

## Constraints and Opportunities of Dairy Production Systems in Urban and Peri-Urban Areas of Central Highlands of Ethiopia

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**Abstract:** The study was aimed at exploring milk and products marketing, main constraints and existing opportunities of dairy production in Assela, Bishoftu, Holetta and Sululta areas of central highlands of Ethiopia. Districts were purposively selected based on the high potential for dairy production. A cross-sectional survey and pre-tested semi-structured questionnaire were used to collect information from a total of 160 randomly selected dairy farmers. Almost all the interviewed respondents sell their milk and milk products which proved that dairy production was market oriented. In peri-urban Assela, 80% of the respondents mentioned as they have no marketing problems. Many of the farmers in peri-urban Bishoftu (85%) and Holetta (80%) as well as urban Bishoftu (70%) and peri-urban Sululta (70%) stated that less milk price relative to feed cost was their main marketing problem. High feed cost was the major constraint of peri-urban Bishoftu (55%), Sululta (55%) and urban Bishoftu (50%). In peri-urban Bishoftu (35%) and Holetta (35%) land scarcity and space limitation was the second limiting factor next to high feed cost. However, in peri-urban Assela water scarcity was the major constraint of dairy production following feed cost. Dairy producers in peri-urban Sululta (50%), Holetta (55%) and Assela (65%) indicated that demand for milk consumption, research institutions and service providers, respectively as the key opportunities to dairy production. Generally, the results highlighted that even if the dairy sector in the study areas was constrained by many factors there are still ample opportunities for dairying. Therefore, harmonized activities must be done by stakeholders to minimize the identified constraints which hinder dairy development.

**Key words:** Constraints • Dairy • Marketing • Opportunities • Peri-Urban • Urban Ethiopia

### INTRODUCTION

In Ethiopia, despite the large livestock size, the sector in general and the dairy sub-sector in particular do not make a considerable contribution to the national income due to several socio-environmental factors. The poor performance of the dairy sub-sector is attributed to socio-economic, infrastructure and technical constraints and inadequate research and extension activities relevant to the development of the dairy industry [1]. Recent studies indicated that the livestock production sub-sector in Ethiopia has a vast contribution to the national economy and generating income to farmers, creating job opportunities, ensuring food security, providing services, contributing to asset, social, cultural and environmental values and sustain livelihoods [2, 3].

Urban and peri-urban dairying is playing enormous roles towards filling the large demand-supply gap for milk and milk products in urban centers, where consumption of dairy products is extraordinarily high [4]. As a result, among others, urban and peri-urban agriculture is practiced to sustain food security [5].

In the central Ethiopia, farmers holding large number of livestock herds are less affected by food insecurity [6]. As noted by Zelalem *et al.* [7] most of smallholder farmers in Ethiopia use low input production systems that relates to comparatively low milk yield per cow/day. As it is familiar in other African countries including Kenya and Uganda, dairy products in Ethiopia are channeled to consumers through both formal and informal dairy marketing systems [8]. Constraints that hamper livestock development can be broadly categorized into

environmental, technical, infrastructural and institutional issues. The major technical constraints are under nutrition and malnutrition, high prevalence of diseases, poor genetic resource management and poor market infrastructure [9].

Owing to suitable government policy support and access to market and services, there is a large potential to develop smallholder dairy production systems in urban and peri-urban areas of Ethiopia. The increase in milk production has benefited much from policy reforms starting from 1993 [8].

Dairy production in Ethiopia is facing many difficulties such as less and fluctuated products price, high and increasing price of inputs like feed and shortage of land are among the main ones which discourage the dairy producers. Though there are constraints which hinder the sector there are also plenty opportunities for its improvement and continuous research is required to tackle problems and sustain dairy development. Therefore, this study was aimed to assess the current dairy products marketing, constraints and opportunities to dairy production in urban and peri-urban production systems of Assela, Bishoftu, Holetta and Sululta towns.

## **MATERIALS AND METHODS**

**Study Areas:** Information about dairy products marketing, constraints and opportunities of dairy production in urban and peri-urban areas was conducted in Assela, Bishoftu, Holetta and Sululta towns' which were considered as the major dairy production belt areas of the central highlands of Ethiopia.

Assela town is located in Oromia region, Central Ethiopia and the capital of Arsi zone. It is located at about 175 km south east of Addis Ababa at 7°57'N and 39°7'E with an altitude of 2430 meters above sea level. Agricultural production system of the study area is of mixed crop and livestock production. Dairy farming using improved breeds is a common practice in urban and peri-urban areas [10].

