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Assessment of Goat Production and Marketing Practices, Constraints and Opportunities in Yabello District of Borana Zone, Southern Ethiopia

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Abstract:

This research was undertaken with the objectives of assessing production and marketing practices, constraints and opportunities of goat production in Yabello District. The results were based on surveying of 100 households and the markets monitoring in the District. Then, the average goat holding in the woreda was 14.43 heads. Of these, female goats account a higher proportion (48.43%) which is due to the fact that pastoralists kept their female goats longer than the male. Goats in Yabello woreda were solely kept for the purposes of generating cashes used for purchasing grains for family consumption. Considerable proportions also used for meat and milk consumptions at home. In Study area various routine activities of goat production were shared among different family members. The activities like purchasing, selling and breeding of goats were performed exclusively by the husband. While, the husbandry roles like care of sick animal, milking, and cleaning barn, was left for women. Prominently, children also participated in herding the flock. Selection of breeding stocks for next generation was more frequently done in bucks (85%) than female animals in the District. Accordingly, half of the respondents were performed selection of breeding bucks based on their body size, pedigree and growth rate. Browsing on shrubs, bushes and tree leaves were the major feed sources for goats throughout the year. In woreda there are three local livestock market such as Haro-bake, El-way and Yabello. Diseases of small ruminants were the first ranked production constraints of small ruminants followed by feed shortage and water scarcity.

Keywords: Goats production, marketing system, opportunities, Yabello district

1. Introduction

Ethiopia consists a huge and diverse goats population. The diversified genetic resources is vital for the present and future livelihoods of the large rural farmers in the country. In Ethiopia, there was about 22.6 million heads of goats that were distributed across different agro-ecological zones of the country (CSA 2012). These resources provide a vast range of products and various services such as immediate cash income, meat, milk, skin, manure, risk management and social functions to many smallholder farmers in the country (Adane and Girma 2008). They also serve as sources of foreign currency through meat and live animal exports (Berhanu et al 2006) and have various social and cultural values; nevertheless the wider variations exist among different cultures, socio-economies and agro-ecologies of the country.

Ethiopia has large goat resources than most of African countries. The relative importance of these resources and their products varied from region to region and are largely determined by ecological and economic factors. Traditionally, keeping large number of goats was considered as an expression of wealth and/or social status in the rural community. However, with ever increasing human population and drastically shrinking of farming land, goat production is becoming a predominant farming practice, particularly for the landless youth and poor families in the rural areas, while their counterparts, the large ruminants, are facing difficulty during critical seasons of feed shortage (Legesse et al 2008).

On other hands, efficient livestock marketing system plays an essential role in assuring better income and benefit for producers. Production without access to market is also a problem for many livestock owners in tropical countries (Lightfoot et al 2005). In Ethiopia, small ruminant production lacks reliable marketing outlets that would benefit small scale small ruminant producers; the pastoralists and consumers (AIS 2003). In many parts of the world, rural people often claim the only reason why they cannot improve their living standards is the difficulties in accessing markets (IFAD 2003). Also with limited opportunities for access to markets goats are often kept beyond their optimum productive levels.

This study was therefore, carried out in Yabello woreda of Borana zone. The Borana rangeland was highly endowed with various species of vegetations dominated by mixtures of perennial and woody plants, trees and shrubs with varying composition in response to intensity of grazing and browsing (Coppock 1994). The Long-eared Somali goats have been so far characterized as a dominant goats

breed in the study area, which are highly adapted to heat stress and harsh conditions of Borana rangeland. In entire Borana zone 1,223,889 heads of small ruminant population were goat's accounts approximately, about 69.03% of total population (BZPDO 2012). The pastoral areas of Ethiopia in general and Borana in particular are believed to be the highest sources of goats for domestic and export markets despite the deep rooted production constraints and wider use of traditional production practices. Thus, based on the above background, this study was designed to address the following objectives;

- To assess sheep and goats production practices in Yabello district of Borana zone,
- To describe sheep and goat marketing systems in the study district and,
- To investigate the constraints and opportunities of sheep and goat production in the study area.

