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Original Article

Husbandry practices of Simada Cattle Population in Three Districts of North-Western Ethiopia

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ABSTRACT

The study was conducted to assess husbandry practices of Simada cattle population in three districts of North-Western Ethiopia. Data were collected through semi-structured questionnaire, focus group discussions, and field observations. A total of 180 households 60 from each district were randomly selected to fill the structured questionnaire. The study revealed that the average cattle herd size was 6.51± .094 heads per household. The purposes of keeping cattle were for traction, milk production, income generation, trashing of crop, manure (to increase soil fertility), social status and meat. Natural pasture and crop byproducts were major feed sources in study area. Most of the respondents housed cattle at night and part of the day. The major sources of water for livestock were rivers, pond, springs/streams and temporary water. Constraints of cattle production were feed shortage, disease, and lack of improved breeds ranking 1st, 2nd and 3rd, respectively. Feed shortage is the most limiting factor for cattle production in the study area and need to be addressed. Provision of strong extension services to farmers for feed resource development and training them in basic principles of collection, storage of harvested feed resources and crop residues should be required.

Keywords: Feed, Husbandry, Population, Simada cattle.

INTRODUCTION

Animal genetic resources are believed to preserve much of the current global genetic diversity with millions of people directly depending on them for the livelihood of the people (Mekuriawand Kebede, 2015). Livestock products in Ethiopia are often used for household consumption and/or sold to finance the purchase of basic household commodities such as coffee, salt, cooking oil, sugar, etc, (CSA, 2015). According to the report of the same source, out of the total annual livestock products, 46.36% of milk, 59.24% of butter, 79.89% of

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cheese, 41.22% of honey, 44.13 % of wax and 26.84 % of egg was used for household consumption.

The total number of cattle in all regions of the country except the non-sedentary population of three zones of Afar and six zones of Somali region was estimated to be 57 million, which is the largest population in Africa (CSA, 2015). The majority of these cattle (98.95 percent) are indigenous breeds which are kept under extensive management (CSA, 2013). Indigenous livestock breeds in Ethiopia are a valuable source of genetic material because of their adaptation to harsh climatic conditions, their ability to better utilize the limited and poor quality feed resources and their tolerance to a range of diseases found in these regions (Fasil and Workneh, 2014).

Ethiopia has an enormous potential for increasing livestock production, both for local use and for export purposes. However, expansion and productivity was constrained quantitatively and qualitatively by inadequate and imbalanced nutrition, sporadic disease outbreak, scarcity of water, lack of appropriate livestock extension services, insufficient and unreliable data to plan the services, and inadequate information to improve animal performance, marketing, processing and integration with crop and natural resources for sustainable productivity and environmental health (Aynalem *et al.*, 2011).

According to Andualem *et al.* (2015) improvement in cattle productivity can be achieved through identification of production constraints and introduction of new technologies or by refining existing practices in the system. Assessment of the cattle production system and identification and prioritization of the constraints of production is a prerequisite to bring improvement in cattle productivity in the country. Prioritization of the production constraints is essential as it helps to use the scarce resources efficiently. Understanding the production system helps to design appropriate technologies and which are compatible with the existing system. In general, assessment of the production system is important to plan development and research activities and bring improvements in productivity.

In Amhara region, there are many characterized and uncharacterized cattle breeds known for their milk production, beef and draught purposes. Among uncharacterized breeds Simada breeds are said to have good performance in its natural environment (Getie*et al.,* 2015). Simada cattle population adapts to harsh climatic conditions, known for its ability to better utilize the limited and poor quality feed resources and their tolerance to a range of disease found in the production areas (Zewdu, 2004).

However, despite the significant contribution of cattle to the area, limited attention is given to assess husbandry practices of Simada cattle population in the area. Simada cattle are found in the highlands of northern Ethiopia, in the area of Gayint, Simada and north wards up to Mount Guna (Rege and Tawah, 1999). But still the information available on husbandry practices and constraints of Simada cattle population in the study area is scanty. Thus, assessment of the cattle husbandry practices, identifying and prioritizing the constraints and feed resources of cattle are necessary in study districtsin order to design appropriate technologies compatible with the existing system and to plan development and research activities aimed at improving cattle production. Therefore, this study was conducted to assess cattle husbandry practices and to identify and prioritize the constraints limiting cattle production in the three districts of North-Western Ethiopia.

