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Household Dairy Production System, Marketing and Constraints in Ethiopia

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Abstract
This study reviews the household dairy production system, marketing and constraints with the aim of delivering summarized and synthesized information for the beneficiaries and users. Agricultural production dominates the Ethiopian economy and contributes 45% of gross domestic product and provides more than 80% of employment. Ethiopia holds large potential for dairy development due to its large livestock population, the favorable climate for improved, high-yielding animal breeds, emerging market opportunity, improved policy environment for involvement of private sectors, and the relatively disease-free environment for livestock. Ethiopia can contribute significantly to poverty alleviation and nutrition in the country. Though different classifications have been used to characterize the dairy production system in the country; based on their locations, dairy production system classified into three broad categories, namely, urban, per-urban and rural dairy production. Among the existing production systems, the traditional dairy production systems, is the one involving from smallholder dairy farms. The traditional (smallholder) milk production system, which is dominated by indigenous breeds, accounts for about 97-98% of the total annual milk production in the country. Over 85% of the milk produced by rural household is consumed within the producer households with the proportion marketed being less than 7%. Dairy production in Ethiopia is constrained by several factors classified as: technical or biological and socio-economic and institutional factors, some of the major environmental constraints such as low rainfall, high temperature and low forage production, common plant association, livestock and human carrying capacity, incidence of important livestock diseases and parasites, mainly define in the lowlands of Ethiopia. There are a number of challenges and bottlenecks limiting the success and profitability of household dairy production systems in Ethiopia.
Keywords: Dairy production, Marketing, Constraints, Ethiopia

1. Introduction

1.1. Background

Agricultural production dominates the Ethiopian economy and contributes 45% of gross domestic product (GDP) and provides more than 80% of employment. The major source of foreign exchange is coffee, which provides 65% of export earnings. Other agricultural export products are oilseeds, pulses, cotton, sugar cane, flowers, hides and skins and livestock - mainly sheep and cattle. Ethiopia has the highest livestock populations in Africa and accounts for 17% of cattle, 20% of sheep, 13% of goats and 55% of equines in sub-Saharan Africa. In fact, Ethiopia is the first in Africa and tenth in the world in livestock populations (Tangka et al. 2002). Livestock production in Ethiopia is mainly of smallholder farming system with an animal having multipurpose use and accounts for approximately 30% of the total agricultural gross domestic product (GDP) and 16% of national foreign currency earnings (IBC, 2004). Cattle are very important livestock species in the traditional mixed crop livestock production systems of Ethiopia by providing mainly drought power, a small amount of milk, meat usually when they retire and manure.

Ethiopia holds large potential for dairy development due to its large livestock population, the favorable climate for improved, high-yielding animal breeds, emerging market opportunity, improved policy environment for involvement of private sectors, and the relatively disease-free environment for livestock. Given the considerable potential for smallholder income and employment generation from high-value dairy products, development of the dairy sector in Ethiopia can contribute significantly to poverty alleviation and nutrition in the country. Though different classifications have been used to characterize the dairy production system in the country; based on their locations, Ahimed et al. (2003) classified into three broad categories, namely, urban, per-urban and rural dairy production. Among the existing production systems, the traditional dairy production systems, is the one involving from smallholder dairy farms. The traditional (smallholder) milk production system, which is dominated by indigenous breeds, accounts for about 97-98% of the total annual milk production in the country (Yonad, 2009). Over 85% of the milk produced by rural household is consumed within the producer households with the proportion marketed being less than 7% (CSA, 2011). The small amount of milk produced by a large number of producers but the low marketable output in Ethiopia possess limitations on the possibilities of exploiting distant but rewarding markets due to high opportunity costs of labor involved. As reported earlier (Muriuki et al., 2001) the vast majority of milk produced outside urban centers in the country is processed into milk products at household level using traditional technologies.

Moreover milk and milk products are economically important farm commodities and dairy farming is

an investment option for smallholder farmers (Tsehay R, 2001). It plays a very important role in feeding the rural and urban population of Ethiopia. Milk is produced daily, sold for cash or readily processed. It is a cash crop in the milk-shed areas that enables families to buy other foodstuffs and is significantly contributing to the household food security (MOA, 1996).

One of the necessary conditions for increased milk production is the provision of assured marketing outlets that are sufficiently remunerative to producers. Even in the long run, surplus milk can be processed into different dairy products for export, which brings foreign exchange. Planners should consider the relative efficiency of alternative milk marketing systems in terms of costs and marketing margins, product hygiene and quality, range and stability of services offered and stability of producers and consumer prices. To do so, policy makers, development organizations and private investors are in need of information of different aspects of the production system of the specific area, potentials and constraints of production and marketing conditions/systems (Matthew man, 1993).

