

Study on Reproductive Performance, Breeding Practice and Selection Criteria of Indigenous Goat in West Omo and Bench – Sheko Zone, Ethiopia

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Abstract

The study was aimed to investigate the reproductive performance, breeding practice, and selection criteria of indigenous goat in West Omo and Bench–Sheko zone, Ethiopia. A single visit questionnaire survey and key informants for interviews were done with a total of 180 households. The data were analyzed by using Statistical Package for Social Sciences. Descriptive statistics were used to describe the result as percentages and ranks for the results. Results from the study revealed that body size, color, and growth rate were the most selection criteria for male goats whereas twining ability, body size, and mothering ability were the selection criteria of female goats. Mating was predominantly uncontrolled and selection emphasis on both female and a male goat for the next breeding. The average age at first parturition was 15.1±0.21 month, average parturition interval 8.1±0.089 month; average weaning age of kid's 4.5±0.1 month and about 73.4% of the goat was giving birth twin. The study therefore concludes that breeding bucks are kept by the majority of the farmers in the study area; this is due to using for breeding and fattening which are contributed to its increase within the flock. Body size, color, and growth for males and twining ability, body size, and mothering ability for females were the highly-rated traits of selection goats. Reproductive performance of goats was generally found to be better, might be due to having a good genetic and management system in the area. The farmers practiced weaning kids at an early age and which is increase kid crop percentage.

Keywords: Breeding; Reproductive; Flock; Selection Criteria; Farmers; Goat

Introduction

Goats have a sole function for smallholder poor farmers due to them require a small investment, broad feeding habit, short reproductive interval, and better ability to adaptation harsh or fragile environmental conditions. They are also important sources of protein for the poor and need extra income and support farmers [1]. In Ethiopia, goats are one of the most important livelihood livestock species in the smallholder farmers with eight distinct diverse breeds [2], which are adapted to a wide range of environments from arid to humid highland [3]. In these different production systems, goats provide a vast range of products for their owners such as meat, milk, skin, hair, manure religious rituals.

According to CSA [4], there are about 32.7 million goats in Ethiopia, of which about 70.49 percent are females and about 29.51 percent are males. Concerning breed, almost all of the goats are indigenous breeds, which account for about 99.97% [4]. The productivity of indigenous goats is getting low as compare to temperate breed due to genetic potential, shortage of feed, lack of infrastructure, inadequate veterinary services, and lack of clear breeding programs. In general, goat crossbreeding programs in the country were not successful because of the incompatibility of the genotype with the farmers breeding objectives, management methods, absence of involvement of all stakeholders in designing breeding strategies, and the prevailing environment of the tropical low input production system [5].

Thus, selective pure breeding of the adapted indigenous breeds is necessary to increase and sustain the productivity of goats in the country to meet the demand of the increment number of the human population. However, the development of sustainable and successful breeding improvement programs should be compatible with the description of the production environment and production system,

characterization of the available local genotype, the definition of breeding objectives, identification of traits to be selected, the decision about breeding methods, and breeding population and understanding of structure and organization of people involved [6], examines the organizational aspects of the breeding scheme under specified framework conditions [7].

There have been different researchers identified breeding objectives, selection criteria and breeding practices associated with the rearing of indigenous goats in Ethiopia [8,9], the diversity of production systems and genetic resources is still not well-represented. In particular, there is limited information on reproductive performance, selection criteria, and breeding practices of breeding stock used by owners of goats in the southwestern part of the country where indigenous breeds have special advantages in the domestic and export market. Therefore, this study was aimed at describing breeding practices, selection criteria, and reproductive performance of indigenous goats in the southwestern part of Ethiopia.

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Materials and method

Description of Study area

This study was covered two districts which are Meanit Goldiya from the West Omo zone and Guraferda from the Bench-Sheko zone of Southwestern Ethiopia. A Meanit Goldiya is one of the districts of the West Omo zone in the South region of Ethiopia. The mean annual temperature of the area varies from 17.6 to 27.5°C and the mean annual rainfall of the area is 1601 to 2000 millimeters. The latitude and longitude of the area are 6.55' to 7.12' and 35.55' to 36.12' with an altitude of 501 to 2500 meters above sea level. The total area of the district is 1658.1 square kilometers. The major livestock species includes 55,536 goats, 95,737 sheep, 255,081 cattle, 200,642 chickens, 5,589 horses, 556 mules and 379 donkeys [10].

