

Full Length Research Paper

Assessment on challenges and opportunities of goat farming system in Adami Tulu, Arsi Negelle and Fantale districts of Oromia Regional State, Ethiopia

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This study was conducted in Adami Tulu, Arsi Negelle and Fantale districts of Oromia Regional State, Ethiopia. The objective of this study was to assess and identify the challenges and opportunities of goat production under farmers' management system. For this study, 6 Peasant Associations (PA: is the smallest administrative unit in Ethiopian government structure), 2 from each district, were selected. From each PA, a group of 15 to 20 farmers were organized at each study site and different types of Participatory Rural Appraisal were conducted. The data collected were analyzed using PRA tool of pair-wise rankings and results expressed in simple descriptive statistics. Goat production system in these study areas were identified as mixed crop-livestock production systems in Arsi Negelle and Adami Tulu districts. Farmers in the Fantale administrative district practiced pastoral and agro-pastoral production systems. Goat production purposes were also identified as mainly to provide milk and meat for home consumption and cash income generation. The rankings of these purposes varied across study areas. Goat fattening is a recent appearing practice in these rural communities. Farmers in the Arsi Negelle and Adami Tulu districts practiced traditional fattening system mostly from July to September. A common operation in traditional fattening system was castration, which improves body condition. Farmers identified feed shortage from November to December, disease incidences, predatory attacks and water shortage as challenges to goat production. Farmers' major sources of income were mainly crop and animal production (goats, sheep and cattle). Animal feeds were mostly available from late May to October. Great opportunities exist for goat production and productivity improvement in surveyed administrative districts, in which the environment was still conducive and animal productivity can be improved by improved management.

Key words: Goat fattening, Income sources, feed shortage.

INTRODUCTION

Ethiopia has diverse agro-ecological zones suitable for livestock production. Agricultural scenario in Ethiopia is characterized by the pastoralism in low land area, and mixed farming systems in mid and highland areas. Livestock have traditionally been an important component

of the agricultural industry in Ethiopia. A 2011/2012 livestock census puts the goat population in Ethiopia at 22.6million (CSA, 2012) of which 32% goats were found in Oromia Regional State. Mid-rift-valley areas of Ethiopia are known to have a high population of sheep and goats. Majority of Ethiopian goat farmers are subsistence farmer. In East Shoa administrative zone, there are over 488.5 thousand goats and in West Arsi administrative zone, there are over 370 thousand goats. The recent data from CSA (2012) indicated that country's goat population growth rate is 1.1% with off-take rate of 35%.

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Abbreviation: PA, Peasant association.

In Ethiopia goat production accounts for 16.8% of total meat supply (Ameha, 2008) and 16.7% of milk consumed in the country (Tsedeke, 2007).

Ethiopian indigenous goats are genetically less productive as compared to temperate breeds (Mohammed et al., 2012). Indigenous goat breeds constitute over 95% of the small ruminant population of Africa and that of Ethiopia is 99.77% that are indigenous breeds (CSA, 2012). Although Ethiopia has tremendous amount of large and small ruminants their productivity has been constrained by complex challenges. Goats are owned by the majority of smallholder rural farmers for whom this resource is critical for nutrition and income. Goats are also an important and secure form of investment, which happens to be major farming activity on vast areas of natural grasslands in regions where crop production is impracticable (Tadelle and Workneh, 2007).

Chronic feed shortage during short rainfall and primitive type of feeding are considered major limiting factors to animal production in Ethiopia. Because of the above problems, Ethiopian livestock production systems are mostly characterized by very low reproduction and production performance managed by resource limited farmers for subsistence. To this augment, this low production and productivity inventory and appraisal of basic resources are the first step towards the over-all process of resources management. This is why emphasis is being increasingly paid on the detailed analysis of the existing and potential resources and formulation of scientific plans for their development, sustained production and utilization. The primary purpose of conducting this Participatory Rural Appraisal (PRA) was to assess and identify the production systems, with their challenges and opportunities for goat production in and around the study areas.

MATERIALS AND METHODS

Description of the study area, site and farmers selection

This study was conducted in six selected PAs of three administrative districts in 2010. The three administrative districts were Arsi Negelle district of west Arsi administrative zone and Adami Tulu and Fantale districts of East Shoa administrative zone of Oromia Regional State. Adami Tulu and Arsi Negelle districts are located at 160 and 210 km south of Addis Ababa, respectively and Fantale district is located on 200 km east of Addis Ababa. Arsi Negelle district is located at 7° 17' N to 7° 66' N and 38° 43' E to 38° 81' E, Adami Tulu district is located at 7° 60' N to 8° 03' N and 38° 51' E to 38° 69' E and Fantale district is located at 8° 70' N to 9° 13' N and 39° 75' E to 40° 04' E (Google Earth, 2012).

