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## A Review on Urban and Peri Urban Cow Milk Distribution Demand and Market Chain in Ethiopia

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### Abstract

Dairy production system of peri-urban and urban is becoming a vital supplier of milk products to urban center, where the request for milk and milk products is remarkably high. This paper reviews the urban and peri urban cow milk market chain in Ethiopia and indicates possible recommendations. Hence milk market actors, functions and their relations, the excited channels outlets and, developing map of the milk market chain, assessing the profit distribution of the actors along the milk market chain and identifying the determinants of milk market involvement and marketed milk volume are reviewed. marketed milk volume is affected by; age, Education Level of house hold head, Access to training, Daily milk yield, Total number of lactating cows, Price and Milk market information. Milk yield has high impact on marketed milk volume in Ethiopia. Milk market in the Ethiopia is channelled informally and is simple and less organized. Therefore there is a need an organizations that may intervene to enhance producers bargaining power in the milk market and satisfying milk demand in the market.

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### Keywords

Urban, Peri-urban, Market chain

### Introduction

Ethiopian cattle population is believed to be about 60.39 million. Out of this total cattle population, the female cattle constitute about 54.68% and the remaining 45.32% are male cattle. Regarding age groups, the majority of the cattle population (that is about 63.09percent) is in the 3 years and less than 10 years age category, with about 28.15% male and about 34.94% female. Moreover, about 16.9% are between age one and three years and those with age category 10 years and overtook small portion i.e. 2.03% of the total estimated number of cattle populations. 98.24 percent of the total cattle in the country are local breeds. The remaining are hybrid and exotic breeds that accounted for about 1.54 percent and 0.22 percent, respectively (CSA, 2018).

Ethiopia is gifted with various topographic and climatic conditions constructive for dairy production. These condition support use of improved, high milk yielding breeds, and offer relatively disease free environment for dairy production. Assumed the high potential for dairy production, the on-going policy reforms and technological interventions, success similar to the neighbouring Kenya under a very comparable production environment is expected (SNV, 2008).

Although Ethiopia has huge potential for milk production, it still delays behind even relative to other African countries. For example, value of total milk production was USD 1.1 million compared with USD 1.22 million for Kenya which have total cattle herd of only 34% of that of Ethiopia (FAOSTAT, 2011). Milk

consumption is also low compared to the African and world averages.

Dairy production is an important component of livestock farming in Ethiopia. The huge and diverse livestock population, varied and favourable agro-ecology for dairying, increasing demand for dairy products in urban and peri urban areas, long-standing culture of dairy products consumption, and favourable policy are indicators of the importance and potential of dairying in the country. In addition, rapidly rising population size with a upward urbanization is resulting in a growing demand for dairy products in Ethiopia. Dairy expansion can lead to growth in rural areas by increasing farm income and employment opportunities (MOARD, 2007).

Total cow milk production for the rural sedentary areas of the country during the 2017/18 period, is estimated to be 3.32 billion litres. The estimate of camel milk for the same areas of the country is about 327.64 million litres. The average lactation period per cow during the reference period at country level is believed to be about six months, and average milk yield per cow per day is about 1.371litres. With regard to camel, the average lactation period is about ten months whereas the average daily milk yield is about 3.91 liters in the sedentary areas of the country (CSA, 2018).

Based on the purpose of production, scale and production intensity, the dairy sector in Ethiopia can be categorized into four major production systems; pastoral/agro pastoral, rural smallholder farmers, urban and peri urban systems and commercial private farms. Recently Tegegne *et al.*, (2013) classified the dairy production systems in the highlands of the country as urban, peri-urban and rural systems, depend on the geographical location and their main production objectives.

Urban and peri-urban dairy production system is playing a significant role in supplying of milk products to urban center, where the demand for milk and milk products is remarkably high. As a result of this, peri-urban and urban dairying is being intensified through the use of cross breed dairy cows, purchased and conserved feed and stall-feeding. These production systems are preferred due to the proximity of the production sites to centers of high fresh milk demand, easy access to agro-industrial by-products, veterinary services and supplies (Azage *et al.*, 2006).

Urban and peri urban milk producers face several unseen costs that make it difficult for them to gain access to

markets and productive assets (Staal *et al.*, 1997). The relatively high marketing costs for fluid milk in Africa, the dispersed nature of fluid milk markets and the risk attached to marketing of perishables in the tropics suggest that transaction costs play a central role in dairy production and marketing. Under such conditions collective action as in producer marketing cooperatives, milk traders groups etc. that effectively reduce transaction costs may enhance market participation. Hence, it is vital to know what governments can do to better support these organizations and their emergence, and determine which alternative institutions should be encouraged.

