



FARMERS PERCEPTION ON THE UTILIZATION OF MILK PRODUCTS AND STRESS TOLERANCE CAPABILITIES OF GOATS IN SELECTED DISTRICTS OF THE NORTH-WESTERN AMHARA, ETHIOPIA

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Abstract: The composition of goats' milk has got better digestibility, alkalinity, buffering capacity and certain therapeutic values in medicine and human nutrition as compared to cow or human milk. Therefore, the objectives of the study were to quantify the current perception of smallholder farmers on the utilization of dairy goat milk and its products, and capacity of stress tolerance capabilities. The study was conducted in three districts of Western Amhara. The data was collected through questionnaires, field observation, focus group discussion and individual interviews with the selected farmers. The results of this study revealed that major causes for under utilization of goat dairy products include cultural taboos (33.8%), bad smell of goat milk (13.3%), lower milk production potential of goats (24%), and lack of awareness (28.9%). However, most farmers explained that they prefer cow milk over goat milk for its nutritional and medicinal values. Majority (85.9%) of farmers reported to use goat milk and its products as a part of diet for the future. The farmers also noted that goats have the stress tolerance and climate change adaptability. From the overall reach clearly seen that specialized dairy goat production must be intensified so as to increase milk and its products and adapting the existing climate change and related factors

Key words: Adaptation, dairy goat, Farmer perception, stress tolerance

Introduction: Goats play important roles in Ethiopia by providing food products (milk and meat), non-food commodities (manure and skins), and income contributing significantly to the small holder farmers. Goats are also

slaughtered during religious and customary rites as well as festive occasions. There are about 28,163,332 heads of goats across Ethiopia (CSA, 2014). Especially in dry areas where it is difficult for dairy cows to survive, goats play a greater role in providing milk for the community. Moreover, goat milk provides more nutritional and therapeutic value than dairy cow milk (Rashmi *et al.*, 2013) and dairy goats require less land and feed resources as compared to dairy cows (CTA, 2007). In this case keeping dairy goats can be considered as a more

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affordable and appropriate option for milk production (Getahun Legesse *et al.*, 2008).

The Amhara region is among the areas of the country endowed with a huge potential for goat production. The region has about 5,291,571 heads of goats, particularly the South Gonder zone and Western Gojam administrative zones with their goat population of about 434,230 and 315,142 goats, respectively are among the areas with great potentials in the region (CSA, 2014). According to the respondents, even if the use of goats as dairy animals had a long history in the region, goat milk and its by products were underutilized. Despite the fact that the composition of goats' milk has got better digestibility, alkalinity, buffering capacity and certain therapeutic values in medicine and human nutrition as compared to cow or human milk (Yangilar, 2013). On the other hand goats are becoming very important animals that thrive best under different stresses. Therefore, this study was initiated to quantify the current perception of smallholder farmers on the utilization of dairy goat products, and stress tolerance capabilities.

Materials and Methods

Description of the study area: The study was conducted in Ebnat, Farta and Gonji kolela districts of Amhara region in 2014 (Figure 1). These districts were purposively selected based on agro-ecology, goat population potentials and experience of using goat milk. Ebnat district considered as lowland, Gonji kolela as midland and Farta as highland.

Ebnat district is located in the South Gondar administrative zone. It is located 122 km from Bahir Dar, the capital of the Amhara region and 714 km away from Addis Ababa. The district has 50% lowland (Kolla), 35% intermediate (Woina- Dega) and 15% highland (Dega) areas. A district has 15% plain, 45% mountain, 30% plateau. The remaining 15% are gorges and valleys. Annual temperature and rainfall is ranges 25°C to 30°C and 500-900mm. Of the 249,837 hectares of land in Ebnat, 68,599 hectares are cultivable and 108,210 hectares are designated grazing lands. Crops grown include teff, wheat, barley, maize, sorghum, beans,

chickpea and sesame. Major soil types are verity, sandy and loam soil. Ebnat has a total human population of 122,514. The district has a total livestock population of 562,040; from this 131,505 are indigenous goats. The district's major socio- economic problem is food insecurity (Ebnat District ARDO, 2013).

