

Research Article

# Assessment of Available Feed Resource and Their Utilization in Guraghe Zone the Case of Cheha Woreda

Kedir Adem\* 

Department Animal Science, Wolkite University, Gubre, Ethiopia

## Abstract

The research was conducted in cheha woreda to assess the available livestock feed resources and their utilization. 60 households were used to collect data. Based on the results of this study, majority (75%) of the society were educated. The availability of feed resources in the study area was varied with the season of the year. In dry season, conserved forage (hay), crop residues, locally available supplementary feeds, concentrates, non-conventional feed and natural pasture were available in their decreasing order. In wet season, natural pasture, locally available supplementary feed, crop residues, concentrates, improved forages and agro industrial by products were available in their decreasing order. Commonly used livestock feeding system observed in study area was direct grazing, cut and carry feeding system, tethering and stall feeding. The major livestock production constraint in the study area was feed shortage and then animal disease, water scarcity, low productivity of animals and lastly weather condition. Based on the result we recommended that to overcome the problem of feed shortage increases productivity of livestock, the government should give attention and provide training of forage conservation methods to the farmers. Providing and introducing improved forages species, veterinary service and support on other technical aspects are also seeking attention too. Farmers should be practiced in fodder conservation as hay which used during drier season.

## Keywords

Conserved Feed, Improved Forage, Non-conventional Feed, Supplementary Feeds

## 1. Introduction

Agriculture dominates the economies of developing countries and livestock is among agricultural sector with a significant economic role in most developing countries being an essential for the food security of human population. It occupies about 30% of the planet's ice free terrestrial surface area and is a significant global asset [1]. It is evolving in response to rapidly increasing demand for livestock products. Keeping livestock is an important risk reduction strategy for vulnerable communities. They are important providers of nutrients and traction for growing crops in smallholder systems [2].

Currently, livestock is one of the fastest growing agricultural sectors in developing countries with 3.77% for livestock vs. 2.71% for crops in the last decade [3]. This growth is driven by the rapidly increasing demand for livestock products, this demand being driven by population growth, urbanization and increasing incomes in developing countries [4].

Ethiopia has leading livestock population in Africa with the estimated livestock population of 44.32 million sheep, 23.3 million goats, 2.31 million camels and over 42 million poultry [5]. Livestock production is an integral part of

\*Corresponding author: [Kedir1430@gmail.com](mailto:Kedir1430@gmail.com) (Kedir Adem)

**Received:** 17 December 2024; **Accepted:** 30 December 2024; **Published:** 17 January 2025



Copyright: © The Author(s), 2025. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Ethiopia agricultural system. The subsector contributes 12% and 33% to total Gross Domestic product (GDP) and Agricultural Gross Domestic Product (AGDP) respectively and provide livelihood for 65% of the population and the livestock sector also accounts for 12-15% of total export earnings (LMA, 2001) [6]. In addition, Ethiopia is known with having diverse agro-ecological zones suitable for livestock production and for growing diverse types of food and fodder crops. According to [5] estimates of livestock in SNNPR are 8831450 cattle, 3169816 sheep, 2651077 goats, 292496 horses, 305089 asses, 70365 mules and 8106038 poultries. The reports of a study [7] shows livestock number of the zone to be estimated as 1122537 Cattle, 340307 Sheep, 131618 Goats, 711836 Poultries, 73050 Horses, 8563 Mules and 73260 Asses.

In spite of this larger number with high potential for meat and milk production, the sector is not on a position that can bridge the gap between the ever-increasing demand for animal products and the level of production. Livestock feed is considered to be responsible for indicated problems. Inadequate quantity and poor quality feed, particularly during the dry season, is one of the most important constraints to livestock feeding system that limiting livestock production and productivity at smallholder farmers in Ethiopian [8]. In addition, many feed resources that could have a major impact on livestock production continue to be unexploited, undeveloped or poorly utilized. A critical factor in this regard has been the lack of proper understanding of the nutritional principles underlying their utilization. Thus, documenting the livestock feed resource and feeding systems of the area is crucial to design appropriate interventions to enhance productivity of livestock and assure optimization of resource use and output managements. Therefore, the current study will be conducted with the objective of assessing the available feed resources and their utilization in the study area.