Although, the huge potential, dairy production has not been completely exploited and encouraged in the country. A number of factors such as use of traditional technologies, limited supply of inputs, inadequate extension service, poor marketing infrastructure, lack of marketing support services and market information, limited credit services, absence of producers' organizations, and natural resources degradation have contributed to un-exploitation of dairy potential. (Berhanu *et al.*, 2007).

Ethiopian milk marketing system is not well advanced. This is reflected where only 5% of small-scale milk production is sold as liquid milk. This has resulted in problems of marketing fresh milk where infrastructure in transport and related services are extremely limited and market channels have not been developed. This means that a significant amount of milk does not reach the markets and a number of producers keep on producing at a subsistence level (Woldemichael, 2008).

Several scholars conduct a research on milk market chain analysis in different corners of the country and they point out that milk market entry decision and quantity of milk supplied to market are powerfully and meaningfully affected by age of the household head, family size, education level, experience in dairy production, number of cross breed milking cows owned and distance from milk market center and milk yield per day (Woldemichael, 2008)

**Dairy production systems in Ethiopia:** The dairy sector in Ethiopia can also be characterised based on market orientation, scale and production intensity. Therefore, three major production systems have been recognized as traditional smallholders, privatized state farms and urban and peri-urban systems. Among these, the traditional smallholder system states the rural milk production

system and produces 97% of the total national milk production and 75% of the commercial milk production. This sector is largely dependent on the indigenous breeds such as native Zebu cattle, which are characterized by low productivity, yielding about 400-680 kg of milk /cow per lactation period (Alemu *et al.*, 2000). The output of descriptive statistics used by (Holloway *et al.*, 2002) show that the state dairy farms now privatized or in the process of privatization, use grade animals (those with more than 87.5% exotic blood) and are concentrated within 100 kms radius around Addis Ababa.

The urban and peri-urban milk production system, the third production system, includes small and larger private farms in urban and peri-urban areas, concentrated in the central highland plateaus (Getachew and Gashaw, 2001). This sector is commercial and mainly based on the use of grade and cross breed animals that have the potential to produce 1120-2500 liters over a 279 days lactation period (Holloway *et al.*, 2002). Peri-urban milk production is advanced in areas where the population mass is high and agricultural land is reduction due to urbanization around big cities like Addis Ababa. It possesses animal types ranging from 50% crosses to high grade Friesian in small to medium-sized farms. The peri-urban milk system includes smallholder and commercial dairy farmers in the nearness of Addis Ababa and other regional towns. This sector owns most of the country's improved dairy stock (Tsehay, 2001).

Urban dairy farming is a system involving extremely specialized, state or businessmen owned farms, which are mostly concentrated in major cities of the country. They have no access to grazing land. Presently, a number of smallholder and commercial dairy farms are developing mainly in the urban and peri-urban areas of the capital (Felleke and Geda, 2001 and Azage, 2001) and most regional towns and districts. Smallholder rural dairy farms are also increasing in number in areas where there is market access. According to (Azage and Alemu, 1998) the urban milk system in Addis Ababa consists of 5167 small, medium and large dairy farms producing 34.65 million litres of milk annually. Of the total urban milk production, 73% is sold, 10% is left for household consumption, 9.4% goes to calves and 7.6% is processed into butter and *ayib* (cheese). In terms of marketing, 71% of the producers sell milk straight to consumers (Tsehay, 2001).

**Dairy marketing systems in ethiopia:** In the African context, markets for agricultural products would typically refer to market places (open spaces where

commodities are traded). Conceptually, however, a market can be visualized as a process in which ownership of goods is transferred from sellers to buyers who may be final consumers or intermediaries. Therefore, markets involve sales, locations, sellers, buyers and transactions (Debrah and Berhanu, 1991). In Ethiopia there two milk marketing processes. These are Formal and informal milk marketing.

**Informal milk trade:** Ethiopian Milk and milk products are channelled to consumers through both formal and informal marketing systems. 95% of the marketed milk at national level is channelled through the informal system. In this marketing system, milk and milk products may pass from producers to consumers straight or through one or more market agents. Producers sell the surplus milk produced to their neighbours and/or in the local markets, either as liquid milk or in the form of butter and/or *Ayib* (Yilma, 2011). This system is categorised by no license to operate, low cost of operation, high producer prices as compared with formal market and no regulation of operation (SNV, 2008). The sanitary condition of milk and milk products channelled through this system is also poor. This is mainly due to the prevailing situation where producers have limited knowledge of dairy product handling coupled with the inadequacy of dairy infrastructure such as cooling facilities and unavailability of clean water in the production areas.