Guraferda is one of the districts of the Bench-Sheko zone in the Southern Nations, Nationalities, and Peoples Region of Ethiopia. The mean annual temperature of the area varies from 15.1 to 27.5°C, and the mean annual rainfall of the area is 1601 to 2000 millimeters. The latitude and longitude of the area are 6.49' to 7.21' and 34.88' to 35.63' with an altitude of 501 to 2500 meters above sea level. The total area of the district is 2505.8 square kilometers. The major livestock species includes 54,945 goats, 3,736 sheep, 49,967 cattle, 69,425 chickens, 5 horses, 12 mules, 207 donkeys [11].

Site Selection and Sampling Techniques

Before deciding on the survey areas, discussions were also made with experts of livestock and fishery offices before the actual survey work to locate the distribution of goat in each kebeles. Discussions were also held with Zonal and district's livestock and fishery office and kebeles administrators about the distribution of Goat types. The three kebeles from the districts were selected purposive, which was based on a relatively large goat population size, their suitability for goat production, road access, and willingness of the farmers to participate in the program. A total of 180 households (90 from each district) were randomly selected for the interview.

Methods of data collection

The survey data were collected from primary and secondary data sources. Primary data were generated by administering a pre-tested structured questionnaire and organizing group discussion. A structured questionnaire was prepared and pre-tested before administering and some rearrangement, refining, and correcting the following respondent's perception were done. Based on the questionnaires, reproduction performance, breeding practices, selection criteria, and goat production objectives were captured. Besides, information was collected from group discussions. The group was composed of youngsters, women, village leaders, and socially respected individuals who are known to have better knowledge on the present and past social and economic status of the area to strengthen the data collection using questionnaires. Discussions were focused on the history of the breed, utility pattern of the breed, and indigenous knowledge on the management of breeding.

Similarly, secondary data like climatic data on temperature and rainfall; geographical location, human and livestock demography, and other related information was collected from the respective district office of livestock and fishery resource.

Data management and analysis: All data collected through the questionnaire were coded and recorded into the Statistical Package for Social Sciences [12]. Data collected from the focus group discussion

were summarized, synthesized, and used to better understand the household survey results. The data were analyzed by using Statistical Package for Social Sciences [12]. Descriptive statistics were used to describe the result as percentages and ranking for the results. Indices were calculated to provide a ranking of the selection criteria of females and males and kidding pattern. It was calculated as Index = Sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) given for an individual reason, criteria, or preference divided by the sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) for overall reasons, criteria or preferences.

Results

Breeding management

The majority of (70% in Meanit Goldiya and 80% in Guraferda) of respondents had breeding buck of which 33.3 % of respondents from Meanit Goldiya and 36.1% from Guraferda had more than one breeding buck in Table 1. The rest percent of farmers had no breeding buck indicated that they use a neighboring buck or there does mate with a breeding buck from another flock in communal grazing land. The Major reason for keeping more than one buck was for fattening and sale (61.9 %), large flock size and fattening and sale (23.8 %) for Meanit Goldiya producers and fattening and sale (46.2 %), large flock size and fattening and sale (34.6 %) for Guraferda goat producers. In both districts, all the breeding bucks were originated from within the young kids of their flock. The average service life of a buck in the flock was significantly ($P < 0.05$) higher in Meanit Goldiya (23.3 ± 0.84 months) than Guraferda (20.3 ± 0.65 months). The main reason for keeping breeding bucks was for breeding (65.5 % for Meanit Goldiya and 62.5% for Guraferda) and both breeding and fattening (19.1% for Meanit Goldiya and 20.8% for Guraferda). About 96.1% of the respondents reported that bucks mating service for their flock and neighbors.