MATERIALS AND METHODS

Description of Study Areas

The study area comprises three districts of south Gonder zone. The districts are Lay Gayint, TachGayint and Simada. The descriptions of the districts are presented as follows.

Lay Gayint district

The district lies within the geographical grid coordinates of 11°32'-12°16' N latitude and 38°12'-38°19' E longitude. It is 175 km away from the regional capital Bahir Dar and 739 km from Addis Ababa. The elevation ranges approximately from 1200 to 4235 meters above sea level. The topography is characterized by 11.97, 5, 8, 75 and 0.03% of the lands are plain, mountain, valley, plateau and water, respectively.The maximum and minimum mean annual temperature is 20 and 8°C, respectively. The annual rainfall is between 600 and 1200 mm (LayGayint District office of Agriculture, 2016).

Simada district

It is located at 11°3′-11°38′north latitude and 38°3′-38°40′east longitude. The district found at about 205 km away from the regional capital Bahir Dar and at 770 km distance from Addis Ababa. The physiographic setting is characterized by 10, 20, 20, 40 and 10% of valleys, mountainous, plateau/plain/, hills and others. Its elevation ranges from 1500 to 4000 m.a.s.l. About 11, 42 and 47% of the area is occurring in highland, midland and lowland, respectively. Also the average annual rainfall amount varies between 1000 to 1500 mm and average annual temperature is 23°C (Simada District office of Agriculture, 2016).

Tach Gayint district

It is located 200 km north east of Bahir Dar town, the regional capital and at 780 km to the North of Addis Ababa. The district lies between 11º 22' - 11º 4' N Latitude and 28º19'- 28º 43' E longitudes. It has an altitude range of 1500-2800 meters above sea level; mean minimum and maximum annual temperature ranges from 13ºC to 27ºC. The mean minimum and maximum annual rainfall ranges from 900 to 1000 mm per annum (TachGayint District office of Agriculture, 2016).

Site Selection and Sampling Technique

Before deciding on the survey areas, discussions were held with the district experts of the rural and agricultural development office and the farmers' representatives about the distribution of local cattle of the area and area dominated by Simada cattle population.

Multistage sampling techniques were employed for this study. At the first stage the three districts are taken purposively based on distribution of Simada cattle population, and mobility of these cattle. In the Second stage four *kebeles* from each district were selected purposively based on their suitability for cattle production, accessibility, and willingness of the farmers to participate in the study. Finally, sample cattle owners were selected randomly using systematic sampling procedure. Farmers were interviewed with semi-structured questionnaire on the husbandry practices, indigenous knowledge, major constraints and production and reproductive performance of cattle in the study area. A total of 180 households 60 from each district and 15 from each *kebele* were selected for the interview. Sampling of households was undertaken by setting criteria; having at least one cattle and willingness to participate in the study. For focused group discussion, a total of 8-10 household heads (HH) were involved in each *kebele.*

Data Collection

Data were collected by administrating a semi-structured questionnaire, individual interview, field observations, organizing group discussion and from secondary sources.

