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Begait Goat Production Systems and Breeding Practices in Western Tigray, North Ethiopia

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Abstract

A study was undertaken to characterize production system, breeding practices and production constraints of Begait goat in Kafta humera district, northwestern lowlands of Ethiopia. Personal observations, focus group discussions and a detailed structured questionnaire were used to collect data from 150 respondents (99 small-scale and 51 large-scale farmers). Mixed crop-livestock production system was found to be the dominant farming system in the study district. The farmers kept a variety of livestock species including goats, sheep, cattle, chickens and donkeys. Small ruminants are the most numerous and are of great importance in the area. Goats are herded with sheep in the open fields by the young boys in the family/hired grazers. They have a number of roles though mainly kept as a source of cash income. Breeding was generally uncontrolled. Size, growth rate and libido were the most frequently reported traits in selecting bucks, whereas does were selected based on size, twining ability and milk yield. Effective population size and rate of inbreeding were calculated by considering random mating and flocks were not mixed. The major constraints hampering goat production in the area were water scarcity, feed and grazing land shortages and insufficient veterinary services among the others. Therefore, addressing these constraints is important to design a successful genetic improvement scheme in the area for goat.

Keywords

Farming System, Husbandry Practice, Marketing, Production Constraints

1. Introduction

Goats (*Capra hircus*) are of the most beneficial animals. Ethiopia is one of the top ten goat producing countries in the world. As per the livestock census car-

ried out in 2016, Ethiopia owns approximately 30 million goats; of which 71.57% are females and the rest 28.43% are males. Majority of the national goat population is found in the lowlands. Nearly all (99.99%) of the goats are indigenous types [1] [2], which have become adapted to a wide agro-ecological zones of the country [3] due to natural selection. The environmental adaptation of indigenous breeds facilitates livestock production in a range of agro-ecological conditions and constraints [4].

Goats are deeply embedded in almost every African culture and are true friends to the rural poor [5]. For instance, goats in Ethiopia are important to the subsistence, economic and social livelihoods of their owners [6] [7] [8]. On top of this, Ethiopia generates hard currency through exporting live goats, goat meat and goat skins. At optimum off-take rates, the country has a potential to deliver 1.13 and 2.00 million goats to national and international markets per annum, respectively [7].

Despite the large goat population is found in the country and its contributions to household income and to the country's national economy, productivity per unit of animal is low. Genetic improvement is one way to increase productivity of the goat genetic resources in the country. According to [9], development of animal genetic improvement plans will only be successful when accompanied by good understanding of the production system and when simultaneously addressing constrains. However, there is little or no adequate information on majorities of indigenous goat breeds/types in Ethiopia to design appropriate breeding plans, suggesting a low level of priority for this area of research. Specifically, the study aims at:

1) Characterizing production system and breeding practices of Begait goat;

2) Identifying the major constraints facing Begait goat production in its home tract.

2. Materials and Methods

2.1. Description of the Study Area

This research work was done in Kafta and Setit humera districts of western zone of Tigray National Regional State, northwest lowlands of Ethiopia. Setit humera town, a special district, is the administrative center of Kafta humera district and western zone of the region. In this study, the district has been integrated as part of Kafta humera district. The study area covers a total area of 71.80 km^2 of which 54.20% is cropland.

The study area is situated 1372 km away from the administrative center of Addis Ababa city to northwest direction. It is bordered by Sudan to the west, Tahtay Adyabo district to the east, Eritrea to the north and Wolkayit and Tsegedei districts to the south. Geographically, it is located in between the latitudes 13˚14'N - 14˚27'N and longitudes 36˚27'E - 37˚32'E. The study area comprises *kolla* (lowland) and *weinadega* (midland) agro-climatic zones with an altitude ranging from 560 - 1849 m above sea level. The annual precipitation in the lowlands and midlands is 448.8 and 1102.5 mm, respectively [10] occurring between

Jun and September. The mean minimum and maximum temperatures in the lowlands are 25˚C and 27.5˚C, respectively while the corresponding values in the midlands are 20˚C and 25˚C. The hottest months are between April and June with temperatures rising up to 42˚C.