The main reason for uncontrolled mating was goat graze together and lack awareness about the effect of inbreeding (37.8%) followed by goats' grazes together (33.3%) and goat graze together and lack of buck and lack of awareness (12.7%) (Table 1). Farmers in the study area allowed the breeding buck to mate his mother, daughter, and sister due to goat graze together (66.7%), followed by Goat grazes together and lack of buck (18.3%) and lack of buck (15%) (Table 1). Almost all respondents in both districts share bucks to and from others with the main reason for using communal grazing, lack of breeding buck, and using common watering point.

Selection criteria of breeding bucks and does

The majority of farmers practices a selection of bucks and does in higher percentage in these districts. As shown in Table 2, the average age at selecting breeding buck was 9.6 ± 0.18 months, while the female goats were selecting at the average age of 1.4 ± 0.02 years, which means the selection is taking place after giving birth by evaluating their kid performance (growth) and fecundity of mother. Body size (0.44), color (0.26), and growth (0.19) are selected in all study areas as the first, second, and third breeding buck selection criteria, respectively. Coat color preferences accounted for a higher index and their color preferences were predominately white, red, brown, and patchy. As reported by respondents, the black coat color was not preferred by the producers due to less demand for this colored goat in the market. For Meanit Goldiya producers, body size, twinning ability, mothering ability, and kid growth with index values of 0.28, 0.27, 0.19, and 0.10, were the

Table 1: Breeding management in the study areas.

District Parameter	Meanit Goldiya	Guraferda	Overall	Test	
	N (%)	N (%)	N (%)	X ²	P-Value
Do You Have Breeding Buck				2.4	0.121
Yes	63(70)	72(80)	135(75)		
No	27(30)	18(20)	45(25)		
Source of Breeding Buck				1.01	0.316
From Young Kid of My Flock	90(100)	89(98.9)	179(99.4)		
Purchase From Market	0(0)	1(1.1)	1(0.6)		
Reason for Keeping Breeding Buck				2.86	0.415
Breeding only	41(65.1)	45(62.5)	86(63.8)		
Breeding and Fattening	12(19.1)	15(20.8)	27(39.9)		
Fattening	4(6.3)	9(12.5)	13(9.4)		
Breeding and Cash Income	6(9.5)	3(4.2)	9(6.9)		
Reason for keeping more than one				1.16	0.559
Large Flock Size	3(14.3)	5(19.2)	8(16.80)		
Sale and Fattening	13(61.9)	12(46.2)	25(54.1)		
Large Flock Size and Fattening and Sale	5(23.8)	9(34.6)	14(29.2)		
Reason for uncontrolled mating				21.4	0.002
Goat grazes together	24(26.6)	36(40)	60(33.3)		
Lack of buck	5(5.6)	6(6.7)	11(6.2)		
Lack of awareness	-	6(6.7)	6(3.3)		
Goat graze together and lack of buck	-	6(6.7)	6(3.4)		
Goat graze together and lack awareness	44(48.9)	24(26.7)	68(37.8)		
Lack of buck and lack awareness	4(4.4)	2(2.2)	6(3.3)		
Goat graze together and lack of buck and Lack of awareness	13(14.4)	10(11.1)	23(12.7)		
Reason for mating with family				5.455	0.065
Goat grazes together	60(66.7)	60(66.7)	120(66.7)		
Lack of buck	9(10)	18(20)	27(15)		
A goat grazes together and lack of buck	21(23.3)	12(13.3)	33(18.3)		
Reason for allowance your buck served other does				8.881	0.012
Communal grazing	77(85.6)	66(74.2)	143(79.9)		
Watering point	5(5.6)	18(20.2)	23(12.9)		
Communal grazing and watering point	8(8.9)	5(5.6)	13(7.2)		
Reason for allowing the doe served by another buck				2.684	0.261
Communal grazing	60(66.7)	63(70.8)	123(68.8)		
Lack of breeding buck	20(22.2)	17(19.1)	37(20.6)		
Communal grazing and lack of buck	10(11.1)	9(10.1)	19(10.6)		

N= number of households, X²=chi square

Table 2: Selection criteria for breeding do and bucks in the study areas.

