

Full Length Research Paper

Farmers' perceived livestock production constraints in Ginchi watershed area: Result of participatory rural appraisal

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A study was conducted in Ginchi watershed area, Dandi district of Oromia Regional State, Ethiopia. The objective of the study was to identify farmers' perception and ranking of the most important constraints to livestock production, and their perceived strategies to alleviate the problems. Data were collected and analyzed by participatory rural appraisal (PRA) tools for this study. The most important problems of livestock production perceived by the farmers in the study area were feed shortage (100% of the key informants), animal disease (73%) and water shortage and poor quality during dry season (27%), respectively. Farmers ranked feed shortage as key constraint to livestock production. Farmers' perception, ranking, reasons and strategies to alleviate the constraints to livestock production were discussed. In conclusion, there is need for technical and institutional intervention to alleviate the identified problems to livestock production through improved feed production and conservation, veterinary health care and services, increased availability of water and quality during the dry season.

Key words: Constraints, feed, disease, livestock, water, participatory rural appraisal.

INTRODUCTION

The Ethiopian economy is primarily based on agriculture and more than 80% of its population is dependent on agriculture of which livestock production plays a significant role (Bureau of African Affairs, 2006). Agriculture contributes to 47% of the country's gross domestic product (GDP) and to more than 80% of the export, and employs over 85% of the population (Bureau of African Affairs, 2006). Livestock sub-sector is playing a crucial role in the traditional subsistence farming, contributing about 12 to 16% to the total GDP and 30 to 35% to the agricultural GDP (Ayele et al., 2002), excluding the value of draught power, transport and manure (Winrock International, 1992). Moreover, the livestock contributes to about 60 to 70% of the livelihoods

of the Ethiopian population (Ayele et al., 2002; Tesema et al., 2010a).

Ethiopia has the largest livestock population in Africa. It is estimated at about 43.1 000 000 heads of cattle, 23.6 000 000 sheep, 18.6 000 000 goats, 0.62 000 000 camels, 34.2 000 000 chickens, 1.7 000 000 horses, 4.5 000 000 donkeys and 0.33 000 000 mules (CSA, 2008). The livestock population is primarily nondescriptive indigenous type and not adequately characterized.

Despite the highest population, the productivity of Ethiopian livestock is low, and compared to its potential, the direct contribution to the national economy is limited. Poor genetic potential, feed shortage in quantity and quality, poor health care and management practices that

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Table 1. Farmers' perception and ranking of major constraints to livestock production in Ginchi watershed.

Constraint	Priority of problems in livestock production (%)			
	1 st	2 nd	3 rd	Rank
Feed shortage	100	0	0	1
Animal diseases and lack of access to vet. services	0	73	27	2
Water shortage in the dry season and poor quality	0	27	73	3

the animals are exposed to are the main contributors to the low productivity (Zegeye, 2003; Azage et al., 2006; Belay et al., 2011a).

In Ethiopia, feed usually is based on fodder and grass, are either not available in sufficient quantities due to fluctuating weather condition or, when available, are of poor nutritional quality (Manaye et al., 2009; Ahmed et al., 2003; Getinet et al., 2003; Tolera and Said, 1992). Yet Ethiopia has the highest number of livestock in Ethiopia. According to Goshu et al. (1989), the Ethiopian livestock sector suffers from animal diseases, because Ethiopia is one of the countries in Africa where many diseases prevail. With this background, participatory rural appraisal was employed with the objective to identify farmers' perceived constraints to livestock production and potential solutions in the Ginchi watershed area.

MATERIALS AND METHODS

Study location

The study was conducted in Ginchi watershed area of Dandi district of the West Shewa Zone of the Oromia Regional State, central Ethiopia. Ginchi is located at about 90 km west of Addis Ababa on the road to Nekemte and is situated between 0° 9' 01" N latitude and 38° 10' E longitude and lies at an elevation of 2200 m above sea level (Kamara and Haque, 1988). The altitude of the watershed ranges between 2140 to 2800 m above sea level with an area of 4100 ha. The area receives a mean annual rainfall of 1140 mm. The average annual minimum, maximum and mean temperatures of the area are 8.4, 24.2 and 16.3°C, respectively. The soil is generally characterized by being cracked deeply when dry and, has a heavy dark texture when moist. Vertic Cambisols, Nitosols and Pellic Vertisols dominate the study area (Mitiku, 1987; Kamara and Haque, 1988).