2.2. Farming System

The agricultural production system in the study area is mixed farming. There are two types of farming systems in the district viz. small-scale and large-scale based farming systems. As a result, farm activities predominantly crop production and livestock rearing are performed by small-scale and large-scale farmers. According to [11], above half (58%) of the total cropland is cultivated by large-scale farmers while small-scale farmers cultivate the rest 42%. Crop production is a rain fed production system without irrigation practice. Sesame and sorghum are the major staple food and cash crops grown in the area. Other crops like cotton, millet, maize and *teff* are well grown.

Livestock production is similar in both farming systems, and it is a traditional type which is characterized by minimal inputs as is in other areas of Ethiopia. [12] Demonstrated that low input production system is found in all livestock production systems prevailing in the country except in Peri-urban and urban system. The most dominant farm animal species of the area are cattle and small ruminants. Animal feeding is free grazing.

2.3. Sampling and Data Collection

Prior to site selection, livestock experts in the district were contacted for brief discussions. In addition, secondary data were reviewed to better understand the current production systems and the area dominated by Begait goat. Based on this information, four *rural kebeles* and the special district were selected as study sites. A total of 150 Begait goat owning farmers (99 small-scale and 51 large-scale farmers) were selected at random.

Interviews were conducted at the farmers' residences using structured questionnaire with the assistance of development agents. The questionnaires covered information on key household characteristics, livestock possession, flock structure, purposes of keeping goat, mating system, marketing system and production constraints. To complement the survey work, focus group discussions were held with a total of 8 - 10 key informants per selected study site. In addition, general information about the district was obtained from secondary data sources.

2.4. Data Analysis

The survey data were analyzed using SPSS software (SPSS for windows, release 16.0, 2007). F test was applied when required to test statistical significances. Indices were calculated for all ranking data using the formula: Index = Σ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] given for an individual reason divided by Σ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all reasons [13]. By considering the number of breeding males (Nm) and breeding females (Nf), the effective

population size (Ne) and rate of inbreeding (ΔF) were also estimated using the equations of $Ne = 4(Nm \times Nf)/Nm + Nf$ and $\Delta F = 1/2Ne$, respectively [14].

3. Results and Discussion

3.1. Household Information

Table 1 presents some key characteristics of the respondents across the two farming systems. The overall average age of the sampled household head was 50 ± 10.44 years, implying that the respondents were adults with a good experience in goat farming. The overall mean family size was 4.85 ± 0.89, which is comparable with the national estimate of 4.80 persons per household [15].

Of the total sampled household heads, 98.67% were males. The rest (1.33%) households were female headed. Indeed, it is unlikely to find a female headed household unless she is widowed or divorced. Literacy rate among the household heads was 69.67%. Similar results were reported by [16] in Dale district and [17] in Goma district. The better educational background obtained in this study would be a good opportunity for further animal genetic improvement programs in the study area, since literate communities are more likely adopt and practice new technologies. The study also revealed that most (98%) of the respondents were married. The percentage of unmarried and widowed was 0.67% and 1.33%, respectively. The present findings indicate that goat farming can be performed by every social class of the community regardless of their background characteristics, viewing the significant importance of goat for its owners.

3.2. Livestock Holding and Flock Structure

Table 2 demonstrates flock structure and livestock possession across the two farming systems. Overall, sampled farmer owned 43.67 goats, 42.90 sheep, 10.19

Table 1. Background characteristics of the respondents by farming system.

Descriptor variables	Small scale farming (n = 99)	Large scale farming (n = 51)	Overall (N = 150)
	Mean ± SD	Mean ± SD	Mean ± SD
Age(years)	48.24 ± 9.88	53.10 ± 10.85	50.00 ± 10.44
Family size	4.91 ± 0.94	4.75 ± 0.80	4.85 ± 0.89
Sex	Percent	Percent	Percent
Male	98.33	100.00	98.67
Female	1.67	-	1.33
Educational level			
Illiterate	27.30	37.30	30.33
Literate	72.70	62.70	69.67
Marital status			
Married	97.00	100.00	98.00
Unmarried	1.00	-	0.67
Widowed	2.00	-	1.33

N: Number of interviewed households; SD: Standard deviation.

Table 2. Mean livestock holdings and flock structure across the two farming systems.