District Class and Selection Criteria	Meant Goldiya Rank				Guraferda Rank				Overall Rank			
	1 st	2 nd	3 rd	I	1 st	2 nd	3 rd	I	1 st	2 nd	3 rd	I
Breeding Doe												
Size	15	32	25	0.28	17	35	11	0.25	32	67	36	0.27
Color	7	3	8	0.07	-	11	28	0.1	7	14	36	0.09
Kid growth	8	7	9	0.1	6	-	-	0.03	14	7	9	0.07
Kid survival	2	-	-	0.01	-	-	6	0.01	2	-	6	0.01
Twining ability	33	14	-	0.27	54	21	5	0.4	87	35	5	0.34
Mothering ability	16	7	27	0.19	5	9	23	0.11	21	16	50	0.15
Pedigree	4	6	16	0.08	5	11	11	0.09	9	17	27	0.09
Breeding Buck												
Body size	55	20	6	0.46	61	11	-	0.41	116	31	6	0.44
Color	15	31	10	0.26	12	30	31	0.25	27	61	41	0.26
Temperament	-	5	2	0.03	5	2	7	0.05	5	7	9	0.04
Growth	8	15	24	0.17	-	35	42	0.22	8	50	66	0.19
Age at 1 st Maturity	-	-	1	0.002	-	-	-	-	-	-	1	0.01
Pedigree	3	10	18	0.09	5	5	6	0.07	8	15	24	0.08

Index= sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) give for each selection criteria divided by the sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) for all selection criteria for a production system.

major breeding does selection criteria, respectively, while in Guraferda twinning ability, body size, mothering ability, and color accounted for 0.40, 0.25, 0.11 and 0.10, respectively. Moreover, kid survival, color, and pedigree in Meanit Goldiya and Kid growth, kid survival, and pedigree were also considered as selection criteria with lower emphasis.

Reproductive performance of goats

Kidding occurred at any time of the year due to uncontrolled mating and non-seasonality of estrus but, there is seasonal variation in kidding pattern. In Meanit Goldiya area kidding occurred in December, September, and June with the index value of 0.36, 0.22, and 0.14 respectively. Similarly, in Guraferda December, September and June were the most kidding occurred season with the index value of 0.28, 0.19, and 0.18, respectively. There was a significant ($P < 0.05$) difference between districts regarding kidding interval with average KI of 8.2 ± 0.09 and 7.9 ± 0.09 months in Meanit Goldiya and Guraferda districts, respectively (Table 3).

According to the current result, the overall average age at weaning was 4.5 ± 0.1 months whereas the age at first kidding in the study areas was 15.1 ± 0.1 months (Table 3). There was a significant ($P < 0.01$) difference in kidding per lifetime of does between the studied areas. The average kidding per lifetime of does in Meanit Goldiya was 11.6 ± 0.22 and 13.3 ± 0.32 in Guraferda area, with the overall value of 12.4 ± 0.27 kidding per lifetime doe.

Litter size was significant ($P < 0.05$) different between across the studied districts. Based on the respondents, most of the birth was twinning (73.4%), 13.3% single, 11.1% single and triple and 1.7% were twins and triple. Some respondents said that quadruplets have occurred, but only three kids were survived because of insufficient milk production of does and husbandry problems. Therefore, these goats are prolific.

Discussion

Breeding management

The report of Tekleyohannes *et al.* [13] reported that the majority of the respondent had the breeding buck in the south Omo zone, Ethiopia which is comparable with the current result. However, this results in contrast to the study of Fantahun *et al.* [14]. Showed the majority of respondents had no breeding buck in the Bench Maji Zone. Similar to the report of Solomon *et al.* [15] goat producers without a breeding buck indicated that they use a neighboring buck or there does mate with a breeding buck from another flock in communal grazing land. This system might be to decrease the risk of inbreeding by mating unrelated flocks. Gains from breeding programs are achieved only when inbreeding depression is well controlled or minimized [16].

The source of breeding bucks in the current study was consistent with the works of Tesfaye *et al.* [17] in Shala districts (82%),

Tekleyohannes *et al.* [13] in South Omo (94%), and 78.3% in Bench Maji zone, Ethiopia [14]. The average life of buck in the flock was between 20.3–23.3 months, after which it will be usually castrated or disposed of through sale or slaughter. Similar practice of changing the serving bucks every 5.5 years (around Dire Dawa) and 4.4 ± 2.01 years (around Asayta) to prevent inbreeding were reported by [18, 19]. The average age at which the breeding buck is changed, revealed in Guraferda, relatively may be considered better in the prevention of inbreeding. The long duration of buck shows non-quantifiable inbreeding in the flock [20].

