

Full Length Research Paper

Participatory analysis of problems limiting goat production at selected districts of East Showa zone, Ethiopia

Gurmesa Umeta*, Misgana Duguma, Feyisa Hundesa and Merga Muleta

Adami Tulu Agricultural Research Center, P. O. Box 35, East Showa administrative Zone of Oromia Region, Ethiopia.

Accepted 5 April, 2011

The study was conducted at selected districts of East Showa zone namely; Adami Tulu Jido Kombolcha and Fentale districts with an objective of identifying problems limiting goat production at the area, to identify constraints and opportunities of goat production of the area and generating information for development practitioners working in the area. The sampled district was selected based on the potential of goat production of the zone. Two kebele per district were selected. 15 to 20 key informant farmers were identified with development workers per sampled kebele for group discussion. Both female and male households invited for group discussion. Appropriate Participatory Rural Appraisal (PRA) tools were identified and used for the study. A mix of PRA tools like group discussion, key informant interviews, pair wise ranking and seasonal calendar were employed for data collection and analysis. The PRA result was analyzed by descriptive statistics by using PRA tools. The study result indicates that, goat production is one of the major livelihood activities for the goat keepers of the area. In addition, it is used as household consumption (milk, butter and meat), generating income serves as wealth storage, and social values/ social gathering. Different problems like diseases (sheep and goat pox, diarrhea, ecto-parasite, circling disease and Mastitis, CCPP, anthrax, pasteurellosis, FMD), shortage of feeds, and lack of awareness on small ruminant fattening extension packages like concentrate supplementation and housing managements, market related problems, lack of awareness on inbreeding concepts and its effect, long kidding interval and Cu- deficiency are the major problems identified by the current study, which limits goat production in the area. Based on this finding, the study recommends that creating of wider awareness for farmers on goat production packages majorly, fattening extension packages, strengthening of veterinary services, reducing of inbreeding through awareness creation and/or introduction of cross breeds are some of the areas that needs to be improved. The study further recommends that, improving of animal feeds is the other major focus areas that needs to be giving due attention by stakeholders working in the area.

Key words: Participatory rural appraisal (PRA), Ethiopia, pair wise ranking.

INTRODUCTION

Ethiopia has a large livestock resource than most countries in Africa. It is estimated that 84% of the 70 million people live in rural areas and depend on agriculture for their livelihoods and the sector contributes 41.4% of the Gross Domestic Product of the country (World Bank, 2006). Goats are the predominant small ruminant species in the middle rift valley of Ethiopia, where most of them are kept under extensive management system and depend almost exclusively on natural pasture. During the dry season, the nutritive value of natural pastures deteriorate and become deficient in many nutrients, especially proteins. As a result, animals

that depend on those pastures progressively lose weight until the wet season comes. Alternatively, animals can be supplemented to minimize or to prevent weight losses (Abule et al., 1998).

There are about 26.1 and 21.7 million sheep and goat population heads in Ethiopia respectively (CSA, 2008). They are important components of the livestock subsector and are sources of cash income and play a vital role as sources of meat, milk and wool for smallholder keepers in different farming systems and agro-ecological zones of the country (Tekelye and Kasali, 1992; EARO, 2000; Workneh, 2000; Ehui et al., 2003;

Kassahun, 2004; Markos, 2006). They are also sources of foreign currency (Berhanu et al., 2006). Moreover, due to their high fertility, short generation interval, adaptation in harsh environment and their ability to produce limited feed resource, they are considered as investment and insurance (Asfaw, 1997). Unlike the large potential of small ruminants in the country their productivity is low. There are various factors that contribute to low productivity: health constraints, feed shortage both in quality and quantity, poor feeding and health management (Bayou, 1998).

Other contributing factors also include low genetic potential, policy issues (Zinash et al., 2001) market and institutional problems and problem of credit facilities and others (Berhanu et al., 2006). Although various research and development activities have been carried out in the past, no significant increase in productivity was achieved. Therefore, improvement programs are necessary to increase productivity and sustainable development of small ruminants in different farming systems of the country in innovative approach; so as to meet the demands of the human population. However, such development achievement for sheep and goats will only be successful when accompanied by a good understanding of the different farming systems and when simultaneously addressing several constraints: feeding, health control, general management, as well as cost and availability of credit and marketing infrastructure (Workneh et al., 2003).

Objectives

1. To identify problems limiting goat production in the area;
2. To identify constraints and opportunities of goat production of the area;
3. To generate information for development practitioners working in the area.

RESEARCH METHODS

General description of the study area

The study was conducted at selected districts of East Showa Zone,

*Corresponding author. E-mail: gurme2010@yahoo.com.

