

## **Management practices and utilization of milk and milk products of Abergelle breed of Goats in extensive production systems in Kolla Tembien district, Tigray, Northern Ethiopia**

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**Target Audience:** *Ministry of Agriculture, goats' owners, policy makers, Researchers,*

### **Abstract**

*A cross sectional study design was conducted from January to June, 2019 to study the housing and health management of Abergelle breed of goat and the utilization of goats' milk and milk products in Kolla Tembien District of Tigray region, Northern Ethiopia. Data on housing, health and utilization of milk and milk products of Abergelle breed of goats were collected from randomly selected 200 respondents by interview, focused group discussion and observation. Accordingly, mixed crop livestock production was practiced by 88% of the respondents. Moreover, 116 (58%), 61 (30.5%) and 23 (11.5%) of the respondents were housing their goats alone, with sheep and cattle, respectively; whereas 83% of the respondents were housing adult goats and kids separately. Furthermore, 100% of the respondents complained their goats are affected by various diseases that resulted in mortality and reduction in production and reproductive performances. It was also revealed that, 90.5% of the respondents take their diseased goats to the nearby veterinary clinics. However, 78% of them complained the veterinary service in their locality is not satisfactory. Additionally, 100% of the respondents use goat milk for household consumption and income generation. Majority (62.5%) of goats milking activity was carried out by children. Therefore, the study has investigated the housing, health and utilization of milk and milk products of Abergelle breed of goats in the study district.*

**Keywords:** *Goats; Health; Housing; Kolla Tembien; management; Milk; Utilization*

### **Description of Problem**

Goats are important component of livestock industry having adaptability to harsh climates which make them suitable for landless and marginal farmers. Goats also play a vital role in the socio-economic structure of poor people which live in rural area (1). For instance, goats in Ethiopia are important to the subsistence, economic and social livelihoods of their owners (2, 3). On top of this, Ethiopia generates hard currency through exporting live goats, goat meat and goat skins

Goats are important milk producers in several parts of the tropics and contribute significantly to human nutrition in many developing countries (4). Goats produce only about 2% of the world's total annual milk supply. However, their global contribution to the nutritional and economic well-being of humanity is tremendous. Improper handling and the low productivity of goat milk remain to be the major problem limiting its consumption (5). Despite the large number and importance of goats, their productivity is low due to a number of factors ranging from feed shortage both in

quality and quantity, health constraints and poor husbandry practices such as feeding, housing and health managements. Despite the huge genetic diversity and valuable contributions of goats to the livelihoods of farmers in rural areas, the sector has been given low research and development attention at global (6) and national (7) levels. This is mainly due to inadequate recognition of the contributions of goats make to the livelihoods of the poor, resulting in underutilization of the diverse goat genetic resources (6).

Therefore, the current study was conducted to assess the housing and health management practices of goats and utilization of goats' milk and milk products in the study area.

## **Materials and Methods**

### **Description of the study area**

The study was conducted in Kola Tembien district. Kola Tembien is located in the central zone of Tigray Region around 880 Kms far from Addis Ababa to North, and 95 kms far from Mekelle city. It has total area coverage of 1,470 km<sup>2</sup>. The altitude of the district ranges from 1600-2300 m.a.s.l. The annual rainfall ranges from 500-800 mm and the average annual temperature ranges from is 25°C-30°C (BOANR, 2003, unpublished data).

### **Study Design**

A cross sectional study was conducted from January to June, 2019 was conducted to assess the housing and health management of Abergelle breed of goat and utilization of goat milk and milk products in Kolla Tembien district of Tigray, Northern Ethiopia.

### **Data Collection and Sampling Technique**

The Wereda has total of 28 Tibias of which 4 Tibias were purposively selected for

this study based on their goat population potential. Then, relevant primary data were collected from a total of randomly selected 200 respondents by interview focused group discussion and observation. The questionnaires were focused on biography and socioeconomic characteristics of the respondents, housing and health management of Abergelle breed of goats and utilization of goat milk and milk products.

### **Data Management and Analysis**

The collected raw data were entered into an Excel sheet; cleaned, coded, imported and analyzed using a Statistical Package for Social Sciences (SPSS) version 20 (2018). Accordingly, descriptive statistical analysis was conducted to compute frequency and percentages for the qualitative data. Moreover, a Chi-Square test was used to see any associations between the dependent and independent variables. A p-level of <0.05 was considered as a statistically significant association.

## **Results**

### **Respondents Biography and Socioeconomic Characteristics**

Out of the total respondents interviewed in the current study, 76.5% of them were males and majorities (59.5%) of them were not educated (Table 1).