So far, most of the characterization review were limited to state farms located mainly in higher altitudes where the climate is suitable for milk production. As dairy production in Ethiopia is constrained by several factors classified as: (a) technical or biological and (b) socio-economic and institutional factors (Fekadu, 1994), some of the major environmental constraints such as low rainfall, high temperature and low forage production, common plant association, livestock and human carrying capacity, incidence of important livestock diseases and parasites, mainly define in the lowlands of Ethiopia. There are a number of challenges and bottlenecks limiting the success and profitability of household dairy production systems in Ethiopia. Therefore, a comprehensive literature review on the current status of dairy production system in the country seems to be appealing. There is a need for reviewing the production system, production performance and constraints of household dairy production. Moreover, information's on either weak sides or the success stories of household dairy production including its marketing and constraints could be used by beneficiaries.

1.2. Objectives

1.2.1 General Objective

- Review on household dairy production system, marketing and constraints in Ethiopia

1.2.2 Specific Objective

- To review on household dairy production systems in Ethiopia
- To review on dairy and dairy product marketing systems in Ethiopia
- To review on constraints of household dairy productions in Ethiopia

2. Review

2.1 Dairy production systems in Ethiopia

Livestock are raised in all of the production systems of Ethiopia by pastoralists, agro pastoralists, and crop/livestock farmers (Ahmed et al., 2003). Dairying is practiced almost all over Ethiopia involving a vast number of small, medium or large-sized subsistence or market-oriented farms. Based on climate, land holdings and integration with crop as criterion, dairy production systems are categorized into rural, per-urban and urban dairy systems.

2.2.1 Rural household dairy production system

Rural dairy system is part of the subsistence farming system that contribute up to 98% of the total milk production of in Ethiopia, and includes pastoralists, agro-pastoralists, and mixed crop–livestock producers (Ketema, 2000; Tsehay, 2002; Yoseph et al., 2003; Zegeye, 2003; Dereje et al., 2005). The system is not market oriented and most of the milk produced in this system is retained for home consumption (Ahmed et al., 2003). The level of milk surplus is determined by the demand for milk by the household and its neighbors, the potential to produce milk in terms of herd size and production season, and access to a nearby market. The surplus is mainly processed using traditional technologies and the processed milk products such as butter, ghee, ayib and sour milk are usually marketed through the informal market after the households satisfy their needs (Tsehay, 2002).

Small-holder producers sell their milk and milk products to urban areas (primarily through informal market) when transport is available and affordable. At some distances, the cost to transport raw milk prohibits selling to distant markets or any market for more rural producers (Land O'Lakes, 2010).

2.2.2 Per-urban or small scale dairy production system

Per-urban milk production is developed in areas where the population density is high and agricultural land is shrinking due to urbanization around big cities like Addis Ababa and other regional towns. It possesses animal types ranging from 50% crosses to high grade Friesian in small to large sized farms, and contributed only 2% of the total milk production of in Ethiopia. This sector owns most of the country‘s improved dairy stock (Tsehay, 2001). The main source of feed is both home produced and purchased hay and the primary objective is to get additional cash income from milk sale. This production system is now expanding in the highlands among mixed

crop–livestock farmers, such as those found in Selale and Holetta, and serves as the major milk supplier to the urban market (Gebre Wold et al., 2000).

2.2.3 Urban or commercial dairy production system

Commercial or intensive dairy farming is a more specialized farming practiced in state sector and very few individuals on commercial basis. These farming systems with combination to per-urban and urban small scale dairy farmers produce 2% of the total milk production of the country. Farmers use part or all of their land to grow fodder crops for their dairy cattle. The dairy animals do not provide draft, but their manure is used as fertilizer on crops, milk is the main source of farm income. It is mainly under taken by small farmers using family labor, but commercial farmers using herd labor also practices this system on a large scale (14). The herd is dominated with improved/cross breed dairy cattle and the production system is market oriented and milk production is for sales (15).

Urban dairy systems in general are located in cities and/or towns and focuses on production and sale of fluid milk, with little or no land resources, using the available human and capital resources mostly for specialized dairy production under stall feeding conditions. As compared to other systems they have relatively better access to inputs (e.g. feeds) and services (e.g. artificial insemination) provided by the public and private sectors, and use intensive management. The urban system of Hawassa, Shashemene, Yirgalem and Dilla is mainly based on cattle, both improved dairy cattle genotypes (crossbreds or high-grade) and indigenous cattle. Marketing of fluid milk in these towns is arranged through direct contact between producers and consumers, and/or involves wholesalers/processors, cooperatives, and retailers (Azage T et al., 2013).