Abbreviations: **CSA**, Central statistical authority; **EPaRDA**, Ethiopian pastoral research and development association; **ESGPIP**, Ethiopian sheep and goat productivity improvement program; **DA**, development agents; **oARD**, office of agriculture and rural development; **MOA**, Ministry of Agriculture and Rural Development; **NARS**, National Agricultural Research System; **OARI**, Oromia Agricultural Research Institute; **PRA**, Participatory rural appraisal; **FMD**, foot and mouth disease; **CCPP**, contagious caprine pleuropneumonia; **PPR**, pest des petites ruminants.

namely, Adami Tulu Jido Kombolcha and Fentale districts, East Showa zone of Oromia regional state. Fentale agro pastoral livelihood zone is located in the mid of rift valley system covering the south corner parts of Fentalle wereda in East showa zone, Oromiya region. Out of the total 18 Peasant Associations (PAs), this livelihood zone has 14, 712 population in 7 PAs that are suitable for both crop production and livestock-rearing in the wereda. The zone has an annual temperature ranging from 25 to 40°C. There are two rainy seasons in the livelihood. The major rainy season is called Gena rain, which normally occurs from July to mid of September with an average annual rainfall ranging from 550 to 700 ml and not enough for long season crop production, while the second minor rain is the Belg, locally called (*Arfasa*), expected to rain from March to April. The dry season runs from October to February. The soil is sandy and loam with low soil fertility due to frequent erosion, salinity and flood. The vegetation is a mix of all type with reverie forest and trees dominant around the bank of Awash River and shrubs and bush away from the river.

The main inhabitants of this livelihood zone are the *Kereyu and Ittu Oromos*. The agro-pastoral communities of the zone are highly dependent on the Awash River both for livestock production and small scale irrigation farming. Some PAs use the river directly for irrigation and some use the schemes and services built by the adjacent sugar state farm. Human population is dense with little grazing and farming land for most of the household (EPaRDA, 2007). Adami Tulu Jido Kombolcha wereda is located at 7.58°N latitude and 38.43°E longitudes, in the southern part of Oromia. It has 1403.3 km² of land inhabited by about 141,745 people of which more than 85% are living in the rural area. Agro-ecologically, the area is categorized under the semi arid (MoARD), with altitude ranges 1500 to 2000 m.a.s.l. The average annual rainfall ranges from 650 to 750 mm and the distribution is highly variable between and within years. Crop-livestock mixed farming system characterizes agriculture in the district (Ibrahim, 2006).

Characteristics of sampled woredas and households

The sampled district was selected based on the potentiality of the area for goat production. Two kebele per district were selected based on the potentiality of the area for goat production and suitability of the site for transportation. Accordingly, Oyitu Basuma and Desta Abijata kebele were selected from Adami Tulu Jido Kombolcha district whereas Gidara and Kobo kebele were selected from Fentale district. Key informants who are expected to know goat production situation of the area were invited by development agents for group discussion. The respondents were selected based on gender consideration. 15 to 20 farmers per kebele participated in group discussion.

Method of data collection and analysis

Participatory Rural Appraisal (PRA) technique was employed for data collection and analysis. The term PRA or Participatory Learning and Action refer to a series of techniques, many of them developed in India, for using local knowledge and skills to learn about local conditions, identify local development problems and plan responses to them. Using of PRA methods for research purpose has three main advantages.

Firstly, the information it provides tends to be highly accurate. This is partly because local people's knowledge of local condition is often greater than had been supposed, as is their capacity to map, model, estimate, rank, diagram and plan. This is also because participatory approach to describing local conditions and planning allow local people discuss and cross check each other's knowledge on the spot.

Table 1. Goat and sheep population size in the sampled woreda.

Sampled districts	Type of small ruminant	
	Goat population (size/heads)	Sheep population (size/heads)
Fentale	109,113	96,245
Adami Tulu J/K	115,784	25,757
Total	224,897	122,002

Source: East showa zonal oARD data, 2010.



Figure 1. A picture showing group discussion undertaken with farmers.



Figure 2. A woman milking a doe and her son is waiting to drink.

Secondly, plans drawn up by local people are more likely to work than plans drawn by outsiders. The third and most important of all, the participatory nature of the process is a development benefit in itself, in terms of empowering local people (Richards, 1992). The current study therefore employed PRA techniques and methods. The PRA methods employed for the current study includes; group discussion, secondary data reviews, diagrammatic presentation like seasonal calendar and analytical games like pair wise ranking and scoring of results.

RESULTS AND DISCUSSION

Goat population size and breed type of the sampled area

The goat breeds found in the study area is Arsi-Bale goat breeds. Arsi-Bale goat is distributed in high lands of Arsi, Bale, Hararghe and Mid Rift Valley of Ethiopia and characterized by small body size, short legs, short ears, both short and long hair as well as their glossy, wavy and gray their color (Worknesh, 1992). According to data

obtained from the sampled woreda of agriculture and rural development of the respective districts indicate, goat production is one of the major livelihood options for the farmers of the area. There is a huge number of goat population size available in the sampled woreda (Table 1). This somehow indicates their significance contribution for the goat keepers of the sampled area compared to other type of shoats. Goat production management system in the sampled area is characterized by traditional farming systems.

Farmers' production objectives

According to other studies conducted in parts of Ethiopia, it indicates goat production is an important component of the livestock subsector and are sources of cash income and play a vital role as source of meat, milk and wool for smallholder keepers in different farming systems and agro-ecological zones of the country (Tekelye and Kasali, 1992; EARO, 2000). The current finding is almost similar with this finding. Farmers' production objectives and/or reasons for keeping goat were assessed by the current study. Accordingly, farmers' production objective across the sampled area is almost similar. This might be because of the similarity of the farming systems of the zone from which the sampled kebele was drawn and it can also be one of the indications of the livelihood option.