## 2. Material and Methods

### 2.1. Description of the Study Area

The study was conducted in three kebeles found in the Cheha woreda of Gurage zone. Gurage Zone is Located at 155 km south west of Addis Ababa between  $7.8^{\circ}$ - $8.5^{\circ}$  North latitude and  $37.5^{\circ}$  -  $38.7^{\circ}$  East longitude of the equator. The zone occupies an area of 5,932 km<sup>2</sup>. Agro ecologically, the Zone is characterized as 171 km<sup>2</sup> dry kola (lowland), 160 km<sup>2</sup> moist kola, 135 km<sup>2</sup> as dry woyenadega (mid-altitude), 3,672 km<sup>2</sup> as moist woyenadega, 1,687 km<sup>2</sup> as moist dega (highland) and 107 km<sup>2</sup> as wurch (frost) and with about 93% of the total area dry woyenadega to moist woyenadega and moist dega climatic condition that makes it suitable for agricultural production [9].

### 2.2. Sampling Technique and Sampling Size

To undertake the study, the woreda was classified in to three different groups based on the agro-ecological condition. A total of three representative kebeles were selected randomly one from each agro-ecology. From each sampled kebeles 20 households were selected purposively who has livestock. Total of 60 representative households were used for interview.

### 2.3. Data Collection Methods

The available feed resource and their utilization related information were collected by using both primary and secondary data. Primary data was collected through semi structured questionnaire's group discussion and personal observations. Secondary data collected from written materials like published materials, reference books and internet access.

### 2.4. Data Analysis

The collected data from both primary and secondary sources were analyzed using Microsoft excel (version 10) and simple descriptive statistics like mean, percentages and standard deviation were applied to present the results.

## 3. Result and Discussion

### 3.1. Socio- Economic Characteristics of Households

From the total householders included in survey, 22.5% of the family members were under the age group less than 15, 44.2% between the age 16-45, 25.8% at the age between 46-60 and 7.5% of the family members were under the group above 60 years. As indicated in table 1, the higher average family age distribution of households was under the age group between 16-45 years. This is an indicator of higher productive human resources of the study area which by turn considered as opportunities for improvement of agricultural sector in general and livestock sector in specific of the study area lessening down other factors to its minimum levels.

*Table 1. Average family age distribution per households.*

No	Age	Average family size/HH	%
1	<15	1.35	22.5
2	16-45	2.65	44.2
3	46-60	1.55	25.8
4	>60	0.45	7.5

Although at lower percentage, there were family members with the age of above 60 years of age. This again implies that there are several family members which have fewer roles in production activities of the sector and are dependent on other members of the family.

### 3.2. Educational Background

The results of this study reveal that, of the total householders in the surveyed area, the majorities (75%) of the family members were literate and the remaining 25% were illiterate. Furthermore, from this literate members of the family, higher percentage (50%) as shown in table 2 below, fall under elementary level of education. On the other hand, there are several (16.7%) family members with secondary educational level and to some extent (8.3%) of the householders family members have seen to have Diploma & above levels of education.

**Table 2.** Educational background per households.

Educational levels	Average family members/HH	%
Illiterate	1.5	25
1-8	3	50
9-12	1	16.7
Diploma & above	0.5	8.3

The relatively higher number of literate/educated householders family members observed was again an indicator for the expected improved livestock production and productivity of the study area because, literacy helps the community to accept or attend training and innovation and it has an impact on properly and effective use of improved or scientific methods of keeping livestock and any other innovation.

### 3.3. Land Holding

The results of the current study indicate that, the land is currently becoming limited natural resources of the study area. The average land holding of the study area was 3.15 ha per householder which was greater than 2.98 reported for enset based farming system in Enor woreda [10]. Out of the total land, 1.3 ha (41.3%) was used for crop production whereas about 1.32 (42%) of the land was used for sources of livestock feed. Furthermore, as indicated in the table 3, higher percentage of land (27%) that was kept for sources of livestock feed was observed to be used for natural grazing followed by lands (17.5%) used for forage production.