2.2 Marketing systems of dairy and its products

In Ethiopia, milk and milk products are marketed through both informal and formal marketing systems. In the dominant informal marketing system, producers sell to consumers directly or to unlicensed traders or retailers. Price is usually set through negotiation between the producer (seller) and the buyer; this system is predominant in the rural dairy production system. In the formal marketing system there are cooperatives and private milk collecting and processing plants that receive milk from producers and channel to consumers, caterers, supermarkets and retailers; this system does exist in urban and per-urban dairy system of Shashemene–Dilla milk shed, although the number of cooperatives is few and its performance is low (Woldemichael, 2008).

Informal market involves direct delivery of fresh milk by producers to consumers in the immediate neighborhood and sale to itinerant traders or individuals in nearby towns. The study on the status of the per-urban dairying showed that about 70, 69, 60, 52 and 43 % of the respondents sell fresh milk in Ambo, Jimma, Naqamte, Gimbi and Dambi Dollo towns respectively. Relatively, small proportions of milk sales were reported from Baddalle and Mattu (Ulfina G et al. 2013).

In Ethiopia, dairy products (fresh milk, butter, buttermilk and cottage types of cheese) are distributed through the informal and formal marketing systems. The informal market involves direct delivery of dairy products by producers to consumers in the immediate neighborhood and sales to itinerant traders or individuals in nearby towns (Siegefreid and Berhan, 1991). Therefore, markets involve sales, locations, sellers, buyers and transactions (Debrah and Berhanu, 1991).

According to Tsehay (2002), a milk-marketing group can be defined as a group of smallholder farmers who individually produce at least one liter of saleable milk and are willing to form a group with the objective of collectively processing and marketing milk. Berhane and Workneh (2003), in their review, indicated the very useful involvement of the government of India at every step of the development for expansion of dairy cooperatives in the country for the successes of dairying and suggested that the Anand pattern of dairy development (India) can be emulated at least around the major milk sheds in Ethiopia, for instance around Nazareth, Dire Dawa, Harar, Bahir Dar, Jimma and Assela.

2.3 Constraints of dairy production in Ethiopia

Major constraints affecting milk production potential of dairy cattle in the most parts of Ethiopia were shortage of grazing land, disease and parasites, shortage of land for cultivation of improved forage, inadequate veterinary service, low milk production potential of local zebu cattle, inadequate AI service and labor shortage. According to Kibru et al. (2015) funding majority of farmers reported that shortage of grazing land was main problem of milk production followed by disease and parasites in Aleta Chukko district of Southern Ethiopia. Inadequate veterinary service to handle outbreak of diseases was also prevailing constraints of milk production in the area. In the Aleta Chukko district, low milk production potential of local zebu cattle and shortage of land for forage cultivation were also major prioritized constraints for milk production. Similarly inadequate AI service to improve milk production performance of local zebu cattle which are dominant cattle population in the study area was also major problem of milk production in the area (Kibru et al, 2015).

2.3.1. Lack of animal health protection and control service

According to Gatwech T. (2012) funding the loss of animals due to diseases was aggravate by shortage of

veterinary professionals, accessibility of veterinary service in the area and lack of adequate transport facility were the major problems. The existing of such a poor performance of veterinary service indicated that regional government give less attention to the livestock sector in general. Similar assumption was reported by Tafesse (2001), in that poor performance of veterinary service in the lowlands is the outcome of the government monopolized service. Livestock keepers therefore, tend to divert to traditional ethno-veterinary practices in the villages and make use of various herbs and/or illegal drugs to treat their animals (Gatwech T., 2012).

According to Azage T et al. (2013) funding diseases in dairy animals affect reproduction, milk production, milk quality and cause mortality and morbidity. In the rural lowland dairy production system of Mieso and Metema, disease and parasite were ranked as the major problem by most of the farmers (about 66–86%).

Mastitis, trypanosomosis, internal and external parasites, bloating anthrax and black leg reported to be a major disease affecting livestock production and productivity in the area (Ulfina G et al., 2013).

2.3.2. Feed shortage

Feed shortage in terms of quality and quantity is the major constraint regardless of the dairy Production system and agro-ecology. Feed constraints could be seen from different dimension in terms of quality and quantity and seasonal feed supply to meet the nutritional requirements of dairy animals. Both roughage and concentrate feeds are either too expensive or unavailable in sufficient quantity and quality to improve dairy production (Azage T et al., 2013).