### **Housing Management of Gats**

This study revealed that 58.0% of the respondents had separate houses for goats to keep them during the night time. Moreover, 83.0% of them were keeping adult goats and kids in separately, and regular cleaning of the houses was practiced by 76.5% of the respondents (Table 2).

## Tables

**Table 1. Respondents' biography and socioeconomic characteristics**

Variables	Category	Frequency	Percent (%)
Sex	Male	153	76.5
	Female	47	23.5
Age (in years)	20-30	14	7.0
	31-40	46	23.0
	41-50	66	33.0
	>50	74	37.0
Level of education	Illiterate	119	59.5
	Elementary	51	25.5
	Secondary	4	2.0
	Certificate	26	13.0
Farming activity	Livestock only	24	12.0
	Mixed crop-livestock	176	88.0
Goats farming experience (in years)	<4	65	32.5
	4-10	72	36.0
	>10	63	31.5
Land size (in ha)	<2	144	72.0
	2-3	53	26.5
	>3	3	1.5

**Table 2. Housing management of goats**

Variables	Category	Frequency	Percent (%)
How do you keep your goats at night?	Alone	116	58.0
	Together with sheep	61	30.5
	Together with cattle	23	11.5
What type of goats' house do you use?	Closed type	128	64.0
	Open but fenced	72	36.0
Do you regularly clean the house?	Yes	153	76.5
	No	47	23.5
Do you have separate houses for adult goats and Kids?	Yes	166	83.0
	No	34	17.0

**Health Management of Goats**

According to this study, 100% of the respondents complained different types of diseases affect their goats which result mortality, reduction in production and reproductive performances. It was also stated that 90.5% of the respondents take their diseased goats to the nearby veterinary clinics

for diagnosis and treatment services. However, 78% of the respondents complained the veterinary service in their locality is not satisfactory. This study has also shown that, 25% and 54% of the respondents sell diseased goats at market place and slaughter for household consumption, respectively (Table 3).

**Table 3. Health managements of goats**

Variables	Category	Frequency	Percent (%)
Do diseases affect your goats?	Yes	200	100
In average how many of your goats die due to diseases per year?	<5	89	44.5
	5-10	86	43.0
	>10	25	12.5
What measures do you take when your goats get diseased?	I treat them by myself	8	4.0
	I take them to veterinary clinic	181	90.5
	I do nothing	11	5.5
Where do you keep diseased goats?	In separate house	135	67.5
	Together with healthy goats	65	32.5
Do you vaccinate your goats regularly?	Yes	111	55.5
	No	89	44.5
Do you deworm your goats regularly?	Yes	176	88.0
	No	24	12.0
Do you think the veterinary service in your area is satisfactory?	Yes	156	22.0
	No	44	78.0
Do you sell diseased goats in the market?	Yes	50	25.0
	No	150	75.0
Do you slaughter diseased goats for consumption	Yes	108	54.0
	No	92	46.0
Do you eat the meat of goats died due to diseases?	Yes	88	44.0
	No	112	56.0

**Table 4. Utilization of goat milk and milk products**

Variables	Category	Frequency	Percent (%)
Do you milk your goats?	Yes	200	100.0
How much is the average milk yield/doe/milking?	<0.5 liter	69	34.5
	0.5-1 liter	44	22.0
	>1 liter	39	19.5
	I do not know	48	24.0
Milking frequency per day?	Once	116	58.0
	Twice	84	42.0
Milking of goats is carried out by	Children	125	62.5
	Men	23	11.5
	Women	52	26.0
For what purpose do you use goat milk?	For household consumption	114	57.0
	For income generation	15	7.5
	Both	71	35.5
Do you process goats' milk for butter production?	Yes	86	57
	No	196	98.0
Do you drink raw goat milk?	Yes	4	2.0
	No	122	61.0
From which animal species do you like to drink milk?	Yes	78	39.0
	No	91	45.5
From which animal species do you like to drink milk?	From cows	91	45.5
	From goats	109	54.5

### Utilization of Goat's milk and milk products

The study has shown that 100% of the respondents milk their goats for household consumption and income generation, and majorities (62.5%) of milking activity was carried out by children. According to the response of the respondents (34.5%), the average milk yield per goat per milking is less than half liter, and 58% of the respondents milk

their goats once per day. Furthermore, 57%, 7.5% and 57% of the respondents use the milk produce for household consumption, income generation and for dual purpose, respectively. It was also found that 98% of the respondents' process goat milk traditionally for butter production. Moreover, 61% of the respondents drink raw milk, and 54.5% of them prefer to drink goat milk than cow milk (Table 4).

