

Research article

Non-Conventional Feed Resources and Their Utilization Practice in North Gondar, North West Ethiopia

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ABSTRACT

This study was conducted to investigate non-conventional livestock feed resources and their utilization practice in north Gondar. One representative district from the three altitudes (low, middle and high) and three peasant associations (AP) from each district were randomly selected. Thus a total of 162 respondents from 9 peasant associations, 18 respondents from each PA were selected by clustered random sampling. A single-visit formal survey with group discussions and visual observations was used to collect primary information and a semi structured questionnaire was prepared for this intention. Descriptive statistical analysis tools and statistical package for Social Science (SPSS) version 13 was used to analyze the data and presented with tables. The average land holding was 1.5 ± 0.8 (mean \pm SE) ha/household. 58.02% of the respondents were illiterate. Sheep and goat house holdings in the study area were slightly higher than cattle. Utilization of the non-conventional feed resource in the different regions was different; for instance barley and wheat straw were utilized by 100% of the respondents in the high altitude while teff straw and maize stover were more utilized in the middle altitude 74.07% and 85.19%, respectively. Those crop residues are becoming traditional in the high and middle altitude. Using 'Atela' (local brewery grain) and kitchen wastes was high especially in high and middle altitudes. From this study, it can be concluded that conventional feed resources like grazing pasture was low due to land shortage and the utilization practice to improve the feeding value of nonconventional feeds was poor. Finally it is recommended that an intervention through training on feed treatment and supplementation is essential to improve the feeding value of crop residues and clear

cut duration of time for how long a feed has been used as a feed for livestock should be put to distinguish it as conventional or non-conventional feed resource.

Keywords: conventional, supplementation, crop residue, kitchen residue

INTRODUCTION

The livestock population in Ethiopia is considered to be the largest in Africa. [6] Reported that the country own about 53.99 million cattle, 25.5 million sheep, 24.06 million goats, 1.91 million horses, 6.75 million donkeys, 0.35 million mules, 0.92 million camels and 50.38 millions of poultry. This livestock sector has been contributing considerable portion to the economy of the country both at the household and national levels and have in the past provided significant export earnings. But not to the extent it has to contribute to the development of the economy of the country. This is due to different constraints from which feed inadequacies (huge gap between demand and supply of nutrients) are reported to be all-encompassing and persistent constraints affecting the production and reproductive performance of different classes of livestock [2], [10], [12]. The focus of feed resources and their utilization represents possibly the most exciting task facing planners and animal scientists in developing countries [9] which is the same catastrophe in Ethiopia. The most devastating factor diminishing of feed for animals is due to rapid increment in the expansion of arable land that reduce the grazing land which is the major source of conventional animal feeds. Due to the shortage of traditional feeds, non-conventional feeds may be the other alternative feeds. Non-conventional feed resources (NCFR) generally refer to all those feeds that have not been traditionally used for feeding livestock and are not commercially used in the production of livestock feeds that includes oil palm by-products, single-cell proteins, feed materials of plant and animal origin (e.g. poultry excreta), and poor quality cellulosic roughages from farm residues such as stubbles, haulms and vines [9]. The importance of these feeds depends on the method of utilization because of their poorness in essential nutrients and the bioavailability of these nutrients contained in NCFR could be improved by supplementation and treatment. A given feedstuff which is traditional in one country may be non-conventional in the other country. Therefore identifying the available alternative or non-conventional feed resources is far important to devise/improve their utilization method to the extent that can bring changes in the production and to take actions in the livestock feed improvement programs so as to enhance the livelihood of the people. Therefore this study was initiated with the general objective of investigating the available non-conventional livestock feed resources and their utilization practice in the study area.

3. MATERIALS AND METHODS

3.1. Description of the Study Area

The study was conducted in North Gondar zone which is located in North western part of Amhara regional state. The altitude ranges from 528 to 4620 masl in western and rainfall varies from 880 mm to 1772 mm with the

maximum temperature of 44.5°C in the lowland and minimum temperature of -10°C in the highland. The area is also classified mainly in to two seasons, the wet season, from June to September and the dry season from October to May.

3.2. Data collection

A single-visit formal survey with group discussions and visual observations was used to collect primary information and a semi structured questionnaire which was filled by trained and locally recruited enumerators was designed.

3.3. Sample size and Sampling Technique

All of the districts found in North Gondar administration zone was listed and grouped in to three (low altitude, medium altitude and high altitude). One representative district from each group (altitude) and three peasant associations from each district were randomly selected. Thus a total of 162 respondents from 9 peasant associations were selected by clustered random sampling.

3.4. Statistical Analysis

Descriptive statistical analysis tools and statistical package for Social Science (SPSS) version 13 was used to analyze the data collected at house hold level. The data presenting way used to summarize the analyzed data was table.

4. RESULT AND DISCUSSION

4.1. Household characteristics

Table 1: Household characteristics of the interviewed respondents

Parameter	Over all mean and proportion (N=162)
Education (%)	
Illiterate	58.02
Primary school	24.69
Junior school	9.88
Secondary school	7.41
Mean age (SE) (years)	31.8±0.05
Mean family size (SE)(N)	5±0.26
Average land holding (SE) (ha)	1.5±0.8

*N= number of observation, SE= standard error, ha= hectare

In this study, the average land holding was 1.5 ha/household. But the landholding is different in the different agro ecologies that it is less than the average in the high altitude areas. In the region where this research was conducted, it has been reported that farm sizes were over 1 ha on average [7]. In contrary to this, Ethiopian smallholder farmers (64.5 %) operated land sizes less than one hectare in the 2000 cropping season [5]. The land holding really affects the availability both in quantity and quality of feed per household. The conventional feed mostly the grazing pasture in the study area have being decreasing due to high demand in land for crop cultivation which is a major source of crop residue . More than half of the respondents were illiterate (58.02%) who may not have knowhow how to treat and supplement when the feed is poor in its nutritional value. Similar results of low educational level which was

manifested by little practice of using veterinary service, artificial insemination and improved forage production was reported in Gurage zone of southern Ethiopia [1].

