



*Original Research Paper*

# **Analysis of the dairy value chain: Challenges and opportunities for dairy development in Dire Dawa, Eastern Ethiopia**

Accepted 28 May, 2014

**Eyassu Seifu<sup>1,2\*</sup>  
and  
Reiner Doluschitz<sup>3</sup>**

<sup>1</sup>Department of Food Science and Technology, Botswana College of Agriculture, Private Bag 0027, Gaborone, Botswana.

<sup>2</sup>Department of Animal Sciences, Haramaya University, P.O.Box 287, Haramaya campus, Ethiopia.

<sup>3</sup>Department of Farm Management (410C), University of Hohenheim 70593, Stuttgart, Germany.

\*Corresponding Author:

Email: [eyassu\\_seifu@yahoo.com](mailto:eyassu_seifu@yahoo.com)

Tel: +267-3650100;

Fax: +267-3928753

The study was conducted to characterize the dairy value chain and to identify challenges and opportunities for development of the dairy industry in Dire Dawa, Eastern Ethiopia. A total of nineteen key informants were interviewed using a structured questionnaire. Moreover, secondary data were used to augment the information obtained through survey. The dairy value chain is not well organized in Dire Dawa. The roles and functions of all the actors in the value chain are not clear and there is a weak link between milk producers, traders and other stakeholders. Shortage and high cost of feed, lack of institution that provides dairy related information, difficulty to get land, disease prevalence, lack of technical support, and lack of dairy related technologies are the major constraints related to milk production whereas problems related to milk marketing include lack of quality control of milk, lack of cooling and storage facilities at milk vending sites, poor quality of milk supplied from rural areas, sale of raw milk, inappropriate milk handling and storage vessels, and spoilage of milk due to lack of preservation and processing facilities. The major opportunities for the development of the dairy sector in Dire Dawa include high demand for milk, presence of enabling policy that encourages investment in the dairy sector, absence of competitors, and easy access to transportation systems. Thus, in order to develop the Dire Dawa dairy industry, all the challenges identified in this study need to be carefully considered and addressed. Moreover, coordination and intervention strategies should be designed and applied across the entire value chain in order to develop the dairy sector.

**Key words:** Challenges, dairy value chain, Dire Dawa, major actors, opportunities, coordination

## **INTRODUCTION**

Ethiopia has the largest livestock population in Africa, estimated at 45,054,969 cattle, 20,562,832 sheep, 20,191,099 goats (MoARD, 2007) and 2.4 million camels (FAOSTAT, 2009). Recent figures indicate that the livestock sector contributes about 12-16% of national GDP, 30-35% of agricultural GDP (MoARD, 2007), 15% of export earnings and 30% of agricultural employment (SNV, 2008). Livestock contributes to the livelihoods of 60-70% of the population (Aklilu, 2002).

The livestock sector in general and the dairy industry in particular do not provide the expected contribution to the national income despite their large numbers due to several factors. The development of the dairy sector in the country is hindered by a number of technical, institutional and socio-economic constraints. The growth in milk production has been slow and the annual milk production is estimated to be 1,089,488,251 litres (MoARD, 2007) which doesn't meet even the domestic demand for dairy products. As a

result the country imports large volumes of dairy products per annum to meet the domestic demand. In 2005, for instance, the country imported 457,260 kg of milk (liquid and powder) which is equivalent to 3,026,724 Birr (MoARD, 2007). The dairy sector is dominated by smallholder farmers who account for about 85% of the population and are responsible for 98% of the milk production (MoARD, 2007).

Rapidly increasing population size with a growing urbanization is resulting in a growing demand for dairy products in Ethiopia. Dairy development can lead to growth in rural areas by increasing farm income and employment opportunities. Besides low milk production levels, milk collection, processing and marketing are not well developed in the country. A comprehensive chain approach aimed at sustainable development of the dairy sector is lacking.

To build a successful and sustainable dairy industry, all possible entry points for intervention across the milk value chain have to be identified; from cow to consumer. Different parts of the value chain need different kinds of support and intervention where the situation of course requires various case to case interventions. Several entry points could be identified across the dairy value chain with varied degree of resource requirement and levels of competition.

Dire Dawa is the second largest city in Ethiopia and has a human population of 342,827 that grows at a rate of 2.5% per annum (CSA, 2008). Thus given its population size, there is high demand for milk and milk products in Dire Dawa. However, the annual milk production in Dire Dawa was reported to be 2,643,000 litres (CSA, 2010), which is far below its demand. To date, there is no information regarding the dairy value chain in Dire Dawa. Thus, investigation of the dairy value chain in Dire Dawa will help to identify possible entry points for intervention across the milk value chain and thereby contribute to the development of the dairy industry. This study was, therefore, designed with the following objectives:

To characterize the dairy value chain in Dire Dawa, identify and describe the actors involved, understand their functions and linkages between them.

To identify the challenges and opportunities for development of the dairy industry in Dire Dawa.

## MATERIALS AND METHODS

### Description of the study area

The study was conducted in Dire Dawa city. Dire Dawa is located in eastern part of Ethiopia between 9027'E and 49'N latitude and between 41038' N and 19'E longitude at a distance of 515 km from the capital Addis Ababa (DDACAO, 1998). The administrative region is estimated to have a total land area of 128, 802 ha of which 97.73% covers the

rural area and the remaining 2.27% accounts for the land area used by the region's main urban centre, Dire Dawa city (DDPAIA, 2005).

