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Assessment of Livestock Feed Resources and Improved Forage Management Practices in Gibe Woreda, Hadiya Zone

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Abstract
This study was conducted in Gibe woreda of Hadiya Zone southern Ethiopia, with objective of assessing available feed resources and improved forage management practices. A cluster sampling procedure was employed. First a total of 5 kebeles from 21 kebeles were randomly selected. Then 31 households from each kebele and hence a total of 155 households, were randomly selected for interview who practiced improved forage production and produce livestock. About 82% of the respondents were males and 72% of them are illiterate. About 46.5% of the respondents had 1-2 ha of cropping land and 65.8% of the respondents had less than 0.5 ha grazing land holdings. The mean number of livestock per household was 2.4 cattle, 1.5 sheep, 1.8 Goat, 0.5 equines and 4.4 poultry. The major livestock feed resource in the area were natural pasture (55.2%), crop residues(30%), improved forages(3.8%), and hay(7%), and industrial by products(4%), were the feed resources used in the study area are used as animal feeds. In rank shortage and poor quality feed (1st), prevalence of disease (2nd), lack of veterinary service (4th) and lack of improved breeds (3rd) were the major constraints for livestock production. Only 3.8% of the respondents cultivate improved forages for different purposes and to feed their animals (1.9%), but 0.95% and 0.95% of the respondents were cultivate forages as wind break/ shelter and for protection of soil erosion respectively. Major species of improved forage cultivated in the area were desho grass, elephant grass, and lablab and cow pea respectively. However, the cultivation improved forages was constrained by land shortage (84% of the respondents) and lack of planting materials (16% of the respondents). It can be conclude that although there is practice of improved forage cultivation the produces are facing with different problems. Thus extension services that encourage the farmers to cultivate the improved forages should be applied.
Keywords: cultivated forage, crop residue, and natural pasture, livestock

Introduction

Livestock production is an integral part of the agricultural activities in Ethiopia and its population constitutes first in Africa and tenth in the world. The sector contributes 12-16% of total gross domestic product (GDP) and 30-35% of the agricultural GDP in the country. Moreover, livestock contribute to the lively hood of about 60-70% population of Ethiopia (Tessema and Alemayehu, 2010). The livestock population is also believed to be the largest in Africa (CSA, 2012) however, the productivity of the animal is low contributed to many factors , of which feed shortage, disease prevalence, bleed selection and lower sectoral focus on animal production are the major (Solomon *et al.,* 2010).

The total livestock population in Ethiopia is increasing but the animal production is decreasing from year to year due to gradual limitation in the area of grazing lands caused mainly by increasing crop cultivation (Adugna, 2008). Increasing human population and declined land productivity resulted in increasing demand for cropping lands in most parts of Ethiopia. This increasing demand for cropping land to produce food for human in mostly satisfied by expanding to natural grazing areas which results in reduction of the amount of land available for natural grazing and forge production for livestock farming (Alemayehu, 2002). Moreover, large area of grazing land in pastoral areas of becoming unsuitable for grazing due to bush encroachment (Adugna, 2008).

In Ethiopia feed shortage interms of quality and quantity is the main cause for the poor performance of the livestock production (Adugna, 2008). Feed shortage is more aggravated during the dry season in both highlands and lowlands of the country (Alemayhu, 2006).

The main available feed resources for livestock in Ethiopia are natural pasture and crop residues which are low in quantity for sustainable animal production (Tesseman and Almayahu, 2010) and such feed renounces cannot fulfill the nutritional requirements of the animals particularly during the dry season, due to poor management and their inherit low productivity and quality (Adugna, 2008). Different strategies can be employed to improve the low poor quality of such commonly viable feed resource. But improved management, production, preservation and utilization should be the primary strategy (Getnet, 2012). High quality concentrated supplementation is also firstly recommended strategy to improve the poor nutritional quality of poor quality natural pasture and crop residues, but such supplements are costly and local unavailable, specially for small holder livestock producers. To this end another strategy which has been getting acceptance and considered as the best solution is the use of improved forages. The use of improved forages is considered to have many advantages besides there use as animal feeds.

Forage cultivation can fill gaps in forage supply, improve the efficiency of labor or increase production. High yielding grasses that allow a high stocking rates are well suited for areas with high densities of animals production for example as basic ration for dairying around cities cultivated grasses can also play a role in more extensive animal husbandry systems when the native vegetation cannot be with stand high grazing pressure (Bayer and water and Bayer, 1998).