The current study also ranked these farmers' production objectives. Pair wise ranking method was employed to rank farmers' production objectives/reasons for keeping goats across the sampled kebele. The result of this pair wise ranking analysis shows that, in most cases respondents ranked production objectives differently. Like the other sampled kebele, respondents at Oyitu Lengano kebele identified different production objectives and ranked production objectives as explained in Table 15. The study result summarized that, small holder goat keepers of the area had been involved in goat production activities to meet different socio-economic needs. According to the analysis result made for Oyitu Lengano kebele indicates milk production is the major reason for raring goat in the area, since it has been serving as a source of milk. Next to milk, wealth storage was ranked at the second followed by wealth storage (Table 15). The following sample pictures taken from the study area support this finding (Figures 1 and 2). At the

Table 2. Production objectives/ reason for keeping goats at Desta Abijata kebele.

Production objectives/reason for keeping goats	Rank in order of importance
Used as a source of milk	1
Used as a source of meat	3
For generating income	1
For social value/gatherings	2
Considered as wealth storage	1

Source: Own PRA pair wise ranking.

Table 3. Production objectives/ reason for keeping goats at Kobo kebele.

Production objectives/reason for keeping goats	Rank in order of importance
Used as a source of milk	2
Used as a source of meat	4
For generating income	1
Used as a gift/ especially during wedding	5
For other social value /gathering	4
For wealth storage	3
Used as a source of butter	4

Source: Own PRA pair wise ranking result.

Table 4. Production objectives/ reason for keeping goats at Gidara kebele.

Production objectives/reason for keeping goats	Rank in order of importance
Used as a source of milk	3
Used as a source of meat	4
For generating income	1
Used as a gift/ especially during wedding	6
For other social value /gathering	5
For wealth storage	2

Source: Own PRA pair wise ranking result.

other kebele named by Desta Abijata, farmers were identified different production objectives which are almost similar with the aforesaid kebele. Like the earlier stated kebele, pair wise ranking was employed to rank their production objectives/reason for keeping goats. Farmers ranked the three production objectives namely; milk, income generation and wealth storage equally at first level implying that, their contribution in these areas is almost equal (Table 2).

Like the previous two kebele, matrix ranking was employed to rank farmers' production objectives for Fentale district (Table 3). For Kobo kebele, the primary farmers' production objective is for generating income, secondly for wealth storage and thirdly for gift specifically during wedding. When we come back to Gidara kebele, the primary objective of goat production is for income generation purpose, indicating their similarity with the earlier mentioned kebele (kobo kebele). Wealth storage

and use of their product for household consumption especially their milk, was ranked at the second and third respectively (Table 4). These in general indicates the pivotal roles that have been played by goat production for the small holder goat keepers of the area which is directly or indirectly used to achieve different socio-economic objectives including food self sufficiency. The other study conducted by EPARDA, 2007 is also in agreement with this finding. According to that study, wealth in Fentale Pastoral Livelihood Zone is determined by livestock holdings in general and goat production in particular. The basic household asset and insurance against food shortages in this livelihood zone is livestock production in general and goat production in particular. Poor households are caught in a cycle that left them with small herds providing little protection from food insecurity when hazards strike.

A person who owned 9 to 12 goats are considered to



Figure 4. A sample of goat housing practices in the sampled area.

be the poorest of the poor at the area whereas a person who owned 50 to 60 goats is considered to be better – off (EPARDA, 2007). This indicates that goat production in the area is one of the main livelihood activities to mitigate food insecurity and other means of livelihood activities. Generally, across the sampled kebele, utilization of milk for household consumption was ranked from first to third. Production of goat is considered as wealth storage and has been played a significant role in terms of generating income. Their contribution with respect to wealth storage and generating income were also ranked from one to third across the kebele. This ranking on the other hand indicates their strong significance for the goat keepers.

Status of extension services available for goat production at the sampled woreda

The current study also tried to see the status of extension services available for goat production in the study area. As discussed so far goat production is one of the major livelihood activities for the farmers of the sampled area. Despite such a huge contribution, very few interventions were made to improve the production and productivity of the existing breed and popularization of other goat production packages to achieve the maximum possible outputs that can be gained from the sector. For this evidence, the major goat production extension package available for the goat keepers of the area is mainly related to veterinary services which have been mainly provided by Districts' Office of Agriculture and Rural Development. This type of extension package services can be categorized under incomplete packages, since it lacks so many related aspects of goat production packages. The veterinary services that have been provided for the small holder goat keepers of the area includes preventive services/vaccinations and treatment of sick goats. Farmers also indicated that the frequency of vaccination made for their goat is very low. The fattening extension components of MOA strategy

designed for the country includes, purchased or farmer owned indigenous cattle and small ruminants, animal feed and feeding system, animal health, housing, selection of fattening animals, fattening period and marketing of fattened animals (MOA, 1990).