Farta district is situated at 11°40' N latitude and 38° E longitude (Abebaw Nega and Solomon Melaku, 2009) and located at about 97 km north-east of Bahir Dar, capital city of the Amhara Region and 667 km away from Addis Ababa, capital of Ethiopia. It lies within an altitude range of 1920-4135 m a.s.l. The district receives an average annual rain fall of 900-1099 mm and a mean-range temperature of 9-25 °C. 56%, 42.5% and 1.5% of a district is intermediate (Woina- Dega), highland (Dega) and Wurch, respectively. A district has 29% plain and 45% mountain. The remaining 26% is gorges and valleys. Farta district has 103,457 hectares of land, among this 61,242 hectares are cultivable, 11,568 hectares are grazing lands, 13,813 hectares are arable, 5,910 hectares are forest land and 1,149 hectares are bushes and shrubs. Crops grown include wheat, barley, beans, potato, maize and chickpea. Brown soil is 50%, red soil is 30% and black soil is 20% in a district. Farta has a total human population of 281,280. The district has a total livestock population of 432,822 from this 40,193 are indigenous goats. The district's major socio-economic problem is food insecurity (Farta District ARDO, 2013).

Gonji kolela is located south of Bahir Dar in the West Gojjam Zone, with an altitude of 2216 meters above sea level, annual average temperature 21 °C and annual average rainfall 1338mm. It is situated 70-km southwest of Bahir Dar. This district has 57% lowland (Kolla) and 47% intermediate (Woina- Dega) areas. A district is 16% plain and 20% mountain. The remaining 26% is gorges and valleys. Of the 64,186 hectares of land, 34,336 hectares are cultivable, 671 hectares are grazing land, 14,686 hectares are arable and 14493 hectares are forest, bushes and shrubs. Crops grown include teff, wheat, barley, maize, sorghum, beans and

chickpea. Major soil types are salty, loam and heavy clay soil. Gonji kolela has a total human population of 21,333. The district has a total

livestock population of 260,685; from this 52,350 are indigenous goats (Gonji kolela District ARDO, 2013)

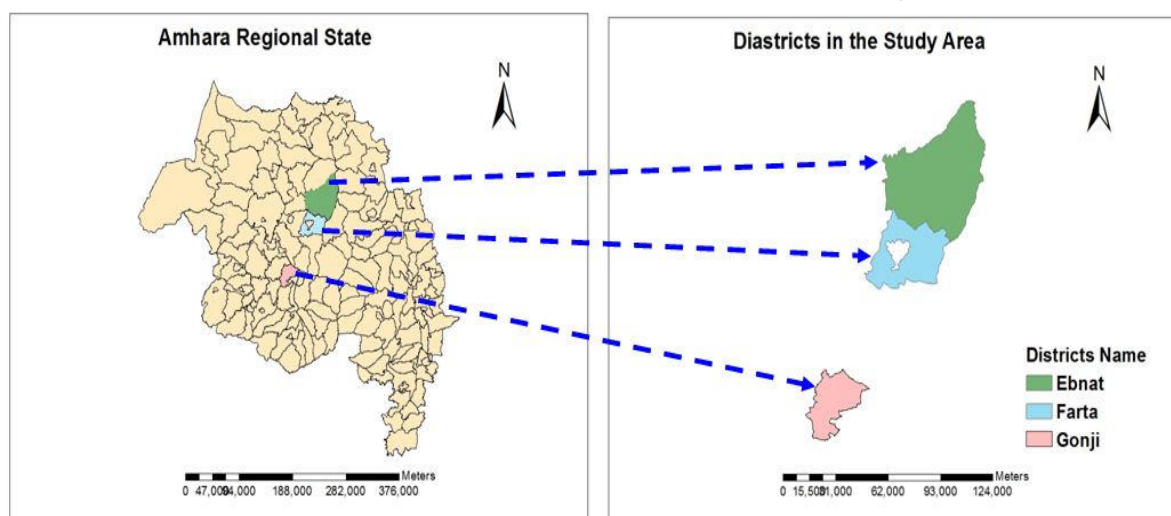


Figure 1. Map of the study areas

Data collection methods: Data was collected through questionnaires, field observation, focus group discussion and individual interviews with the selected farmers. Data collected on farmers' perception towards indigenous dairy goat production and utilization of its milk through individual interviews, focus group discussions and questionnaires were analyzed by frequency, percentage and descriptive statistics