**Table 5. Association between dependent and independent variables**

Variables	Category	Measures taken when goats get diseased			X <sup>2</sup>	P-value
		I treat them by myself	I take them to Veterinary clinic	I do nothing		
Goats farming experience	<4years	5(62.5%)	57(31.5%)	3(27.3%)	11.636	0.020
	4-10 years	1(12.5%)	63(34.8%)	8(72.7%)		
	>10 years	2(25.0%)	61(33.7%)	0(0.0%)		
Goats farming experience	Where do you keep sick goats?					
		<i>In separate house</i>	<i>Together with healthy goats</i>			
	<4years	54 (40%)	11(16.9%)	10.656	0.006	
	4-10 years	43(31.9%)	29(44.6%)			
>10 years	38(28.1%)	25(38.5%)				
Level of education	Do you house adult goats and kids separately?					
		Yes	No			
	Illiterate	52(59.1%)	67(59.8%)	58.669	0.000	
	Elementary	19(21.6%)	32(28.6%)			
Secondary	52(59.1%)	67(59.8%)				
Certificate	19(21.6%)	32(28.6%)				
Level of education	Do you eat the meat of goats died due to diseases?					
		Yes	No			
	Illiterate	52(59.1%)	67(59.8%)	8.914	0.030	
	Elementary	19(21.6%)	32(28.6%)			
Secondary	0(0.0%)	4(3.6%)				
Certificate	17(19.3%)	9(8.0%)				

### Association between dependent and independent variables

The Chi-Square test analysis showed that the respondents' farming experience was statistically significantly associated ( $p < 0.05$ )

with the measures taken when their goats got sick and housing management of diseased goats. It was also revealed that the respondents level of education was statistically significantly associated ( $p < 0.05$ ) with housing of adult goats

and kids separately and consumption of goat meat dead due to diseases (Table 5).

## **Discussion**

In this study, majority (76.5%) of the interviewed respondents were males. This result is in close agreement with the report of (8) who reported 79.6% of the interviewed respondents in Humbo District of Wolaita Zone, southern Ethiopia were males. Regarding the age of the respondents, majority of them (37%) were greater than 50 years. This result is not in agreement with the report of (9) who reported majority of the interviewed respondents in Bahir Dar Zuria and Mecha districts, Northwestern Ethiopia were within the age category of 15-55 years old. Different studies reported that presence of large proportion of old aged people (greater than 50 years old) can be disadvantage for undertaking different agricultural activities.

About 17% of the respondents did not separate kids and does during night and day time, possibly increasing the chance of getting contagious diseases by running the kids with the flock when the new born kids are not immunologically competent. A study conducted by (10) has reported kids are at higher risk of dying if they are not being separated from adult animals.

According to the informal communication with the respondents, they have lack of awareness on the disadvantages of housing adult goats and kids in the same house during the night time. Therefore, provision of extension services and trainings to the farmers on general husbandry practices of goat farming could be paramount important to improve the existing poor management practices of goat farming in the study area, and hence enhance the production and productivity of goats. As a result, the livelihood of the farmers can be improved.

Goats are important milk producers in several parts of the tropics and contribute

significantly to human nutrition in many developing countries (4). According to the current study, milking goats to get milk for household consumption and income generation is practiced by all of the interviewed respondents. In Ethiopia, goats are raised mainly for three purposes. About 3% of adult goats are kept for milk, about 3.36% for meat, about 46.3% for breeding, and the rest are raised for all the above three and other purposes (11). Goat milk has advantages over cow or human milk in having higher digestibility of protein and fat, alkalinity, buffering capacity, and certain therapeutic values in medicine and human nutrition (12).

However, the consumption of goat milk is still not widely accepted in some parts of the world despite its high nutritional benefits. Moreover, majority of the respondents in the current study milk their goats once per day. According to the suggestions of various studies, goats should be milked twice a day on a regular schedule, preferably every 12 hours. A reduction in the number of times a goat is milked per day will reduce milk yield. If goats are only milked once a day, then yield will be reduced by one third (13).

Diseases are among the major factors that affect the health, production and productivity of goats in the current study area. The goat owners in the study area take various measures when their goats get diseased. Majority of them take their diseased goats to the nearby veterinary clinics for diagnosis and treatment services. On the other hand, some goat owners treat diseased goats by themselves, while others do nothing.

## **Conclusion and Applications**

1. Goat farming is one of the livestock farming activities in the study area and it serves as a source of income for the farmers.
2. Goats are kept for immediate source of cash and to produce milk for household

consumption as well as income generation.

3. The farmers have knowledge gap on proper husbandry practices of goats such as housing and health management as well as utilization of goat milk and milk products.

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### Conflict of Interest

The authors declare that they have no conflict of interests.

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