Data collection and analyses

Both primary and secondary information was used to collect data for this study. Secondary data was obtained from ILRI and District Office of Agriculture. Data were collected and analyzed using Participatory Rural Appraisal (PRA) techniques (Simon, 2000). The PRA tools are applied to a group of farmers in the present study area, with a total of 38 (10 women and 28 men) farmers and key informants to obtain data on farming system and constraints to livestock production and potential opportunities to cope with the identified constraint. The participatory tools used to analyze the data for this study was preference ranking.

The farmers voted and ranked the perceived constraints based on severity and importance of constraints to livestock production and livelihoods of the farmers. Before conducting PRA, a

preliminary visit to the community was made to present and discuss the purpose and objectives of the study. This was to obtain background information on the local farming system before conducting the questionnaire. Direct observation, transect walking with the community key informant farmers around crop farms and homesteads was made to have an overview of the topography, vegetation, soil type, crops grown, livestock species kept, water resources etc. Following transect walking collection of information was through systematic group discussions with key informants consisting of men and women. At the group meeting, problems and opportunities were discussed extensively. The participating farmers drew agricultural calendars and resource maps. Separate session was arranged for women to secure maximum flow of opinion. The method was used mainly because it is ideal to gather data concerning farmers' values, opinions, objectives and knowledge, and it emphasizes on direct researcher-farmer communication and low cost and relatively short duration. A total of 28 community key informants including male and female and 10 separate female key informants were selectively sampled for the PRA data collection. The farmers voted and ranked the perceived constraints based on severity and importance of constraints to livestock production and livelihoods of the farmers.

RESULTS AND DISCUSSION

The PRA results show that, feed shortage, livestock diseases, water shortage and quality in decreasing order of importance were identified as the most important constraints hampering the expansion of small-holder livestock production in the Ginchi watershed area (Table 1). The key informants indicated that, inadequate and poor quality animal feed (100% of key informants), animal diseases challenges (73%), reduced water quantity during dry season (27%) and poor water quality (27%) were reported to be the major constraints in that order of importance to smallholder livestock.

Farmers' coping strategies and potential solutions to livestock production constraints

The key informant farmers indicated that, conserving and utilization of crop residues and hay, limiting livestock number in balance with the available feed resources, allocating part of their crop land for pasture and improved forage production and reducing number of unproductive stock were suggested as potential strategies to overcome livestock feed shortage (Table 2). Moreover, the key informants mentioned bring about regular access to veterinary care and services, regular vaccination, access

Table 2. Farmers' perception of constraints to livestock rearing, reasons for the problems and coping strategies in Ginchi watershed area (PRA result).

Problems	Possible causes	Potential solutions to the constraints
Feed shortage	Land shortage, increased human and stock population, intensive crop production, long dry season, water logging, lack of information and inputs on forage development technologies.	Conserving and utilization of crop residue and hay, limit livestock number based on available feed resource, using some crop land for pasture and forage production, culling unproductive stock.
Livestock diseases and lack of access to vet. services	Internal and external parasites, outbreak of contagious diseases, feed shortage, water logging, lack of capital to buy medicine, lack of veterinary care and service.	Access to low cost drugs, regular vaccination, accessible vet services, use of traditional medicines and improved water quality (dry season).
Reduced water quantity during the dry season.	Lack of rain, deforestation and increased human and livestock population, use of irrigation at up stream	Reforestation, additional water development use big rivers at far distant and traditional dam construction.
Poor water quality in the dry season	High prevalence of leech in the dry season, contamination due to washing and bathing, reduced flow and quantity of water, runoff into water sources.	Use of herbs against leech, access to drugs that eradicates leech, seclusion of drinking, bathing and washing points, water development, construction of small dams.

to low cost veterinary medicines, use of traditional medicines and improving water quality in the dry season are the potential solutions to tackle animal diseases. Measures to cope up with water shortage and its poor quality in the dry season are mentioned in Table 2.