2. Materials and Methods

2.1. Study Area and Data Collection

The study was conducted b/n September 2012 and May 2013 in order to assess goat's production and marketing practices and the exiting constraints and opportunities in Yabello district of Borana Zone, Oromia National Regional States. Borana zone comprises many pastoral and few Agro-pastoral districts, while Yabello was one of the pastoral districts in the zone. Yabello is an administrative town of Borana zone located at 565 kilometers from Addis Ababa, the capital city of Ethiopia and it was geographically located at 4° 53'49' N, latitude and 38° 5' 28' E, longitude (CARE 2009).

Prior to performing sampling, the background of the study area were assessed with regard to the potential of goat production and their distributions in the District. The rapid exploratory field visit was carried out with extension agents. Based on the information obtained from rapid exploratory field visit coupled with the secondary data on goat populations and their distribution within the District; ten (10) kebeles were purposively identified. Thus the sample size was determined using the formula recommended by Arsham (2005) for survey study as follows.

$$N=0.25/ (SE)^2 \text{ Were, } N= \text{ sample size}$$

SE= standard error

Therefore, by assuming the standard error of 5% and the confidence interval of 95%, 100-householders were selected and have been interviewed. Initially the sampling villages in the selected kebeles were identified purposively based on the population of goats in the villages. Then, the households owning goats were selected using random sampling technique from the identified villages in the kebeles.

A formal survey using structured questionnaires was conducted with open-ended and close-ended questions. With this respect primary data on the demographic characteristics of pastoralists, livestock holding and structure, production objectives and role of different family members in husbandry of goats, breeding practices of goats, feed and water resources and their availability and housing of goat flocks, various routine husbandry practices such as identification and marking, castration and trimming, dipping and culling of goats were collected from selected households in the District. Similarly, the purposes of sale, markets location, types of goats marketed, mode of marketing, market participants and prices were collected using the structured survey questionnaire. Data collected through formal interview was substantiated by field observation.

2.2. Market Monitoring

Market monitoring has been carried out at three different livestock market centers in Yabello District; Haro-bake, Yabello and El-way market centers. The number of goats marketed in each marketing days, modes of marketing and prices of different categories of goats were collected from those market centers through monitoring of the market from October 2012 to April 2013.

2.3. Data Analysis

Microsoft Excel was utilized for data management and entry. SPSS software, version 20 was employed for analysis of data (SPSS 2011). Data were analyzed by descriptive statistics such as percentages, means, standard deviations, ratios, figures, and charts for assessing of goat husbandry practices, marketing systems, constraints and opportunities in the district.

Index ranking system was utilized to provide overall ranking of the purpose of keeping, selection criteria, goats market participants and major production constraints of goats in the district. Thus the formula utilized to calculate index ranking was, $\text{Index} = \frac{\sum \text{of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for a given particular purpose of keeping, selection criteion, market participant and constriant of sheep and goats}}{\sum \text{of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all purposes of keeping, selection criteia, market participants and constriants of sheep and goats}}$.

The quantitative data means like distance to watering point and interval of watering goats within a season has been compared by means of one way analysis of variance (One-Way ANOVA) in SPSS. The differences between means has been declared significant at $P < 0.05$.

3. Results and Discussion

3.1. Livestock Holding and Flock Structure

The average cattle holding of Yabello district was significantly higher than the holdings of other types of domestic animals. Therefore, this indicates that cattle is the dominant species of livestock reared among the respondents in the district. Following cattle small ruminants' holding per household are also shows the second highest proportion in study district. (Figure 1)