Results and Discussion

Utilization of goat dairy products: Several questions were asked to determine the degree of utilization and perception of goat milk by the small holder farmers in the areas. According to the respondents there was a good habit of consuming raw and processed goat milk for food and medicinal value. Based on the focus group discussion, some (36.4%) of the respondents from Ebnat confirmed that goat milk and its product are included in their food stuff. However, none of the farmers from Farta and Gonji kolela districts utilize goat milk for food except some experiences as a medicine (10% and 16%) of the respondents in the two districts), respectively. According to the respondents the major causes for under utilization of dairy goat products include cultural taboos (33.8%), bad smell of goat milk (13.3%),

lower milk production potential of goats (24%), and lack of awareness (28.9%). However, all of the participants in the group discussion explained to use goat milk and its products specially ghee for medicinal purposes to treat cattle diseases (tifina) and human ailments (mich, kunkun and dandruff). Similarly, goat milk provides more nutritional and therapeutic value than dairy cows milk (Rashmi *et al.*, 2013).

Preference of goat milk: Based on the focus group discussion, majority (75% Ebinat, 67% of Farta and 70 % of Gonji kolela farmers) reported that they prefer goat milk to cow milk for its nutritional and medicinal values. They believe that the therapeutic value of goat milk is attributed to the diversified feed habit of goats. Likewise, goat milk is easy to drink and is a rich source of calcium, phosphorous and chlorine than cow's milk (Bonface *et al.*, 2003). However, some farmers (5% Ebinat, 3% of Farta and 7 % of Gonji kolela farmers) explained that they prefer cow milk over goat milk for its nutritional and medicinal values.

Stress tolerance of dairy goats' species: In the group discussion farmers were asked to choose between keeping goats for dairy purpose and keeping dairy cows. Most (62.5%) of the

farmers in the study areas preferred keeping dairy goats. The respondents justify the advantage of keeping dairy goats than cows due to their stress tolerance (31.2%), lower initial costs (26.6%), shortage of grazing land (20.2%), nutritional content and health benefit of goat milk (13.8%) and their ease of management (8.3%). (Getahun Legesse *et al.*, 2008) stated that it is impossible to keep dairy cattle in highly populated highlands of Ethiopia, with ever-increasing human population and drastically shrinking farmlands. Dairy goats, therefore, offer alternative to dairy cattle in dry areas (Mohamed *et al.*, 2002). About 12.5% of farmers wanted to keep dairy cows since they do not want to use goat milk and its products due to cultural and knowledge barriers. However, 25% of the farmers recommend keeping both dairy goats and dairy cows. Majority (85.9%) of farmers reported to use goat milk and its products as a part of diet for the

future. However, 14.1% of the farmers do not wanted to use goat milk and its products as a whole.

Farmers’ perception for resistance of goats to different factors: In order to assess the perception of farmers on the stress tolerance and climate change adaptability of dairy goats they were asked to rate the goats with other livestock species. The following result was obtained from the three sample districts.

Resistance to disease: According to perception of respondents in Farta district goats were highly resistant to diseases followed by cattle. Similarly, goats were the first followed by cattle in Gonji kolela district. This may be probably due to the feeding habit of goats; goats eat different browse species that may have medicinal value. However, cattle were highly resistant to diseases than goats, equines and sheep, respectively in Ebnat district (Table 1).

Table 1: Ranking resistance of goats for diseases related to other livestock

Resistance to disease	Rank 1	Rank 2	Rank 3	Rank 4	Index
Ebnat					
Goat	33.3	25.0	8.3	33.3	0.26
Sheep	0	0	75.0	25.0	0.17
Cattle	66.7	25.0	8.3	0	0.36
Equine	0	50.0	8.3	41.7	0.21
Farta					
Goat	61.5	23.1	15.4	0	0.35
Sheep	0	7.7	46.2	46.2	0.16
Cattle	38.5	61.5	0	0	0.34
Equine	0	7.7	38.5	53.8	0.15
Gonji kolela					
Goat	73.7	26.3	0	0	0.37
Sheep	0	10.5	15.8	73.7	0.14
Cattle	15.8	36.8	36.8	10.5	0.26
Equine	10.5	26.3	47.4	15.8	0.23

Resistance to parasite: Cattle have higher resistance to parasite followed by goats both in Ebnat and Gonji kolela districts, while goats were first followed by cattle in Farta district.