This study also attempted to examine the type of technologies used by farmers from these menus of fattening packages through group discussion. Only few farmers were engaged in improved fattening practices through the demonstration made by the available Research Center and few NGOs indicating that the majority of farmers are still using their own fattening practices (indigenous knowledge) which can take longer period when compared to the available improved fattening options. Under the improved practices, different fattening packages like use of concentrates and ration formulation, improved housing, and other management aspects were demonstrated. This finding is also in agreement with Ethiopian Economic association 2006. According to this study, participation of farmers in small ruminant fattening packages is very few across the country; only 11.1% of farmers participated on small ruminant fattening packages. The goat production management system of the area is also under traditional management systems (Figure 4). Generally, the intervention made for the development of small ruminant fattening extension package at the area is very weak.

Goat fattening adoption studies needs to be conducted in the area to clearly know the figure of adopters and non adopters of goat fattening extension packages. On the other hand, there is no or very few intervention was made in the area in terms of local breed improvements through crossing with exotic breeds and/or improving the existing breeds through selection. The study conducted by Azage et al. also indicated that, across the country there were few exotic breeds of sheep and goats which have been introduced into the country for crossbreeding. Among these, the Awassi, Dorper, Hampshire and Corriedale sheep have been used for meat and wool in the highlands, while the Anglo-Nubian, Sanan, Toggonburg,

Table 5. Problems constraining goat production at Oyitu Basuma kebele.

No	Type of problems	Rank of problems in order of importance
1	Shortage of feeds	3
2	Market related problem	3
3	Disease	2
4	Predators	5
5	Shortage of labor	4
6	Long generation interval	4
7	Lack of Awareness on improved practices	1

Source: Own PRA result.

are preferred for milk and meat production in the lower altitude of the mixed farming systems of the country. Not only lack of improved breeds, farmers have no awareness (nill) on inbreeding effect. They said "*Haraamummaan namaaf malee re'ee ykn horii irratti akka hojjetu hin beeknu*" which can be translated as "*we don't know as inbreeding effects applies for small ruminants/animals; we know it for human beings*". This problem is also the other main gap identified by this piece of study which can negatively influence the production and productivity of the goat.

Other problems hindering goat production at Adami Tulu Jido Kombolcha district

Goat production practice in the study area has been constrained by a variety of factors. Pair wise ranking was employed to assess the detail of these problems which is associated with goat production. At Oyitu Basuma kebele, shortage of feeds, lack of market information, predators, long kidding interval, and lack of awareness on utilization of goat production extension packages, shortage of labor, and diseases are the major problems identified by this study. Among these problems, lack of awareness on improved goat production practices, disease problem, shortage of feeds and market related problems were ranked at first, second and third respectively.

The current study also identified market related problems, in terms of inaccessibility to market place and/or lack of effective market information at the right time and place and exploitation by middle men when marketing of the goat was done between traders and sellers. These market related problems and shortage of feeds were both ranked at third, indicating almost their equal influence on goat production which will finally influence on the maximum possible benefits that can be achieved from it. The other goat production related problems identified from the study were long generation interval, predators and shortage of labor (Table 5). When we come back to Desta Abijata kebele, different factors like shortage of feeds, market related problems,

predators, long kidding interval, shortage of labor and diseases are the major problems identified by the study. Pair wise ranking was also employed to rank these problems. As shown by pair wise ranking analysis; shortage of feeds, long kidding interval, shortage of labor and disease are ranked at first, second and third respectively (Table 8). Both of the two problems namely shortage of labor and disease, were ranked at third indicating that, their influence on goat production at the area is almost similar.

Diseases of small ruminant (goat) identified through group discussion at the districts

Disease is one of the non-genetic factors negatively influencing goat production of the study area. Therefore, type of diseases prevailing in the area and influencing goat production of the area was assessed. Farmers/pastoralists listed the diseases of goat in the area by local name and clinical symptoms of the diseases were also mentioned for identification of major small ruminant disease problem in the areas. Even though this disease assessment method does not employ sampling and laboratory diagnosis, detail review was made to correlate or match the clinical symptoms listed with veterinary literature. The study finding therefore identified different diseases including sheep and goat pox, diarrhea, ecto-parasite, anthrax, circling disease and mastitis. The other problems identified here is mineral deficiency (mainly Cu-deficiency) which is locally named as '*wuro*'. Farmers of the study area considered Cu-deficiency as a disease type.

Pair wise ranking analysis was employed to rank the identified disease, based on the severity of the diseases in the area. According to the current study conducted at Oyitu Basuma kebele shows Cu-deficiency, Circling Disease and Diarrhea was ranked at first, second and third respectively whereas (Figure 3) diarrhea, Cu-deficiency, sheep and goat pox were ranked as first, second and third respectively for Desta Abijata kebele of ATJK district (Table 6). Farmers indicated that kids born by Cu deficient Does are often born dead or unable to



Figure 3. When the son is drinking goat milk.

Table 6. Rank for goat diseases identified at both kebeles of ATJK district.

No.	Type of disease/problems	Name of the kebele	
		Rank at Oyitu Lengano	Rank at Desta Abijata
1	Cu-Deficiency*	1 st	2 nd
2	Sheep and goat pox	5 th	3 rd
3	Diarrhea	3 rd	1 st
4	Anthrax	4 th	5 th
5	Ecto-parasite	7 th	6 th
6	Circling disease	2 nd	4 th
7	Mastitis	6 th	4 th

*= Farmers considered it as one of the disease type. Source: Own PRA result.