The study of Netsanet [21] showed that the major purpose of keeping bucks was for mating (64.5% for konso and 67.7% for Meta-Robi) and for both mating and fattening (11.8% for konso and 21.2% for Meata- Robi) which is in agreement with the present finding. In the study area, farmers practiced uncontrolled mating which is closer to the finding of Kebede *et al.* [22], Solomon *et al.* [23]; Fantahun *et al.* [14]; Tesfaye [24], and Derje [25]. This might be due to bucks and does run together throughout the year. It was associated with the parturition distributed throughout the years. However, uncontrolled mating together with small flock size and poor record-keeping on the pedigree is expected to result in severe inbreeding which leads to poor growth rates [26], and communal grazing one cause of severe inbreeding in the flock. In the study area farmers allowed the breeding buck to mate his mother, daughter, and sister which is Similar to the reports of Alubel [27] for Abergelle and Central highland goats and Ahmed *et al.* [28] for goats in Western Ethiopia. This trend may lead to inbreeding depression. The share of bucks to and from other in the present work was in agreement with the reports of Ahmed *et al.* [28] who reported the majority of farmers allowed their does to be served by any buck when the does show signs of heat for Horro Guduru Wollega zone of Oromia region.

Selection Criteria of Breeding Bucks and Does

It is well known that selection within each goat breed has been done by the farmer and/or breeder to selecting desirable male and female animals to include them from passing genes to the next generation. The practices of selection in the current study are in agreement with the study of Lorato [29] in way to-Guji for selection of bucks and Fantahun *et al.* [14] in Bench Maji zone for breeding females, however, this result higher than the report of Fantahun *et al.* [14] for breeding bucks. The selection of breeding stock by farmers is through using their indigenous knowledge, mostly, they depend on information about the performance of potential buck/doe dams, information from relatives/ancestor, and assessment of young buck and/or doe. The average age at selecting breeding buck in the current finding was closer to the report of Dereje [25] in Eastern Ethiopia (9.5 months). Similarly, the average age breeding female for selection in this study agreed with the work of Netsanet [21] in konso district (17.04 months), however; this value was higher than the finding of Dereje [25] in eastern Ethiopia (8.4 months).

Table 3: Reproductive performances as estimated by respondents.

District characters	Meanit Goldiya(N=90)	Guraferda(N=90)	Overall(N=180)	Test	
	Mean±SE	Mean±SE	Mean±SE	F-value	p-value
Age at 1 st mating males (months)	9.7±0.181 ^a	7.7±0.163 ^b	8.7±0.17	63.214	0
Age at 1 st mating females (months)	10.3±0.13 ^a	8.64±0.26 ^b	9.5±0.2	33.407	0
Age at 1 st kidding (months)	15.1±0.17 ^a	15.1±0.26 ^a	15.1±0.21	0.012	0.913
Kidding interval (months)	8.2±0.09 ^a	7.9±0.09 ^a	8.1±0.89	5.341	0.022
Average reproductive life time (years)	6.8±0.17 ^a	7.1±0.09 ^b	6.9±0.13	1.304	0.255
Number of kidding/ life time /doe	11.6±0.22 ^a	13.3±0.32 ^b	12.4±0.27	18.836	.000
Average weaning age of kid	4.5±0.12 ^a	4.4±0.09 ^a	4.5±0.1	0.770	.381

Different superscripts within the same row show a significant difference at $P < 0.05$ significance level; SE=standard error