The climatic condition of Dire Dawa Administrative Region seems to be greatly influenced by its topography, which lies between 950–1250 masl, and which is characterized by warm and dry climate with a relatively low level of precipitation. The mean annual temperature of Dire Dawa is about 25.4°C. The average maximum temperature of the administrative region is 31.4°C, while its average minimum temperature is about 18.2°C. The region has two rainy seasons; that is, a small rain occurs from March to April, and a main shower of rain that extends from August to September. The aggregate average annual rainfall that the region gets from these two seasons is about 604 mm. On the other hand, the region is believed to have an abundant underground water resource (DDPAIA, 2005).

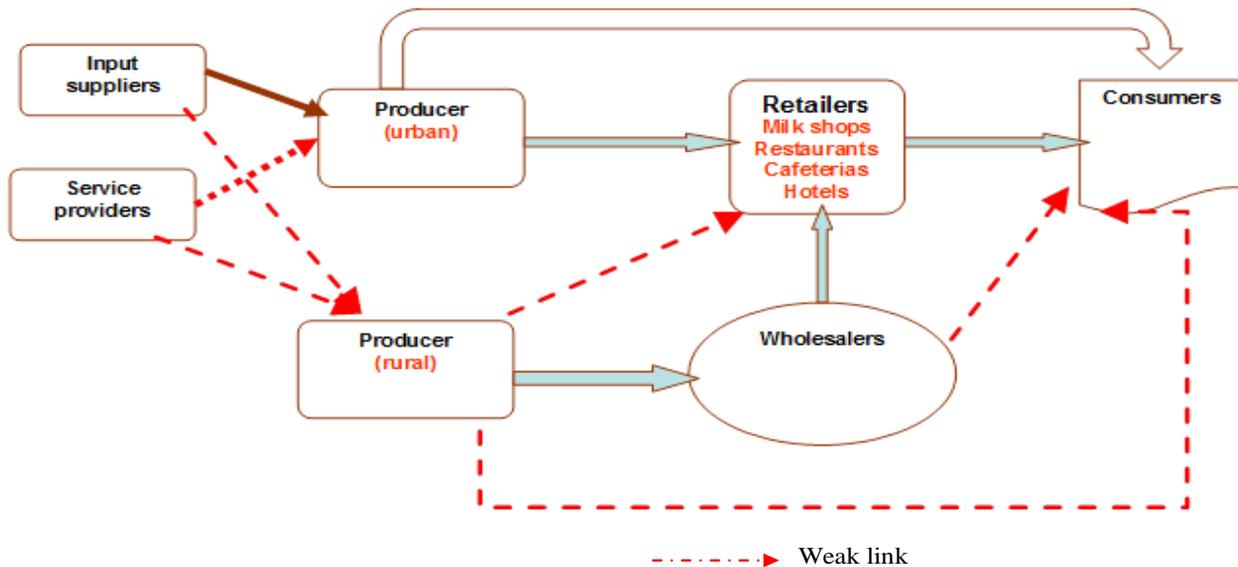
About 73.6% of the population of the region resides in urban areas and the rest 26.4% live in rural areas. Being one of the largest urban centres in the country, Dire Dawa has become home for people of different religious and ethnic groups (DDPAIA, 2005). Islam and Christianity are the predominant religions practiced in the region.

### Sampling method and data collection

Purposive sampling method based on production of milk and possession of crossbred/grade dairy cows, and involvement in the sale of milk, respectively was employed to select dairy farms and milk vendors found in Dire Dawa city. The dairy farms and milk vendors found in Dire Dawa were identified with the help of the Dire Dawa Investment and Agriculture Bureaus. A cross-sectional survey (key-informant survey) was carried out among the major dairy farms (fifteen) and milk vendors (four) from April 2010 to June 2010 using a single-visit multiple-response survey method (ILCA, 1990) in order to understand and describe the dairy value chain and the various actors involved in the value chain. Separate semi-structured questionnaires were developed and administered to farm owners and milk vendors (traders) found in Dire Dawa city. In addition to the primary data generated through survey, secondary data was collected from reports published about the study area and through consultation of concerned individuals in public institutions. The questionnaire mainly included open-ended questions on herd structure and composition; milk production; milk collection; transportation and storage; milk processing; milk quality/standards; milk marketing and market outlets for dairy products; input supply; service provision; constraints to milk production; and opportunities for dairy development.

### Statistical analysis

The survey responses were summarized into groups and given codes before entering into computer. Descriptive



**Figure 1:** The dairy value chain in Dire Dawa

statistics was used to analyze the data using SPSS software version 12.0.

## RESULTS AND DISCUSSION

### The dairy value chain in Dire Dawa

Figure 1 illustrates the typical dairy value chain of Dire Dawa. The major actors of the dairy value chain in Dire Dawa include input suppliers, service providers, milk producers (urban and rural dairy farmers), wholesalers, retailers and consumers. The input suppliers are those agents who supply inputs such as animal feed, forage seeds, veterinary drugs and AI services to dairy farmers whereas service providers are institutions who provide technical support (professional advice and training), technological packages and credit (loan) to the producers. Wholesalers are milk vendors who collect (buy) milk from individual rural producers and deliver the milk to customers (retailers) in Dire Dawa town. The retailers buy milk either from urban dairy farms or wholesalers who supply rural milk and sell the milk to individual consumers at higher price. The retailers involved in milk marketing in Dire Dawa include small milk shops (kiosks), restaurants, cafeterias and hotels.