**Table 3.** Average land holding and land use patterns per household.

Land use type	Average land use(ha)	(%)
Home	0.47	14.2
Crop production	1.30	41.3
Grazing/pasture land	0.85	27
Forage production	0.53	17.5
Total land holding	3.15	100

As indicated in table 3, land used for livestock production or used for livestock feed production (1.38) was observed to be comparable, even greater than that of land used for crop production (1.30). This result was not agreed with the results of 0.45ha and 2.04ha for grazing and cultivation respectively in enor woreda [10]. This was supposed to be resulted because of the study area relies on perennial crop, which is relatively taken minimum land compared to other cereal crop. Enset was the dominant food crop in the area so that enset by nature is steady crop means long-lasting or perennial crops and relatively produce or give high yield consuming less area of land. So that the results of this study indicates the proportion of land used for livestock feed sources was directly proportional with the amount of land used for Enset crop. On the other hand, the livestock has a good position in the society of the study area for their crucial products. Furthermore, among the study area, the more the land with inappropriate for cultivation, the more the land left for livestock feed sources. Finally, it was seen that, the proportion of land used for livestock feed sources to be directly proportional with that of livestock number of the study kebele.

### 3.4. Livestock Holding and Herd Composition

From the results of the survey on number and herd composition of livestock of the study area, there were significant differences in the average number of livestock per household and the species of livestock, with higher number (3.5) for cattle followed by poultry (7.5) and sheep (1.9) and with lower number of equine. This results was dis agree with the results of 4.32 and 5.19 for cattle and sheep respectively in Gumer woreda but relatively agree with 3.81cattle in ejha woreda [11]. This variation might be due to the variation in the role of livestock based on the agro ecologies of the country and the available resources for livestock production mainly types of feeds.

**Table 4.** Average livestock per household.

Livestock Species	Average No. of livestock	Percentage
Cattle	3.5	24.1

Livestock Species	Average No. of livestock	Percentage
Sheep	1.9	13.1
Goat	1.3	9.0
Equines	0.3	2.1
Poultry	7.5	51.7

For this, the observed lower proportion of goat relative to similar species (sheep) in the study area as indicated in the [table 4](#) was the best reason for this condition to be happen. That means as the study area (Cheha woreda) is relatively close to highland/ waynadega, the feed resources for goat which is browse species is relatively scarce compared to lowlands. Based on the responses of householder, the main purpose of keeping livestock were the source of income,

milk, meat production and manure for soil fertility.

### 3.5. Major Feed Resources

The availability of feed type in the study area was varying in wet and dry seasons. In dry season, crop residue, conserved forage, locally available supplementary feed, concentrates, tree fodder leaves and natural pasture was available in their decreasing orders. In wet season on the other hand, natural pasture, locally available supplementary feed, crop residues to some extents, concentrate, improved forages and agro-industrial by products were available in their decreasing order. In dry season availability of crop residues, hay and locally available supplementary feeds are high and in contrast in wet season the availability of natural pasture high and this result is agreement with the [\[12\]](#) point that with 50% of the feed to the animals feed come from natural pasture is major animal feed in the wet season.

**Table 5.** The major feed resources in wet and dry seasons.

Feed type	Wet season		Dry season	
	No. of respondent	%	No. of respondent	%
Natural pasture	20	50	3	7.5
Crop residue (wheat straw, teff trawl and maize Stover)	4	10	8	20
Improved forage(elephant grass, Rhodes grass)	3	7.5	2	5
Agro-industrial by-product(wheat brain)	2	5	2	5
Locally available supplementary feed (enset and atella)	5	12.5	7	17.5
Fodder tree leaves	1	2.5	3	7.5
Concentrates (maize, molasses)	3	7.5	6	15
Conserved forage (hay)	2	5	9	22.5

Natural pasture is primary source of feed to their animal in the some parts of the study areas. The variations may come from agro-ecological different between the two areas. A supplementary feed are available in small amount in dry and wet season.