Farmers' coping mechanisms to alleviate feed shortage

Men stressed feed shortage both in quality and quantity as the first important constraint to livestock production in the Ginchi watershed. The key informants indicated that, feed shortage is the most important constraints to livestock rearing in the watershed. In view of the respondents, the causes of feed shortage were land shortage, certain grazing areas with potential for grazing cannot be utilized due to water logging problems during the main rainy season in low and middle altitude and increased human and livestock population and intensive crop production that in turn resulted in reduced pastureland.

According to the key informants, because of poor traditional farming practice and shortage of land due to expansion of croplands, crop residues produced from their crops will only supplement to feed livestock for short period. The key informants suggested that, increased utilization of crop residues, cultivation of high yielding improved forage, allocating part of their cropland for grazing and reducing number of their stock are strategies used to cope up with feed shortage (Table 3).

Farmers' strategies to overcome livestock diseases

According to the key informant farmers livestock diseases challenge was the second most important constraint to livestock production next to feed shortage. However, leech (blood sucking parasitic) infestation was perceived as the second important constraint and very much stressed by all the farmers in the study area particularly in the middle and highland areas during the dry season, (October to May). Of all livestock diseases, around 97.4% of the interviewed households reported leech as the most severe parasitic livestock health problem in the area (Belay et al., 2011b). In low altitude, feed shortage was followed by other livestock diseases because the importance of leech is not high in this area.

The key informants indicated that, regular vaccination, access to adequate veterinary care and services, drug that eradicate leech and increased water quantity during dry season to creating unfavorable condition for leech multiplication are potential solutions to control livestock diseases (Table 4).

In the *Ginchi* watershed, farmers indicated that, cattle and small ruminants are subjected to heavy internal and external parasitic burdens. Internal parasites have existed for long and at present too, year round infection is a serious problem. The reason is that, most of the grazing areas are water logged during the rainy season and form favorable environment for the parasites and their vectors. This coincides with an increase in the internal parasites density, which in turn result in an increased internal parasites contact rate.

Table 3. List of prioritized solutions for coping feed shortage in Ginchi watershed (PRA result).

Solution	Priority of solutions to feed shortage (%)				Rank
	1 st	2 nd	3 rd	4 th	
Increased utilization of crop residues	56	19	25	0	1
Production of improved forages	19	63	12	6	2
Allocating part of cropland for grazing	6	18	38	38	3
Culling unproductive animals	19	0	25	56	4

Table 4. List of prioritized solutions for coping up livestock disease in Ginchi watershed (PRA).

Solution	Priority of solutions to feed shortage (%)				Rank
	1 st	2 nd	3 rd	4 th	
Regular vaccination	72	22	6	0	1
Access to vet. services	22	39	17	22	2
Access to drug against leech	6	22	44	28	3
Increase water quantity in the dry season	0	17	33	50	4

Absence of animal health services (veterinary clinic) in their vicinity either to readily buy the medicines or take the animals to the veterinary clinic at Ginchi, shortage of capital to purchase medicines were mentioned as factors contributing to animal diseases. Most of the farmers indicated that, although effective drugs against some of the internal parasites are available, their high cost and the possibility of re-infection do not permit their effective control.

Due to the increased cost of medicines from veterinary clinics, the farmers in Ginchi watershed had to rely on locally prepared herbal medicines. They added that, the livestock sub sector has less access to extension and development inputs as compared to the crop sub sector. Thus, the extension and development plan for crop and livestock should be carried out side by side and executed with appropriate production package as both sectors in the area are highly integrated.

An attempt was made to collect data on major livestock diseases, which were known to exist in Ginchi watershed using informal survey with individuals and group of respondents. Most of the respondents are aware of the local names of the diseases, symptoms of the diseases, type of animal they affect, their seasonal occurrence, local curative measures and the farmers also recognize diseases by post mortem indication, which can readily be translated into standard veterinary terms.

The following diseases were identified by the farmers to be prevalent in the watershed:

Abba Sanga (Local name)

Symptoms: White foam through mouth, high fever, dark red bloody discharge through anus, distension of stomach and sudden death without apparent cause and

die within 1 day of exhibiting symptoms. When the meat is cooked it gets straightened. It affects cattle, sheep, goat and man. Abba Sanga is a more appropriate term of farmers for anthrax.