Figure 5. Kid born from Cu-deficient goat at the study area (paralyzed).

suckle her dam due to paralysis and often dies. The kid stands unsteadily or cannot stand, displays muscle tremors and head shaking, and may grind its teeth (Figure 5). Farmers of the study area have been using their own mechanism to minimize the problems caused

from Cu-deficiency. One of the mechanisms is that, when the situation occurs at the area, they migrate their goats to other areas and stay there for a few weeks/months because they think that the disease is infectious which can be transmitted from one goat to the other. According

Table 7. Seasonal calendar of disease occurrence for Oyitu kebele of ATJK district.

Type of disease	Months of the year at which respective disease mostly occurs											
	1	2	3	4	5	6	7	8	9	10	11	12
Cu-Deficiency												
Diarrhea												
Anthrax	When goat are in a good condition											
Ecto parasite												
Circling disease	Not season specific											
Mastitis	At any time when ectoparasite occurred											
Sheep and goat pox	Occurs suddenly											

1 Represents September, 2 represents October, 3 represents November,....., 12 represents August. Source: Own data.

Table 8. Problems constraining goat production at Desta Abijata kebele.

No	Type of problems	Rank of problems in order of importance
1	Shortage of feeds	1
2	Market related problem	3
3	Disease	2
4	Predators	4
5	Shortage of labor	3
6	Long kidding interval	1

Source: Own PRA result.

to farmers' perception, when they change the place for their goat, copper deficiency prevalence will decrease or no kid mortality. Generally copper deficiency problem is common in the Mid-Rift Valley areas as indicated by farmers. Also, laboratory investigation was made for soil, vegetation and blood of animals to see the status of copper in the area. The result indicated that all the soil, the vegetation and the animal serum were found deficient of copper in the area.

Seasonal occurrence of the disease in the district (ATJK)

For designing of appropriate disease prevention and controlling mechanisms and planning for improved veterinary delivering services, identification of their seasonality of occurrence is very important. For this purpose seasonal calendars which is one important PRA tool was employed. According to the result of seasonal calendar analysis, it indicates that Cu-Deficiency occurred throughout the year, sheep and goat pox and circling disease is not season specific which means, it occurs suddenly whereas both ectoparasite and diarrhea mostly occurs from September to December. Anthrax occurs whenever a goat is at a good condition (Table 7). This is because they said, anthrax usually kills well fed and healthy animals without showing clinical sign or any

poor condition.

Farmers of the other PA of the same district (Desta Abjata) reached an agreement with regard to the time of occurrence of these diseases, respondents expressed that Cu-deficiency, sheep and goat pox occurs at the area from May to August whereas diarrhea and anthrax occur from August to October and other diseases like ectoparasites, circling disease and mastitis occur from May to September respectively (Table 9). At both kebeles, as we identified that diarrhea occurs at the same season, August to October which is considered to be a wet season in this area.

Problems hindering goat production at Fentale district

Like the aforementioned district, goat production at Fentale district is constrained by many factors including disease, shortage of feeds, predators, market related problems, long generation interval, shortage of water and shortage of labor. The type of problems identified by the current study at the sampled kebele is almost similar. Pair wise ranking analysis method, was used to identify and rank problems negatively influencing goat production at the study area. Accordingly, shortage of feeds, market related problems and shortage of labor was ranked as first, second and third, respectively at Gidara kebele

Table 9. Seasonal calendar of disease occurrence for Desta Abijata kebele of ATJK district.

Type of disease	Months of the year at which respective disease mostly occurs												
	1	2	3	4	5	6	7	8	9	10	11	12	
Cu- deficiency													
Sheep and goat pox													
Diarrhea													
Anthrax													
Ectoparasite													
Circling disease													
Mastitis													

1 represents September, 2 represents October, 3 represents November,.....,12 represents August. Source: Own data.

Table 10. Major problems constraining goat production at both kebele.

No.	Type of problems	Name of the kebele	
		Rank at Gidara kebele	Rank at Kobo kebele
1	Disease	4	1
2	Shortage of feeds	1	3
3	Predators	6	7
4	Market related problem	2	4
5	Long generation interval	5	5
6	Shortage of labor(attendant)	3	6
7	Shortage of water	(*)	2

Source: Own PRA result. (*)= The respective problem was not mentioned at respective kebele.

whereas disease, shortage of water and feeds were ranked at first, second and third respectively (Table 10).

As it has been explained in Table 10, different non-genetic factors had been identified that have negative influence on the goat production of the area. Disease problem is one of the major problems identified in the area. This disease problem is associated with lack of effective monitoring and control mechanism systems in case of disease outbreak and lack of veterinary services at appropriate time and places. The other problem identified during the survey period was shortage of water for their goats, but this problem is minimized at some kebele following the establishment of irrigation schemes at some kebele of Fentale woreda. The other problem identified by this study was market related problem. These market related problems includes lack of effective market information, long time travel to market place and low market price are the major one. Shortage of feed is the also one of the major type of problem identified by the study. This problem is caused from the degradation of shrubs, acacia and other leguminous trees at the area which could be associated with different factors like degradation of range lands' productivity at the area and increase demand of lands especially around irrigation scheme.