There is generally weak link between urban milk producers and service providers (universities/colleges, bureau of agriculture and investment office). The urban milk producers complain that they do not get services such as technical support, technological packages and credit from the concerned institutions. Milk suppliers need to have technical support on the process of production including feeding and nutrition, breeding, sanitation and

milk hygiene, human and animal health, marketing and handling and transportation of milk towards collection centres (SNV, 2008). Through appropriate technical support and capacity improvement, the problem of the milk value chain, i.e., shortage of raw milk supply and access to reach the market could be tackled. Thus, there is an urgent need to create effective and functional linkages between milk producers, service providers and all institutions involved in the development of the dairy sector in Dire Dawa. Possible interventions in the supply side could be strengthening of raw milk supply, establishment of milk collection centres, and provision of feed, logistics and dairy breeds.

### Milk production and supply in Dire Dawa

There are two types of milk producers (suppliers) in Dire Dawa: private urban milk producers and rural smallholder subsistence farmers. The average daily milk yield, number of milking cows, lactation length and calving interval of both local and crossbred cows are indicated in Table 1. At the time of this study, there were 15 major dairy farms in Dire Dawa city that possess crossbred/grade dairy cows. These farms use crossbred (Holstein-Friesian vs Zebu or Jersey vs Zebu cattle) for milk production under stall feeding management system. Apart from these major dairy farms, milk is also produced by individual households mainly from indigenous cows.

The amount of milk produced per day/cow by local cows in the present study (Table 1) is lower than the value 2.8 kg milk/head/day reported for local Zebu breed by Kiwuwa et al. (1983). However, the daily milk yield of crossbred cows observed in the present study is much higher than the value

**Table 1.** Productive and reproductive performance of local and crossbred cows in Dire Dawa city

Variables	Breed of cows	
	Local	Crossbred/Grade
Average number of cows	37129	730
Average daily milk yield (kg/cow)	2	16.5
Average lactation length (days)	150	195
Average lactation milk yield (kg/cow)	300	3217
Average calving interval (days)	912	547

Source: (Zelalem Yilma, unpublished data).

**Table 2.** Major milk suppliers to Dire Dawa city

Category*	Milk suppliers	Type of milk
Urban	Small - medium scale urban dairy farms	Cow
Peri-urban	Melka Jebdu Shinile Hurso	Cow and camel
Rural	Garamuleta	Cow
	Kulubi	"
	Lange	"
	Kersa	"
	Babile	Cow and camel
	Erer	"

\*Urban farms are dairy farms located in and around Dire Dawa city within 3 km radius; Peri-urban farms are dairy farms located at 4- 16 km from Dire Dawa city; Rural farms are dairy farms located more than 16 km from Dire Dawa.

5.6 kg/head/day reported by Kiwuwa et al. (1983) for crossbred cows (Zebu x exotic F1 crosses) in Arsi highlands of Ethiopia. The high daily milk yield observed in crossbred cows in the present study might be attributed to the high grade animals (>75% exotic blood levels) used by producers in Dire Dawa city. About 73.6% of the Dire Dawa population resides in urban areas and the rest 26.4% live in rural areas. The estimated per capita milk consumption in Dire Dawa was reported to be 5.36 litres per person per year (USAID, 2013). So, in view of Dire Dawa's population, the amount of milk produced currently in the city is much below its demand. This suggests a need for increasing milk production in order to meet the increasing demand for milk in the city.

The lactation length of local cows (Zebu breed) was only five months and that of crossbred cows was 6.5 months (Table 1). These figures are below the national averages for lactation length of local cows (239 days) (Mukasa-Mugerewa & Tegegne, 1989) and crossbred cows (279 days) (Ahmed et al., 2004). The lactation milk yield of local (300 litres) and crossbred (3217 litre) cows observed in this study are also below the values 400-680 litres and 1120-2500 litres of milk/cow reported by Ahmed et al.

(2004), respectively. The calving interval (CI) for local cows was found to be 34 months and that of crossbred cows was 18.2 months (Table 1), values which are much longer than CI (25 months) reported for highland Zebu cattle (Mukasa-Mugerewa, 1989) and CI (15.3 months) reported for Friesian x Zebu crosses (Kiwuwa et al., 1983). The short lactation length and the long calving interval observed may have been attributed to the relatively poor management conditions and poor plane of nutrition of the cows in the study area. Plane of nutrition is a major factor that determines the productive and reproductive performances of dairy cows (Ahmed et al., 2004).

Urban dairy farms are the major milk producers in Dire Dawa. However, milk is also supplied to Dire Dawa city from smallholder subsistence farmers located at a radius of 85 km. The major rural producers who supply milk to Dire Dawa city are indicated in Table 2.