According to Ulfina G et al. (2013) funding inadequate supply of quality feed and low productivity of the indigenous cattle breeds are the major factor limiting dairy productivity in the region. 42% of the respondents were reported feed shortage as the most single problems responsible for low milk yield and low productivity of the dairy system.

According to Derese and T. (2008) funding unavailability of feed probably limit the milk production potential of cows with good milk producing ability more than any other single factor and is the most serious constraint to improve dairying.

2.3.3. Shortage of land

According to Azage T et al. (2013) funding shortage of land for dairy farming and feed production is a major problem in urban and per-urban dairy farming system of Shashemene–Dilla milk shed. Dairy farms under this system are under tremendous pressure to expand dairying mainly due to rapid urbanization and population growth. Most urban producers (97%) keep their cattle within their own residence compound. Although urban expansion creates great opportunity for commercialization of dairy production, it has to be supported with appropriate policy framework to promote dairy development. Shortage of land is also the major constraint in the rural highland dairy production system.

According to Abebe B. et al., (2014) funding indicated most of the dairy producers, milk production is constrained primarily by shortage of land for grazing and cultivation of improved forage crops. The problem of feed shortage is associated with small land holdings to produce sufficient quantities and limited knowledge on the conservation of seasonally available feed.

2.3.4. Genotype related constraints and reproductive wastage

In Ethiopia, indigenous cattle breeds are the dominant source of milk and milk products. The number of crossbred cows is very low and is mainly concentrated in and around major urban and per-urban centers. Indigenous cattle breeds are generally characterized as multi-purpose animals and managed in low input production system. These animals have been naturally selected for adaptive and not for functional traits, and they are inherently low milk producers (Azage T et al., 2013).

Genetics make up of our dairy cattle covers about 99% of the cattle populations in Ethiopia are indigenous that are adapted to feed and water shortages, diseases challenges and harsh climates. The productivity of indigenous cattle believed to be poor even if no practical recording scheme has been used to judge their merit (Ahimed M et al., 2003). The main problem of milk production in the country is that of the poor genetic potential of the indigenous cattle, which gives to low milk output. Crossbreeding has been practiced with encouraging results. However, a strictly controlled breeding program has not been practiced. Milk production is as low as 0.5 to 2 liters per day over a lactation period of 160 to 200 days (Tesfaye and A., 1990).

Improving the feeding, watering and health care of indigenous cattle did not increase the quantity of milk per day to allow the animals to be used for commercial market milk production (Belachew et al., 2003). If improvement of the local Ethiopian breeds for milk production is targeted, then it is important to have a designed selection program in place for a few selected promising breeds (Ketema and H., 2000).

2.3.5. Poor access to inputs and services

Access to inputs and services includes extension, animal health, credit, market information, AI and dairy inputs. However, service delivery in the studied areas is not as effective and not up to the satisfaction of dairy farmers because the services rendered are very limited, untimely and irregular (Azage T et al., 2013).

The inefficient AI service reported in the current study is associated with lack of sufficient facilities and

trained AI technicians in the area. According to the respondents, due to the aforementioned reason coupled with shortage of breeding bulls for natural mating in their surroundings, cows and heifers pass a series of estrus cycles without being served. This represents a substantial production and reproductive wastages critically affecting the expected life time productivity of the cows. The problem of AI service provision seems to be a critical issue at national level. AI service in Ethiopia has not been successful to improve reproductive performance of the country's dairy industry (Sinishaw and W., 2005).

3. Conclusion

Ethiopia has the highest livestock populations in Africa and accounts for 17% of cattle, 20% of sheep, 13% of goats and 55% of equines in sub-Saharan Africa. In fact, Ethiopia is the first in Africa and tenth in the world in livestock populations. Livestock production in Ethiopia is mainly of smallholder farming system with an animal having multipurpose use and accounts for approximately 30% of the total agricultural gross domestic product (GDP) and 16% of national foreign currency earnings. Cattle are very important livestock species in the traditional mixed crop livestock production systems of Ethiopia by providing mainly drought power, a small amount of milk, meat usually when they retire and manure. Ethiopia holds large potential for dairy development due to its large livestock population, the favorable climate for improved, high-yielding animal breeds, emerging market opportunity, improved policy environment for involvement of private sectors, and the relatively disease-free environment for livestock. Ethiopia can contribute significantly to poverty alleviation and nutrition in the country. Though different classifications have been used to characterize the dairy production system in the country; based on their locations, dairy production is classified into three broad categories, namely, urban (commercial large scale), per-urban (small scale) and rural (household) dairy production. In Ethiopia, milk and milk products are marketed through both informal and formal marketing systems. In the dominant informal marketing system, producers sell to consumers directly or to unlicensed traders or retailers. Price is usually set through negotiation between the producer (seller) and the buyer; this system is predominant in the rural dairy production system. In the formal marketing system there are cooperatives and private milk collecting and processing plants that receive milk from producers and channel to consumers, caterers, supermarkets and retailers. Major constraints affecting milk production potential of dairy cattle in the most parts of Ethiopia were shortage of grazing land, disease and parasites, shortage of land for cultivation of improved forage, inadequate veterinary service, low milk production potential of local zebu cattle, inadequate AI service and labor shortage.