Most importantly production of improved forages provides a source of protein which greatly increases the productivity of animals from crop by-products which are the available energy source for ruminants (Alemayelw, 2002). Moreover, supplementation of forage legumes greatly improves the voluntary feed intake and digestibility of cereal crop residues and poor quality pasture based diets (Adugna, 2007).

The adoption of improved forage technologies in a sustainable manner at the house hold lever is expected to assume a pivotal role in increasing animal production (Mulualem and Molla, 2013). However the adoption of improved forage production (husbandry) is not well developed in most parts of Ethiopia, although there has been practice done by government institutions and nongovernmental organizations for decades. Poor supplementation may reduce livestock production and productivity (Adugna, 2007) and increment in livestock population with decreased grating availability will results in reduced productivity of livestock (Negash, 2007). Besides to above mentioned issues the existence of different livestock feed resources related problems together with poor management of available feed resources in Gibe districts of Hadiya Zone calls scientific research as solutions for the problem.

Materials and Method

The study was conducted in Gibe woreda of Hadiya Zone, southern Ethiopia which is located at 259 km from Addis Ababa and 25 km from Hossana town capital of Hadiya zone. The altitude ranges between 1500-2200 meters above sea level and mean annual rainfall of 1900 millimeter. The mean minimum and maximum temperatures in the study area are 8^0c and 18^0c, respectively.

The woreda has three agro-ecological zones, namely high land (Dega), Mid-land (woinadega) and low land (kola) and a total of 21 rural kebeles and three junior municipalities located in those agro-ecologies, six kebeles in high land, six kebele mid-land and the rest twelve kebeles in low land. The major crops cultivated in the study areas are cereal crops, vegetables, *enset,* coffee and fruits (Gibe woreda Agricultural Office 2002).

Sampling Methods

A cluster sampling procedures was used for the study, based upon the agro- ecology of the district (woreda) that is high land, mid-land and low land. Firstly, a total of five kebele (one kebele from high land), one kebele from mid- land and three kebele from low land were randomly selected. From those selected kebeles, a list of farmers who practicing improved forage production was obtained from the woreda Agriculture office. Then the list of total of twenty one households from each kebele and hence a total of one hundred five households were selected for the interview.

Data source

Both primary and secondary data was used for this study. The primary data were collected by through interview with questionnaire (that is closed/ structured questionnaire and open ended question/ unstructured questionnaire). The secondary data were collected from woreda agricultural office and other written documents. Then the data were collected on:- available livestock feed resources, methods of managing improved forages, crop residues and livestock husbandry systems, challenge and opportunities sources of information on improved forages, methods of production, source and availability of improved forages resource.

Data Analysis

The data was analyzed by using SPSS (Ver., 17). and by using simple descriptive statistics like percentage and mean and presented by using graphs, tables and charts.

Results and Discussion

Demographic characteristics of the respondents

Demographic characteristics of the respondents are presented in Table 1. Majority (82%) of the interviewed respondent were males. The family size of the households was high with those who had 6-8 family numbers accounted 58% and those who had 3-4 family numbers were 32% while 10% of the respondent had family size of <3 persons per household CSA (2003) reported the average national, and that of SNNPRs family sizes per household were 5.2 and 5.1 persons respectively, but more than half (58%) of the respondents in the present study had family size beyond those mention average family sizes.

With respect to the educational status of the respondents, majorities (72%) of them were illiterates while the rest (28%) were literate (Table1). The presence of large proportion of literate households may an

opportunity for easily accepting and adopting of improved management practice of livestock and other agricultural technologies as in opposite to Tassew and Seifu (2009).

Table 1: *Demographic characteristics of the respondents*

Variables	*Number (N= 155)*	*Percentage (%)*
Sex of households		
Male	126	82
Female	29	18
Family size of the households		
<3	21	10
3-5	52	32
6-8	82	58
>9	-	-
Educational status of the households		
Illiterate	97	72
Literate	58	28

Livestock Species and holding purpose of keeping in the study area

The average number of livestock per households is shown in table 2. The mean number of the livestock per household was 2.40 cattle, 1.50 sheep, 1.8 goats, 0.5 equines and 4.4 poultry. The average numbers of livestock per household in the present study were very low compared to the values, 15.6 cattle, 44 sheep, 7.6 goat, 1.99 equines and 11.8 chickens reported by Seid and Brahan (2014) in Burji Woreda, Segen Zuria Zone of SNNPRS.