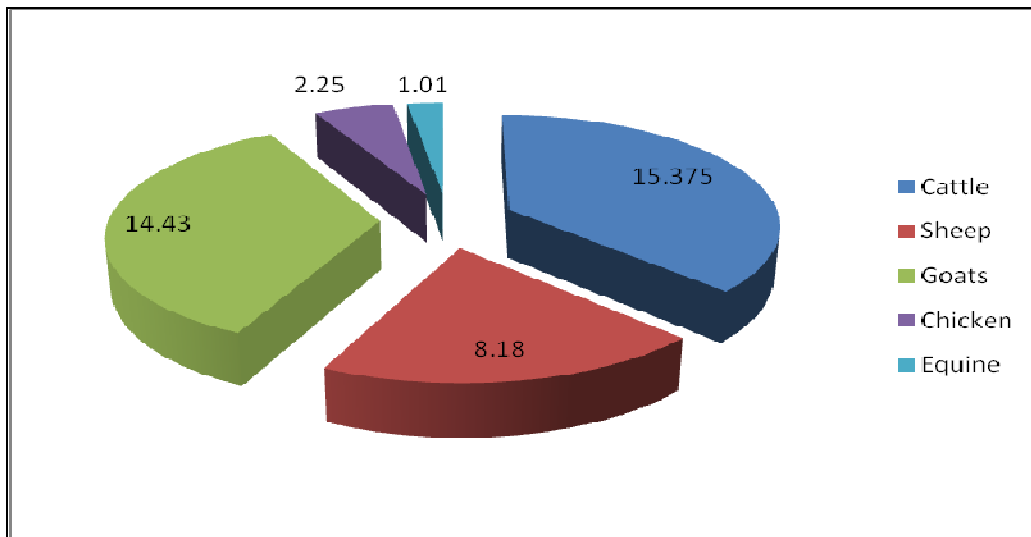


Figure 1: Mean livestock holdings in the study District

In the study districts the flocks of goats are made of various age and sex composition. The composition of breeding females constitutes larger proportions in the flocks (48.4%). Therefore, this could be due to the reason why the pastoralists in the district are interested in keeping female goats for longer periods of time in their flocks and/or the importance of culling was not fully recognized (Table 1).

Goats categories	Mean ±SD	%
Kids < 6 months	2.40±0.90	16.7
Kids (6-12 months)	2.63±0.89	18.3
Intact male>1 year	1.82±0.80	12.7
Female>1 year	6.96±2.87	48.4
Castrated	0.56±0.57	3.4
Total	14.43±4.18	100

Table 1: Average Goats flock compositions within household

3.2. Production Objectives and Role of Family Members in Husbandry

The purposes of keeping goats in the Yabello district were literally remaining similar among the interviewed respondents. The respondents in the study district keeps their goats for different purposes such as sources of income, meat, milk, ceremonial activities, and saving insurance. The ranked purpose of keeping goats by respondents in study areas were presented in Table 2. Accordingly, source of income was ranked as first purpose of raising goats in the study area. This is in concord with Tsedeke (2007) which reveals that the rural households do not sale large animals for acquiring them back is not as easy as small ruminants. Whereas, next to sources of income, meat, milk, ceremonial value and saving insurances has been ranked according to their order of importance.

Purpose of keeping	Ranking	Rank1	Rank2	Rank3	Index
Income source	1st	64	16	3	0.38
Meat	2nd	32	32	12	0.28
Milk	3rd	4	32	32	0.18
Ceremony	4th	0	12	36	0.10
Saving	5th	0	8	16	0.05
Manure	none	0	0	0	0
Butter	none	0	0	0	0

Table 2: The purposes of keeping goats in study area

On the other hand, the routine husbandry activities of goats were shared among various family members in the pastoral areas. In Yabello district men dominated most of goat marketing (purchase and sale) and breeding related decisions, though women plays an important role of caring sick animals, milking and cleaning barns. This was agree with Tesfaye (2009) that the women clean flock barns (66%) and Edea et al (2012) were women did care for sick animals (71.2%). Furthermore, family children have a significant role in goats herding and certainly in cleaning the barns and milking (Figure. 2).