The quality of milk supplied by rural producers to Dire Dawa city is generally poor. Milk is transported by placing it in plastic bottles (Jerican) from a place as far as 85 km away from Dire Dawa city using un-refrigerated open vehicles (minibuses) at an ambient temperature of greater than 30°C. Thus, by the time the milk arrives at Dire Dawa

market, large proportion of the milk gets spoiled and as a result Dire Dawa consumers often avoid such milk the result of which is considerable financial loss to the producer and/or trader.

### **Milk marketing in Dire Dawa**

The dairy farmers in Dire Dawa have only two market-outlets for selling their milk. These are selling to neighbors (i.e., individual consumers) and retailers. There is no formal milk marketing system both in the urban and peri-urban areas of Dire Dawa. That is, there is no well-organized milk marketing system in Dire Dawa. This is in line with the findings of Geleti et al. (2014) who reported that there is no formal milk marketing system in Nekemte and Bako milkshed areas in western Ethiopia. Traditional/informal milk markets have played a key role in dairy development in Ethiopia. Informal, small-scale markets control over 90% of marketed milk in the country. Producers sell their milk to anyone whom they come across every day. Debrah & Berhanu (1991) reported that producers' knowledge of alternative sales outlets and of price they get will generally enhance their bargaining position and improve their chances of getting the highest prices for their products. Producers will also have the flexibility to shift between outlets to obtain best prices (Belachew, 1997). At the time of this study, there were only two dairy cooperatives (Adis Alem and Goro Dairy Cooperatives) which were established in 2007 and 2010, respectively by the NGO Jerusalem Children and Community Development Organization (JeCCDO) that is engaged mainly in capacity building of the community. The milk producers in Dire Dawa do not get the benefit that they would get otherwise and do not have a guarantee for selling their products especially at times of low demand for milk in the market. Debrah & Berhanu (1991) reported that large producers opted to market most of their output through outlets that guaranteed stability of purchase even if it was less remunerative than if sales were made directly to individual consumers.

Dairy cooperatives and formation of milk groups help reduce transportation cost, save time and provide cooling facilities in some cases. It also gives producers a guaranteed access to market and sell their milk. Establishment of milk groups and cooperatives as well as milk-collection centres can give dairy farmers a broader choice of marketing their milk instead of depending on local traders and neighborhood buyers. Thus, one entry point for intervention to improve the dairy sector in Dire Dawa is establishment of and strengthening the existing dairy cooperatives. Therefore, this calls for an integrated action towards this end by all concerned bodies. The JeCCDO initiative in this regard is a good start that needs to be supported by others too. The successful dairy cooperatives and milk groups formed by farmers in Selale and Ada'a areas of the country (Redda, 1998) could serve as a good example of success stories for dairy farmers in Dire Dawa.

Dairy co-operatives and milk groups have facilitated the participation of smallholders in fluid milk markets in the Ethiopian highlands (SNV, 2008). Evidence from Kenya emphasizes the importance of milk collection organizations in improving access to market and expanding productive bases (SNV, 2008).

Currently, there is no milk processing plant in Dire Dawa. As a result, consumers do not have any chance to buy different processed dairy products based on their preference. The Dire Dawa market is dominated by fluid milk and thus processed dairy products such as cheese and butter, etc. are rarely found on the market. This is a good opportunity for potential investors interested to establish milk processing plants in Dire Dawa, in fact, provided that other factors in particular milk yield is sufficient and there is reliable supply of milk.

The major sales outlets of milk produced in Dire Dawa are retailers (small milk shops), cafeterias, restaurants, hotels and individual consumers who buy milk at farm gate (Table 3). Urban milk producers sell one litre of milk for 8 Ethiopian Birr<sup>1</sup> whereas the price of one litre of milk sold by retailers (traders) was on the average 9.5 Birr. On the other hand, the quantity of milk sold per day per farm was on the average 137 litres while milk retailers sell about eight litres of milk per day. Debrah and Berhanu (1991) reported that significant variations were observed in price charged or paid for fresh milk sold through alternative marketing systems, type of producer and outlet used.

Most customers in Dire Dawa buy milk from urban dairy farms by paying cash on daily basis. However, some customers pay the monthly amount in advance which they call it contract payment where in fact there was no any formal contractual agreement between the producers and buyers in the strict sense of the term. Urban milk producers deliver milk to their clients on daily basis using Badjaj (three wheeled scooter), horse cart, bicycle or using their own vehicle.

In order to develop the dairy industry in Dire Dawa, milk supply and marketing systems need to undertake radical changes. For such changes to occur, development of market-oriented dairy farming system is a prerequisite. In order to convince farmers to follow such approach, creation of awareness and education of farmers need immediate attention.

### **Constraints to the dairy sector**

In Ethiopia, the livestock sector in general and the dairy sub-sector in particular do not make a substantial contribution to the national income, despite their large size, due to numerous socio-environmental factors. The poor performance of the dairy sub-sector is attributed to socio-economic, infrastructure and technical constraints, inadequate research and extension activities, and lack of policies relevant to the development of the dairy industry (SNV, 2008). Among others, land tenure policies, feed

**Table 3.** Price, mode of transport, transportation cost and sales outlets of milk in Dire Dawa city

Variables	Market agent	
	Producers (n = 15)	Traders (n = 4)
Price of milk/L (Birr)	8	9.5
Average amount of milk (L) sold per day/farm or trader	120.5	8.3
Mode of payment	Cash	Cash
Mode and average cost of transport (Birr/month)	Cash in advance	
	Badjaj (1291.7)	-
	Horse cart (1500)	
Sales outlet	Bicycle (360)	
	Individual consumers	Individual consumers
	Retailers (milk shops)	
	Cafeterias	
	Restaurants	
	Hotels	

n = number of respondents; L = litre.

availability, lack of adequate dairy services, lack of marketing outlets, and poor roads and transportation systems are the major constraints of the dairy sector in three East African countries viz., Ethiopia, Kenya and Uganda (SNV, 2008).