Sheep have lower resistance to parasite in all study areas. Equines were better than sheep for resistance of parasite (Table 2).

Table 2: Ranking resistance of goats for parasites related to other live stocks

Resistance to parasite	Rank 1	Rank 2	Rank 3	Rank 4	Index
Ebnat					
Goat	10.0	50.0	0	40.0	0.23
Sheep	0	0	80.0	20.0	0.18
Cattle	80.0	10.0	0	10.0	0.36
Equine	10.0	40.0	20.0	30.0	0.23
Farta					
Goat	69.2	30.8	0	0	0.37
Sheep	0	0	30.8	69.2	0.13
Cattle	30.8	69.2	0	0	0.33
Equine	0		69.2	30.8	0.17
Gonji kolela					
Goat	31.6	57.9	0	0	0.32
Sheep	0	10.5	47.4	42.1	0.17
Cattle	52.6	31.6	15.8	0	0.34
Equine	15.8	0	26.3	57.9	0.17

Resistance to heat: According to respondents in Ebnat district, goats have higher resistance to heat followed by cattle, equines and sheep, respectively. The resistance sequence is similar

for the other two districts (Table 3). This may be attributed to the characteristic smaller area to volume ratio of goats.

Table 3: Ranking resistance of goats for heat compared to other live stocks

Resistance to heat	Rank 1	Rank 2	Rank 3	Rank 4	Index
Ebnat					
Goat	91.7	8.3	0	0	0.39
Sheep	0	16.7	16.7	66.7	0.15
Cattle	8.3	58.3	33.3	0	0.28
Equine	0	16.7	50.0	33.3	0.18
Farta					
Goat	100.0	0	0	0	0.4
Sheep	0	0	30.8	69.2	0.13
Cattle	0	76.9	23.1	0	0.28
Equine	0	23.1	46.2	30.8	0.19
Gonji kolela					
Goat	100.0	0	0	0	0.4
Sheep	0	0	31.6	68.4	0.13
Cattle	0	78.9	21.1	0	0.28
Equine	0	21.1	47.4	31.6	0.19

Resistance to frost: Sheep have higher resistance to frost than other livestock species in all study areas. This may be due to their longer and denser hair than other livestock species to minimize the direct effect of external cold environment on the skin. Cattle were next resistance to frost followed by equine and goats, respectively in all the study areas (Table 4).

Table 4: Ranking resistance of goats for frost related to other live stocks

Resistance to frost	Rank 1	Rank 2	Rank 3	Rank 4	Index
Ebnat					
Goat	16.7	8.3	8.3	66.7	0.18
Sheep	83.3	0	0	16.7	0.35
Cattle	0	75.0	25.0	0	0.28
Equine	0	16.7	66.7	16.7	0.2
Farta					
Goat	0	0	7.7	92.3	0.11
Sheep	76.9	15.4	7.7	0	0.37
Cattle	7.7	61.5	30.8	0	0.28
Equine	15.4	23.1	53.8	7.7	0.25
Gonji kolela					
Goat	0	0	10.5	89.5	0.11
Sheep	100.0	0	0	0	0.4
Cattle	0	57.9	36.8	5.3	0.25
Equine	0	42.1	52.6	5.3	0.24

Resistance to drought: Goats were higher resistance to drought followed by equine, cattle and sheep, respectively in Ebnat district. However, they were the first followed by cattle, equine and sheep, respectively for both Farta and Gonji kolela districts. This indicates sheep

have lower resistance to drought than other livestock species. The reason for higher resistance of goats to drought may be their browsing ability on plant species that flourish at the time of drought while grazers did not get the grasses (Table 5).