The value obtained for body size and coat color in this result is in agreement with the report of Solomon [30] in western lowland and Abergele goat keepers. Similarly, Fantahun *et al.* [14] reported that body size was the most highly rated trait for selection by farmers in the Bench Maji zone which is inconsistent with the present result. This implies that body size and growth rate were the preferred trait, this might be fetched better market price, had a better growth rate, and reached market weight sooner. The improvement of the trait related to growth performance can be achieved easily through village level selection as the trait are easy to measure and have high heritability [30]. The preferred coat color in the current study was in a good agreement with the report of Solomon [30] in Western Lowland and Abergele goats which are red, brown, and patchy. This might be associated with socio-cultural practices; market demand. Similarly, Halima *et al.* [31] reported that the black coat color was not preferred by the farmers in Amhara region, Ethiopia which is similar to the current observation. This may be due to black color is less market demand. The result obtained for twinning ability is similar to the work of Fantahun *et al.* [14] in the Bench Maji zone, Southwestern Ethiopia. The probable reason for high emphasis for twinning ability as the preferred trait in both districts keepers could be due to the high availability of the feed throughout the years and the breed potential, particularly in Guraferda areas.

Reproductive performance of goats

Goat is the most prolific livestock from all domesticated ruminants. The current finding concerning the kidding pattern of indigenous goats is incomparable with the report of Dhaba *et al.* [9] in Ilu Abba Bora, Dejene [32] in the Bench-Maji zone, and Deribe [33] in Alaba zone. The probable reason is of kidding concentrated toward the end of the main rainy season indicating that most of the goats came into heat and mated during the short rainy season (April) and at the beginning of the main rainy season (June) due to the presence of adequate feed. The kidding interval in the current study was incomparable with those reported by Shenkute [34], Dereje [25], Hulunim, [35], Tesfaye [24], Feki [19], Abegaze, [36] in various part of Ethiopia. However, this value was higher than the work of Tsigabu [37] in the Nure goats Gambella region. Short kidding interval is vital for bringing genetic progress and improves the production potential through different techniques within a short rate of turnover generations of the goats. This is a crucial approach and one that occurs as a natural consequence of a village management system where male goats are continually present [38].

Yadeta *et al.* [39] revealed that the weaning age of kids was 4.67, 3.82, and 3.52 months in High, Mid, and Lowland area of in Ada Barga and Ejere districts West Shoa zone Oromia, Ethiopia, respectively and Assen and Aklilu [40] reported that the weaning age of kids in high land and the midland area was 4.7 months of Tigray zone which is incomparable with the present study result. The lower weaning age may be due to does suckle their kids for a short time, as a result; does show estrous cycle earlier resulting in improve reproductive efficiency and the preferences of farmers for more kid crops until time to earn more income. The age at first kidding in the current finding was in comparison with the report of Hulunim [35] in Bati goats; Tesfaye [24] in Arsi-Bale goats; Abegaze [36] in Abergele goats and Assen and Aklilu [40] in central Tigray goat. However, this result is lower than the report of Tsigabu [37] in Nure zone goats (16.76 months) and Seka (2.09 years), Mana (2.07 years), and Dedo (2.16 years) districts of South-Western Ethiopia [41].

On the other hand, the current result was higher than the report of Getahun [42] in Keffa and Adilo goats (12.5 months) and 12.46

months in Goma district [34]. The report of Hulunim [35] showed that the mean (\pm SE) of kidding per lifetime of a doe in Bati, Borena and Sit, areas was 11.08 ± 0.25 , 9.77 ± 0.15 , and 9.04 ± 0.16 , respectively which is lower than the present study finding. This could imply that goats around the Guraferda area have better reproduction performance than goats in the Meanit Goldiya area which might be attributed to either genetic and management variation. The litter size in this study result was by the work of Tsigabu [37] reported that most of the birth (82.78%) was twinning in Nure zone goats of the Gambella region. But this result different from the report of Mahilet [8] disclosed that single birth was significantly higher in Hararghe highland goats.

Conclusion

This work is delivered approaching to reproductive performance of goats, breeding practices, and selection criteria of farmers in the study area, which are prerequisite in developing genetic improvement strategies. A single visit questionnaire survey and key informants for interviews were done with a total of 180 households. The data were analyzed by using Statistical Package for Social Sciences. Descriptive statistics were used to describe the result as percentages and ranks for the results.