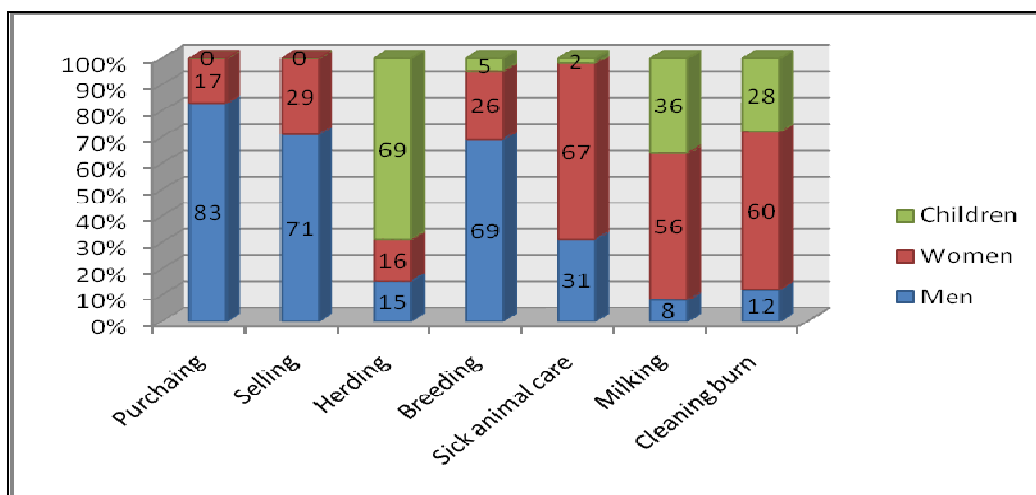


Figure 2: Role of family members in goat's husbandry

3.3. Breeding Practices of Goats

Mating was predominantly uncontrolled and none of the respondents reported controlling of the breeding practices of their goats. About 87% of interviewed pastoralists have their own bucks in the flock. Of those bucks owned by the respondents, 66% were home-born while the rest were obtained through purchasing. On other hand the remaining, 13% of respondents were uses the breeding bucks of their neighbors or relatives. Though, breeding is one of the most important tools of improving animal performances none of the respondents reported to have basic breeding plan of their flock. And, mating of the flock was carried out randomly elsewhere in the field and/or during the night in the barn.

Overall, 48% of the pastoralists practiced selection of their breeding bucks while only 17% conduct selection of their breeding female. This indicates that, selection of breeding bucks were more common than in Does among sampled pastoralists. Therefore, body size and pedigree was the frequently used characters for selection of breeding buck, however growth rate, body color and tail formation are less frequently used traits (Table 3). While, the characters like body size, lambing interval and mothering ability were the most rated traits considered in the selection of breeding females.

In this study, even though the selection of breeding males are more common in the flock, lack of selective mating were significantly affected the progress of genetic improvements through selection. On the other hand, the trends of selection of breeding females for breeding stock was comparatively lower that significantly undermine the contribution of female to genetic progress. Therefore, this was slowdown the progress of genetic improvements through selections.

Characters	Ranking	Respondents ranking			Index
		Rank1	Rank2	Rank3	
Body size	1st	26	6	2	0.32
Pedigree	2nd	9	21	8	0.26
Growth rate	3rd	8	11	10	0.19
Color	4th	5	6	9	0.12
Tail formation	5 th	0	4	19	0.09

Table 3: Ranked selection criteria for breeding bucks

3.4. Major Feed and Water Resources of Goats

There are various feed resources available for goats in study district, according to interviewed respondents. The most common feed sources are browse of different bushes, shrubs, tree leaves and others. This feed in the study area was literally available in consistent manner both during wet and dry season. Overall, 81% and 86% of the respondents were relied on browsing of different bushes, shrubs and tree leaves as major feed sources for their goats in the dry and wet season respectively. However, there was also a practice of feeding goats from pods of acacia trees particularly during shortage of natural pastures. Grazing of goats was also reported among few respondents in study area upon the shortages of the browsing probably during the dry period. Nevertheless, none of the respondents were provides agro-industrial by-products, improved forage and crop residue for their goats (Table 4).

Feed types	Availability (%)	
	Dry season	Wet season
Grazing natural pasture	4	14
Browses	81	86
Acacia pods	15	0
Total	100	100

Table 4: Major feed resources of goats

Among the interviewed pastoralists about 73% has faced feed shortage mainly, during the dry season. And, the main causes of feed shortage in the District were due to recurrent drought, scarce of browse in the dry period and increased animal population (Table 5).

Causes of feed shortages	N	Percentage (%)
Recurrent Drought	30	41.1
Scarce of browse	14	19.2
Increased of animal population	3	16.4
Bush encroachment (unpalatable)	12	4.1
Expansion of settlements	9	12.3
Expansion of cultivated land	5	6.8
N=number of respondents		

Table 5: Causes of feed shortages in study District (%)

About 71% of drinking water for goats was obtained from dip well during dry season, while 79% was obtained from pond water during wet season (Table 6).