Major disease of small ruminant (goat) identified at Fentale district

Like the earlier two Kebeles of ATJK district, matrix ranking was also employed to assess type of diseases prevailing in the sampled areas and the rank of the identified diseases in order of importance. The finding shows that different diseases are prevalent in the area as explained by the following table. Among these diseases, CCPP is one of the most severe diseases identified at Kobo kebele. Type of diseases identified by farmers at Gidara kebele are; PPR, CCPP, sheep and goat pox, circling disease, ectoparasites, anthrax, pasteurellosis, "Ege Erba" and Mastitis. Circling disease, CCPP and sheep and goat pox are ranked as first, second and third respectively.

"*Dhibe Tiru*" which we have translated as "liver disease" is not well known by the local community. The name was given just from pathological lesion found on the liver after death and post mortem. This type of lesions are similar with lesions of Rift Valley Fever (RVF) which is a viral disease, but such lesions are difficult to say as a disease which is not specific and it needs further research. Another disease symptom they call as a disease is "Ege Erba" which means movement of tail when the goat is

Table 11. Major goat diseases identified at the two kebeles.

Type of disease	Rank at Kobo PA	Rank at Gidara PA
PPR	2 nd	8 th
CCPP	1 st	2 nd
Sheep and Goat Pox	4 th	3 rd
Circling Disease	6 th	1 st
Ectoparasite	3 rd	9 th
Anthrax	3 rd	-*
Pasteurellosis	7 th	-*
Mastitis	2 nd	4 th
FMD	-*	6 th
'Dhibee tiruu'	-*	5 th
'Ege Erba'	5 th	7 th

Source: Own PRA result, *= the respective diseases were not indicated by farmers at respective kebele.

Table 12. Seasonal calendar of disease occurrence for Gidara kebele.

Type of disease	Months of the year at which respective disease mostly occurs												
	1	2	3	4	5	6	7	8	9	10	11	12	
PPR	[Bar from month 1 to 6]												
CCPP	[Bar from month 1 to 3]												
Sheep and goat pox	[Bar from month 1 to 12]												
Circling disease	[Bar from month 1 to 12]												
Ecto parasite	[Bar from month 1 to 11]												
Dhibe Tiru (liver disease)	[Bar from month 1 to 11]												
'Ege Erba'	Not season specific ,it is a symptom of disease												
FMD			[Bar from month 3 to 12]										
Mastitis	[Bar from month 1 to 12]												

1 Represents September, 2 represents October, 3 represents November,.....,12 represents August. Source: Own PRA result.

sick. This is also less important and not a priority disease in the area but it needs detail small ruminant disease investigation (Table 11).

Seasonal occurrence of the disease at Fentale district

Seasonal calendar was employed to study the season/time/ of occurrence for the aforementioned diseases. The frequency of its occurrence slightly varies from one kebele to the other kebele. The result of the current study indicates that, some of diseases occur at the same time whereas some others occur either before or after occurrence of certain disease(s). The three types of diseases, namely; sheep and got pox, circling disease and mastitis occurs throughout the year/season/ and diseases like 'ectoparasite, "dhibee tiruu" and FMD happen nearly throughout the year. Ege Erba happens suddenly and the other two diseases namely; PPR and

CCPP happen early in the first six months (Table 12). Most probably, PPR and CCPP prevail for 1 to 3 weeks whereas circling disease and ecto-parasites occur throughout the year. Anthrax and "ege erba" occur suddenly but, anthrax becomes more severe during the dry season (Table 16).

Mitigation strategies used and recommended to minimize the existing problems

In participatory research like the current study, farmers can also be considered as an investigator since their contribution in identifying and prioritizing the existing situation is strong in PRA principle. The current study identified different problems which have been negatively influencing goat production of the area. In addition to this, farmers' mitigation strategies that have been used to minimize the identified problems were assessed. The gap existing between farmers' mitigation strategies and improved practices were identified by the study. Finally,

Table 13. Summary of mitigation strategies used by farmers and possible intervention areas identified from the study to improve the existing situation.