Dhukuba Hare (Local name)

Symptom: Swelling under chest and on stomach, loss of appetite, unable to lay down, highly communicable, death within five days. It affects donkey and horses. This disease corresponds to African Horse Sickness. Local curative measure is that, they open the swelling and put a herbal medicine inside it and close the swelling.

Mura (Local name)

Symptoms: Shivering, high fever, swelling of blood vessel under tongue, skin hair erect, stomach ache, floppy ear, no or reduced rumination, after slaughtering the meat colour looks like liver, the lung becomes brown. The disease affects all species and high in milking cows. It is a disease of all seasons but high in October. The farmers believe the cause is cold weather, particularly when they graze grass with dew. This disease corresponds to a collection of infectious diseases.

Farmers use a plant called harita white tip of eucalyptus leaves, onion and ginger for treatment of the disease.

Hir'u (Local name)

Symptoms: Diarrhea, high water intake, emaciation, excreta contains mucus like material and has bad smell,

flat and mobile worms without segment in faeces, reduced appetite, labored respiration, after slaughtering flat red worms are seen in the livers in affected animal, the liver colour is changed to white and become tough, the disease is prevalent all season but high from April to October. The farmers described the disease affecting only ruminants (cattle, goat and sheep). The disease has been associated with temporary stored water in grazing area and marshy places and not with snails. The farmers reported this in cattle; it causes reduction in milk yield and draft power in oxen. They use a mixture of salty soil (hora) and salt to treat the animal. This disease is appropriate for an internal parasite like liver fluke or fascioliasis.

Qabana (Local name)

Symptoms: The main clinical signs are fever, unable to walk (lameness), wound in the mouth, soreness on the tongue, on the edge of the hoofs, splits of the skin around the claws of the feet and on the teats and udder of cows, high water intake, saliva that hangs from the lips in strings, unable to eat, standing in water for long time, sharp fall in milk yield and inability of oxen to perform land cultivation, highly communicable and affects in mass, covers many area and but happens once in 10 years, affects cattle of all age. This disease corresponds to be foot-and-mouth Disease.

Dhibe Shimbira (Local name)

Symptoms: Itching of the body against wood, loss of hair on head and back, emaciation, sometimes bloody discharge through anus, loss of weight and few deaths. This disease may correspond to be external parasite Meningitis or Dermatophilosis.

Dhulandhula (Local name)

Symptom: The symptoms are coughing, blood through nose and mouth, breathing problem, highly emaciated and become anaemic, high weight loss, reduced milk yield and is caused by a motile parasite in water during dry season. It affects only cattle. Leech infestation continued to be the major long existing health hazard of cattle in the *Ginchi* watershed, with no control measure except hand removing and traditional herbal medicines. Farmers use exotic tobacco leaf for removal of the leech from the forehead, hand de-leech when it comes under tongue, and keep the cattle for a day without drinking water as they belief the leech comes down to the mouth when the leech is thirsty. The seasonal pattern of leech infestation on cattle was investigated. The leech load rises to a pronounced peak from December to early June

and low or no infestation during main rainy season. This seasonal pattern of leech infestation is such that the strategic use of watering troughs during dry season (October to May) may be a cost effective method of overcoming the problem. Farmers blame leech to be the main cause of reduced milk yield and oxen power in the watershed. Hence there is a need to assess the economic loss because of leech infestation in cattle in the watershed.

Dhibee Haraa (Local name)

Symptom: Clinical signs observed by farmers were high temperature, watery nasal and oral discharge, swellings, and appearance of subcutaneous nodules of different sizes on legs and the animal seeks shade. This disease was for the first time identified in *Ginchi* watershed in July (2001). In previous years, this disease was not prevalent in the area. It affected many cattle but not other species. It was said to be Lumpy skin disease.

Farmers' strategies to alleviate water scarcity in the dry season

Results of the participatory rural appraisal indicated that, factors contributing to water scarcity particularly in the dry season are climate change, deforestation, irrigation at upstream and increased human and livestock population. Farmers stressed that, quantity of rivers flow was reduced in amount compared to past years and the main reason is deforestation as poor people depend heavily on forest products for their livelihoods and for fuel as there is no alternative sources of energy for food preparation.

