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Herd Management and Breeding Practices of Sheep Owners in North Wollo Zone, Northern Ethiopia

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Abstract: This study was aimed to generate organized information on selective breeding objectives, traits preferences and production system of native sheep types in Habru and Gubalafto districts of North Wollo Zone under smallholders' management conditions. The study was performed based on household survey. Among the livestock species, sheep accounted for the largest proportion in the study area and the average sheep flock size was 7.02 million heads in Habru and 18.08 million in Gubalafto. The primary reason of keeping sheep was for cash income in both Habru and Gubalafto. Growth rate, body size, coat color, tail type and mating ability were the most frequently reported traits in selecting breeding rams across the two districts; whereas lambing interval, mothering ability, coat color, body size and twinning rate were mentioned as traits given due emphasis in choosing future breeding ewes. The production constraints in order of importance as perceived by farmers were: feed shortage, diseases and parasite prevalence, land shortage and poor performance in Habru. Similar production constraints were recorded from Gubalafto districts, except for land shortage and genotypes which were ranked as 4th and 3rd. To realize full benefits of a breeding strategy; approaches should be holistic with concurrent improvement in the non-genetic factors (disease resistance and feed efficiency) as well. In order to minimize the failure of breed improvement programs it is important to involve farmers considering the existing breeding practices, management systems and trait preferences of the community and the multipurpose roles of targeted animals.

Key words: Breeding Practices · Gubalafto · Habru · Selection criteria · Trait preferences

INTRODUCTION

Agriculture in Ethiopia is the foundation of the country's economy, accounting for half of gross domestic product (GDP), 80% of exports and 85% of total employment [1]. Livestock is an integral part of agriculture. Ethiopia's estimated livestock population is often said to be the largest in Africa. In the country, there were approximately 50.8 million cattle, 25.5 million sheep, 22.78 million goats, 2.0 million horses, 0.38 million mules, 6.2 million donkeys, 1.1 million camels and 49.3 million poultry excluding the Afar and Somali Regions [1]. The Amhara National Regional State has 9 million heads of sheep which is about 35% of the national sheep population [1].

Traditionally, sheep and goats have served as a means of ready cash income to meet immediate needs such as acquiring agricultural inputs, paying school fees or tuition, taxes, medical bills and purchasing large animals and a reserve against economic and agricultural production hardship or monetary saving and investment in addition to many of other socio-economic and cultural functions [2].

Knowledge of indigenous animal breeding practices and techniques is 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

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animal genetic resources [3]. The farmers' decision of selection criteria could be affected by breed, production system and herd size [4]. The traits traditionally considered as criteria for selecting breeding stock are important in describing the adaptive attributes and genetic merits of the indigenous livestock and in identifying farmers' choice of sheep breeds and the underlying factors that determine the choice of genetic stock used.

Despite the importance of knowing the communities breeding practices, such information is not available for traditional sheep breed in North Wollo zone. Besides, breeding objectives and selection criteria were not explained well. The sheep has limited research focused on the breeding objectives and selection criteria [5]. The breeding practices and the selection criteria or traits, on which the livestock keepers wish to improve and base their selection, have to be understood. Nevertheless, little is known about traditional herding practices, breeding practices and selection criteria of sheep improvement in North Wollo zone. Thus, this study was essential to assess indigenous sheep breeding practices, herding systems, selection criteria and identifying trait preference of smallholder farmers in the studied area.

Specific objectives of the study were:

- To assess farmers' selective breeding objectives and trait preferences in the study areas
- To identify and describe the sheep production systems, major constraints and opportunities to improve sheep production in the study area

MATERIALS AND METHODS

Study Areas: This study was conducted in two districts (i.e Habru and Gubalafto) of Northern Wollo zone, Northern Ethiopia. Habru is one of the thirteen districts in North Wollo zone. It is situated an altitude ranging from 1200-2350 m.a.s.l [6] at 39° 38'E longitude and 11°35'N latitude. Its mean annual maximum and minimum temperatures were 28.5 °C and 15 °C, respectively [6] where as the mean annual rainfall of the district varied from 750 to 1000 mm. Gubalafto is located an altitude range of 1600 to 3300 m.a.s.l [7] at 36.31° and 39.81°E longitude and 9.11° and 14.59°N latitude. The mean annual maximum and minimum temperatures recorded in Gubalafto were 22.28 °C and 7.5 °C, respectively [7], while the mean annual rainfall of the study areas varied from 777 to 1050 mm.