Bishoftu is located 45 km south east of Addis Ababa, at an altitude of 1900 meters above sea level and at 8.44°N latitude and 39.02°E longitude. The area has a rainfall pattern with a long rainy season from June to October and a short rainy season from March to May. The average annual rainfall and average maximum and minimum temperature for the area are 1100 mm and 28.3°C and 8.9°C, respectively [11].

Holetta is among the places that are known to be potentially high for dairy production, located between 38.5°E longitude and 9.8°N latitude and an elevation of 2400 meters above sea level. It is situated in the central highlands of Ethiopia. The average annual rain fall and temperature is about 1200 mm and 18°C and the average monthly relative humidity is 60%. The seasons are classified into dry, short rainy and long rainy which last from October to February, March to May and June to September, respectively [12].

Sululta district is one of the six districts of Oromia Special Zone Surrounding Finfinne of Oromia National Regional State. The districts' capital town, Chancho, is 40 kms away from Addis Ababa towards the North-west. It lies on the geographical coordinates of 9° 11' 0" N latitude, 38° 45' 0" E longitude. The area is characterized by shallow valley with an elevation of 2500 meters above sea level, almost completely surrounded by mountains with numerous small rivers which drain into the Muger. The average annual temperature in Sululta is 14.7°C with an average rainfall of 1119 mm [13].

### **Sampling Procedures and Sample Size Determination:**

A cross sectional study involving purposive selection of study sites but random selection of dairy farms and farm owners from the urban (City) and peri-urban (Around the city) areas were conducted. The four study sites, namely Assela, Bishoftu, Holetta and Sululta towns and their peri-urban areas were purposively selected as they have large number of dairy farms. The sampling frame of Kebles and dairy farms were obtained from respective Woreda/district livestock and agriculture development offices of the sites. Additionally, information was collected from the respective Woreda/district livestock and agriculture development experts about the available dairy farms in each Keble found in both production systems of the study areas. Depending on the frame lists and information obtained two Kebles from each production systems were purposively selected based on the availability of crossbred dairy animals and dairy production experiences. Dairy farms were then randomly selected from each Keble and questioned about the required farm information. The sample size was determined according the formula given by Arsham [14] for survey studies:  $N=0.25/SE^2$  Where, N = sample size; SE = Standard error of dairy farms. Accordingly, by considering standard error of 3.95% with 95% CI as follows,  $N=0.25/(0.0395)^2 = 160$ ; a total of 160 dairy farms were selected by random sampling method from all study sites.

Before the formal survey, a pre-test survey was conducted to collect general background information about the study areas. The information that was collected in the pre-test survey helps to guide the development of actual survey questionnaire.

**Questionnaire:** A comprehensive open-ended and close-ended type semi-structured questionnaire was prepared and used to collect the needed dairy farm information. The information that was collected during the actual interview was supported by farm observations and discussions. Milk, milk products selling and marketing problems, major constraints and opportunities of dairy production systems in urban and peri-urban areas of the study sites were addressed in the survey.

**Data Analysis:** The collected survey data was analyzed using Statistical Procedures for Social Science [15] software version 20. Descriptive statistics cross-tabulation such as percentage was used to present the results.

## RESULTS AND DISCUSSION

**Milk and Products Marketing:** As indicated in Table 1, all (100%) of the respondents in urban and peri-urban Bishoftu, Holetta and Sululta stated that as they practiced selling of milk and milk products. Additionally, in urban and peri-urban Assela 95% and 75% of the respondents, respectively sell their milk and milk products. Generally, the current results showed that majority of the dairy producers were market oriented. Most of the interviewed dairy farmers in peri-urban Assela (80%), urban Sululta (55%), urban Assela (50%) and urban Holetta (40%), respectively described that there was no milk and milk products marketing problem. On the other hand, 85%, 80%, 70%, 70%, 60%, 50% and 40% of the respondents in peri-urban Bishoftu, Holetta, Sululta, urban Bishoftu, Holetta, Assela and Sululta, respectively said that less milk price relative to feed cost was their main marketing problem. Furthermore, in peri-urban Sululta and Holetta less milk price during fasting was stated as marketing problem by 15% and 10% of the dairy farmers, respectively (Table 1).

