Herding way of indigenous goats.

Variable	Districts						Test	
	Tole (N)	%	Becho (N)	%	Overall (N)	%	X^2	p-v
Goat herding							0.02	0.88
Male and female separated								
All class herded together	37	41.1	36	40.0	73	40.6		
Kids are separated	53	58.9	54	60.0	107	59.4		
Way of herding							17.74	0.00
Goat of 1HH run as a flock	37	41.1	65	72.2	102	56.7		
Goat of >1HH mix together	53	58.9	25	27.8	78	43.3		

1HH=One Household

Grazing Method of indigenous goat in the study area

Seasonal variation influenced grazing methods in study area as shown in Table 4. During dry season there was significance difference within the woreda *P* (<0001) In dry season 52.8% of respondents use free grazing and 47.2% use herding. Incongruity with the current result the majority (62.2%) of goat owners herded their animals in east Hararghe, during the dry season, [7]. During wet season all respondents Herding (100%) in both Woreda. Some respondents used herding grazing or browsing method because of predators during dry season and all of respondents herding their stock because of during wet season (summer) their crop production. Match up to the cur-

rent result 60.1% of farmers practiced herding in east Ha-   rarghe, during the wet season [7].

Table 3. Grazing method of indigenous goats.

Variable	Districts						Test	
	Tole (N)	%	Becho (N)	%	Overall (N)	%	X^2	p-value
Dry season							11.79	0.00
Free grazing	59	65.6	36	40	95	52.8		
Herding	31	34.4	54	60	85	47.2		
Wet season								
Herding	90	100	90	100	180	100		

Water source and watering of indigenous goat in the study area

The primary source of water during dry season River (index=0.3) followed by spring (index=0.25), pipe (index=0.19), borehole (index=15), and damp (index=0.11) and the primary source of water during wet season was Rain water(index=0.45) followed by river(index=0.18), damp (=0.15), pipe (index=0.12), and spring (index=0.11). In Tole woreda most of respondents used river, spring and pipe, and in Becho woreda addition to river, spring and pipe also borehole were used during dry season. Similar to the current finding the main sources of water in Guduru, Amuru and Horro were rivers, water wells, springs, rain water and natural ponds but, their importance is slightly different in different season [1].

The watering frequency of study area listed in (Table 5). The watering frequency during dry season once a day (37.2%), once in 2 day (21.1%), and once in 3 day (41.7%) The result indicated that the farmers in the study area watering their goats once a day during dry season and freely available during wet season which most of the farmers used rain water.

Table 4. Water source of indigenous goats.

Variable	Districts					
	Tole		Becho		Overall	
	DS	WS	DS	WS	DS	WS
Source water	Index	Index	Index	Index	Index	Index
Borehole	0.08	0.00	0.23	0.00	0.15	0.00
Damp	0.10	0.15	0.12	0.15	0.11	0.15
River	0.34	0.21	0.27	0.15	0.30	0.18
Spring	0.28	0.08	0.21	0.15	0.25	0.11
Pipe	0.21	0.14	0.17	0.09	0.19	0.12
Rain water	0.00	0.42	0.00	0.47	0.00	0.45

Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons (attributes). DS=Dry Season, WS=Wet Season

Table 5. Watering Frequency of indigenous goats.

Variable	Districts						Test	
watering frequency	Tole (N)	%	Becho (N)	%	Overall (N)	%	X^2	P-value
Dry season							7	0.04
Freely available								
Once a day	42	46.7	33	36.7	75	41.7		
Once in 2 day	12	13.3	26	28.9	38	21.1		
Once in 3 day	36	40	31	34.4	67	37.2		
Wet season								
Freely available	90	100	90	100	180	100		
Once a day	0		0		0		0	
Once in 2 day	0		0		0		0	
Once in 3 day	0		0		0		0	

N=Number

Major indigenous goat diseases and their treatment in the study area

Diseases such as Orf, Foot-root, Salmonellosis, Listeriosis, Peste des Petitis Ruminants (PPR), and Contagious Caprine Pleura Pneumonia (CCPP) were reported to be occasional health problems in the areas Table 6. Farmers of the study area were able to identify the types of diseases affecting their animals by recognizing the common symptoms through experience. The range of diseases was area and season specific and hence requires site-and season-specific attention. In the study area the primary disease affects goats were Orf (index=0.25), Foot root (index=0.18), CCPP (index=0.16), PPR (index=0.16), CCPP (index=0.16), Listeriosis (index=0.15), and Salmonellosis (index=0.12). According to the group discussion held with community in the study area, majority of

goat disease problems occurred during the wet season, which might be due to moisture born disease external and internal parasites. During dry season some disease problems occurred; which could be due to feed and water shortage.

Majority of the respondents treat their goat traditionally and modern. About 75.6% of respondents treat their goat by taking their goats into health center and about 24.4% of respondents treat their goats traditionally in Tole Woreda and about 57.8% of respondents treat their goat by taking their goats into health center and about 42.2% of respondents treat their goats traditionally in Becho Woreda. The overall of respondents in the study area 61.8% treat their goats by taking to veterinary service and about 38.2 treat by traditional treatments which made by griding/mixing local available plants. As they have been mentioned they use medicinal plant such like in local language *insilale*.