Problems	Mitigation strategies used by farmers	Suggested mitigation strategies proposed by the team of researchers
Shortage of feeds	<ol style="list-style-type: none"> 1. Migration(moving to other places in searching of feeds) 2. Cutting the leaf of large trees during feed shortage 3. Storing of crop residue 4. Concentrate supplementation (recently) 5. A forestation 6. Reducing of flock size 	<ol style="list-style-type: none"> 1. Development of improved forage varieties 2. Adoption of agro by-product technology utilization 3. Feed conservation 4. Reducing flock size 5. Improving the indigenous breeds through crossing and/or within the breed selection
Disease	<ol style="list-style-type: none"> 1. Using homemade medication like salt, tandem , tobacco leaf 2. Medication (purchased from market) 3. Branding of site of pain 4. Vaccination 5. Washing the affected body with soap and water 	<ol style="list-style-type: none"> 1. Strengthening of veterinary clinic/ services 2. Identification of prevailing disease in the area 3. Regular vaccination 4. Awareness creation 5. Strengthening participatory monitoring of the flock
Predators	<ol style="list-style-type: none"> 1. Shepherding 2. Construction of burn to protect from Hyena and fox 3. Distributing of their goats to relatives who have more children 4. Take children from their relatives 5. Hobbling the goat 6. Tying the goat 7. Selling 8. Migration(moving to other places in searching of feeds) 9. Keeping the goats by shifting(darabee) 	<ol style="list-style-type: none"> 1. Close supervision of the goats 2. Appropriate housing
Shortage of labor	<ol style="list-style-type: none"> 1. Reducing flock size to manageable size by husband and wife 2. Hiring of labor 	<ol style="list-style-type: none"> 1. Enhancing semi intensive production system
Market problems	<ol style="list-style-type: none"> 1. Wake up early in the morning and also one day prior to reach on market 2. Improving goat body condition 3. Selection of market places 4. Refusing to sell to brokers 	<ol style="list-style-type: none"> 1. Improving of market information delivering systems 2. Developing group selling method 3. Enhance group fattening practice
Long kidding interval	<ol style="list-style-type: none"> 1. Migrating to feed available area 2. Maintain breeding bucks 3. Migration(moving to other places in searching of feeds) 4. Borrowing of breeding bucks 	<ol style="list-style-type: none"> 1. Feed Improvement 2. Breed improvement 3. Natural resource conservation
Shortage of water	<ol style="list-style-type: none"> 1. Increasing the number of donkey to fetch the water at once to avoid day to day travel in searching of water 	<ol style="list-style-type: none"> 1. Establishing of water ponds

Source: Own PRA result.

possible mitigation interventions to be made were identified by this study in a participatory manner. This can be one of the major inputs that can be applied by

stakeholders working in the area to improve the situation. After identifying farmers' mitigation strategies, possible intervention areas were identified (Table 13).

Table 14. SWOT analysis for goat production of the study area.

No	Strength	Weakness	Opportunity	Threat
1	Veterinary station was established at many PAs	Weak veterinary services(untimely or lack of regular vaccination)	GOs are planning to strengthening veterinary services delivery at all Pas of farming community. Veterinary faculties are now opened in many universities and many vet professionals are now graduating every year on different levels.	Lack of awareness among farming community about animal disease management strategies. Shortage of trained man power and shortage of budgets
2	DAs trained by animal science and animal health technicians was assigned at some Kebeles to live livestock production extension	Strong attention was not given to the sector by MoARD compared to other sectors like crop production	Livestock Resource development Agency was established at all woreda which expected to improve the existing situation of the sector	Turnover of DAs, shortage of animal health technicians and shortage of budgets allocated for the sector
3	Research center like ATARC & EGPIP are working on goat breed improvements and polarization of other goat fattening packages	Weak linkages between and among actors working in the area of goat production technology generation and popularization	Research-Extension Advisory Council will be established at woreda levels to minimize linkage problems. NARS is encouraging participatory technology development and dissemination	Shortage of budgets and lack of commitment to carryout effective and efficient participatory technology development and dissemination
4	Different goats feed resources are available (acacia sp. and other trees)	Degradation of natural forests due to population enrollment, charcoal making and deforestation	GOs will pay attention to natural resource management (conservation of natural forests). One diploma holder trained in natural resource management will be assigned at all PAs	Lack of awareness by farmers and lack of commitment to take responsibility of conserving available forests (esp. acacia sp. in the area), Climate change
5	Government policies are encouraging live stock development in general and goat production packages in particular	There is no clear goat breed development strategies at regional and national level	Regional research Institute(OARI) is planning to develop and implement Goat breeding strategies	Breed development/ improving the existing breeds may take many years and budgets Breed improvement may be ineffective unless it is not done in participatory manner
6	There is increasing demand of goat at local markets	Farmers were not accessed to improved market information	Farmers will be linked with potential buyers	Lack of effective infrastructure
7	Availability of fattening options /industrial by-product/ for fattening of goats	Lack of effective awareness by farmers on available fattening options and ration formulation	Farmers awareness on fattening options will be strengthened by actors working in the area	Cost of industrial byproduct is increasing from time to time

Source: Own PRA results.

SWOT analysis of goat production for the area

SWOT analysis is important to identify strengths, weaknesses, opportunities and threats with regard to

improving goat production of the area. This SWOT analysis is made based on the data taken from respondents, MoARD and observations made by researchers. The analysis is shown in Table 14.

Table 15. Production objectives/ reason for keeping goats at Oyitu Basuma kebele.

Production objectives/reason for keeping goats	Rank in order of importance
Used as a source of milk	1
Used as a source of meat	5
For generating income	4
Considered as wealth storage	2
For social value/gatherings	6
Due to having short generation interval	3

Source: Own PRA pair wise ranking result.

Table 16. Seasonal calendar of disease occurrence at Kobo kebele.

Type of disease	Months of the year at which respective disease mostly occurs											
	1	2	3	4	5	6	7	8	9	10	11	12
PPR												
CCPP												
Sheep and goat pox	After rainy season(spring +autumn)											
Circling disease	Throughout the year											
Ecto parasite	Throughout the year											
Anthrax	Occurs suddenly but more sever during dry season											
Pasteurellosis	During dry season											
Ege Erba	Unknown											
Mastitis	Not season specific but usually related with lactation, pregnancy and kidding											

Source: Own PRA result.