Table 5: Ranking resistance of goats for drought related to other live stocks

Resistance to drought	Rank 1	Rank 2	Rank 3	Rank 4	Index
Ebnat					
Goat	91.7	8.3	0	0	0.39
Sheep	0	16.7	8.3	75.0	0.14
Cattle	0	25.0	66.7	8.3	0.22
Equine	8.3	50.0	25.0	16.7	0.25
Farta					
Goat	100.0	0	0	0	0.4
Sheep	0	15.4	30.8	53.8	0.16
Cattle	0	46.2	46.2	7.7	0.24
Equine	0	38.5	23.1	38.5	0.2
Gonji kolela					
Goat	100.0	0	0	0	0.4
Sheep	0	10.5	26.3	63.2	0.15
Cattle	0	52.6	36.8	10.5	0.24
Equine	0	36.8	36.8	26.3	0.21

Resistance to feed shortage: According to respondents in Ebnat district, goats have higher resistance to feed shortage followed by equine, cattle and sheep, respectively. Similarly equine have higher resistance to feed shortage next to

goat in Gonji kolela district. However, goats were ranked first resistance to feed shortage than other livestock species while equine and cattle have similar resistance to feed shortage in Farta district (Table 6).

Table 6: Ranking resistance of goats for feed shortage related to other live stocks

Resistance to feed shortage	Rank 1	Rank 2	Rank 3	Rank 4	Index
Ebnat					
Goat	91.7	8.3	0	0	0.4
Sheep	0	16.7	33.3	50.0	0.17
Cattle	0	25.0	58.3	16.7	0.21
Equine	8.3	50.0	8.3	33.3	0.22
Farta					
Goat	76.9	23.1	0	0	0.38
Sheep	0	15.4	53.8	30.8	0.18
Cattle	0	38.5	38.5	23.1	0.22
Equine	23.1	23.1	7.7	46.2	0.22
Gonji kolela					
Goat	100.0	0	0	0	0.4
Sheep	0	15.8	31.6	52.6	0.16
Cattle	0	26.3	47.4	26.3	0.2
Equine	0	57.9	21.1	21.1	0.24

Resistance to water shortage: According to the respondents goats have higher resistance to water shortage than other livestock species in all the study areas. Cattle are next to goats both in

Ebnat and Farta districts while sheep have the next higher resistance to goat in Gonji kolela district. Equines have lower resistance to water shortage than others in all study areas (Table 7).

Table 7: Ranking resistance of goats for water shortage related to other live stocks

Resistance to water shortage	Rank 1	Rank 2	Rank 3	Rank 4	Index
Ebnat					
Goat	66.7	25.0	8.3	0	0.36
Sheep	0	16.7	58.3	25.0	0.19
Cattle	25.0	58.3	16.7	0	0.31
Equine	8.3	0	16.7	75.0	0.14
Farta					
Goat	84.6	0	15.4	0	0.37
Sheep	0	38.5	23.1	38.5	0.2
Cattle	7.7	46.2	46.2	0	0.26
Equine	7.7	15.4	15.4	61.5	0.17
Gonji kolela					
Goat	100.0	0	0	0	0.4
Sheep	0	57.9	36.8	5.3	0.25
Cattle	0	31.6	52.6	15.8	0.22
Equine	0	10.5	10.5	78.9	0.13

Conclusion: From this study, it was possible to see that the farmers in Ethiopia are accustomed to use dairy goat milk and its products. The consumption of the products were improved due to the fact that the farmers perception on goat milk utilization were enhanced and the composition of goats' milk has got better digestibility, alkalinity, buffering capacity and

certain therapeutic values in medicine and human nutrition as compared to cow or human milk. This study was also confirmed that the indigenous goat population shown the increasing trend due to the fact that the species has tremendous capacity of resisting different stress like disease, parasites, heat, frost, drought, feed shortage and water shortage. The discussion

with the farmers and different stockholders also indicated that due to the human population growth and change of the grazing lands to farm land, either the indigenous or exotic cows could not be increasing the possibility of producing milk and its product due to the shortage of feed availability. Generally, it was possible to see that specialized dairy goat production must be intensified so as to increase milk and its products.

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