Sampling Procedures: North Wollo Administrative Zone consists of thirteen districts. Two districts, namely, Habru and Gubalafto, were strategically selected based on distribution of sheep population. From each district, three peasant associations (PAs) were purposely taken based on higher concentration of the sheep population and accessibility information obtained from group discussion, field visits and secondary data. About 30 households were randomly sampled from each peasant association based on the distribution of sheep through discussion with key informants in the village and secondary information. The number of households which were included in the study was 90 from three PAs of Habru district and 90 from three PAs of Gubalafto district. In total, 180 households were selected for cross sectional survey study. The geographical locations of the study areas are indicated in Fig. 1.

Data Collection Procedures: The survey work was done using: (1) semi-structured questionnaires prepared and translated to local language and pre-tested before administration and some re-arrangement and correction in accordance with respondents' perceptions were made and (2) focus group discussion using well tested checklists (3) reconnaissance tour (field observation) (4) informal ways. The selected households were interviewed using semi-structured questionnaires by enumerators, who were hired, trained and under close supervision of the researcher and the following data were collected: origin of sheep, socio economic characteristics of the household, breeding practices, trait preferences, castration practices and routine husbandry practices.

Basic socio-economic data on description of the study areas and other issues related to them were collected from offices of Agriculture and Rural Development of the two districts using pre-checked checklist.

Statistical Data Analysis: The type of statistical analysis used varied depending upon the nature of the data and data collection tools. All data gathered during the study period were coded and recorded in Microsoft excel 97-2003. Data from household survey were described and summarized by using descriptive statistics of SAS version 9.1.3 (2005). Chi-square (x^2) test was carried out as appropriate to assess the statistical significance among categorical variables. An index was also calculated to provide overall ranking for categorical variables such as constraints of sheep production, purpose of keeping sheep and selection criteria of females and males.