Livestock species	Small-scale farming	Large-scale farming	Overall
	(mean ± SD)	(mean ± SD)	(mean ± SD)
Goat	42.21 ± 18.42[a]	46.43 ± 15.94[a]	43.67 ± 17.49
Kids	11.92 ± 5.22[a]	13.16 ± 4.33[a]	12.34 ± 4.96
Buckling	3.18 ± 1.28[a]	3.51 ± 1.07[a]	3.29 ± 1.22
Doeling	5.18 ± 2.29[a]	5.71 ± 1.88[a]	5.36 ± 2.17
Bucks	1.89 ± 0.92[a]	1.99 ± 0.81[a]	1.94 ± 0.89
Does	19.54 ± 8.41[a]	21.47 ± 6.99[a]	20.19 ± 7.98
Castrates	0.67 ± 0.47[a]	0.76 ± 0.43[a]	0.70 ± 0.46
Sheep	41.68 ± 17.86[a]	45.41 ± 15.07[a]	42.90 ± 17.09
Cattle	9.62 ± 4.68[b]	11.29 ± 3.98[a]	10.19 ± 4.51
Chicken	9.45 ± 3.69[a]	10.16 ± 0.70[a]	9.70 ± 3.57
Donkey	0.97 ± 0.28[a]	0.94 ± 3.34[a]	0.96 ± 0.20

Means with the same letter within the same row are not significantly different ($p > 0.05$); SD: standard deviation.

cattle, 9.70 chickens and 0.96 donkeys. There was a slight increase in mean livestock holding of respondents from small-scale to large-scale farming even if the difference is not statistically significant except for cattle. None of the respondents owned mules and horses. This finding supports the fact that mules and horses could not adapt the hot environmental conditions of the area.

The mean flock size of goats in the present study was close to the work of [18] and [19], who reported that 44.0 and 48.5 heads per household in Siti zone of Somali region and Abergelle district of Amhara region, respectively. In contrast, the mean flock size recorded in this study is higher than the previous average flock size of 21.20 Begait goats in the area [20]. This difference might be due to random sampling error or due to changes in goat farming system over time in the area.

The number of males and females in the sample population and their ages were often used as an indicator of a traditional management system in Africa [21]. The present finding revealed that the proportion of does represents the largest class followed by suckling kids, while castrates represent the lowest proportion (**Table 2**). This is in good agreement with previous findings in Ethiopia [17] [22] [23] [24] and elsewhere in Africa [25] [26] [27]. The higher proportion of does than other age groups suggests that adult females stay in a flock for breeding purposes and/or milk production. However, the less number of buckling as compared to doeling is because of marketing and slaughtering of buckling. There was a high level of elimination of the majority of born male kids.

Small ruminants were the predominant livestock species in the area (**Table 3**) and this shows that their wide acceptability and ease of adaptation in the area. Sheep and goat numbers are growing fastest in the mixed farming systems [28] as subsistence farmers prefer small stock because the risk of losing large ruminants is high [29]. In rural areas of Ethiopia, because of their subsistence and

economic reasons, goats and sheep have been described as bank reserve which can be drawn upon when cash money is required. This confirms a study by [30], who reported that keeping livestock, especially small ruminants plays role as safety net that enables households to get quick income to settle urgent financial needs.

3.3. Purposes of Keeping Goat

Knowledge of reasons for keeping animals is a prerequisite for deriving operational breeding goals [6] [31]. **Table 4** summarizes reasons of keeping goats and the ranking of these purposes by owners. The most frequently reported reason for keeping goat was cash income generation followed by milk and meat production for home use. This implies that sale of goats to generate cash constitute the primary purpose among the other benefits of keeping goats in the area. This was also observed in similar studies [32] [33] [34] [35], who reported that cash income as the most important reason in goat farming. However, the purpose of keeping goats in rural areas of South Africa is mainly for traditional purposes and meat consumption [36].

3.4. Land Holding and Goat Production

Mixed crop-livestock production system takes place as an important source of livelihood in the area. Huge ruminant animals such as goats are kept and a vast area of land is cultivated. Overall cropland holding of small-scale and large-scale

Table 3. Percentage of households owning livestock species across the two farming systems.

Livestock species	Small-scale farming		Large-scale farming		Overall	
	n = 99	%	n = 51	%	N = 150	%
Goat	99	100.00	51	100.00	150	100.00
Sheep	80	80.80	38	74.50	118	78.67
Cattle	66	66.67	33	64.70	99	66.00
Chicken	69	70.00	30	58.82	99	66.00
Donkey	67	67.67	29	56.86	96	64.00

Table 4. Reasons for keeping goats as ranked by respondents in the area.