Water sources	Percentage (%)	
	Dry season	Wet season
Dip well	71	2
Pond	6	79
Cisterns	3	5
Motor & Hand pipe	4	0

Table 6: Sources of water during dry and wet season

The frequency of watering and Distances to water points in District was significantly affected by seasonal variation ($P < 0.05$). The average distance to the watering points during dry season was 7.87 kilometers which could be as close as 1.61 kilometers during wet season. Similarly, the average watering interval of goats among the interviewed pastoralists was 5.56 days which was beyond ten days on an average during wet season (Table 7). Likewise, Endashaw (2007) reported that 86% of households in moist kola area of Dale District of Southern Region were walking 6-10 kilometers distances to water points during dry season. This shows that in the dry season goats were forced to trek longer distances to the water point in dry season, which results in loss of energy thereby undermine drought resistance.

Interval of watering and Distances to water point	Seasons		
	Mean \pm SD		Test
	Dry season	Wet season	P-value
Interval of watering (day)	7.56 \pm 0.97	14.97 \pm 1.72	0.016
Distances (km)	7.87 \pm 1.58	1.61 \pm 1.12	0.023

Table 7: Average interval of watering and distance to water point

Water scarcity was the critical problem among the pastoralists in the District. Of the interviewed pastoralists, 71% of goats owners were reported shortage of water for their animals, particularly during the dry season. The shortages of water for goats flock was mainly caused by the drying of water sources (31%), long trekking to water sources (21%) and an increase of animal population (19%).

3.5. Goats Production Practices in the Study District

3.5.1. Fencing and Housing

Fencing was virtually common among all pastoralists in the District for the purposes of handling animals and protecting them from predators. Fences were usually made from locally available materials such as shrubs, thorny and wooden trees. Among the interviewed pastoralists 82% keeps their flocks in open corrals at night, while the remaining keeps their flock in the main family

house. However, the kids were frequently kept in the family houses or separately built pen, which was meant to provide ideal environment. The houses meant for goats flocks was made of a combination of woods and thorny branches of acacia trees.

3.5.2. Castration and Hoof Trimming

Pastoralists in study District practice goat castration infrequently; blaming castrations affect the growth and sale price of animals at market. This was due to the fact that late castration cause shocks to the growth of animals (Girma and Alamu 2008). Hoof trimming of goats was carried out very infrequently (6%) in Yabello district. This was due to the facts that long trekking of animals during herding and watering was used to balance growth of hooves.

3.5.3. Dipping and Culling

Despite its application was during intense tick infestation, acaricide application was one of a routine management practices in the study District. Nearly all pastoralists apply acaricide on their goats. However, there was no regular schedule of acaricide application. Hand dressing (81%) was the main methods of acaricides application. While, the remaining respondent’s was being used knapsack sprayer. Culling of unproductive animals is not common in the study area. They maintain all undesired animals within the flocks for a longer time. On an average the pastoralists in the study area kept their female goats for more than 6.72 years within the flocks regardless of their productive and reproductive performance.

3.6. Goats Marketing Systems in Yabello Districts

3.6.1. Purposes of Sale

Most of the respondents in study area have sold their goats mainly for obtaining immediate cashes in order to purchases food items (74%). However, the remaining respondents (26%) had sold their goats in order to obtain cash for family, animal health handling cost and other unforeseen needs. Similarly, Tesfaye (2009) reported that the farmers in Metema Woreda of Amhara Region had sold their goats when they face a shortage of cashes to fulfill their immediate household needs.

3.6.2. Markets Location

The common livestock markets in the District were Haro-bake, El-wayya and Yabello market. Most often, these markets are arranged once a week except, in Yabello small ruminant’s market which was held twice a week. Of these market centers Haro-bake was the largest market center in terms of number and species of animals marketed. The average numbers of goats marketed at Haro-bake was about 167 per a single market day. Yabello market center was arranged in Yabello town and exceptionally, carried out only for sheep and goats marketing. In general, within these primary markets proportionally larger number and categories of marketable animals was accommodated per every marketing day (Table 8).

Market center	(Mean ± SD)
Yabello	130±29.7
El-wayya	144±32.3
Haro-bake	167±37.4

Table 8: Average number of small ruminants marketed every market days

On the other hand, considerable numbers of pastoralists sold their goats on farm gates and bush markets which take place at various rural areas of the study District. Though it was not regular market throughout the year these markets are usually arranged to supply marketable animals to primary markets in district. Generally, the respondents in the study District sold their goats to the nearest market places, regardless of information animal price (Figure 3).