Table2: *Mean livestock number of the respondents*

Livestock	Total no. of livestock (N=155)	Mean
Cattle	254	2.4
Sheep	160	1.5
Goat	195	1.8
Equines	52.5	0.5
Poultry	460	4.4

Land holding size

The size of cultivated land and grazing land holdings of the respondents is shown in table 4. Majority (60%) had cultivated land holding of 1-2 ha, followed by 46.5% who possessed cultivated landholding less than 1 ha. However, only 20.6% of the respondents had greater than 2 ha, cultivated land. With respect to grazing land holding majority (65.8%) had less than 0.5 ha, 20% of the respondents had 0.5-0.75 ha grazing land holding and only 14.2% had grazing land size of >0.75 ha.

The land holding size in study area is lower than the average total land holding size of 36 ha per household reported by Seid and Berhan (2014) in Burji Woreda, Segen Zuria Zone of SNNPRS. Increasing population and declining land productivity result in increasing demand for arable land in most of Ethiopia (Alemayehu, 2002). Smallholder farmers operate with extremely limited resources interims of land, livestock and other forms of capital (Bayer and waters Bayer, 1998).

Table 3: Land holding size the Respondents

landholding size (ha)	Number of households (N= 155)	Percentage (%)
Size of cultivated land		
<1	51	32.9
1-2	72	46.5
>2	32	20.6
Size of grazing land		
<0.5	102	65.8
0.5- 0.75	31	20.0
>0.75	22	14.2

Major crops grown in the study area

The major crops grown in the study area is shown in table 5. The producers ranked the type of crop differently. Majority (88%) and 84% of the respondents ranked first *enset* and wheat respectively, as their preferred crop to cultivate. On the other hand, 26% of the respondents were ranked peas ninth. This indicates that wheat straw and *enset* leaves are the major livestock feed resources in the area especially during dry season. The present finding is similar with Feleke (2000)

Table 4: *Major crops grown (cultivated) in the study area*

Name of the crop	Rank	Number of respondents (N= 115)	percentage (%)
Wheat	2nd	88	84%
Enset	1st	92	88
Teff	3rd	74	70
Coffee	4th	62	60
Maize	5th	58	5
Barley	6th	46	4
Banana	7th	39	7
Bean	8th	32	30
Pea	9th	27	26

Sources of Livestock feed

Table 6 shows the source of livestock feeds in the study area. Different feed resources including communal and private grazing land which are the sources of pastures, crop residues, improved forages and hay and industrial by products are used as animal feeds. 40% and 30% of the respondents ranked private grazing land (1st) and crop resides (2nd) respectively, as main sources of feeds for their livestock. Private grazing (natural pasture) can be the main source of forage for animals kept by pastoralist smallholder farmers (Bayer and waters Bayers, 1998). According to Adugna (2008) and Getnet (2012), the majority of livestock feed resource in Ethiopia are the natural pastures, crop residues and aftermath grazing. Grazing land is one of the main feed resources for ruminants in the Ethiopian highlands (Getnet 1999). All those reports agree to the present study.

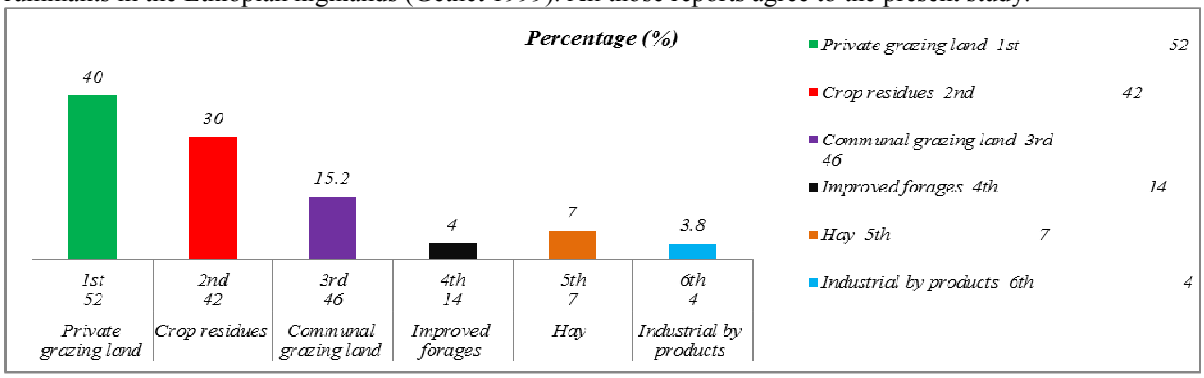

Fig1. Sources of feeds for livestock in the study area

Constraints of livestock production

The constraints of livestock production in the study are is shortage and poor quality feed (36%) and prevalence of disease (30%) were ranked 1st and 2nd respectively, and lack of improved breed (3rd) and lack of veterinary service (4th) were the major constraints for livestock production by the respondents. Among the different factors that constraints livestock productivity in Ethiopia feed shortage and disease are considered to be the major one. In support to the results of the present study, Adugna (2008) reported that, feed shortage interms of quantity and quality, in the main cause for the poor performance of the livestock sector in Ethiopia.