One of the major constraints that the urban milk producers of Dire Dawa are encountered is lack of access to land for establishment of a dairy farm and for forage production. Large proportion (57%) of the respondents indicated that it is very difficult to get land for establishment of dairy farms in Dire Dawa (Figure 2). According to the respondents, this problem occurs mainly due to bureaucracy to get land for investment, failure to appreciate the positive contribution of a viable dairy industry to the national economy by regional decision makers, and also due to the low attention given to the dairy industry. Shortage of land was also observed to be one of the factors hindering successful evolution of the dairy value chains in Nekemte and Bako areas of western Ethiopia (Geleti et al., 2014). Reports indicate that the greatest institutional and socio-economic constraint that the dairy industry faces today arises out of socio-economic rather than technical problems; i.e., lack of access to land for expansion of the dairy enterprises and feed production (SNV, 2008). The problem of inadequate feed in the country is a result of the limited land availability for pasture establishment especially on productive highland areas where dairy cattle can flourish and where the density of the population is high. Thus, all concerned bodies should work hard to solve this policy (land tenure) related problem and encourage potential investors interested to engage in the dairy sector.

Another important problem reported by all the respondents (100%) was feed shortage, i.e., low supply and high cost especially of agro-industrial by-products (Figure 2). Most dairy farmers of Dire Dawa purchase feed for their

dairy animals from Addis Ababa which is located at a distance of 515 km and transport it all the way to Dire Dawa. The transportation cost is almost comparable to the cost of the feed itself. The problem of feed shortage is also reported by Geleti et al. (2014) and Galmessa et al. (2013) as one of the major factors that hinders urban and peri-urban dairy development in Oromia Region of western Ethiopia. Inadequate supply of quality feed is the major factor limiting dairy productivity in Ethiopia (SNV, 2008). Improved feeding is crucial for satisfactory animal growth and feed supplements stimulate higher milk production. Feed, usually based on fodder and grass, are either not available in sufficient quantities due to fluctuating weather conditions or when available are of poor nutritional quality. These constraints result in low milk yield, high mortality of young stock, longer parturition intervals, and low animal weight.

In the highlands of Ethiopia, high population growth and density are causing shortage of grazing land on which livestock production by smallholders depends. In the lowland areas, the shortages of feed and water during the dry season forces animals and livestock keepers to trek long distances in search of feed and water (Land O'Lakes, 2010). The quality of feed also deteriorates during the dry season in both the mixed farming and pastoral systems. Apart from this, there is critical shortage and high cost of feed (Yilma et al., 2011; USAID, 2013). Besides, there are only few companies that produce concentrate feeds and therefore dairy processing plants depend on farmers' scanty produce.

Among the different types of animal feeds used, supply of grass hay is very limited in Dire Dawa. Thus, production of forage/pasture species specially adapted to Dire Dawa climate could be one possible solution to overcome the limited supply of hay in the area. Establishment of animal feed (ration) mixing and processing plants in the vicinity of