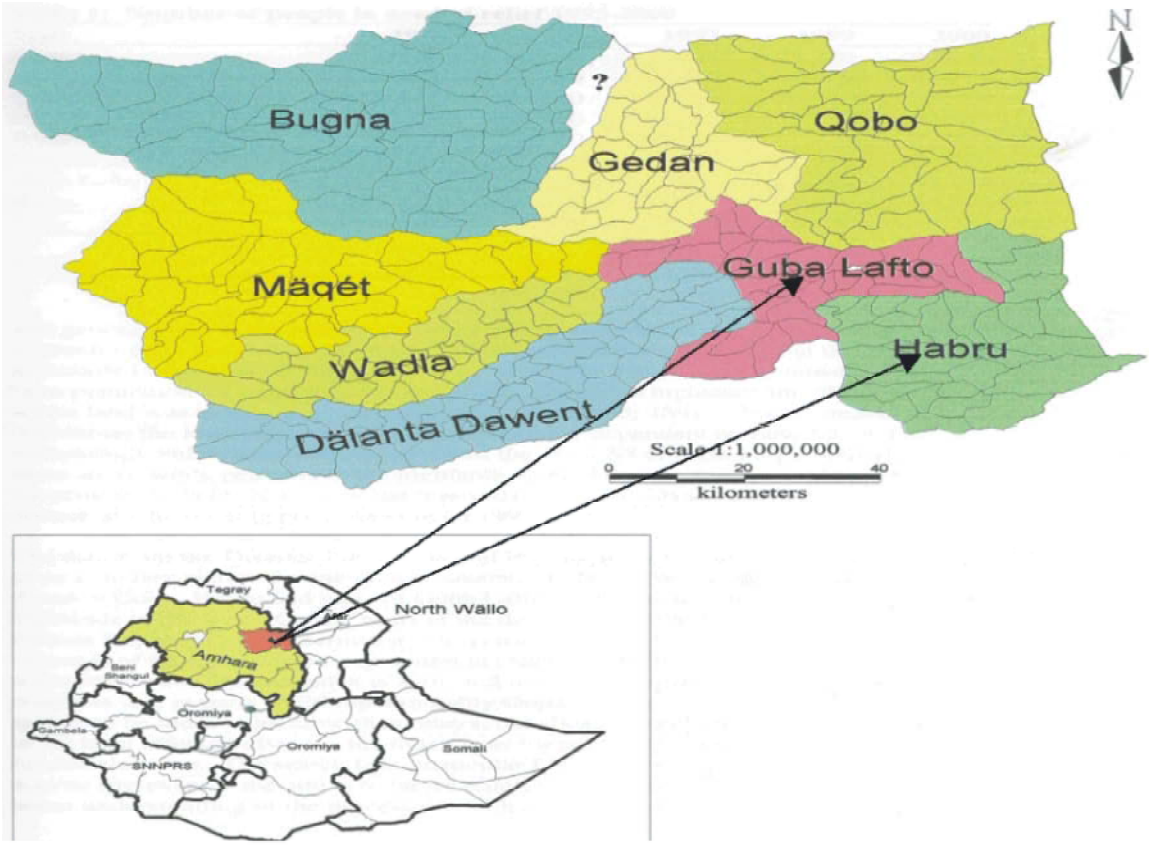

Fig. 1: Maps of the study areas

RESULTS AND DISCUSSION

General Household Information: One hundred eighty households (ninety from Habru area and ninety from Gubalafto area) were participated in this household survey work. The average family size in the study households were 6.4 for Gubalato and 4.5 for Habru. Family size was significantly ($P<0.05$) different between the two districts. This is attributed to high need of labor for agricultural activities. Figures for Gubalafto district obtained from this survey were comparable to the report of the national average family size of 6.50 [8], Kaffa and Bench-Maji zones (6.70+30) [9] and Nedjo (6.3) [10] but lower than Horro (7.3) [11].

The largest proportions (62.2% in Habru and 68.9% in Gubalafto) of the respondents were within the age group of 19-60 years. Male headed households were 78.9% in Habru and 83.3% in Gubalafto while the proportion of female headed households was 21.1% in Habru and 16.7% in Gubalafto. In both districts, the proportion of male headed households were significantly ($p<0.05$) higher compared to female headed households. Yet female headed households were found to be larger in Habru as compared to female headed households in Gubalafto. This might be related to either their husbands have died or they are divorce.

Sheep Flock Structure: The flock structure of surveyed sheep flock in the two districts is presented in Table 2. Breeding ewes formed the largest proportion (34.4%) of the flock followed by ewes (19.2%), ewe lambs (15.8%), ram lambs (13.3%), ram (9.3%), breeding ram (4.9%) and castrates (2.0%) for Habru where as the proportions of breeding ewes, ewe lambs, ewes, ram lambs, ram, breeding ram and castrates were 37.1%, 21.7%, 19.6%, 8.7%, 6.5%, 4.5% and 2.0, respectively, for Gubalafto. According to the results, Gubalafto was significantly higher ($P<0.05$) in all age categories of sheep population analyzed in this study than Habru. The current finding was consistent with sheep flock structure reported for Menz sheep where breeding ewes (49.2%) were dominant [12]. The proportion of breeding ewes (34.4% for Habru and 37.0% for Gubalafto) obtained from study was above 30% reported for Keffa and Bench-Maji ewes[9] and 15.3-20.7%