Purpose	Rank			Index
	Rank 1	Rank 2	Rank 3	
Cash income	119	17	12	0.448
Meat home consumption	11	10	118	0.190
Milk	20	123	7	0.348
Skin	0	0	3	0.003
Saving value	0	0	10	0.011

Index = ∑ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular purpose divided by ∑ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all purposes. The highest index value indicates the highest importance of the trait.

farmers was observed to be 4.10 and 86.90 hectares, respectively. This indicates that there is huge crop residue production in the area, a considerable source of goat feed. Normally, crop residues are grazed or stockpiled for animal feeding. In some cases, the stored residues are sold during the critical period of feed scarcity. Sorghum crop residues are by far the most abundant feed resource in the area.

4. Goat Husbandry Practices

4.1. Feeds and Feeding Management

The different feed resources reported in the area were natural pasture, browse species, crop residue and crop aftermath. Private grazing land was not common in the area. It was reported that communal grazing was the most abundant feed source for goat in the area though grazing drastically reduces in the dry season. Indigenous browse species are available feed resources for goats mainly in the dry season and the drought periods (March-June). It was indicated that *Acacia mellifera*, *Acacia seyal*, *Anogeissus leiocarpus*, *Balanite aegyptica*, *Dichrostachys cinerea*, *Sclerocarya birrea*, *Combretum hertmannianum*, *Rhus nataliensis*, *Zizyphus spina-cristi* were the predominant plant species widely utilized as goat feed source.

Crop residue and crop aftermath grazing were the other vital feed resources of goat during crop harvesting and after harvesting has occurred. Animals feed on the residue in two ways. The harvested crop residue is stacked near to homestead and fed to selected group of animals in the dry season. Otherwise, standing residue is left for grazing. However, the expansion of cropland, increase in livestock population and area enclosure are negatively affecting feed resource in the area.

4.2. Water Sources and Watering Management

Water resource is pertinent and vital for the subsistent life of livestock and livestock owners. In the study area, river, pond and borehole form the major source of water for domestic use and livestock watering. Indeed, water points are limited and large number of animals watered at the same water points leading to high chances of spreading diseases and land degradation. There were only two government constructed water points. Besides, private water points were very few.

Distance to water points varied with season and was invariably longer during the dry season. This posed challenges to breeders and sometimes limited access to water. A large proportion (45.33%) of the respondents travel 6 - 10 km to water their animals in the dry season. While in the wet season 67.33% of the total respondents watered their animals at a distance of less than 1 km. Shorter watering frequencies were used to water animals in the area. The proportions of the respondents that watered their goats once a day and twice in a day were 82% and 18%, respectively. Watering with more than a day frequency is not reported.

4.3. Housing System

Based on personal observations and interviewed households' information, goats were housed with sheep in nights. None of the respondents had provision for

accommodating different age groups. Only sick ones and newly born kids/lambs were retained alone in sheds. Sheds were constructed of locally available materials. Sheds were not permanent as animals migrate from place to place in search of feed and water. However, farmers in urban areas used permanent houses separated from or attached to their homesteads.

4.4. Herding Practice

The common herding management in the area was free grazing. All the interviewed farmers replied that they herded goats with sheep. One or two herdsman and at least one herding dog used to accompany flocks for grazing. There is also the possibility of mixing with other goats and sheep flocks in the nearby vicinity of villages. Flocks of small size of less than 30 were pooled together to a maximum size of 60 to 120 heads for grazing. And then the flocks owned by different farmers were taken together by hired grazers.

4.5. Common Goat Diseases and Health Management

Diseases are a major constraint to the improvement of livestock industry in the tropics as they decrease production and increase the morbidity and mortality [37]. The most commonly prevailing diseases which hamper goat production in the study area are presented in Table 5. Respondents indicated that diseases affect all age groups of goats and mortalities from disease are high. More than half (53%) of the sampled respondents were able to separate between the different diseases. Diseases were named according to their symptoms.