CONCLUSION AND RECOMMENDATION

The current study findings indicate that, goat production is one of the major livelihood options for the goat keepers of the area. Their contribution can be viewed in terms of source of income, milk, meat and wealth storage. It is also considered as risk mitigation strategies to cope up with adverse environmental impacts especially when shortage of rain occurred in the area. This could be through direct selling of the animal which finally helps to overcome financial problem and enable households to purchase consumable goods for house hold consumption. The goat production system of the area is characterized under traditional management system.

Hence, goat production at the area had been constrained by many factors which can be categorized under genetic and non genetic factors. These factors include disease, shortage of feeds, market related problems, Cu-deficiency, long generation interval, shortage of labor, weak extension services, lack of breed development program (improving local breeds through crossing or selection program). Breed improvement program, veterinary services, fattening extension packages, improving marketing system and other aspects of related extension services need to be given due attention by the stakeholders working in the area to improve the existing situation.

REFERENCES

- Abule E, Amsalu S, Tesfaye AA (1998). Effect of level of substitution of lablab (*Dolichos ablaba*) for concentrate on growth rate and efficiency in post weaning goats. In: Proceeding of the 6th Ethiopian Society of Animal Production (ESAP) conference held on 14-15 may 1998, ESAP, Addis Ababa, Ethiopia, pp. 264-269.
- Asfaw W (1997). Country report: Ethiopia, Proceedings of a Seminar on Livestock Development Policies in Eastern and Southern Africa 28th July–1st August 1997, Mbabany, Organized by CTA, OAU/IBAR, The Ministry of Agriculture, Cooperative, Swaziland (1997).
- Bayou K (1998). Control of sheep and goatskin diseases. In: B.C. Ian and B. Bayou, editors, Proceedings of Control of Sheep and Goatskin Diseases for Improved Quality of Hides and Skin 13–14 February 1998, FAO, Addis Ababa (1998).
- Berhanu G, Hoekstra D, Azege T (2006). Improving the Competitiveness of Agricultural input Markets in Ethiopia: Experiences since 1991. Paper presented at the Symposium on Seed-fertilizer Technology, Cereal productivity and Pro-Poor Growth in Africa: time for New thinking 26th Triennial Conference of the International Association of Agricultural Economics (IAAE), August 12 – 18, 2006, Gold Coast, Australia.
- Draft Disaster Preparedness Contingency Plan for Fentale Woreda (EPaRDA 2007): OROMIYA NATIONAL REGIONAL STATE PASTORAL AND AGRO PASTORAL LIVELIHOOD BASE LINE PROFILE (SEVEN PCDP WOREDAS). Available on: www.pcdp.org.et/Docs/baseline/oromia-final.pdf.
- EARO (Ethiopian Agricultural Research Organization) (2000). National Small Ruminants Research Strategy Document. EARO, Addis Ababa, Ethiopia.
- Ibrahim J (2006). Adoption dairy innovations: its income and gender implications in Adami Tulu district. Unpublished M.Sc. Thesis, Haramaya University.

- Ehui SK, Ahmed MM (2003). Berhanu Gebremedhin, Benin S.E., Nin Pratt A. and Lapar Ma.L. 10 years of Livestock Policy Analysis. Policies for improving productivity, competitiveness and sustainable livelihoods of smallholder livestock producers. ILR (International Livestock Research Institute), Nairobi, Kenya, p. 118.
- Kassahun A (2004). The State of Ethiopia's Farm Animal Genetic Resources-Country Report: A Contribution to the First Report on the State of the World's Animal Genetic Resources. ESAP (Ethiopian Society of Animal Production) Newsletter. Issue No. 10, 2004.
- Markos T (2006). Productivity and Health of indigenous sheep Breeds and Crossbreds in the Central Ethiopian Highlands. Faculty of Medicine and Animal Science department of Animal Breeding and Genetics. Ph.D.dissertation. Swedish University of Agricultural Sciences, Uppsala, Sweden
- Tekelye B, Bruns E, Kasali OB, Mutiga ER (1993). The effects of endoparasites on the reproductive performance of on-farm sheep in Ethiopian highlands. *Indian J. Anim. Sci.*, 63: 8-12.
- Workneh A (2000). Do smallholder farmers benefit more from crossbred (Somali x Anglo- Nubian) than from indigenous goats? PhD Thesis. Georg-August University of Goettingen, Goettingen, Germany. Cuvillier Verlag, Goettingen.
- World Bank (2006). Africa Development Indicators 2006. Washington D.C CACC (Central Agricultural Census Commission). 2008. Ethiopian Agricultural Sample Enumeration, 2007/08. Results at country level. Statistical report on socio-economic characteristics of the population in agricultural household, land use, and area and production of crops. Part I. (December 2008) ddis Ababa, Ethiopia.
- Zinash S, Aschalew T, Alemu Y, Azage T (2001). Status of Livestock Research and Development in the Highlands of Ethiopia. In: P.C.Wall (ed.). *Wheat and Weed: Food and Feed*. Proceedings of Two Stockholders Workshop.