Breeding bucks are kept by the majority of the farmers in the study area; this is due to using for breeding and fattening which are contributed to its increase within the flock. Uncontrolled mating was predominant, because of goat graze together and goat grazes together and lack of awareness about the effect of inbreeding. Allowing buck to mate their family and using bucks from their flock might increase the rate of inbreeding depression and needed strategies to reduce the risk of depression. Body size, color, and growth were found an important trait of selection males whereas twinning ability, body size, and mothering ability were also criteria for the selection of female goats. Reproductive performance of goats was generally found to be better, might be due to having a good genetic and management system in the area. The farmers practiced weaning kids at an early age and which is increase kid crop percentage. But it should be considered practicing of weaning at an early age may impose stress on them affecting their weight. Thus, to design a possible breeding strategy (particularly a community-based breeding program), farmer trait preferences for different traits and production potential of goats should need to be considered.

References

1. Notter DR (2012) Genetic improvement of reproductive efficiency of sheep and goats. Anim Reprod Sci 130(3-4): 147-151.
2. EBI (Ethiopia biodiversity institution) (2016) Farm Animal Diversity of Ethiopia: Breeds and Ecotypes Catalogue. Ethiopian Biodiversity Institute (EBI), Addis Ababa, Ethiopia.
3. ESGPIP (2008) Genetic improvement of sheep and goat. Ethiopia Sheep and Goat Productivity Improvement Program Sheep and goat production handbook for Ethiopia. pp: 99-101.
4. CSA (2018) Agricultural Sample Survey of 2017/18 (2010 EC), Volume II: Report on Livestock and Livestock Characteristics (Private Peasant Holdings).
5. Kosgey IS, Baker RL, Udo HMJ, Van Arendonk JA (2006) Successes and failures of small ruminant breeding programmes in the tropics: a review. Small Rumin Res 61(1): 13-28.
6. FAO (2010) Breeding strategies for sustainable management of animal genetic resources. Animal Production and Health Guidelines. Rome, Italy.
7. Roessler R, Herold P, Momm H, Valle Zárate A (2012) Organization of breeding under difficult framework conditions-the case of smallholder pig breeding in mountainous areas in Northwest Vietnam. Arch Anim Breed 55: 590-602.
8. Mahilet D (2012) Characterization of Hararghe highland goat and their production system in eastern Hararghe. Haramaya University, Ethiopia, 39-55.