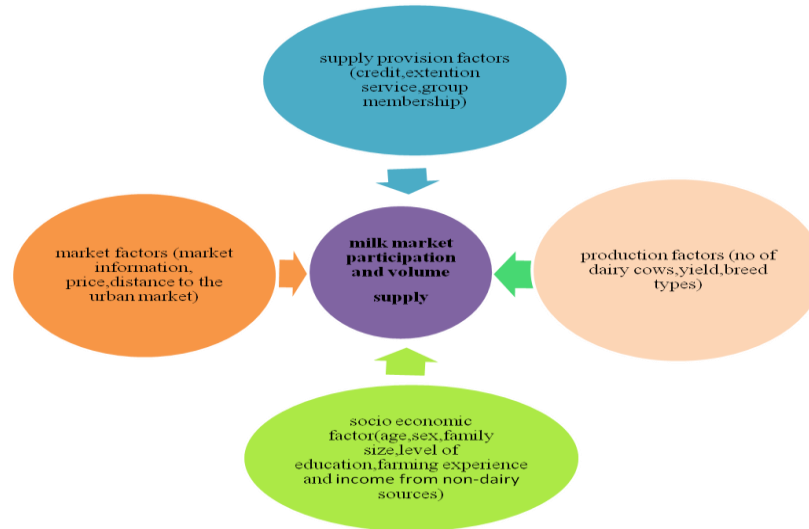
**Formal milk trade:** Milk is collected at the cooperative or private milk collection centres and transported to processing plants. In this system, milk quality tests (principally acidity using alcohol and clot-on-boiling test, and density) are performed on delivery, thereby assuring the quality of milk. This has encouraged the producers to advance the hygiene conditions, storage and transportation of the milk in order to avoid refusal of the product on delivery to the collection centre. The formal milk market appears to be expanding during the last decade with the private sector leading the dairy processing industry in Addis Ababa and other major regional towns. However, the share of milk sold in the formal market in Ethiopia (two percent) is much less than that sold in neighbouring countries: 15% in Kenya and 5% in Uganda (Muriuki and Thorpe, 2001).

Although the price of the different inputs into the dairy production varies and is constantly increasing, milk producers continue to get very low amounts for their products as compared to the cost of production. It is therefore important to put a functional control

mechanism in place so that producers can get what they deserve. Most farmers live in remote areas not easily accessible by road to facilitate transportation of agricultural products including milk and milk products to places with storage facilities and selling points. Transportation of fresh milk to any market will take a number of hours to reach the market. (GRM International BV, 2007).

The relatively high cost of marketing liquid milk and the risk attached to marketing perishable products play a central role in dairy production and marketing. The lack of cooling facilities, inadequate means of transport, and poor communication considerably aggravate the difficulties of collecting and preserving locally produced milk. The action of pooling of milk collection and transportation activities has the potential to mitigate the Cost.

**Fig.1** Conceptual Frame work of the review



**Distribution and retailing of milk in ethiopia**

According to (CSA, 2010b) only 6.8 percent of the total milk produced is marketed and milk and milk products are distributed both informally and formally. In the informal system, milk is distributed from producers to consumers (neighbours and/or in local markets) and milk products mainly in local markets. In the formal system milk is distributed by milk cooperatives and unions and the private sector. Milk collected at milk collection centres is supplied directly to consumers in the urban towns and the surplus is collected by large dairy enterprises such as Lame (Sholla), Sebeta Agro Industry (Mama) and Family Milk and transported by bulk tankers to the respective processing plants. These dairy enterprises process and pack the fresh milk collected for distribution to consumers in urban areas through agents and retailers. Homogenized, pasteurized and standardized (2.7–2.8 percent milk fat) milk packaged in half litre capacity plastic packets are distributed.

There are several factors that affect the production as well as distribution of milk and milk products. Among

other factors, the unstable and low consumption levels of milk and milk products can be considered as one important factor to hamper dairy development in the country. The demand for milk and milk products declines substantially during the fasting period of the Ethiopian Orthodox Church as this population abstains from consuming animal products including milk and milk products. There is a missing link in the dairy value chain as it is difficult to justify the cause of the supply/demand mismatch. Most producers complain of the lack of market outlets for milk, especially during and shortly after the rainy season where milk production increases following the increased availability of animal feed and during fasting periods. Contrary to complains from the producers on milk surpluses, large milk processing enterprises are reported to be operating below their potential capacities mainly due to shortage of milk. Lame (Sholla) milk, the pioneer and one of the biggest dairy enterprises in the country, has a processing capacity of 60 tons/day, but has never operated at its full capacity (CSA, 2010b).