4.2. Livestock herd structure

Sheep and goat house holdings in the study area are slightly higher than cattle. A study conducted by [14] around Debre Birhan also showed that higher sheep house holding (24 ± 0.2) while cattle households (2.8 ± 0.3) remain nearly the same with the result of this study which may be due to small ruminants need less feed and space than large ruminant (cattle). Those small ruminants can relatively meet their requirements easily from some house leftovers and/or nonconventional feed sources than large ruminants.

Table 2: Cattle - holdings/household (means \pm S.E)

Type /species of livestock	Over all mean (N=162)
Calves	2.01 \pm 0.35
Heifers	1.36 \pm 0.61
Bulls	0.71 \pm 0.33
Oxen	1.23 \pm 0.12
Dry cows	1.11 \pm 0.27
Lactating cows	2.01 \pm 0.56
Sheep	3.04 \pm 0.6
Goat	5.07 \pm 0.86
Donkey	1.01 \pm 0.24
Horse	0.6 \pm 0.28

4.3. Non-Conventional Feed Resources

Utilization of the non-conventional feed resource in the different regions is different; Barley and wheat straw were utilized by 100% of the respondents in the high altitude and teff straw and maize stover were more utilized in the middle altitude (74.07% and 85.19% respectively). Those crop residues are becoming traditional in the high and middle altitude. This may be because of grazing land shortage which is the result of increasing in demand for land for crop cultivation to meet the increasing human population.

Table 3: Major non conventional feed resources as reported by respondents (N=162)

Feed resource	Agro ecology					
	High altitude (n=54)		Middle altitude (n=54)		Low altitude(n=54)	
	Dry season	Wet season	Dry season	Wet season	Dry season	Wet season
Nuge seed cake	22.22	5.56	20.37	7.41	12.96	-
Wheat straw	100	85.19	55.56	24.07	-	-
Teff straw	-	-	74.07	29.63	64.82	11.11
Maiz stover	-	-	85.19	-	94.44	-
Barley straw	100	53.7	57.41	33.33	-	-
Wheat bran	22.22	14.82	20.37	9.26	5.56	-
Atela (local brewery grain)	77.78	37.04	24.07	5.56	16.67	-
Household leftovers	74.07	33.33	64.82	12.32	25.93	-

*(-) = not available

But in low altitude it is not far they started to collect crop residues as source of feed during scarcity usually from April to June. The reasons they began to collect crop residues is due to the diminishing grazing land so that the standing hay for the dry season is also decreasing. This is again due to the increase in human population in the low land through new settlements from highlands and expansion of land for crop cultivation. [11] also reported in the high and middle altitude areas where mixed farming is practiced, increase in human population density leads to demanding crop production reducing grazing lands.

The local brewery grain (atela) obtained from brewing of 'tela' (local beer) was used for longer periods in the high and middle altitude of the study area and less common in the low land areas (table 3). Crops used for brewing tela include sorghum, maize, finger millet and barley. Therefore using or searching options to feed livestock is related with the degree of conventional feed scarcity. Farmers in the peri urban were using household leftovers like injera, wot and tunic and spoiled onion.

4.4. Utilization Practice of Non-Conventional Feed Resources (n=162)

Utilization and management practice	Frequency	Proportion (%)
Treatment	8	4.94
supplementation	37	22.84
Conservation of CRs	150	92.59
Shaded Storage CRs	21	12.96

CRs= crop residues

Expanding the feed resource base through utilization of non conventional feed resources is a compelling task to the chronic feed deficit [4]. But using these NCFRs is limited due to unbalanced nutrient supply, undesirable compound and difficulty to store. Therefore there is a need to treat and supplement to avoid these problems. These crop residues which are the major NCFRs in the study area are generally poor in their nutrient composition which cannot even meet the maintenance requirement. In the last three months (April, May, June), until the commencement of the rainy season animals are losing their body weight and sometimes when the commencement of the rainy season delays farmers may totally lose some of their animals. Only 4.94% of the livestock producers in the study area are practicing feed treatment (physical); they are chopping straw and hay; sometimes mix it with atela. Ensiling conserves the feeding value of some agro-industrial by-products, but the adoption of this technique is still limited generally and in the study area particularly [4]. Some (22.84%) of the farmers respond as they are supplementing with nuge seed cake especially animals with poor condition and oxen. Many researches revealed that supplementation of poor quality feeds with concentrate and legume forage improves animal performance [3], [13]. Farmers (87.04%) in the study area store crop residues without shade which may reduce the nutritive value of the feed [8].

5. CONCLUSION

The conventional feed resources like grazing pasture and land for harvesting forage for hay preparation is diminishing. Crop residues have been using as an alternative feed source. Now it is better to call them traditional feed. Therefore researchers should trail other alternative feed sources to fill the gap of demand and supply. The utilization practice to improve the feeding value of these crop residues is poor which needs an intervention through training of feed treatment and supplementation. Finally it is recommended that clear cut duration of time should be put in distinguishing of conventional and non-conventional feed resources; for how long the feed has to be used for feeding of livestock to be classified as conventional feed or non-conventional feed. Otherwise grouping of feedstuffs in to traditional and non conventional is ambiguous.

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