Vaccination services were provided by Bureau of Agriculture and Rural Development of the district at seven clinics. In addition, farmers use modern drugs either from government clinics or open markets and treat their animals themselves. Some farmers also claimed that veterinary officers were called to treat their sick animals. The most extensively used drug in the area was oxytetracycline and locally known as *leshlesh*. Likewise, branding was applied when animals get sick and for identification purpose.

4.6. Origin, Distribution and Current Status of Begait Goat

Indeed, there is no documented information on the exact origin of Begait goat. According to [20], it is believed that the breed was derived from Nubian type

Table 5. Local names and scientific equivalents of the common goat diseases in the area.

Scientific name	Local name (*Tigrigna*)
PPR (pest des petits ruminants)	Gulhay
Foot rot	Mojelle
Orf/Contagious Ecthyma/Sore mouth	Af-gumed
Pasteurellosis	Mi'eta
Small pox	Enfrir
Anthrax	Megerem

goats. In the area the breed is also known as Barka/Hassan. From individual interviews, 37% of sampled farmers agreed that the breed's name "Barka" is an indicator of the breed's origin that is Barka area from Eritrea while most (63%) of the respondents believed that the breed's origin could be Eritrea and Sudan. From the focus group discussions, it became obvious that Begait goat is primarily kept by Beni Amir ethnic group who lives in Eritrea and Sudan bordering Ethiopia. This observation is supported by [38], who documented that Beni Amir ethnic group occupies the borders between much of Eritrea's Barka valley and eastern Sudan.

Despite the exact date of immigration remains unclear, Begait goat is extensively distributed across northwestern lowlands of Ethiopia. It is estimated that >110,000 Begait goats are found in northwestern and western zones of Tigray region. Based upon the results of focus group discussions and individual interviews, population size of the breed is at increasing trend. The possible reason reported for this trend was the involvement of more farmers in Begait goat production as the breed is more prolific and resistant to drought conditions with better milk yield and meat quality. At present, Bureau of Agriculture and Rural Development of Tigray region has established a ranch, at Mai Woyni *kebele*, western zone of the region, for all Begait animal species aiming at conservation, breeding and improvement.

4.7. Breeding Practice and Selection Criteria

In the study area, mating was random. There was no report of controlled mating. Bucks run with does throughout the year and castration was an uncommon practice in the area. This resulted in indiscriminate and uncontrolled breeding. The productive life span of buck was reported on average 5 years. Most (83%) of the respondents had own buck. Farmers who had no breeding males, purchase buck from local markets or got buck service from their neighbors. This finding is in line with previous findings [14] [39] [40].

The most common way of selecting goats as parents for the coming generations is to use the offspring of a chosen parent (buck and/or doe). Linear index is the best strategy for selecting replacements in the livestock industries [41]. Selection criteria for buck and doe with corresponding index values are presented in **Table 6**.

The respondents prioritized body size, growth rate and libido as selection criteria for buck with the indices of 0.329, 0.232 and 0.183, respectively. While the most important selection criterion for does were body size (index = 0.330), twining ability (index = 0.219) and milk yield (index = 0.166). Others like mothering ability, kid survival, kidding interval and age at puberty were also reported as criteria but with lower rankings.

4.8. Effective Population Size and Level of in Breeding

The effective population size (Ne) and level of inbreeding (ΔF) were calculated for Begait goat using the averaged breeding males and females under closed

Table 6. Selection criteria for buck and doe in the study area as ranked by owners.

Class and selection criteria	Rank			Index
	Rank 1	Rank 2	Rank 3	
Buck				
Body size	82	18	14	0.329
Drought resistance	18	18	28	0.131
Growth rate	17	70	18	0.232
Libido	12	31	67	0.183
Coat color	15	8	17	0.087
Horn	6	5	6	0.038
Doe				
Body size	85	14	13	0.330
Age at puberty	8	4	3	0.039
Kidding interval	8	5	6	0.045
Twining ability	8	75	23	0.219
Milk yield	14	16	75	0.166
Kid survival	10	15	8	0.076
Mothering ability	17	20	22	0.126

Index = ∑ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular trait divided by ∑ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all traits.

breeding practice. Majority of the bucks were originated from their respective flocks which lead to inbreeding. Communal herding in contrast increases genetic diversity by rising Ne [6], which is a common practice in the study area. The obtained results for Ne and ΔF were 7.08 and 0.07, respectively. The rate of inbreeding was equivalent to the maximum acceptable value of 0.063 [42].