Table 1: General household characteristics in Habru and Gubalafto districts

	District					
	Habru		Gubalafto		Total	
Variables	n=90	%	n=90	%	N=180	%
Family size (±SE)	4.54±0.11[b]		6.44±0.20[a]		5.49±0.14	
Age structure (year)						
<18	25	27.8	15	16.7	40	22.2
19-60	56*	62.2	62*	68.9	118*	65.6
>60	9	10.0	13	14.4	22	12.2
X^2-value	38.07		51.27		86.80	
Sex structure						
Male	71*	78.9	75*	83.3	146*	81.1
Female	19	21.1	15	16.7	34	18.9
X^2-value	30.04		40.00		69.69	
Marital status						
Single	7	7.8	5	5.6	12	18.9
Married	64*	71.1	70*	77.8	134*	74.4
Divorced	19	21.1	15	16.7	34	6.7
X^2-value	60.20		81.67		140.93	
Educational status						
Illiterate	58*	64.4	66*	73.3	124*	68.9
Able to read and write (Basic education)	23	25.6	17	18.9	40	22.2
Grade five to twelve	9	10.0	7	7.8	16	8.9
X^2-value	42.47		66.47		107.20	
Occupation						
Farmer	68*	75.6	70*	77.8	138*	76.7
Trader (Merchant)	12	13.3	13	14.4	25	13.9
Handicraft	10	11.1	7	7.8	17	9.4
X^2-value	72.27		80.6		152.63	

*P<0.05; x^2 = Pearson Chi-square; N = Number of observation

Table 2: Sheep flock structures in Habru and Gubalafto districts in Northern Wollo zone

	District					
	Habru (n=90)			Gubalafto (n=90)		
Age category	n	MSE±SE	%	n	MSE±SE	%
Ram lambs (<6 months old)	84	0.93±0.07[b]	13.3	141	1.57±0.07[a]	8.7
Rams (6-12 months old)	59	0.66±0.07[b]	9.3	105	1.17±0.05[a]	6.5
Breeding rams (>12 months old)	31	0.34±0.06[b]	4.9	73	0.81±0.05[a]	4.5
Castrates (older than 1 year)	13	0.14±0.04[b]	2.1	33	0.37±0.06[a]	2.0
Ewe lambs (<6 months old)	100	1.11±0.04[b]	15.8	353	3.92±0.14[a]	21.7
Ewes (6-12 months old)	121	1.34±0.11[b]	19.2	319	3.54±0.13[a]	19.6
Breeding ewes (>12 months old)	224	2.49±0.12[b]	34.4	603	6.70±0.20[a]	37.1

Different superscripts denote significant differences at P<0.05 between means of the districts

N =Sheep number; SE = standard error;

reported for Dawro zone and Konta special woreda sheep [13]; but bellow 46.8% reported for Menz breeding ewes and 49.2% reported for Afar ewes [14].

Breeding Objectives: In this study, the purposes of keeping sheep by farmers in the study area are presented in Table 3. The primary reason for keeping sheep in Habru district was to derive income (index=0.42) followed by savings (living bank for rural farmers) (index= 0.23), social and cultural functions (index = 0.16), meat (mutton) (index = 0.09) and manure (index =0.09). In Gubalafto, like that of Habru, the primary purpose of keeping sheep was to generate incomes (index=0.40) followed by savings (living bank for rural farmers) (index=0.31), social and cultural functions (index = 0.13 and meat (mutton) (index =0.08). These results corroborated with findings of

Table 3: Ranking purposes of keeping sheep in Habru and Gubalafto districts in Northern Wollo zone

	District							
	Habru				Gubalafto			
Production objectives	Rank1	Rank2	Rank3	Index	Rank1	Rank2	Rank3	Index
Sale (income source)	66	7	17	0.42	68	4	3	0.40
Mutton (Home use)	5	11	19	0.09	2	17	9	0.08
Manure	4	9	20	0.09	-	4	19	0.06
Social and cultural functions (prestige)	-	7	4	0.16	-	10	50	0.13
Savings (living bank for rural farmers)	10	53	3	0.23	17	55	9	0.31
Fleece yields	-	3	-	0.01	3	-	-	0.02

Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for particular production objective divided by sum of (3for rank 1 + 2 for rank 2 + 1 for rank 3) for all objectives

[15] and [16] who reported that cash income source and insurance are the principal objectives why farmers in sheep-barley system keep sheep. The fact that farmers keep sheep mainly as source of cash income is because it can be immediately sold for quick cash at the local markets [15] and have short generation interval and require low initial capital.