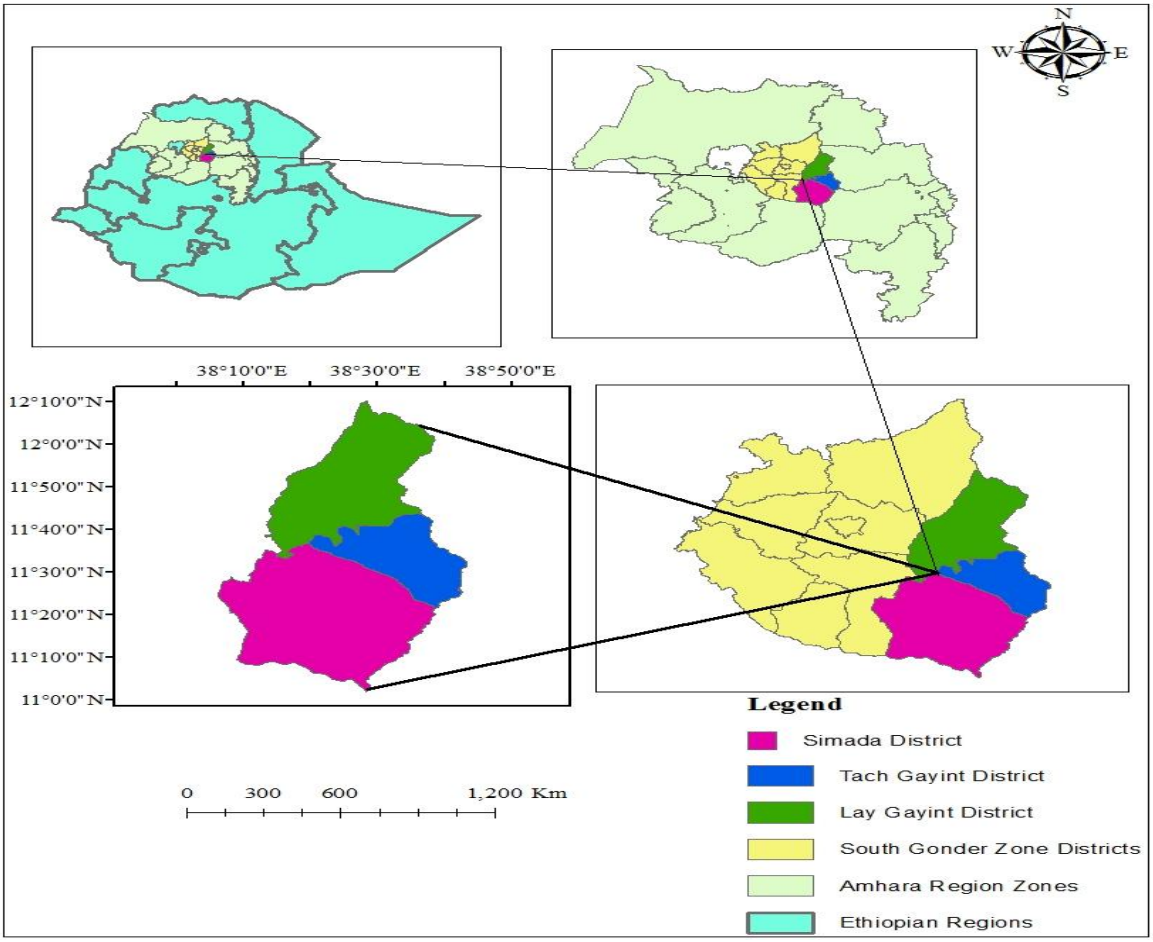

Figure 1: Map of study areas

Questionnaire and group discussion

General information list of FAO (2012) was used as a checklist in designing the questionnaire. It is used to collect information on general socio-economic household characteristics, herd structure, feeds and feeding management, diseases prevalence, major constraints and opportunities for cattle production and alternative approach to tackle these problems were collected. The questionnaire was pre-tested before administration and some re-arrangement, reframing and correcting in accordance with respondent perception was done. The questionnaire was administered to the randomly selected house hold heads or representatives by a team of enumerators recruited and trained for this purpose with close supervision by the researcher.

Sets of open-ended questions were used to guide focus group discussions with key informants, local agricultural extension staffs, elders and socially respected farmers who are known to have better knowledge on the present and past socio-economic status of the study areas, to substantiate the information collected through individual farmer interview. Through group discussions information on the current status and major constraints of the breed, indigenous knowledge on husbandry practices, major constraints and opportunities for cattle production and alternative approach to tackle these problems were collected.

Statistical Analysis

The SAS 9.1, version 2008 and SPSS statistical computer software (SPSS, version 20, 2011) was employed to analyze the data. Index was calculated to provide ranking for purpose of keeping cattle and constraints for cattle production.

RESULTS AND DISCUSSION

General socio-economic characteristics

Mean age and family size of the respondents are presented in Table 1. Overall mean age of the respondents was (42.90 ± 0.50) years, implying that the respondents were at their productive age. According to Mwambene*et al.* (2012) the involvement of active working age group is crucial for the sustainable development and genetic improvement in dairy cattle.
The overall mean family size per household was 5.98 ± 1.39 heads and this figure is less than the Ethiopian national average (7.4) and greater than Sub-Saharan average (5.6) as reported by USAID (2009). There was significant (P<0.05) difference amongTachGayint and the rest of the two districts in terms of household family size.This might be the family planning program in TachGayint district is better than both Lay Gayint and Simada districts.