4.9. Reproductive Performance

According to respondents, the age at puberty in Begait goat was 7.41 ± 1.85 months for males and 8 ± 1.78 months for females. The present finding is within the range of age at sexual maturity reported for most of the tropical goat breeds under extensive system of management [20] [43].

The reported mean age at first kidding (AFK) for Begait goat was 14.18 ± 1.24 months. This is in agreement with that reported by [44] for Metema goats that have mean AFK of 13.6 ± 2.44 months. This result is also in agreement with reported age at first kidding for Arsi-Bale goats which is 14.88 ± 0.3 months [16] and shorter than for Somali short-eared goats which is 19.9 ± 7.93 months AFK under traditional management conditions.

Begait goat breed, according to the respondents had an average kidding interval of 8.4 ± 1.37 months. This result was shorter than the reported kidding interval for Abergelle and Central Highland goats which were 11.31 ± 2.21 and 10.3 ± 1.42 months, respectively [45]. Higher longevity under adverse conditions is one of the adaptation traits of tropical livestock. The mean reproductive lifes-

pan of does in the flock was reported 11.44 ± 1.17 years and the average number of kids per doe per lifespan was 15.32 ± 1.76.

4.10. Acquisition and Disposal

The famous methods used to acquire goats were new born, buying and inheritance with the index values of 0.390, 0.343 and 0.186, respectively (Table 7). This is in good agreement with the findings of [33] and [46] in Uganda. Whereas disposal was through selling, slaughtering in holidays and death in that order (Table 7).

Goat marketing in the study area was traditional type. All (100%) of the respondents reported that weighing balance is unknown for selling and/or buying animals; rather visual assessment was used to estimate body condition of animals. Hence, selling price was fixed by negotiation between sellers and buyers. This result agreed with many research reports [16] [47] [48] from Ethiopia. The study results also indicated that higher numbers of goats are sold and better price is fetched in holidays although farmers sell goats at any time of the year depending on their need for money. Goat owners sold their goats primarily for purchasing food items, health expenses, farm input expenses (fertilizer and cropland rent), labor expenses (herdsman and laborers), school expenses for children and to pay back credit.

4.11. Production Constraints

Interviews with the sampled farmers revealed key problems constraining goat production in the area (Table 8). Water shortage, feed and grazing land shortages and inadequate veterinary services were ranked first, second and third, respectively. In line with the present findings previous studies [49] [50] indicated that the major problems of small ruminant farming include inadequate supply of

Table 7. Ways of acquiring and disposing goat in the study area as ranked by owners.

Way of acquiring and disposing goat	Rank			Index
	Rank 1	Rank 2	Rank 3	
Acquiring (Entered through)				
Born	82	43	19	0.390
Bought	50	69	20	0.343
Gift	10	11	21	0.081
Inheritance	8	27	89	0.186
Disposing (Exited through)				
Sale	91	28	24	0.392
Death	29	24	78	0.237
Slaughter	17	83	32	0.277
Theft	7	11	11	0.060
Predator	6	4	5	0.034

Index = ∑ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular method divided by ∑ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all methods.

Table 8. Ranked goat production constraints in the study area.

Constraints	Rank			Index
	Rank 1	Rank 2	Rank 3	
Feed and grazing area shortages	28	52	19	0.230
Water shortage	49	24	35	0.256
Inadequate veterinary services	31	32	23	0.200
Labor shortage	9	6	20	0.066
Market problem	20	23	24	0.144
Theft	9	7	17	0.064
Predators	4	6	12	0.040

Index = ∑ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular constraint divided by ∑ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all constraints.

water and pasture mainly in the dry season and problems arising from inadequate veterinary services and infrastructure.

5. Conclusion

This study provides insight in to agricultural production system, breeding practices and major production constraints encountered in goat farming in the study area, which are preconditions in developing breeding programs. The present study also revealed that there are two types of farming systems in the area namely small-scale and large-scale farming. Goat production is an integral component of the existing farming systems by providing multifunctional roles to its owners. The high economic significance of goat coupled with its large flock size in the study area would suggest the scope of genetic improvement schemes in the area. However, water scarcity, feed and grazing area shortages, poor veterinary services and market linked problems should be addressed.

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