Herding Practice: A good understanding of the community's herding practices is crucial to bring sustainable improvement in the smallholders flock through community-based strategies [17]. It was shown that sheep were kept with other livestock particularly with cattle, donkey and horse in the study areas. According to the respondents, sheep were most often herded with cattle and equines (77.8% in Habru and 85.6% in Gubalafto). Herding separately and separately and with other animals was rarely practiced in both districts. The proportions of households keeping sheep separately and separately and with other animals were 12.2% and 10% in Habru and 10% and 4.4% in Gubalafto, respectively.

Tethering Practice: One of the modification strategies advocated for the typical free-roaming characteristics of animals in the traditional system is tethering feeding method which confines the animals within a restricted location for grazing. Majority of farmers (67% for Habru and 63% for Gubalafto) practice tethering in their own grazing lands throughout the year in spite of some farmers in limited peasant associations who could not tether their animals during dry seasons. Similarly, during rainy season, majority of the farmers in Kaffa (72.7%) and in Bench-Maji (77.8%) zone practiced tethering whereas in dry season, majority of the farmers got their sheep freely graze in Kaffa (78.6%) and in Bench-Maji (70.6%) [9].

Castration: Castration of lambs was a common practice in surveyed areas. Above half of the interviewed farmers (67.0% for Habru and 69.0% for Gubalato) practice castration. According to farmers, the appropriate seasons for castration range from September to November and the reported average castration age was 17.9 months for Habru sheep and 20.4 months for Gubalafto sheep. Farmers believed that castration at early age affect the growth of the sheep.

Commonly used method of castration was Burdizzo method which is accessible in animal health center and clinics. The method was more frequently exercised in Habru district. Traditional method of castration was also operational less frequently in this area. Unlike Habru farmers, Gubalafto farmers use traditional method more frequently. The traditional materials and tools used for castration included ropes, river-stones (*allelo*), woods, syringes and local drug solution. Traditional method of castration was also practiced in North West highlands[18] and Menz area [14, 12]. Castration was usually done for fattening a ram to get more incomes or used for home consumption but it has not been recognized as a method of preventing undesired breeding.

Fattening Practices: Sheep fattening is practiced by 67% farmers in Habru and 69% farmers in Gubalafto. This study demonstrated that majority of the male sheep in a household is kept for fattening purpose and sold at an early age. Among the feed types used for fattening in both study areas, natural pasture (grazing), crop residue, local brewery residue (*atella* of *katikalla*and *tella*), grain, salt, leaf and root of sweet potato, concentrate and improved forge were the major feed resources used for fattening. In the study area, fattening usually practiced following the end of the main rainy season and in the beginning of dry season coinciding with the availability

Table 4: Breeding management in Habru and Gubalafto districts

		District			
		Habru		Gubalafto	
Breeding management	Particulars	N	%	N	%
Ram possession	Having no breeding ram	45	50.0	21	23.3
	Having one breeding ram	34	37.8	16	58.9
	Having > 1 ram	11	12.2	53	17.8
	Total	90	100	90	100
Sources of breeding ram	Own (private) flock	45	50.0	69	76.7
	Neighbor flock	21	23.3	15	16.7
	Market	24	26.7	6	6.7
	Total	90	100	90	100
Purposes keeping breeding ram	Breeding and fattening	74	82.2	76	84.4
	Breeding only	5	5.6	7	7.8
	Breeding and socio-cultural reasons	7	7.8	5	5.6
	All the 4 aspects are important	4	4.4	2	2.2
	Total	90	100	90	100

N =number of household

of good quality and quantity of natural pasture, better forage production and aim to specific market (holiday market). Some farmers also reported that they perform fattening activity twice a year, during the time when the quantity and quality of available feed resource is high. However, finishing process in the area is lengthy, takes a year and half or two, primarily due to poor resource base and less awareness of costly process of fat deposition and has a great consequence on labor and other variable costs and thus might not be economical.