A two stage sampling technique was implemented. In the first stage, Arsi Negelle, Adami Tulu and Fantale districts were selected using purposive sampling and followed by identification of potential PAs (Hailu, 2008; Tesfaye, 2010; Assen and Aklilu, 2012). Goat population and accessibility of the areas were used as criteria in selecting districts and PAs. Accordingly, two PAs from each district were selected for this study. The selected PAs include O'itu and Abijata from Adami Tulu administrative district, Aliwoyo and Daka from Arsi Negelle administrative district and Gidara and Kobo from

Fantale administrative district. In the second stage, at each selected PA 15 to 20 farmers (Arse et al., 2010) were randomly selected for group discussion using systematic sampling procedure. Finally, a multi-disciplinary team composed of Nutritionist, Breeders, Productionist, Economist, Extensionist as well as Development Agents of the respective PA was established to conduct the survey using different PRA tools.

Data collection and analysis

Different PRA tools were employed to collect information on different aspects of goat production practices. The PRA tools used to generate information from participants were: Focused group discussion, Pair-wise ranking of preferences of income sources, goat production challenges, purposes of goat production, gender based activities to identify gender related activities, scheming seasonal calendar of feed shortage and availability. The data collected were analyzed using PRA tool of pair-wise rankings and results expressed in simple descriptive statistics.

RESULTS AND DISCUSSION

Goat production system

Farmers in this study area were practicing different type of production systems. Farmers in these study areas do not know about the breed type of their goat. The goat breed type in these study areas belongs to rift valley family and are called Arsi breed (Kassahun and Solomon, 2008). The Arsi breed goat is distributed throughout the Arsi, West-Arsi, Bale and parts of East-Shoa, South-Shoa and West Hararge administrative zones, in altitude that range from 300 m lowland up to 4000 m above sea level, highland (Kassahun and Solomon, 2008). Solomon et al (2008) reported that the Arsi goats were kept in small flocks in mixed farming systems in the highlands as well as in agro-pastoral systems at lower altitudes. Majority of farmers rear their goats under predominantly free grazing systems. Tethered feeding was practiced around perennial crop growing areas. Some arable farmers provided crop residues, thinning of maize and sorghum, kitchen waste and chopped browse to their goats. The use of crop residues as feed source was also indicated by CSA (2012) and Assen and Aklilu (2012).

Arsi Negelle and Adami Tulu districts were more dependent on crop production. Farmers in Arsi Negelle and Adami Tulu districts were practicing mixed crop-livestock production system and in which goat production was the major share in livestock production. The results are in agreement with findings of Solomon et al. (2008) indicated that the goat production played important role in mixed crop-livestock production system. Pastoral and agro-pastoral farmers of Fantale administrative district rear goat in mixed livestock system. In this society, goat production was the dominant livestock, and income from it play important role in covering home consumption expenses. The results obtained in this present study are in agreement with the results reported by Markos (2006) and Solomon et al (2008).

Table 1. Purpose of goat rearing.

Production purposes	Arsi Negelle district		Adami Tulu district		Fantale district	
	Daka	Aliwoyo	Abijata	O'itu	Gidara	Kobo
Milk	1 st	1 st	1 st	1 st	3 rd	2 nd
Meat	3 rd	5 th	5 th	5 th	4 th	5 th
Cash income	2 nd	2 nd	2 nd	2 nd	1 st	1 st
Saving value	4 th	4 th	4 th	4 th	5 th	4 th
Wealth indicative	5 th	3 rd	3 rd	3 rd	2 nd	3 rd

Table 2. Major sources of income.

Income sources	Arsi Negelle district		Adami Tulu district		Fantale district	
	Daka	Aliwoyo	O'itu	Abijata	Gidara	Kobo
Crop production	2 nd	1 st	1 st	1 st	3 rd	5 th
Goat production	3 rd	3 rd	2 nd	2 nd	1 st	1 st
Sheep production	5 th	5 th	6 th	5 th	4 th	2 nd
Cattle production	1 st	2 nd	3 rd	3 rd	2 nd	3 rd
Donkey cart service	4 th	4 th	5 th	4 th	5 th	6 th
Horse cart service	9 th	8 th	8 th	7 th	9 th	9 th
Poultry production	6 th	6 th	4 th	6 th	8 th	8 th
Beekeeping	8 th	7 th	9 th	8 th	*	*
Camel production	*	*	*	*	6 th	4 th
Petty Trade	7 th	*	7 th	*	7 th	7 th

* = Unknown or does not exist in the area.