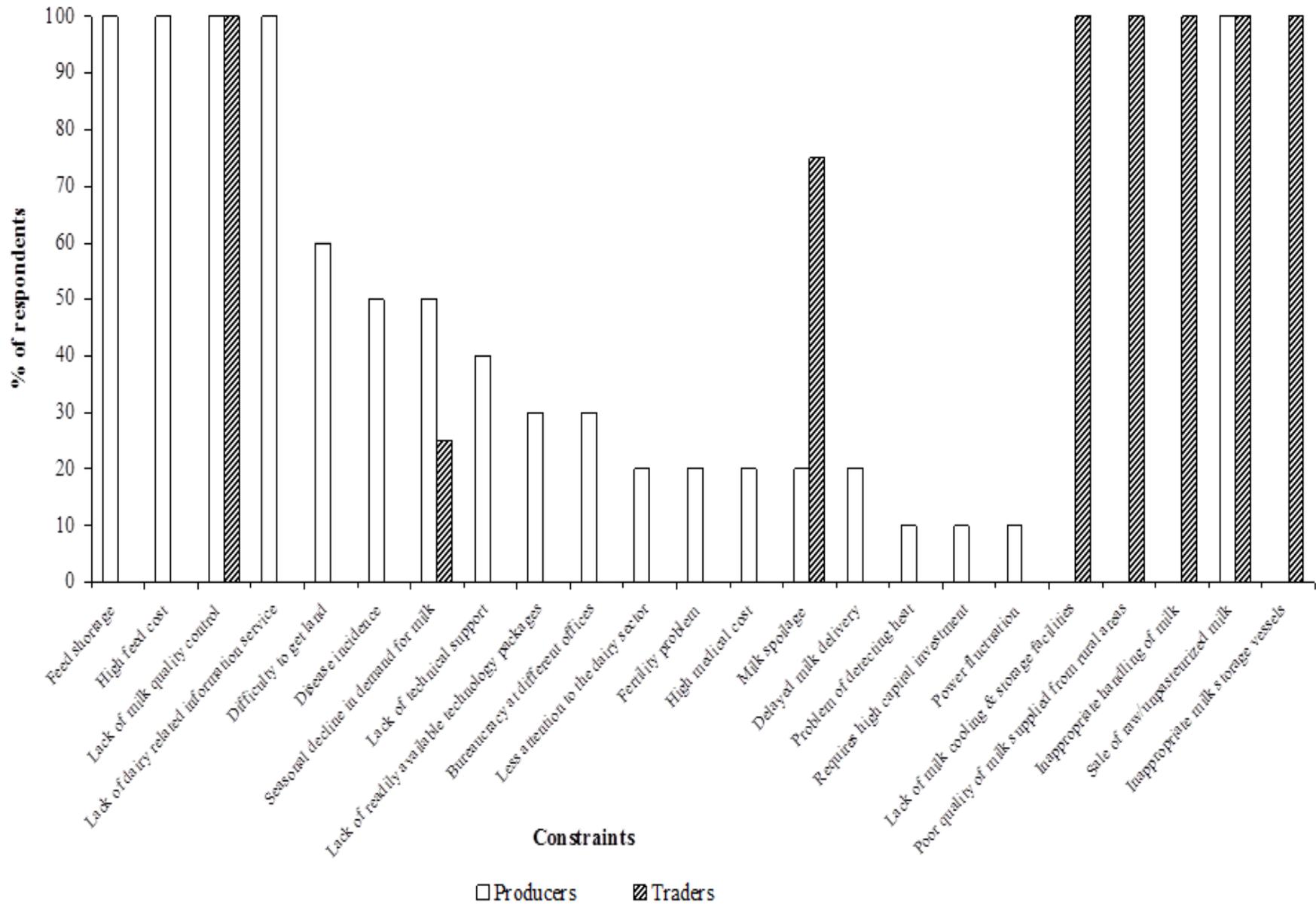


Figure 2: Major constraints associated with production and sale dairy products in Dire Dawa

Dire Dawa may solve the problem of high transportation cost of agro-industrial by-products.

Feed supply is a major issue for smallholder dairy systems, as most systems operate under conditions of extreme land pressure. Feed conservation for dry season supplementation has been a major issue, as most technologies such as silage, haymaking, and urea treatment are not suitable for smallholders (SNV, 2008). Fodder trees and mixed tree-legume protein banks can be a solution. Hence, improved nutrition through adoption of sown forage and better crop residue management and use can substantially raise livestock productivity.

Currently, there is no institution that monitors and controls the quality and safety of milk sold to Dire Dawa consumers. Some respondents indicated that there is a possibility that milk obtained from cows infected with zoonotic diseases such as tuberculosis can be sold on the market. Thus, absence of milk quality control in the area is a very serious problem that may cause public health risk which may one day result in a catastrophic outbreak of milk-borne diseases such as tuberculosis and brucellosis in the area. Therefore, this potential health hazard (risk) can be prevented by putting in place appropriate regulatory mechanisms in order to monitor and control the safety of milk sold to the consumers in Dire Dawa. Hence, there is an urgent need to establish milk quality control and regulation mechanisms in the area.

Many of the milk producers (57%) indicated that they often do not get the support they need from the concerned institutions (organizations) (Figure 2). They indicated that they are badly in need of services such as professional advices (training on basic milk/dairy production techniques), readily available technological packages and loan (credit) from service providers in order to run their business successfully; however, there is weak linkage between milk producers and the service providers in Dire Dawa. Thus, coordination and creation of sustainable linkage between producers and service providers is one priority area of intervention in order to develop the dairy sector in Dire Dawa.

Even though all the dairy farmers of Dire Dawa reported that veterinarians often check the health of their animals and periodically give them vaccinations against the most common diseases of dairy cows, some of the dairy farmers reported incidence of diseases such as mastitis and other zoonotic diseases of public health concern in their dairy herds. Poor animal health and management are major constraints of dairy development in Ethiopia which cause poor performance across all dairy production systems (SNV, 2008). Many of the disease constraints which affect milk supply are also attributed to insufficient money to purchase drugs or vaccines by the owners. Geleti et al. (2014) reported the existence of inefficient veterinary services in Bako and Nekemte areas of western Ethiopia. Some of the dairy farmers (28.6%) of Dire Dawa mentioned high medical and/or multi-vitamin cost as important

constrain that affects their farm business. Thus, this calls for the need for good and easily accessible veterinary services in the area.

Dairy farmers who use artificial insemination to breed their animals reported a major fertility problem in their dairy herds. They indicated a very high service to conception rate in their herd the cause of which has not yet been identified. Inefficient breeding (Geleti et al., 2014) and inadequate AI service (Galmessa et al., 2013) are among the problems that contribute to underdevelopment of the dairy sector in western Ethiopia. Some farmers also reported the problem of detecting cows on heat. In general, the underlying cause of low fertility of cows associated with the use of artificial insemination needs careful investigation. There is also a need to give farmers training on mating and heat detection techniques.