### 3.6. Feeding System

As shown on [figure 1](#), most of respondents (65%) feed

their livestock by grazing followed by cut and carry system, tethering and stall feeding. Furthermore, the results of this study indicate that, due to its over utilization the condition of grazing land is decreasing from time to time and as a result of increment in crop production and the quality is dropping due to over grazing. This result is similar with that of [\[13\]](#) that reports if a number of animals allowed to graze are higher than the caring capacity of grassland, there is fast depletion of desirable spaces and deterioration of the grass land.

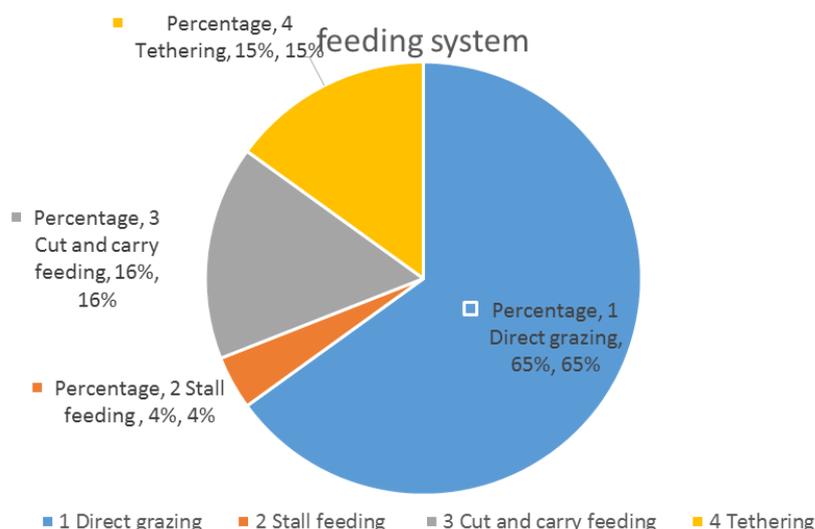


Figure 1. Feeding system.

Some of respondents (16%) respond that they fed their livestock by using cutting and carry systems from natural pasture, forest and garden and some of them (15%) feed their livestock by tethering. A few farmers (4%) respond that they use stall feeding by supplementing their cattle with small amounts of locally available supplementary feeds, like Enset by-products and atella over the years, especially during lactating period. This result is supported by that of [14] that reports the especial value of supplementing agro industrial by products for livestock mainly in urban and pre urban production systems as well as in situational where the productivity potential of the animals were relatively high and require

high nutrient supply dairying or pre urban fattening activities.

### 3.7. Livestock Production Constraints

Based on table 6, the livestock production constraints in the study area were feed shortage, low productivity of animals, water scarcity, weather condition, disease and housing management in the decreasing order. As indicated in the table 6, feed shortage is the major constraints of the study area. The respondents indicated that, the feed shortage was aggravated by the increment in crop land at the expense of grazing land.

Table 6. The major livestock production constraints.

Types of constraints	No of respondents	%	Rank
Feed shortage	17	42.5	1
Water scarcity	6	15	3
Animal disease	3	7.5	5
Low productivity of animal	7	17	2
Housing	2	5	6
Weather condition	4	10	4

The condition of rain fall was among the reported constraints in the area, as rain fall exists the water bodies are recharged, however, the erratic rain fall is hampering proper recharge there by affecting the livestock in the study area resulting for poor quality and inadequate water supply. The overall livestock production constraints reported in the present study was similar with the reports that indicated that

inadequate feed and nutrition, poor health and low productivity of breeding stock production constraints in several parts of Ethiopia Desta [15].