Dairy products are not consumed during fasting seasons and most of the milk during this period is processed into cheese (Ayib) and butter for later sales and consumption [16]. A study in Mekelle city, Ethiopia by Solomon [17] also revealed that the majority of the

dairy producers (92%) sell all of their milk products and the remaining 8% of them use milk only for home consumption. However, the production could not satisfy the demand in the market mostly during non fasting seasons. Comparable to the present results, Kassu [18] further mentioned that among all the constraints of milk and butter marketing in Bona district of Southern Nation Nationalities and People Regional States (SNNPRS), Ethiopia lack of training related to milk product marketing, distance to marketing points and fluctuation of prices were considered as the main problems. In East Gojjam Zone, Amhara Region and North and East Showa Zones of Oromia Region, the price of fresh milk was highly influenced by different external factors such as farm location, transport access, marketing system, seasonal variation, fasting period and processors demand [19].

**Constraints of Dairy Production:** As indicated in Table 2, high feed cost, land shortage and space limitation, feed quality, availability and cost problems as well as inadequate extension and veterinary services were the major dairy production system constraints in both urban and peri-urban areas of the study sites. High feed cost was the primary constraint in urban dairy production system of Holetta, Bishoftu, Sululta, Assela and peri-urban Sululta, Bishoftu, Holetta and Assela, respectively. But as reported by the respondents the problem was more serious in urban Holetta, Bishoftu and peri-urban Sululta. More respondents in peri-urban Bishoftu and Holetta said that land scarcity and space limitation were also their main production problems. Furthermore, dairy farmers in peri-urban Assela stated that water unavailability was frequently observed and become one from their major challenges which hinder dairy production.

High feed cost, land scarcity and space limitation and feed quality, availability and cost problems were mentioned by respondents as the primary dairy production constraints in almost all the study sites. Comparable to the current results, Sintayehu *et al.* [20] also reported that the availability and costs of feeds were the major constraints in Shashemene-Dilla area, South Ethiopia. Zelalem *et al.* [7] also indicated that inadequate animal feed resources as one of the important challenges of Ethiopian dairy sector. In Boditti town, south Ethiopia land shortage and availability and costs of feeds were reported as the primary constraints of dairy production by Asrat *et al.* [21] which were similar to the current results. A recent study by Haftu [22] described that feed scarcity

Table 1: Milk marketing practices and marketing problems in the study areas

Measured variables (%)		Study site							
		Assela		Bishoftu		Holetta		Sululta	
		U n=20	PU n=20	U n=20	PU n=20	U n=20	PU n=20	U n=20	PU n=20
Is there milk and products marketing?	Yes	95	75	100	100	100	100	100	100
	No	5	25	0.0	0.0	0.0	0.0	0.0	0.0
Overall		100	100	100	100	100	100	100	100
Marketing prblems	No marketing problem	50	80	20	10	40	20	55	15
	Less milk price relative to feed cost	50	10	70	85	60	80	40	70
	Less milk price during fasting	0.0	0.0	10	0.0	0.0	10	5	15
	No milk marketing channel	0.0	10	0.0	0.0	0.0	0.0	0.0	0.0
	The milk cooperatives did not give money on time	0.0	0.0	0.0	5	0.0	0.0	0.0	0.0
	Overall	100	100	100	100	100	100	100	100

n = number of respondents U= Urban; PU= Peri-urban

Table 2: Common constraints of urban and peri-urban dairy production systems

Measured variables (%)		Study site							
		Assela		Bishoftu		Holetta		Sululta	
		U n=20	PU n=20	U n=20	PU n=20	U n=20	PU n=20	U n=20	PU n=20
Constraints	High feed cost	40	35	50	45	55	40	45	55
	Land scarcity and space limitation	15	10	20	35	10	35	15	20
	Feed quality, availability and cost problems	25	15	15	10	25	10	30	10
	Inadequate extension services	10	10	5	10	5	10	5	10
	Inadequate veterinary service	5	5	5	0.0	5	0.0	5	0.0
	Water scarcity	0.0	20	0.0	0.0	0.0	0.0	0.0	0.0
	Disease problems	0.0	5	0.0	0.0	0.0	5	0.0	5
	Waste removal problems	5	0.0	5	0.0	0.0	0.0	0.0	0.0
	Overall	100	100	100	100	100	100	100	100

n = number of respondents U= Urban; PU= Peri-urban

and high feed cost were the primary constraints of dairy production in Hossana town. The same author further mentioned that space limitation was another dairy production constraint in the study area. Feed shortage was the primary constraint which hindered dairy production in Dale and Shebedino districts [23]. As reported by Malede *et al.* [24] 33.3% of dairy farmers in Gondar town stated that land shortage was the major constraint of dairy production. Moreover, high feed cost (23.3%), feed shortage (13%) and insufficient veterinary service (5%), respectively were also reported as the main constraints which agreed to the current results. Asrat *et al.* [25] also mentioned that land shortage and feed scarcity were the primary constraints which hamper dairy production in Wolaita Sodo town. The authors also described that land shortage was the major constraint in surroundings of Wolaita Sodo district.