There are various dairy cooperatives and unions and private dairy enterprises that are engaged in the collection, processing and distribution of milk. The Ada'a Dairy Cooperative, Selale and Asella Dairy Cooperative Unions are some of the institutions that play an important role in connecting milk producers with processors and consumers. There are a few private enterprises involved in the production, processing and distribution of milk and milk products. (GRM International BV, 2007).

### **Demand and preferences of milk in ethiopia**

The demand for milk and milk products is a purpose of several factors that include: population growth, seasonality of demand and supply, low per capita consumption and high transaction costs. The predictable growth rate of human population of three percent is not at balance with that of milk production estimated at 2.1 percent. This is described among other factors, by the population pressure that has led to people cultivating more and more land formerly used for grazing. As a result, the grazing land has been stretched beyond its capacity and consequently led to low efficiency of the livestock. During the rainy season when milk production increases following a relatively increased feed availability, milk producers are faced with the problem of acute lack of milk outlets (Yilma, 2011). Generally, the demand for milk and milk products is higher in urban areas where there is high population growth. The increasing of urbanization and population growth leads to the appearance and development of specialized medium-to-large scale dairy enterprises that collect, pasteurize, pack and distribute milk to consumers in different parts of the country.

Christians of the Ethiopian Orthodox Church that represent more than 43% of the population, refrain from eating animal products including milk and milk products for about 250 days a year and the faithful do not eat anything at all until the daily service is finished at around 3:00 p.m. The longest continuous fasting period is just before the Ethiopian Easter that lasts for 55 days. The end of fasting periods and other major holidays are celebrated by consuming *Enjera* (Ethiopian kind of pancake prepared from *Teff – Eragrostis*). This is consumed with chicken and/or meat sauces flavoured with ghee and accompanied by *Ayib* and traditional beverages. The demand for animal products in general and that of milk and milk products in particular generally decrease during fasting periods among the Orthodox Christians (Yilma, 2011).

### **Empirical evidences on determinant factors of market participation and volume supply of milk.**

According to Bardhan *et al.*, 2012, Factors Affecting Market Participation and Choice of Marketing Channel in Uttarakhand, India were; age, landholding size, distance to market and quantum of milk production. Similarly, Findings of (Mumba, 2012), were based on multiple regression analysis to determine milk market participation in Zambia and results indicated that profitability of smallholder dairy farming is a function of dairy cow herd size and distance trekked to transport milk to the market. Moreover, (Nkwasi, 2015) employs Probit and censored Tobit regression model to examine Determinants of milk market participation of dairy farmers in Kiruhura District, Uganda. Results indicated that the most important factors of formal marketing choice and the total milk proportions sold to formal channel were (respectively) household size, total volume of milk produced, payment period, and source of market information, milk selling price and distance to the milk collection centers.

(Gizachew, 2005) revealed that education level of the dairy household head, extension visits and income from non-dairy sources had positive relationship with household milk market entry decision (Getachew, 2005) also found that dairy cow breed, loan, income, education level of spouse and distance from milk market were related to marketed surplus positively; however, distance from district and education level of the household head were related negatively with marketed milk supply.

Many researchers conduct a research to address factors that regulate milk market participation decision and milk sale volume of dairy household in Ethiopia. Results revealed that it can be strongly and significantly affected by many aspects like; age of the household head, family size, education level, experience in dairy production, number of cross breed milking cows owned and distance from milk market centre, annual non-dairy income source, existence of a child, landholding size, distance from urban centres and milk yield per day played an important role in the possibility of milk sales decision, Farm experience of household head, years, Long Fasting dates and feed constraints (Bedilu *et al.*, 2013).

### **Conceptual framework of the review**

Figure 1, below indicates a flow diagram of the conceptual framework for this review. This framework is all about urban and peri urban milk market chain analysis



which provides a visual view of interactions between the urban and peri urban milk producers' internal and the external environmental factor with in fluid milk marketing chain actors'. At this conceptual framework, socio economic characteristics of producers (such as education level of the individual milk producers, sex of household milk producers, farming experience of producers, family size, and income from non-dairy farm) and supply provision (credit access and extension service). Production factors (such as dairy breed type, number of dairy cows and milk yield) and Marketing factors (are Distance to woreda market, milk marketing information, marketing price of milk) influences the milk market participation and marketed milk volume.

Positive interaction among milk producer's characteristics, supply factors, production factors and marketing factor, leads to sustainable increasing milk production and participation in milk marketing in high volume in the study area. On the other hand miss linkage between these factors may negatively influence milk market participation and volume.

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