Some respondents indicated seasonal decline in demand for milk in Dire Dawa. They mentioned that the demand for milk decreases during fasting periods especially among those consumers who are followers of the Orthodox Christian faith who do not consume animal products including milk and milk products during fasting seasons and fasting days. This is in line with the report of Debele and Verschuur (2014) who identified long fasting period of the Ethiopia Orthodox Church as one of the major factors that affects the milk value chain in Ada'a district of East Shewa Zone, Ethiopia. In Ethiopia, Orthodox Christians (over 43 percent of the population) are abstained from consuming dairy products for about 250 days every year (Redda, 2002; Yilma et al., 2011).

Capital requirements for establishing dairy farms/plants are generally high and may be especially constraining for smallholder farmers. Some of the respondents (10%) in the present study indicated that one of the constraints for engaging in dairy business is that it requires high initial capital (Figure 2). Formation of institutional credit schemes may help some smallholders to engage in a dairy business.

A closer observation of the dairy industry of Dire Dawa revealed that there is no institution responsible for keeping dairy related records (databases) that would provide reliable, up-to-date and consistent information regarding the dairy sector. As a result, it is very difficult to get dairy farm or product related information in Dire Dawa. Thus, establishment of a dairy board at national or regional (Dire Dawa) levels as is the case in other African countries such as Kenya may solve this problem.

Constraints related to sale of milk and milk products encountered by milk traders of Dire Dawa are indicated in Figure 2. Some of the problems encountered by the traders are similar to problems that milk producers face whereas some problems are unique to the milk vendors. Lack of quality control of milk, milk spoilage, sale of raw/unpasteurized milk and seasonal decline in demand for milk are problems that traders share with milk producers. Whereas lack of milk cooling, storage, preservation and processing facilities and consequent

**Table 4.** SWOT analysis of the dairy sector in Dire Dawa

<b>Strengths</b>	<b>Weaknesses</b>
Attractive milk price Cheap farm labour	Absence of quality control for milk Low milk production Shortage of skilled/trained staff Difficulty to get land Limited supply and high feed cost Absence of milk processing plants Poor quality raw milk Lack of cooling & storage facilities Incidence of animal diseases Absence of dairy cooperatives/milk groups Lack of milk collection centres Lack of reliable, up-to-date & consistent information
<b>Opportunities</b>	<b>Threats</b>
High demand for milk Milk consumption tradition of the society Presence of people with d/t cultures & religion Less competitors in the dairy sector Conducive investment policy Access to air, train and bus transportation systems	Sale of raw/unpasteurized milk Low demand for milk during fasting periods & rainy seasons The high ambient temperature of the area

deterioration of milk quality, and inappropriate storage vessels and handling of milk are problems peculiar to the milk vendors. Thus, building the capacity of milk vendors (traders) by providing facilities for milk cooling and storage and establishing milk collection or vending centres may help alleviate some of the problems that the milk vendors face in Dire Dawa.

### SWOT analysis of the Dire Dawa dairy sector

Table 4 presents the results of SWOT (strengths, weaknesses, opportunities and threats) analysis of the dairy sector of Dire Dawa. The weaknesses and threats of the dairy sector indicated in Table 4 are basically similar to the constraints of the dairy sector discussed above. The strengths of the dairy industry of Dire Dawa are the attractive price of milk and availability of cheap labour for dairy farms and milk vending activities.

The high demand for milk, milk consumption tradition of the society and presence of people with different cultural and religious backgrounds in Dire Dawa give opportunities that will attract potential investors to establish dairy farms and milk processing plants in Dire Dawa. This in turn will positively contribute to the development of the Dire Dawa dairy industry.

Currently, there is no milk processing plant in Dire Dawa. Thus, this could also be considered as an opportunity for potential investors because they will have fewer competitors in the sector that would affect marketing of their products.

The Government of Ethiopia is encouraging investments in the agricultural sector. Hence, presence of enabling

policy environment is also an opportunity for the growth of the dairy industry in Dire Dawa. The location of Dire Dawa is another opportunity for the development of the dairy industry. Dire Dawa has access to road (bus), train and air transportation systems and thus this will give a good opportunity for marketing dairy products both in the domestic and export markets.

### Conclusion

The dairy value chain in Dire Dawa is not well organized. The roles and functions of all actors in the value chain are not clear and there is weak linkage between milk producers, traders and all stakeholders of the dairy industry in the area. Thus, there is a need to develop an effective and functioning linkage between all the stakeholders in the value chain in Dire Dawa. In order to develop the dairy sector in Dire Dawa, there is a need to consider the weaknesses and threats of the dairy sector identified in this study. Besides, based on the constraints identified, possible intervention strategies should be designed and applied along the entire value chain in order to bring about positive change in the dairy industry in the area.

### ACKNOWLEDGEMENTS

This study was conducted by a financial assistance obtained through the Edulink project. The Food Security Centre of Hohenheim University is acknowledged for provision of

postdoctoral research scholarship and assistance during preparation of this manuscript. The authors are grateful to Dr. Zelalem Yilma for the data on productive and reproductive performance of local and crossbred cows.