Breeding Management: Availability of ram in the system considerably affects all biological and financial performances of the flock [19]. Over 23.3% of the sheep owners in Gubalafto have no breeding ram, 58.8% owned one ram and 17.8% owned more than one breeding ram (Table 4). Whereas, 50.0% of Habru sheep owners did not have breeding ram, 37.8% owned one ram and 12.2% had more than one breeding ram. Those farmers who did not own breeding ram indicated that they use neighboring ram or their ewe mated with breeding ram from other flock during communal grazing land though communal grazing land are rarely found in the study areas, particularly in Gubalafto district. They are, however, unintentionally selecting against fast-growing desirable genotype ram lambs. This is because those good looking with high growth ram lambs are sold out from the flock before they reach breeding age. Since there are no controlled breeding, ram lambs which are not sold because of poor growth and conformation have the best chance to mate the flock.

Breeding Practices: A type of mating practiced in both study areas was natural mating or uncontrolled mating within the household's flock and between neighboring flocks. The rams run with ewes throughout the year. Thus, year round reproduction was obtained without consideration of market demand. A few respondents recognized a peak mating season. The reported peak season for mating started from the beginning of June to December when new growth of grasses has initiated due to rain. Lambing was concentrated in some of the months (August to February) of a year. This was also true for Washera sheep in northern western highland [18], Abergelle sheep in Tigray region [20] and Sekella and Sekota sheep [15].

Selection Criteria: Farmers in both study areas are well experienced in selection of future breeding ewes and rams from own flock of sheep. About 77% of the farmers in Habru and 63% in Gubalafto practice selection. Males were selected at 8.87 months for Habru and 9.0 months for Gubalafto. The corresponding figures for females were 7.93 and 10.21 months, respectively.

Lambing interval, mothering ability, coat color and twinning with corresponding indexes of 0.22, 0.19, 0.17 and 0.15 were the major selection criteria reported by farmers in Habru districts to identify breeding ewes (Table 5). Unlike Habru farmers, farmers in Gubalafto ranked appearance or body size as 3rd criterion for selecting breeding ewes next to lambing interval and mothering ability. So, in Gubalafto, lambing interval, mothering ability, appearances (size) and coat color were

Table 5: Selection criteria for breeding ewe in Habru and Gubalafto districts

	District							
	Habru				Gubalafto			
Selection criteria for breeding ewe	Rank1	Rank2	Rank3	Index	Rank1	Rank2	Rank3	Index
Appearance (size)	12	9	7	0.11	8	16	17	0.14
Coat color	13	19	15	0.17	10	15	12	0.13
Mothering ability	10	30	11	0.19	15	30	7	0.21
Age at first lambing	-	6	9	0.04	3	7	7	0.06
Lambing interval	33	9	3	0.22	34	5	11	0.23
Twining	14	7	27	0.15	8	9	29	0.13
Tail size and shape	5	3	16	0.07	4	3	7	0.05
Longevity	3	7	2	0.05	8	5	-	0.06

Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for particular trait divided by sum of 3for rank 1 + 2 for rank 2 + 1 for rank 3] for all traits

Table 6: Selection criteria for breeding ram in Habru and Gubalafto districts

	District							
	Habru				Gubalafto			
Selection criteria for future ram	Rank1	Rank2	Rank3	Index	Rank1	Rank2	Rank3	Index
Body size	16	31	8	0.22	47	10	8	0.31
Coat color	15	19	21	0.19	10	19	37	0.19
Horn type	7	9	3	0.08	7	9	3	0.08
Ear length	1	3	5	0.03	1	3	5	0.03
Fast growth	33	10	15	0.25	7	31	15	0.18
Mating ability	11	9	37	0.16	11	9	21	0.13
Tail size and shape	7	9	1	0.07	7	9	1	0.07

Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for particular trait divided by sum of 3for rank 1 + 2 for rank 2 + 1 for rank 3) for all traits

Table 7: Ranking trait preferences in Habru and Gubalafto districts

	District							
	Habru				Gubalafto			
Traits	Rank1	Rank2	Rank3	Index	Rank1	Rank2	Rank3	Index
Adaptability	35	9	10	0.25	36	5	10	0.24
Disease resistance	9	6	33	0.13	9	10	7	0.10
Meat (Mutton)	7	9	9	0.09	3	9	32	0.11
Reproduction rate	11	13	8	0.12	5	34	7	0.17
Wool	5	6	6	0.06	8	2	5	0.06
Feed shortage resistance	9	8	9	0.10	12	15	16	0.15
Coat color	7	34	5	0.17	7	4	6	0.06
Longevity	7	5	10	0.08	10	11	7	0.11

Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for particular trait divided by sum of 3 for rank 1 + 2 for rank 2 + 1 for rank 3 for all traits

the 1st, 2nd, 3rd and 4th important traits as perceived by farmers with mean indices of 0.23, 0.21, 0.14 and 0.13, respectively (Table 5).