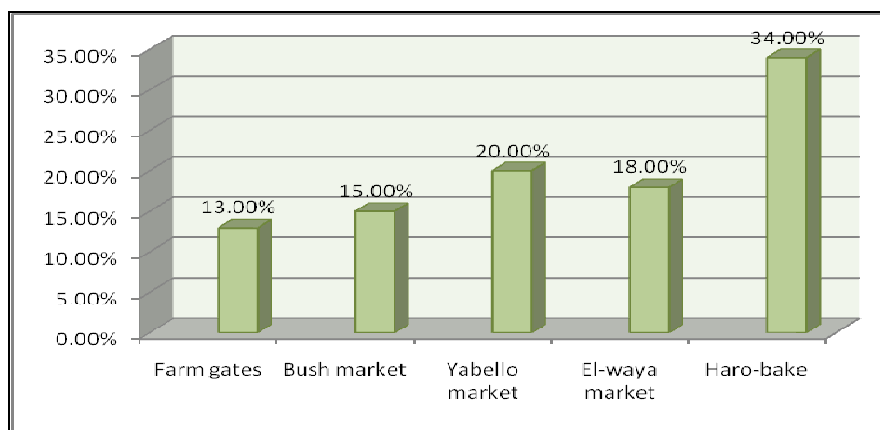


Figure 3: Market places where households recently selling their goats (%)

3.7. Types of Goats Marketed and Their Prices

The classes and average prices of goats at three different markets in Yabello District are summarized in Table 9. All age, sex and weight categories of goats were marketed in these market centers. Among all categories of goat marketed, the prices of goats were higher at Haro-bake market center followed by Yabello market. In all the three known livestock market centers the castrate was the highest sell price within all the three market centers in study area. On other hands, the female goat (6-12 years) shows constant prices among all the three markets. On the body weight bases the average price of goats were 26.4 Ethiopian Birr per kilogram of live body weight.

Classes of Goats	Mean \pm SD (EB)		
	Haro-bake	El-wayaya	Yabello
Female >1Year	562 \pm 47.7	489 \pm 31.3	525 \pm 31.6
Male >1Year	724 \pm 64.7	598 \pm 41.5	654 \pm 48.5
Female (6-12months)	319 \pm 37.1	313 \pm 25.2	319 \pm 23.4
Male (6-12months)	345 \pm 34.7	324 \pm 30.5	330 \pm 36.0
Castrates	856 \pm 67.5	813 \pm 32.2	836 \pm 43.9

Table 9: Average prices of sheep and goats in different markets

3.8. Mode of Marketing

Most of the respondents were sold their goats based on physical observation based price estimation (82%). However, the rests sold their goats on body weight bases, were only a young male goats was purchased by the traders. The reason for selling animals on physical observation based price estimation was mainly due to the preferences of the purchaser (Table 10).

Reasons	Respondent (%)
Purchaser preferences	91
Incentive prices	4
Avoiding mischief	5

Table 10: The reasons of selling goats based on body condition observations

3.9. Market Participant and Price Information

According to the respondent's ranking small traders were the first ranked marketing agents involved in the goats marketing. Next to small traders, brokers, big traders and butchers were ranked in order of their importance with the considerable roles in small ruminants marketing in the District (Table 11).

Market Agents	Ranking	Respondent			Index
		Rank 1 st	Rank 2 nd	Rank 3 rd	
Small traders	1st	60	17	1	0.36
Brokers	2nd	12	44	17	0.23
Big traders	3rd	28	11	0	0.17
Butchers	4th	0	22	42	0.14
Local consumers	5th	0	7	40	0.08

Table 11: Ranked goat's market agents

3.10. Goats Production Constraints and Opportunities

3.10.1. Goats Production Constraints

Disease of small ruminants was the major production constraint of goats followed by feed shortages and water scarcity in the study area. According to respondent ranking there were also various potential production constraints of goats in study area (Table 12).