9. Urgessa D, Duguma B, Demeke S, Tolamariam T (2013) Breeding practices and reproductive performance of traditionally managed indigenous sheep and goat in Ilu Abba Bora zone of Oromia Regional State. *Glob Vet* 10(6): 676-680.
10. West Omo Zone Finance and Economic Development (BSZFED) (2019) Annual report of Bench Maji zone finance and economic development main department. Mizan-Teferi, Ethiopia.
11. Bench Sheko Zone Finance and Economic Development (BSZFED) (2019) Annual report of Bench Maji zone finance and economic development main department. Mizan-Teferi, Ethiopia.
12. SPSS. 21.0 For window, r Elase 12012.SPSS Inc., Statistical Package for Social Sciences, USA.
13. Tekleyohannes B, Jamroen T, Sayan T, Girma A, Asrat T, Somkiert P (2012) Purposes of keeping goats breed preferences and selection criteria in pastoral and agro-pastoral districts of South Omo Zone. *Livestock Res Rural Dev* 24(12).
14. Fantahun T, Alemayehu K, Abegaz S (2016) Characterization of goat production systems and trait preferences of goat keepers in Bench Maji zone, southwestern Ethiopia. *Afr J Agric Res* 11(30): 2768-2774.
15. Solomon AK, Mwai O, Grum G, Haile A, Rischkowsky BA (2014) Review of goat research and development projects in Ethiopia. ILRI Project Report. Nairobi, Kenya: International Livestock Research Institute.
16. Kosgey IS (2004) Breeding objectives and breeding strategies for small ruminants in the tropics. pp: 272.
17. Tesfaye K, Tekalign G, Estifanos T (2011) Performance and economic efficiency of browsing Arsi-Bale goats supplemented with sweet potato (*Ipomoea batatas* L.) vines as a replacement for concentrate. In *J Livest Prod* 2(7): 92-99.
18. Grum G (2010) Community-Based Participatory Characterization of the short Eared Somali Goat Population around Dire Dawa. pp: 129.
19. Misbah F (2013) Community-based characterization of Afar goat breed around Aysaita district of Afar region.
20. Jimmy S, David M, Donald KR, Dennis M (2010) Smallholder goat breeding systems in humid, sub-humid and semi-arid agro-ecological zones of Uganda. *Glob Vet* 4(3): 283-291.
21. Netsanet, Z (2014) On-farm phenotypic characterizations and performance evaluation of Central highland goat and Woyto-Guji goat types for designing community-based breeding strategies.
22. Gizaw S (2010) Sheep and goat production and marketing systems in Ethiopia: Characteristics and strategies for improvement: 23.
23. Tesfaye K, Haile A (2010) Assessment of on-farm breeding practices and estimation of genetic and phenotypic parameters for reproductive and survival traits in indigenous Arsi-Bale goats.
24. Dereje T (2011) Community based characterization of Hararghe high land goats in Darolabu district Western Hararghe.
25. Saico SS, Abul S (2007) Socio-economic constraints on goat farming in the lowveld of Swaziland-A case study of Matsanjeni. *J Sustain Dev Afr* 9(3): 37-49.
26. Alemu A (2015) On-farm phenotypic characterization and performance evaluation of Abergelle and Central highland goat breeds as an input for designing community-based breeding program.
27. Ahmed S (2013) On-farm phenotypic and production system characterization of indigenous goats in Horro Guduru Wollega zone, western Ethiopia.
28. Lorato Y, Ahmed KM, Belay B (2015) Participatory Characterization of the Woyto-Guji Goat and Its Production Environment around Northern Omo, Ethiopia. *Agric Nat Resour Sci* 2(2): 455-465.
29. Solomon A (2014) Design of community based breeding programs for two indigenous goat breeds of Ethiopia.
30. Hassen H, Baum M, Rischkowsky B, Tibbo M (2012) Phenotypic characterization of Ethiopian indigenous goat populations. *Afr J Biotech* 11(73): 13838-13846.
31. Assefa D (2010) Phenotypic characterization of indigenous sheep types in Kaffa and Bench-Maji zones of Southern Nations Nationalities and Peoples Region.
32. Gemiyu, D (2009) On-farm performance evaluation of indigenous sheep and goats in Alaba, Southern Ethiopia.
33. Shenkute BG (2009) Production and marketing systems of small ruminants in Goma district of Jimma zone, western Ethiopia.
34. Gatew H (2014) On-farm phenotypic characterization and performance evaluation of Bati, Borena and Short eared Somali goat populations of Ethiopia.
35. Abegaz S, Solkner J, Gizaw S, Dessie T, Haile A, et al. (2013) Description of production systems and morphological characteristics of Abergelle and Western lowland goat breeds in Ethiopia: implication for community-based breeding programmes. *Anim Genet Resour* 53: 69-78.
36. Gezahegn TG, Gulich GA, Kebede K, Mekasha Y (2015) Phenotypic characterization of goat type in Nuer Zone of Gambella People Regional State, South Western Ethiopia. *Glob J Anim Breed Genet* 3(5): 164-180.
37. Alphonsus C, Akpa GN, Sam IM, Agubosi OCP, Finangwani FI, et al. (2010) Relationship of parity and some breeding characteristics in Red Sokota goats. *cont j vet Res* 8: 25-30.
38. Yadeta N, Manzoor AK, Gemedo D (2016) Study of productive and reproductive performances and farmers' traits preferences for breeding of small ruminants in Ada Barga and Ejere Districts of West Shoa Zone, Oromia, Ethiopia. *Adv Life Sci Technol*: 49.
39. Ebrahim A, Hailemichael A (2012) Sheep and goat production and utilization in different agro-ecological zones in Tigray, Ethiopia. *Livest Res Rural Dev* 24(1): 3-5.
40. Kechero Y, Tolemariam T, Haile A (2013) Characteristics and determinants of livestock production in Jimma Zone/Southwestern Ethiopia. *Afr J Basic Appl Sci* 5(2): 69-81.
41. Getahun, L (2008) Productive and Economic performance of Small Ruminant production in production system of the Highlands of Ethiopia.