Table 5 Constraints for livestock production

Constraints	***Rank***	***No of respondents(N:115)***	***%***
Shortage and poor quality feed	1st	58	37.4
Disease prevalence	2nd	41	26.5
Lack of improved breeds	3rd	33	21.3
Lack of veterinary service	4th	23	14.8

Purpose of improved forage production

The purpose of improved forage production (cultivation) by the respondents is can be produced for different purposes. Majority (49%) of the respondents cultivated improved forages to feed their animals. But 21.9% and 29.1% of the respondents were cultivated forages as wind breaks/shelter and for protection of soil erosion respectively. According to Getnet (2012), the integration of improved forage crops in agricultural systems has many advantages including soil conservation, weeds, pests and disease controls, besides to their primary as high quality animal feeds

Table 6: Purpose of improved forage production

Purpose of improved forage production	*No of respondents(N=155)*	**%**
For own stock feeding	76	49.00
For protection of soil erosion	34	21.9
As wind break/shelter	45	29.1

Time of feeding improved forages

Time/ season of feeding of improved forages for their livestock is the results from the purpose of improved forage production that shows above majority (17.4%) of the respondents feed their animals during the rainy season while 72.9% of the respondents provide their animals with improved forages during the dry season and 9.7% of respondents feed their animals by improved forages through out of the year. Improved forages are also less costly than purchasing of the Concentrate and agro-industrial by-products feeds and their cultivation and use was considered to be environmentally friendly (Getnet, 2012). Those produced improved forages are provided for different classes and age groups of livestock i.e. dairy cow, calves, draft power animals like ox, donkey and horses respectively.

Table7: ***Time of feeding improved forage***

Time/season	Number of respondents (N= 155)	Percentage (%)
Dry season	113	72.9
Rainy season	27	17.4
Throughout the year	15	9.7

Constraints for cultivation of improved forages

According to Mulualem and Molla (2013), if improved forages are being integrated and produced at house hold level in a sustainable way, animal productivity was increased. However, adoption and cultivation of improved forages at small holder farmers remains the main challenge in Ethiopia constrained to different factors. The main constraints for cultivation of improved forages in the study area were shown in table 9. Although all the respondents had an interest to cultivate improved forages, land shortages (29%), lack of planting material (16%) and none-interest of the respondents (55%) were the raised constraints for cultivating improved forages in the study area. In support to the results of the present study, Alemayehu (2012) reported that, the lack of seed remains the constant constraint to wider adoption of improved forages by farmers and other in Ethiopia.

Table 8: *Main Constraints for cultivation of improved forages in the study area*

Factor	***Number of respondents (N= 155)***	***Percentage (%)***
Land shortage	89	57.4
Lack of planting material	58	37.4
Non - interest	8	5.12

Improved forage management practices

Majority (72%) of the respondents reported that they first clear and practice proper land preparations and then sow the forage seeds by drilling methods and broadcasting method depending on forage seed species. But the rest of respondents (25%) were simply tracing the land and broadcasting the forage seeds. They apply organic fertilizer like manure and animal dung to increase the productivity of the forage production.

Once established the forages are utilized mostly through cut and carry system. The farmers cut and brought the forage to their animals. Adugna (2008) also reported that cultivated forages are mainly important as cut- and carry sources of feed and as a supplement to crop residues and natural pastures. However, no one of the interviewed respondents conserves improved forages in the form of either hay or silage and the respondents claimed that this is mainly could not produce cultivate surplus amount of forages.

Conclusion

The results of this survey study indicated that the available feed resources in the study areas were natural pastures, crop residues hay and cultivated forages. But the principal feed resources for livestock were natural pasture and crop residues. Improved forages were used mainly as livestock feeds and also for protection of soil erosion and as wind brake and shelter Desho grass, elephant grass, lablab and cowpea were the cultivated forage species in the study area; however, the cultivation of improved forages was constrained by land shortages, lack of planting materials and non-interest.

Recommendations

Natural pasture and crop residues should be supplemented with high quality supplements. In this regard the use of improved forages that have multi-purpose should be given attention.

Farmers should be encouraged to cultivate improved forages through provision of planting materials in

order to fulfill the need and nutritive value of their livestock and to obtain income from the improved forage by selling forage seed and improved forages in the production plots. Further research work should be conducted in the animal feed handling, conservation, and preservation strategies in the area.

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