Table 1. Average age and family size of respondent across the districts

Districts	Age	Family size	Male <15 yrs	Female<15 yrs	Male ≥15 yrs	Female≥15 yrs
			LSM ± SE			
Lay Gayint	42.52 ± 0.83	6.18 ± 0.16[a]	1.25 ± 0.08	1.20 ± 0.09	2.02 ± 0.09[a]	1.78 ± 0.12
TachGayint	43.28 ± 0.85	5.58 ± 0.16[b]	1.30 ± 0.07	1.25 ± 0.08	1.56 ± 0.11[b]	1.53 ± 0.11
Simada	42.90 ± 0.97	6.18 ± 0.19[a]	1.28 ± 0.07	1.35 ± 0.08	1.91 ± 0.12[a]	1.66 ± 1.13
Overall	42.90 ± 0.50	5.98 ± 0.10	1.28 ± 0.04	1.27 ± 0.05	1.83 ± 0.06	1.66 ± 0.07

LSM = Least Square Mean SE = Standard Error; [a b] different superscripts across a column (districts) were significantly p< 0.05 different

Livestock Possession

The livestock possession in the sampled household was significant difference (P<0.05) for livestock in general and cattle herd size in particular among Lay Gayint and the other two districts because Lay Gayint district practices more fodder crop growing than the two districts which reduce feed scarcity. The communities keep more number of Sheep than cattle and goat. This difference might be due to absence of enough communal grazing area for livestock in the study area.The overall figure of cattle possession has smaller than that of Tesfaye (2007) with 12.25±0.23 cattle per household in north western Ethiopia and larger than that of Belay *et al.* (2012) with 4.53 ±0.4 cattle per house hold in Dandi district , western Shoa.

Purpose of Keeping Cattle

The major purposes of keeping indigenous cattle are summarized in Table 2. The survey revealed that the production objectives of farmers in mixed production system include not only marketable products such as milk, generation of income from sale of live animal and butter, hide and meat, but also non-marketable functions such as draught power, manure, threshing crops and socio-cultural services. This result was similar with the result of Jirenga (2007) reported for Danno district of west Shoa zone and Ayantu *et al.* (2012) reported for Horro district of Horroguduru Wellega zone, which shows that cattle are kept for different purposes that vary with production systems. Functions like source of meat for consumption ranked relatively low among the reasons of keeping Simada cattle. This could be mainly because cattle are slaughtered during specific occasions and functions such as weddings, funerals, religious festivity and cultural festivals when rare slaughter of animals is conducted outside these days.

Table 2. Purpose of keeping cattle population in the study area

Districts	Purposes	R1	R2	R3	R4	Index
Lay Gayint	Traction/ draft power	39	14	5	0	0.347
	Milk	6	17	28	7	0.230
	Income	13	23	10	6	0.245
	Manure	0	2	8	19	0.068
	Trashing crop	2	4	9	23	0.102
	Social status	0	0	0	2	0.003
	Meat	0	0	0	3	0.005
TachGayint	Traction/ draft power	37	20	3	0	0.357
	Milk	9	19	21	7	0.237
	Income	12	16	22	6	0.243
	Manure	0	0	2	20	0.040
	Trashing crop	2	5	12	24	0.118
	Social status	0	0	0	1	0.002
	Meat	0	0	0	2	0.003
Simada	Traction/ draft power	40	18	2	0	0.363
	Milk	7	17	21	7	0.213
	Income	10	13	21	11	0.213
	Manure	0	1	7	20	0.062
	Trashing crop	3	11	9	20	0.138
	Meat	0	0	0	2	0.003

Husbandry Practices

Feed and feed resources

The major sources of feed for livestock in the study area are shown in Table 3. Natural pasture and crop residues were found to be the major feed sources in all districts. Overall 45.0 and 37.2% of natural pasture and crop residue were the major feed resource for livestock feeding in the study area. Similarly Belay *et al.* (2012) in Dandi district, Beriso *et al.* (2015) in Aleta Chuko district, and Mulugeta and Berhan (2015) in Western Tigray reported that natural pasture was the major feed resource of cattle.