Purpose of goat farming and sources of income

The primary purpose of goat rearing was to sustain their livings. The pair-wise ranking of purpose of goat farming in both pastoral and agro-pastoral farming systems is presented in Table 1. In these study areas of pastoral and agro-pastoral farming system the primary purpose of keeping goat was to generate income, followed by milk and meat for home consumption (Table 1). In Arsi Negelle and Adami Tulu where mixed crop-livestock production farming system is dominant farming system, farmers reared goats to generate cash income followed by meat for consumption, savings and holiday festive and ceremonies. The purpose of goat production in all the three districts was almost similar. The present reports are in agreement with Muluken (2007) who reported about goat production system in Metama and Sekota administrative districts of Ethiopia. The result of this study also agreed with Addis (n.d) who reported that farmers in developing country like Ethiopia raise goats for meat and milk production. Endashaw (2007) and Tsegahun et al (2000) also reported that farmers of highlands in reared goat mainly for milk and meat for home consumption and for cash income generation. Tesfaye (2009) and Mekuriaw et al (2012) also reported that the farmers keep goat for cash income generation.

The major income sources ranked in Table 2 was adopted from original pair-wise comparison matrix of income sources in these study areas. Farmers in the mixed crop-livestock farming system ranked crop production as top income generator and followed by income generated from livestock productions. This report is in agreement with Endashaw (2007) in which farmers of Wonsho PA in Sidama administrative zone ranked income from crop production on top. But in the pastoral and agro-pastoral areas livestock production was given the highest priority than crop due to frequent crop failure by insufficient rain fall. According to extrapolated data from pair-wise ranking results, in Arsi Negelle and Adami Tulu districts crop production was the major source of income because these two districts practice mixed crop-livestock production system. Therefore, in mixed crop-livestock farming system crop production was the most reliable and it generates significantly high income than livestock production does. This study results also indicated that the pastoral and agro-pastoral farmers in Fantale administrative district ranked livestock production as the major income generating sector. Farmers in the two administrative districts namely, Arsi Negelle and Adami Tulu their income source preference varies between and within the administrative districts though they practice the same type of farming system. The farmers in

Table 3. Seasonal calendar of fattening and feed shortage.

PA	Months											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daka	→						→					→
Abijata	→						→					→
Aliwoyo	→							→				→
Gidara	→											→
Kobo	→											→
O'itu	→											→

→ = Feed shortage duration; Green cells = goat fattening months in respective PAs; Farmers in Gidara, Kobo and O'itu PAs do not practice fattening activity.

the two PAs of Fantale administrative district unanimously ranked goat production as the major source of their cash income (Table 2). This present findings are in agreement with Solomon et al. (2010) who reported that the primary objective of goat rearing are cash income, savings and meat for household consumption in pastoralist communities.

Seasonal calendar of feed availability and goat fattening activity

Farmers reported the severe feed shortage appearing in their area was recent years' phenomena. They reported that goat farming is being challenged by the currently appearing feed shortage. Farmers reported this recently that worsening feed shortage was due to untimely and erratic rainfall as a result of climate change. Feed shortage was the major goat production constraints in all study areas. Seasonal feed shortage was also reported by Solomon et al. (2010) in Gomma, Metema, Mieso and Fogera districts of Ethiopia. Farmers indicated that the worst feed shortage happens during dry season of the year. The major feed shortage months in the six PAs is given in Table 3. These months were from November to May. The degrees of severity of feed shortage vary across the administrative districts and even within a district. Due to problems mentioned in Table 3, the respondents reported that the goat production trends was declining and risking their livelihood. Farmers also indicated that the untimely and erratic type of rain fall caused by climate change is affecting shrubs and bushes growth adversely. They also reported that diseases were spreading more rapidly by this climate change. The length of array shows feed available season. As indicated in Table 3, farmers of Aliwoyo PA have longer feed shortage season than others.

Moderately improved fattening practices in Adami Tulu and Arsi Negelle were the recent development. This is in agreement with the report of Tsegahun et al. (2000) that indicated goats usually receive little to no supplementary feeding in the highland and semi-arid mixed farming

systems. The farmers in Fantale administrative district do not practice fattening of goat; they simply rear animal mainly for milk. They keep their wethers with other flock and sell when they need cash. But farmers around peri-urban and in nearby urban areas and farmers in the mixed crop-livestock production system practices seasonal fattening targeting big markets of the year and this is in agreement with CSA (2012) report. Farmers in Daka, Abijata and Aliwoyo PAs were from mixed crop-livestock production system area and they practice seasonal fattening. Gidara and Kobo PAs were from nomadic-pastoral area and they do not practice seasonal fattening. O'itu PA farmers were from mix crop-livestock production system but they were far away from main highway located in the raged swatch of rift valley.