## 4. Conclusions

This study was conducted in chaha worda for determina-

tion of available livestock feed resources and their utilization. The major feed resources in the study area were natural pasture, crop residues, enset, conserved forages and locally available supplementary feeds such as "atella". The availability of feeds varies depending on the season with wet season natural pasture was observed to be an important source of feeds for their livestock. Whereas in dry season, hay, enset and crop residues are common feed resources for livestock. There was little bit production of improved forages like elephant grass, Rhodes grass observed in the study area. Most householder (65%) were using grazing as the major livestock feeding system where as (15%) of them use tethering and others (16%) follow stall feeding by cut and carry feeding methods. The livestock production constraints in the chaha woredas were feed shortage, low productivity of animal, water scarcity, weather condition, disease and housing. Among the observed constraints, the feed shortage is the major one resulting for low productivity of animals and water scarcity to some extents.

## Abbreviations

CSA	Central Statistical Authority
GZADD	Gurage Zone Agricultural Development Department
HH	House Holder
LMA	Livestock Marketing Authority

## Acknowledgments

First of all, I would like to express my sincere gratitude to Wolite University for financial and overall supports for my whole works. I am also grateful to Mr. Biniam Dembela for his valuable support during data collection. Lastly, I would also like to extend my appreciation to all my friends from Department of Animal Science who have been supportive throughout and provided a stimulating environment for my work.

## Author Contributions

As sole author I am confirming that, I was responsible all duties of the manuscript.

## Conflicts of Interest

The author declares no conflicts of Interest.

## References

- [1] Steinfeld, H.; Gerber, P.; Wassenaar, T.; Castel, V.; Rosales, M.; de Haan, C., 2006. Livestock's long shadow. FAO, Rome 2006.
- [2] Nelson, G. C., Rosegrant, M. W., Koo, J., Robertson, R., Sulser, T., Zhu, T., et al. (2009) Climate Change Impact on Agriculture and Costs of Adaptation.
- [3] FAO (Food Agricultural Organization), 2004. Livestock development program, country information brief Ford and Agricultural organization of May, 2004.
- [4] Delgado, D. C.; Cairo, J.; Moreira, O., 2005. Ruminant fermentation in river buffaloes and commercial Zebu cattle fed integral forage of sugarcane. Cuban J. Agric. Sci., 39(1): 51-54.
- [5] CSA (Central Statistical Agency) 2003. Statistical report on land part IV, Ethiopia Agricultural sample Enumeration 2001/2 results SNNPRS Addis Abeba.
- [6] LMA (Livestock Marketing Authority), 2001. Study on cause of cross border Illegal Trade in south west And Eastern Ethiopia market research and promotion department Addis Abeba.
- [7] Gurage zone micro and small enterprises development bureau manual. (2005 E. C)
- [8] Anderson, E. R.; Roberts, B. R., 1987. Palatability studies on plants in the south-western Orange Free State sandveld. South Afric. J. Botany, 53(1): 12-16.
- [9] Gurage Zone Agricultural Development Department). 2011. Documented report on socio-economic study of the zone.
- [10] Adem, K. (2024). Feed Resources for Livestock and Improved Forage Production Status in Enor Woreda, Gurage Zone of Ethiopia. American Journal of Life Sciences, 12(6), 104-112. <https://doi.org/10.11648/j.ajls.20241206.11>
- [11] Kerga, T. (2021). Husbandry practices and phenotypic characterization of indigenous sheep types in Gurage Zone, Southern Ethiopia. International Journal of Livestock Production, 12(4), 154-167.
- [12] Alemayehu M, 2004. Pasture and forage resources profiles Ethiopia pp, 19 Ethiopia /FAO/ Addis Abeba.
- [13] Yeshitila, 2008. Land degradation and strategies for sustainable development of Ethiopia high lands.
- [14] Alemayehu M, 1998. Natural pasture improvement study around small holder Dairy areas, Moa small dairy development project (SDDP) Addis Abeba, Ethiopia.
- [15] Desta L, Kassiem, Benins and Pender J (2000). Land degradation and strategies for sustainable Development in Ethiopia highlands, Amahra Region.

## Research Field

**Kedir Adem:** Animal Nutrition, Dairy science, Poultry production, Ruminant Nutrition, Apiculture, Fishery and Aquaculture