Characters	Ranking	Respondents			Index
		Rank 1 st	Rank 2 nd	Rank 3 rd	
Diseases	1st	52	20	4	0.33
Feed shortage	2nd	16	28	18	0.20
Water scarcity	3rd	16	20	32	0.20
Drought	4th	8	12	4	0.09
Market problem	5th	4	8	20	0.08
Poor extension	6th	4	4	16	0.06
Predators	7th	0	8	8	0.04
Labor shortages	none	0	0	0	0.00

Table 12: Ranked goats production constraints in study District

3.10.2. Opportunities of Goats Production in Yabello District

The Yabello District was endowed with various trees, shrubs, bushes, acacia species and different natural forests and vast rangelands left for communal grazing that could be the potential feed sources goat in the District. Therefore, this can enhance the livelihood of rural families and youths in the District as if they engaged in goats rearing.

From their physiological adaptation points of view goats are highly resistant to the harsh climates and recurring drought than their counterpart; the cattle. And, therefore in the study District recurring drought is becoming common phenomenon usually happening every five years (Baker 1989) which result in loss of substantial numbers of animals which was highly prone to drought. Thus, keeping goats in this District could give a security against this natural disaster.

In Yabello District there was considerably huge number of goats' populations. These, huge indigenous resources have its own genetics merit in adaptation to harsh pastoral environment and yield a considerable amount of products that could be significantly improved when extension and veterinary services provided.

4. Conclusion and Recommendations

4.1. Conclusion

Small ruminant production among pastoralists in Yabello District was largely undertaken along with the large ruminants. However, goats were the second largest types of animals following cattle in the districts.

The main purpose of raising goats in the study area was primarily to generate cash for purchasing food items and fulfilling other immediate family needs.

In the study area husbands are primarily responsible for marketing and breeding related decisions of goats, while women undertake the routine husbandry activities like sick animal care, milking and cleaning barns.

The principal feed sources of goats were browses of various shrubs, bushes, and tree leaves and acacia species both during wet and dry season. And, all pastoralists herd their goats in vast communally owned range lands areas without offering any supplementary feeds.

Dip well was the most commonly used water sources during the dry season while hand-dag ponds were usually used during wet period. Shortage of water for goats are the major problem among the pastoralists in the District particularly during dry season which was due to drying of many water sources and thereby, elongation of distance to water points.

Selection of breeding male in the flock was substantially carried out among the interviewed pastoralists than breeding female. The selection of breeding males was largely done by considering the characters like body size, pedigree, growth rate and coat color. Whereas, in selection of breeding female the characters like body size, lambing interval and mothering ability were considered.

There are three known market centers in Yabello District where small ruminants are marketed. Additionally, bush markets are arranged at different local marketing center. The major market agents that were largely participating in goats marketing are small traders. All age, sex and weight categories of goats were marketed at all market centers in the District.

One of the limiting factors of goat's production in Yabello district was diseases of small ruminants. The interviewed pastoralists claimed the diseases of small ruminants as a major limitation of goats in study district. Feed shortages during the dry periods, water scarcity and drought were also among the mentioned important constraints of small ruminant production in the district.

4.2. Recommendations

Therefore based on the above conclusions the following recommendations are forwarded;

- More emphasis needs to be placed on the improvement of goat production in the district due to their significant contribution to the family income and food supply and their ability to survive and produce in the harsh environments.
- In study District women's involvements in the production of small ruminants was reasonably significant. Therefore, this trends need to be encouraged to significantly increase the roles of small ruminants in strengthening women thereby improving the livelihood of rural community in the district.
- Diseases which are the major constraint in of goat's production should be studied in depth and causative agent's needs to be identified and appropriate precautionary measures should be set in place.
- Feed shortage was a critical problem in Yabello District, especially during drier season. Therefore, range productivity improvement program has to be designed to avoid and/or reduces shortages of feeds happening in the drier season. Moreover, feed conservation strategy needs to be given due attention as there were abundant pastures in the district during wet season.
- Water sources and its availability were significantly affected by seasonal variation in the District. During dry period water points get dry and consequently water requirements of animals become increased due to increased temperature, which led to water scarcity. Therefore, it needs appropriate intervention to minimize the problem.
- Market intervention with respect to improving infrastructures and delivery of market and price information for efficient marketing system must be designed to encourage the producers and consumers.

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