The key informants indicated that, the potential solutions to water scarcity are reforestation, additional water development such as boreholes and traditional dam construction to increase water quantity particularly in the dry season (Table 5). The majority of the key informants (75%) voted for forest development to increase water availability for domestic and livestock drinking.

Farmers' strategies to alleviate water quality problems

According to the results of formal survey result (Belay et al., 2011b), 71.1% of the surveyed households reported that, changes had occurred in quantity or amount of flow of rivers and streams over times. The factors responsible for the decrease in quantity of rivers and streams flow was deforestation (28.9%), decreased rain fall (23.7%), irrigation upstream (7.9%), deforestation and irrigation (3.9%), deforestation and increased intensity of evaporation (2.6%), decreased rainfall and irrigation (3.9

Table 5. List of prioritized solutions for coping up water scarcity in Ginchi watershed (PRA).

Solutions	Priority of solutions to feed shortage (%)				Rank
	1 st	2 nd	3 rd	4 th	
Reforestation	75	12	13	0	1
Water development	0	81	19	0	2
Traditional dam construction	25	6	69	0	3

Table 6. List of prioritized solutions for coping up poor water quality in Ginchi watershed (PRA).

Solutions	Priority of solutions to feed shortage (%)				Rank
	1 st	2 nd	3 rd	4 th	
Separation of human and livestock points	75	12	13	0	1
Separate washing and bathing points	0	81	19	0	2
Fencing water points	25	6	69	0	3

%), increase in human and livestock population (1.3%), deforestation and increased human and livestock population (2.6%) and 25% of the respondents have no idea whether the quantity of water in the rivers and streams have showed any change. The suggested possible improvements in quantity of water were reforestation (14.5%), water development (9.2%), small dam construction (7.9%), reforestation and dam construction (1.3%) and 67.1% of the respondents did not have any suggestion for improvement of quantity of water.

The key informants in this study indicated that, the coping strategies to overcome water quality problems are separation of human and livestock drinking water points, separate washing and bathing points, fencing water sources for human use (Table 6). The majority (75%) of the key informants suggested separation of livestock and human drinking points to reduce water quality problems.

Participatory rural appraisal (PRA) result for women

A separate session of PRA was also arranged for women to secure maximum flow of opinions in identifying livestock rearing constraints in their area. As men, the women also identified feed, disease, poor water quality and lack of capital and access to credit for livestock development activities as the major constraints to improvements in livestock production. But unlike the men, the women put the order of importance of these constraints in different way. Women stressed animal diseases as the main problem in livestock production. Among animal diseases, women also recognized '*dhulandhula*' in Afan Oromo-local language (local name for leech), as the most important parasitic disease affecting the productivity of their cattle. This parasite was very much stressed by all participating women in the

study area, particularly in middle and highlands. The main reason for the prioritizing leech was that, there is a reduction in milk yield of cows milking cows when infested by leech.

Women were also able to name and identify the symptoms and seasons of common disease of livestock prevailing in their area. Generally, women identified three types of diseases '*hir'u*' (liver fluke), '*mura*' (name for a collection of infectious diseases) and leech. Seasons mentioned were all year round disease for '*mura*', April to October and sometimes year round for liver fluke and October to June for leech. However, women perceived feed shortage as the second important constraint, and poor water quality due to high leech infestation as the third important problem to livestock rearing.

Conclusion

From results of this study, it is concluded that, the most important problems perceived by the farmers in the study area were feed shortage, animal diseases, and water shortage and poor quality during the dry season, respectively. Farmers ranked feed shortage as key constraint to livestock production. The reasons for feed shortage were land shortage, increased human and livestock population, increased crop production, long dry season, water logging, lack of information and inputs on forage development technologies.

The reasons mentioned for livestock diseases were internal and external parasites, outbreak of contagious diseases, feed shortage, water logging, lack of capital to buy medicine, lack of veterinary care and service. The problems of water scarcity and poor quality were due to lack of rain, deforestation and increased human and livestock population, use of irrigation at upstream, high prevalence of leech in the dry season, contamination due

to washing and bathing, reduced flow and quantity of water, runoff into water sources. Thus, there is need for technical and institutional intervention to alleviate the identified problems to livestock production through improved feed production and conservation, veterinary health care and services, increased availability of water and quality during the dry season.

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