Table 3: Major sources of feeds in the districts

Sources of feeds	Districts						Overall	
	Lay Gayint		Tach Gayint		Simada			
	Freq	%	Freq	%	Freq	%	Freq	%
Natural pasture	28	46.7	25	41.7	28	46.7	81	45.0
Established pasture	4	6.7	2	3.3	4	6.7	10	5.6
Hay	7	11.7	4	6.7	7	11.7	18	10.0
Crop byproduct	20	33.3	28	46.7	19	31.7	67	37.2
House made leftover	1	1.7	1	1.7	2	3.3	4	2.2

Freq = frequency

According to Table 4 feed scarcity were observed in both dry and rainy seasons. In the current study, (58.9%) of the respondents indicated that shortage of feed for livestock was critical in wet season. The study revealed that feed shortage occurs in wet season due to limited grazing area as most of the available land was used for crop production and most of grazing pasture land covered with water logging. Similarly, Belay *et al.*, (2012) reported that feed shortage was encountered in wet seasons in Dandi district Oromia Regional State due to water logging of the grazing pasture lands and intensive cropping.

In this study, out of 180 respondents, 69.4% of them have got livestock feed from their own production and purchased feeds especially pasturelands from other farmers and governmental organization either for free grazing and/or cut-and-carry feeding systems. This finding is in line with Belete *et al.* (2010) in Fogera district who reported that the major feed resources were produced from own production and purchased.

Table 4: Season of feed scarcity and sources of feed across districts

Season feed scarcity	Districts							
	Lay Gayint		TachGayint		Simada		Overall	
	N	%	N	%	N	%	N	%
Dry season	26	43.3	10	16.7	18	30.0	54	30.0
Rainy season	28	46.7	41	68.3	37	61.7	106	58.9
Year round	6	10.0	9	15.0	5	8.3	20	11.1
Source of feed								
Own production only	5	8.3	17	28.3	21	35.0	43	23.9
Purchased only	7	11.7	4	6.7	1	1.7	12	6.7
Own production and purchased	48	80.0	39	65.0	38	63.3	125	69.4

N = number of respondents

Housing system

Most of the respondents (56.7 %) keep their cattle in a house at night and part of the day and the rest 41.6 and 1.7 % of respondents keep their cattle at night in a house and open shade, respectively. Overall, almost all respondent house their cattle in closed shade in order to protect their cattle from theft and adverse environmental conditions and also for ease of husbandry practices such as feeding, watering, milking and waste management. The result of this study was consistent with Belete *et al.* (2010) in Fogera district northern Ethiopia reported that 64% of the respondents house their cattle. In Guduru area (Western Oromia) majority (60%) of farmers enclosed their cattle in stall/fence at their back yard during nighttime (Demissu *et al.*, 2013).

Table 5. Housing system of cattle in the study area

Housing system	Districts						Overall	
	Lay Gayint		TachGayint		Simada			
	N	%	N	%	N	%	N	%
Open shade	2	3.3	0	0	1	1.7	3	1.7
Housed at night only	23	38.3	29	48.3	23	38.3	75	41.6
Housed at night and part of the day	35	58.3	31	51.7	36	60.0	102	56.7

N = number of respondents

Watering systems

The survey result of this study indicated that the major sources of water for livestock were rivers, pond, springs/streams and temporary water in order of importance. The overall result of this study indicates that river with 65% was the major source of water in dry season for livestock. This implies that its quality and availability are season dependent. Chali (2014) in Arsi Highland of Oromia Region reported that river and pond with 54.2 and 38.5% were the major water sources for the cattle. The present result is in comparison with Tesema *et al.*, (2002) who revealed that rivers are the major sources of water for livestock in Belesa districtAmhara region. The main sources of water during the wet season were temporary

water with 83.3, 91.7and 88.3% in Lay Gayint, Tachgayint and Simada districts, respectively. The study of Seid and Berhan (2014) in southern Ethiopia reported that during the wet season, temporary water ranked 1st followed by streams as the main source of water for livestock in all altitudes.

Table 6: Source of water for livestock in different season, season of water shortage and distance travel to water point in the study area

Sources in dry season	Districts						Overall	
	Lay Gayint		TachGayint		Simada			
	N	%	N	%	N	%	N	%
Pond	12	20.0	25	41.7	12	20.0	49	27.2
River	44	73.3	30	50.0	43	71.7	117	65.0
Spring	3	5.0	4	6.7	4	6.7	11	6.1
Hand dug well	1	1.7	1	1.7	1	1.7	3	1.7
Rainy season								
Pond	4	6.7	1	1.7	1	1.7	6	3.3
River	6	10.0	4	6.7	5	8.3	15	8.3
Temporary water	50	83.3	55	91.7	53	88.3	158	87.8
Hand dug well	0	0	0	0	1	1.7	1	.6
Shortage of water								
Yes	7	11.7	30	50.0	29	48.3	66	36.7
No	53	88.3	30	50.0	31	51.7	114	63.3