## REFERENCES

- Ahmed MAM, Ehui S, Assefa Y (2004). Dairy development in Ethiopia. Washington, DC:Environment and Production Technology Division, IFPRI.
- Aklilu Y (2002). An Audit of the livestock marketing status in Kenya, Ethiopia and Sudan, Volume 1. Nairobi, Kenya: OAU-IBAR.
- Belachew H (1997). Milk sales outlet option in Addis and the surrounding peri-urban areas. In Proceedings of the 5<sup>th</sup> National Conference of Ethiopian Society of Animal Production (ESAP) (pp. 72-81). Addis Ababa, Ethiopia: ESAP.
- CSA (2008). Summary and statistical report of the 2007 population and housing census results. Addis Ababa, Ethiopia: Federal Democratic Republic of Ethiopia Population Census Commission.
- CSA (2010). Agricultural sample survey 2009/2010 (2002 EC). Volume II. Report on livestock and livestock characteristics. Statistical Bulletin 468. Addis Ababa, Ethiopia: Central Statistical Agency.
- DDCAO (1998). Annual report. Dire Dawa, Ethiopia: Dire Dawa Administrative Council Agricultural Office (DDCAO).
- DDPAIA (2005). Profile of Dire Dawa Administrative Council. Dire Dawa, Ethiopia: Dire Dawa Provisional Administration Investment Agency (DDPAIA).
- Debele G, Verschuur M (2014). Assessment of factors and factors affecting milk value chain in smallholder dairy farmers: A case study of Ada'a district, East Shawa Zone of Oromia Regional State, Ethiopia. *Afri. J. Agric. Res.*, 9(3): 345-352.
- Debrah SH, Berhanu A (1991). Dairy marketing in Ethiopia: Markets of first sale and producers' marketing patterns. Research Report No. 19. Addis Ababa, Ethiopia: International Livestock Centre for Africa.
- FAOSTAT (2009). Production statistics. Live animals. FAO Statistics Division. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO). Available at: <http://faostat.fao.org/site/573/default.aspx#ancor> (Accessed on 27 November 2011).
- Galmessa U, Dessalegn J, Tola A, Prasad S, Kebede M (2013). Dairy production potential and challenges in western Oromia milk value chain, Oromia, Ethiopia. *J. Agric. Sustain.*, 2 (1):1-21.
- Geleti D, Hailemariam M, Mengistu A, Tolera A (2014). Analysis of fluid milk value chains at two peri-urban sites in western Oromia, Ethiopia: Current status and suggestions on how they might evolve. *Global Vet.*, 12 (1): 104-120.
- ILCA (1990). Livestock Systems Research Manual, Vol.1. Working Paper 1. Addis Ababa, Ethiopia: International Livestock Centre for Africa (ILCA).
- Kiwuwa GH, Trail JCM, Kurtu MY, Worku G, Anderson FM, Durkin J (1983). Crossbred dairy cattle productivity in Arsi Region, Ethiopia. Research Report No. 11. Addis Ababa, Ethiopia: International Livestock Centre for Africa (ILCA).
- Land O'Lakes (2010). The next stage in dairy development for Ethiopia: Dairy value chains, end markets and food security. Addis Ababa, Ethiopia: Land O'Lakes Inc.
- MoARD (2007). Livestock development master plan study. Phase 1 report- Data collection and analysis. Volume 1- Dairy. Addis Ababa, Ethiopia: GRM International BV.
- Mukasa-Mugerwa E (1989). A review of reproductive performance of female *Bos indicus* (Zebu) cattle. ILCA Monograph No. 6. Addis Ababa, Ethiopia: International Livestock Centre for Africa (ILCA).
- Mukasa-Mugerwa E, Tegegne A (1989). Peripheral plasma progesterone concentration in Zebu (*Bos indicus*) cows during pregnancy. *Rep. Nutr. Dev.*, 29 (3): 303-308.
- Redda T (1998). Prospects for Ethiopian dairy development. In Proceedings of the role of village dairy cooperatives in dairy development: Prospects for improving dairy in Ethiopia (pp.149-159). Addis Ababa, Ethiopia: Smallholder Dairy Development Project, Ministry of Agriculture.
- Redda T (2002). Small-scale milk marketing and processing in Ethiopia. In Rangnekar D, Thorpe W (Eds.). Smallholder dairy production and marketing - Opportunities and constraints. Proceedings of a South-South Workshop (pp. 352-367). Anand, India: National Dairy Development Board and Nairobi, Kenya: International Livestock Research Institute.
- SNV (2008). Dairy investment opportunities in Ethiopia. A case study report. Addis Ababa, Ethiopia: SNV-Netherlands Development Organization. Available at: <http://www.snvworld.org/en/Documents/Dairy%20Investment%20Opportunities%20in%20Ethiopia.pdf> (Accessed on 07 June 2010).
- USAID (2013). Value chain analysis for Ethiopia: Expanding livestock markets for the small-holder producers. Addis Ababa, Ethiopia: AGP-Livestock Market Development Project AID-663-C-12-00009.
- Yilma Z, Guernebleich E, Sebsibe A (2011). A review of the Ethiopian dairy sector. Addis Ababa, Ethiopia: FAO Sub Regional Office for Eastern Africa (FAO/SFE).