But Kobo and O'itu PA farmers practice traditional type of fattening system in which they fatten their candidate wether targeting big holidays festive. Here the most important point was that farmers who fatten wether do not put especial attention on the wether aimed for selling except castrating; which they believe castration would enhance rate of weight gain. This traditional fattening system takes long time. Gidara's farmers do not practice any kind of fattening. The farmers were entirely pastoral and they practice pastoral production system. Whenever they need cash they sell any of wethers in nearby markets.

Major challenges to goat production

Climate change was affecting and challenging the life of farmers. The pasture production potential was declining because of climate change. The prevailing goat production challenges in these study areas were complex. Farmers in these study areas were practicing climate sensitive type of agriculture. Goats and other livestock were largely reared in extensive system and fully dependent on rain-fed pasture and this is in agreement with Solomon et al. (2010). The major challenges to goat production in the six selected study areas were severe feed shortage, high disease prevalence, high predatory,

Table 4. Major challenges to goat production.

Challenges	Arsi Negelle district		Adami Tulu district		Fantale district	
	Daka	Aliwoyo	Abijata	O'itu	Gidara	Kobo
Feed shortage	5 th	2 nd	1 st	2 nd	1 st	3 rd
Disease	1 st	1 st	3 rd	1 st	4 th	1 st
Predatory	4 th	6 th	6 th	6 th	6 th	7 th
Market	6 th	5 th	4 th	3 rd	2 nd	4 th
Breed	2 nd	3 rd	2 nd	5 th	5 th	5 th
Labor shortage	3 rd	4 th	5 th	4 th	3 rd	6 th
Water Shortage	7 th	7 th	*	*	*	2 nd

Breed = Less productivity of breed (of goat); Market = Market problem, * = Does not exist.

poor market, genetically less productive breed, severe water shortage and high shortage of laborer. These findings are in agreement with reports by Beruk and Tafesse (2000), Fisseha et al. (2010) and Assen and Aklilu (2012). The participant farmers in group discussion ranked the major challenges in their area in relation to goat production (Table 4). The major goat diseases reported were anthrax, liver fluke, orf (disease like Foot-and-mouth disease), pneumonia and internal parasites.

Early kid mortality was also a serious problem of the farmers. The ranking of the challenges is made from pairwise comparison of all. For Arsi Negelle district farmers the first ranked challenge is goat disease prevalence. On subsequent ranking of the challenges farmers of the same district of Arsi Negelle but at two different site (Daka and Aliwoyo) fall apart are having site specific challenges. In the same way farmers of Adami Tulu district and in the two study site ranked their production challenges (Table 4). In the same district of Adami Tulu, in Abijata PA feed shortage was the first ranked challenge but in o'itu disease incidence was ranked first. Farmers of Gidara and Kobo peasant associations ranked the goat production challenges differently though they were in the same district of Fantale.

Challenges and opportunities of goat keeping

Goat production can significantly benefit the owners or producers since they can be used for milk and meat for home consumption. In addition to production for milk and meat for home consumption goat was also used as major source of cash income. It was also used as insurance for crop production. In pastoral and agro-pastoral communities, goat were given higher value than other type of livestock because goat as are highly adaptive to harsh environment in pastoral areas. Farmers in all the selected study areas were willing and eager to used modern technologies because they were quite sure that improved management will improve production and productivity of their animals. Improved environment improves the genetic potential with the result of improved productivity. Goat have great role in reducing unnecessary expansion

of bushes and shrub by browsing on it and in turn maintaining the equilibrium of the nature in pasture lands. At federal government level, there is pastoral standing committee which works on improving life pastoral communities. There are also many Non-Governmental Organizations (NGO) that are working on improving living and livelihood through improving the production and productivity of their animals. Government is also working to solve the challenges.

Conclusion

Farmers were working on primitive type of production system. As a result, the production and productivity as well as income from sale of the animals were very low. Farmers in Arsi Negelle and Adami Tulu districts were practicing mixed crop-livestock production system. Arsi Negelle and Adami Tulu districts were more dependent on crop production. Farmers in Fantale administrative district practice pastoral and agro-pastoral production system. The main purposes of goat production were for milk, meat and cash generation. All the farmers castrate their billy assuming castration per se improves body condition. Only few farmer closer to urban areas practice moderately modern goat fattening system with special supplementation of conventional feeds. The farmers in the Fantale administrative districts do not have good experience of fattening before marketing their wethers. Moderately improved fattening practices in the two study areas were the recent development. Major challenges in goat production were feed shortage, disease prevalence and etc. The major income sources in the area were income from cattle production, crop production, goat production and etc. Severe feed shortage happens during dry season in the months from November to May.

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