**Opportunities of Dairy Production:** Most respondents in urban Sululta (25%), Holetta (25%), Assela (20%) and in peri-urban Sululta (50%) stated that high demand for milk consumption as the main opportunity to dairy production. Farmers in peri-urban Holetta (55%), urban Bishoftu (45%) and Holetta (40%) rather mentioned that the existence of research institution as a better

opportunity to dairy development in the respective areas (Figure 1). Moreover, majority of the interviewed respondents in urban Bishoftu (30%), Sululta (30%) and peri-urban Sululta (30%) mentioned that income generation and employment creation as opportunities to dairy production. Most of the respondents (65%) in peri-urban Assela stated that existence of service providers as the main opportunity for dairy production.

Studies in the Ethiopian highlands indicated that dairying generated 34% of the total household income of farmers in the Holleta area [26] and 48.9% of the urban farmers of Southern Ethiopia [20]. Azage *et al.* [27] concluded that urban and peri-urban dairy production systems could contribute to overall development through income generation and employment opportunity. Azage *et al.* [28] also mentioned that the large and diverse dairy animals genetic resources adapted to the wide and diverse agro-ecologies, establishment of several structures and service centers such as veterinary health and artificial insemination (AI) centers, high demand for consumption of dairy products, huge human population with long-standing tradition of consumption of dairy products, high rate of urbanization and income growth, availability of trained manpower, research institutions and technologies shows that Ethiopia has ample opportunities

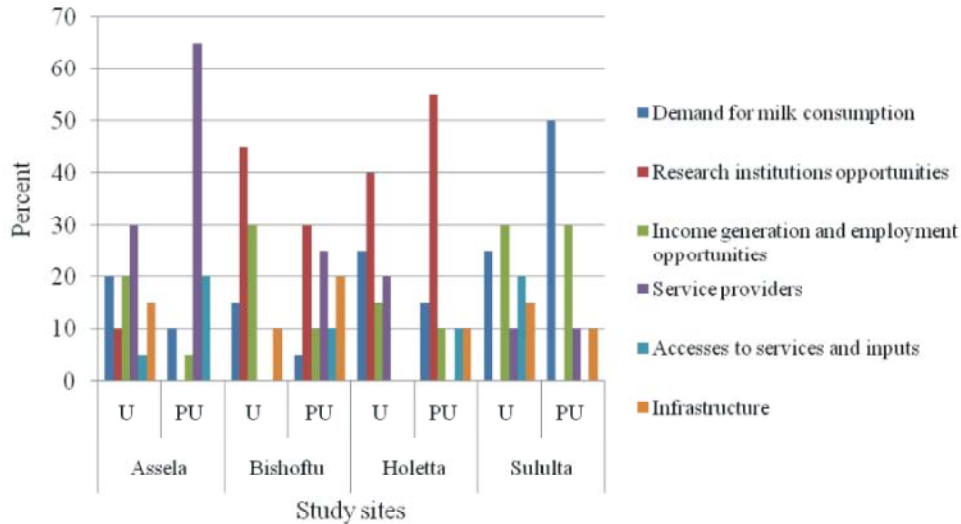


Fig. 1: Opportunities of dairy production in urban and peri-urban production systems (%)

for dairy development. A study by Solomon [17] revealed that because of the rapid urbanization, extensive population growth and change in the living standard of the people in Mekelle city, dairying gives the opportunity for dairy producers to generate income as it is highly demanded product which was in agreement to the present results. The same author also mentioned other opportunities for milk producers in the same area concerning to accessing adequate land and credit for dairy cooperatives, animal health service, AI service and extension and training services. In Wolaita Sodo area high milk demand was the main opportunity to dairy production as stated by Asrat *et al.* [25] which was consistent with the current results. The authors' further stated that dairying provides the opportunity for smallholder farmers to use land, labor and feed resources and generate regular income.

### CONCLUSIONS

The current study assessed milk and milk products marketing, constraints of milk and products marketing, major constraints and opportunities for dairy production in urban and peri-urban production systems. Generally, from the current survey study high feed cost, land scarcity and space limitation as well feed quality, availability and costs were the primary as constraints of dairy production. With the existing bottleneck problems there are many opportunities for dairy development in the study areas. Therefore, coordinated efforts are necessary to address the identified constraints and marketing problems across the different dairy production systems.

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