Traits like fast growth, body size, color and mating ability were all considered as important in both of the districts and given due emphasis in selecting breeding rams. Among selection criteria considered, fast growth, appearance (body size), coat color and mating ability was ranked 1st, 2nd, 3rd and 4th by sheep owners in Habru with an index of 0.25, 0.22, 0.19, 0.16, respectively (Table 5). But for Gubalafto, appearance, coat color, fast growth and mating ability with corresponding indexes values of 0.31, 0.19, 0.18 and 0.13 were frequently considered (Table 6). Similar selection criteria were used by sheep owners in other parts of the country [9, 12].

Breed and Trait Preferences: Breed and trait preferences are useful to make better informed decisions in developing interventions to improve the contribution of sheep to livelihoods of their keepers.Adaptive traits such as tolerance to diseases and feed shortage were given high emphasis in selecting replacement stocks in both districts. Thus, adaptability (index= 0.25), coat color (index= 0.17), disease resistance (index= 0.13) and fertility (index= 0.12) were among the reported preferred traits in their order of importance by the respondents (Table 7) in Habru area whereas in Gubalafto, adaptability (index= 0.24), fertility (index= 0.17), feed shortage resistance (index= 0.15) and meat (index= 0.11) were among the traits considered for improvement intervention. In Habru, adaptability, large body size, polled, coat color of red, brown and white/creamy color, tail with long, broad and twisted at the end are the most preferred traits by most of the farmers. Similar traits were preferred by the farmers in Horro [11] and in Afar [14].

Majority of Gubalafto smallholder farmers, however preferred adaptability, coat color of white, light red and mixture of white and black, fast reproduction rate, presence of horn and high fleece yield. Like Gubalafto sheep keepers, shepherds in Menz had similar trait preferences [14].

In both Habru and Gubalafto districts, key informants and local leaders reported that the tendencies of farmers to rear Washera sheep other than indigenous Gubalafto and Habru sheep has become high. According to them, they liked these sheep types for their fast growths, attractive coat color, large body size and nice posture. They also mentioned that such type of sheep can fetch high premium price when it has been sold. Due to this reason, it was observed that some farmers practiced selective breeding.

Weaning Practices: In the study areas, lambs are weaned naturally without attendant/shepherd intervention. The overall reported average weaning ages for both sexes and breeds was 5.07 months within a range of 2 month to 1year implying that farmer' sheep management can extend or shorten the age for weaning. In fact, there is little information on the effect of unrestricted suckling on the performance of indigenous sheep breeds in Ethiopia. The weaning age obtained in this study was comparable with overall weaning age of Horro and Bonga sheep (4.80) [21] but higher than weaning age of the thin-tailed Gumuz sheep (3.95 months) [22].

CONCLUSION

In the study areas, culling inferior sheep, weaning, record keeping, castrating ram at right age and provision of regular vaccination before disease out breaks were poorly practiced. The office of Agriculture and Rural Development and kebele development agents are expected to train farmers on improve management practices to enhance flock productivity. The sheep types in the study areas were also small in size (overall least square mean= 24.55 kg) and achieving minimum standard yearling (market) weight of 30kg is not easy within those sheep, thus careful cross breeding with other large sized indigenous sheep types should be considered but genetic improvement programmes for the sheep types should be built on indigenous practices (trait preferences, herding and breeding practices) and the multi-functional roles with additional support by government authorities (Minister of Agriculture). Long term strategy should focus on selection. Qualitative traits like coat color type and pattern influenced the decision of farmers in choosing animals so determination of economic value for such traits is suggested. In order to minimize the failure of breed improvement programs it is important to involve farmers considering the existing breeding practices, management systems and trait preferences of the community and the multipurpose roles of targeted animals.

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