N = number of respondent's

Health management of cattle

In the current study it was observe that feed shortage is the major factors that predispose the cattle for a variety of infectious and non-infectious diseases. According to group discussion the reported and the most economically important diseases were infectious diseases (anthrax, black leg, pasteurellosis, lumpy skin disease and foot and mouth diseases), non-infectious diseases (bloat and green overload), external parasite (ticks and lice), internal parasites (fasciolosis) and vector borne diseases (trypanosomasis). Many of the veterinary clinics in the study area are not well-equipped in terms of medical supplies and human power and are often distantly located. Control measures taken in the study area include vaccination, deworming and spraying. Traditional methods of treatment for some diseases were also reported during group discussion. Bleeding the leg of the animal for black leg, brand the area around the rib with hot iron for anthrax, administering pepper orally for bloat and green overload and also abscond the stomach and provide anti foaming agent in sever case for bloat.Most of the infectious diseases were reported to occur in the dry season while the prevalence of parasitic diseases was described to increase at the beginning and at the end of the wet season.

Major Constraints for Simada Cattle Production

The respondents put the most critical problem to cattle production as feed shortage in all districts. Lack of improved breed's problem ranked second for Lay Gayint and Tach Gayint, while disease is the 2nd important problem for Simada. Generally, feed shortage, disease, lack of improved breeds, lack of improved forage, shortage of water during dry season and lack of labor for keeping cattle were ranked by respondents as factors that hindered cattle production in the study area. Ayantu *et al.*, (2012) found similar result at Horro district. According to the report from elders and key informants in the study areas, feed shortage was the major constraint mainly due to shortage of grazing land as a result of expansion of crop land.

Table 7. Cattle production constraint across districts

Districts	Constraints	R1	R2	R3	R4	Index
Lay Gayint	Feed shortage	59	1	0	0	0.398
	Disease	0	26	20	12	0.217
	Lack of improved breed	0	28	26	4	0.233
	Lack of improved forage	0	0	4	20	0.046
	Water shortage	0	1	2	8	0.025
	Labor shortage	1	4	8	16	0.080
TachGayint	Feed shortage	47	11	2	0	0.375
	Disease	5	12	26	8	0.193
	Lack of improved breed	6	27	18	6	0.245
	Lack of improved forage	0	0	1	12	0.023
	Water shortage	1	7	10	12	0.095
	Labor shortage	1	3	3	22	0.068
Simada	Feed shortage	49	8	3	0	0.377
	Disease	8	17	28	3	0.237
	Lack of improved breed	2	28	17	8	0.233
	Lack of improved forage	0	2	1	19	0.045
	Water shortage	0	2	8	21	0.072
	Labor shortage	1	3	3	9	0.047

CONCLUSIONS AND RECOMMENDATIONS

Simada cattle are kept in a mixed crop-livestock production system and they play multi-functional roles in this production system. Simada cattle owners prefer both marketable (milk yield, growth rate and reproductive performances) and non-marketable (draught power output, coat color and adaptability) traits.The overall mean of cattle possession (head/HH) in the study area were 6.51± .094. The overall mean land size possessed per household was 1.67 ± .02 ha. The purpose of keeping indigenous cattle was for traction, milk production, income generation, trashing of crop, manure (to increase soil fertility), social status and meat. Traction takes the lead in all districts. Natural pasture, crop byproduct, established pasture, hay and house made leftover were identified as major feed sources in study area. Most of the respondents housed cattle at night and part of the day. The major sources of water for livestock were rivers, pond, springs/streams and temporary water. Feed availability in quantity and quality was ranked the first most important problem limiting livestock production in the area.

Based on the above conclusions the following recommendations were forwarded

Feed shortage got the highest rank by cattle owners to be the most limiting factor for cattle production in the study area which need to be addressed. Therefore, Provision of strong extension services to farmers for feed resource development and training them in basic principles of collection, storage of harvested feed resources and crop residues should be required. It was noted that farmers lack awareness on the production and use of improved forages and hence consolidated extension service and training is required for the farmer by agricultural development professionals.

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