Table 6. Major indigenous goat diseases and their treatment.

Variable		Districts				
Disease	Local name	Tole Index		Becho Index		Overall Index
Orf	Hendera	0.25		0.25		0.25
Foot-root	O'icho	0.12		0.24		0.18
CCPP	Sombessa	0.20		0.11		0.16
Salmonellosis	Dukuba xane	0.10		0.13		0.12
Listeriosis	Meramerto	0.13		0.16		0.15
PPR	Merereba	0.206		0.113		0.16
Treatment	Number	%	Number	%	Overall	%	x2	P-value

Variable		Districts					
Disease	Local name	Tole Index		Becho Index		Overall Index	
Health center	68	75.6	52	46.8	120	61.2	
Tradition	22	24.4	38	43.2	60	38.8	6.4	0.01

Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons (attributes).
CCPP= Contagious Caprine Pleura Pneumonia, PPR= Peste des Petitis Ruminants

Causes of death indigenous goat in the study area

The cause of death was disease, accident, predators, parasite and poising presented in Table 7. The primary cause of death for goats was disease (index=0.332) followed by accident (index=0.293), parasite (index=0.145), Predators (index=0.14), and poising (index=0.121). This implies that there might be lack of health center or no sufficient health center in the study area. As respondents and group discussion, mentioned there was no sufficient health center and even if health center available there was no drug in health center.

Table 7. Causes of death indigenous goats.

Variable	Districts		
Cause of death	Tole Index	Becho Index	Overall Index
Disease	0.33	0.33	0.33
Accident	0.29	0.08	0.19
Predators	0.11	0.17	0.14
Parasite	0.16	0.13	0.15
Poising	0.11	0.13	0.12

4. Conclusion

Castration was primarily practiced to improve the fattening potential and acquire better price by selling fattened goats. At age of >6months the goats might be reach for sexual maturity, and disturbed the flock especially during night, releasing bad smell from the body and loss from the flock for mating another flock were the most reason for castration at this age. The construction of house goat house in the main house might be challenge when zoonotic disease happened. The primary feed resource during dry season was natural pasture followed by Shrubs and during wet season the primary feed resource was Shrubs and bushes followed by natural pasture. The primary disease affects goats were Orf, Foot root, CCPP, PPR, CCPP, Listeriosis, and Salmonellosis. The results of this study recommended that improving feed source and construction of sufficient health center to increase production productive the goats.

Abbreviations

PPR   Peste des Petitis Ruminants
CCPP   Contagious Caprine Pleura Pneumonia

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Ahmed Seid. and Kebede, K., 2013. On Farm Phenotypic and Production System Characterization of Indigenous Goats in Horro Guduru Wollega Zone Western Ethiopia (Doctoral dissertation, Haramaya University).

[2] Ahuya, C. O., Okeyo, A. M. and Peacock, C., 2005. Developmental challenges and opportunities in the goat industry: the Kenyan experience. Small Ruminant Research, 60(1-2), pp. 197-206.

[3] Alefe Takele, 2014. Phenotypic characterization of indigenous goat types and their production system in Shabelle Zone, South Eastern Ethiopia M. Sc Thesis Haramaya university. 130p.

[4] Belete Asefa, 2013. On farm phenotypic characterization of indigenous goat types and their production system in bale zone of Oromia region, Ethiopia. MSc thesis haramaya university.

[5] CSA, 2020. Federal Democratic Republic of Ethiopia, Agricultural sample survey 2017/2018 (2010 E. C.) Report on livestock and livestock product characteristics (private peasant holdings). No. 585, Volume II, Addis Ababa, Ethiopia.

[6] Genet M. 2016. Molecular characterization of Ethiopian indigenous goat populations: genetic diversity and structure, demographic dynamics and assessment of the kisspeptin gene polymorphism Degree of Doctor of Philosophy in Applied Genetics Addis Ababa University. 274p.

[7] Netsanet Zergaw, Tadelle Dessie and Kefelegn Kebede. 2016. Indigenous breeding practices and selection criteria of goat owners in Konso and Meta-Robi districts, Ethiopia: implications for designing community-based breeding strategy. Livestock Research for Rural Development, 28, p. 7.

[8] Seada Adem Husen., 2017. On farm phenotypic characterization of indigenous goat and their breeding and husbandry practices in tach gayint and ebinat districts of south gondar zone, amhara region, Ethiopia.

[9] Seid, A., 2018. Breeding practices and strategies for genetic improvement of indigenous goats in Ethiopia. Greener Journal of Agricultural Sciences, 7(4), pp. 90-96.

[10] Solomon A., Mwai O., Grum G., Haile A., Rischkowsky B. A., Solomon G. and Dessie, T. (2014). Review of goat research and development projects in Ethiopia.

[11] Solomon, A. K., Grum, G., Haile, A., Rischkowsky, B. A., Solomon, G. and Dessie, T., 2014. Review of goat research and development projects in Ethiopia. ILRI (aka ILCA and ILRAD).