4. Recommendation

- ❖ It is better to mitigate feed shortage through planting improved forage through irrigation and feed storage systems for dry seasons.
- ❖ It is important to use AI service to increase milk production by improving genetic potential of local dairy cattle.
- ❖ It is important to use modern production system with improved technology in urban area and in rural area improve traditional system through feed supplementation and better health care.
- ❖ Make market channel to increase marketing of dairy cattle and its products.

5. Reference

Abebe B, Zelalem Y and Ajebu N, 2014. Dairy Production System and Constraints in Ezha Districts of the Gurage Zone, Southern Ethiopia. Global Veterinaria 12 (2): 181-186, 2014

Ahimed, M. M., Ehui, S. and Yemesrach Asefa. 2003. Dairy development in Ethiopia. ILRI, International Livestock Research Institute. Socio-economics and policy Research Working Paper,58.

Azage T., Berhanu G., Dirk H., Berhanu B. and Yoseph M., 2013. Smallholder dairy production and marketing systems in Ethiopia: IPMS experiences and opportunities for market-oriented development. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 31. Nairobi: ILRI.

Belachew, H. and E. Jemberu, 2003. Challenges and opportunities of livestock marketing in Ethiopia. In: proceeding of the 10th annual conferences of the Ethiopian Society of Animal Production (ESAP), held in Addis Ababa, Ethiopia, 21-23 August 2003, ESAP, Addis Ababa, Ethiopia, pp: 1-13.

Berhane Mekete and Workneh Ayalew, (2003): Promotion of dairy marketing using farmer's cooperatives: Lessons from India. In: Jobre Y and Gebru G (eds), Challenges and opportunities of livestock marketing in Ethiopia. Proceedings of the 10th annual conference of ESAP(Ethiopian Society of Animal Production) held in Addis Ababa, Ethiopia, 22–24 August 2002. ESAP, Addis Ababa, Ethiopia. pp. 81–87.

CSA (Central Statistical Agency), 2011. Agricultural sample survey. Report on livestock and livestock characteristics (private peasant holdings). Addis Ababa, Ethiopia, pp: 9-26.

Debrah, S. and Berhanu A., (1991): Dairy marketing in Ethiopia: Markets of first sale and producers' marketing

patterns. ILCA research report 19, ILCA (International Livestock center for Africa), Addis Ababa, Ethiopia.

Dereje, (2005): Survey of traditional cattle production systems and preferred cattle functions in North and south Wollo zones, Ethiopia. Ethiopian Veterinary Journal 9(1):91–108. Economist Intelligence Unit. 2007. Country Report for Ethiopia, January 2007. Economist Intelligence Unit, 26 Red Lion Square, London WC1R 4HQ, UK. In: http: //www.alacrastore.com/.

Derese, T., 2008. Present situation of urban and per-urban milk production and quality of raw milk produced in West Shewa Zone, Oromia Region, Ethiopia, M.S. thesis, Haramaya University, Alemaya, Ethiopia.

Fekadu, 1994. Present situation and future aspects of milk production, milk handling and processing of dairy products in Southern Ethiopia, (unpublished PhD thesis, Agricultural University of Norway)

Gatwech T., 2012. Dairy production, processing and market system: A case study of Gambella, south west Ethiopia. Debre zeit, Ethiopia.

Gebre Wold, A., Alemayehu, M., Demeke, S., Bediye, S and Tadesse, A. (2000): Status of dairy development. Smallholder Dairy Development Project (SDDP) dairy research in Ethiopia. In: The role of village dairy co-operatives in dairy development. SDDP (Smallholder Dairy Development Project) Proceedings, MOA (Ministry of Agriculture), Addis Ababa, Ethiopia.

IBC, 2004. The state of Ethiopia's Farm Animal Genetic Resources. A contribution to the first report on the state of the world's animal genetic resources, May 2004, Addis Ababa, Ethiopia.

Ketema, H., 2000. Dairy development in Ethiopia. In: the role of village dairy co-operative in dairy development, SDDP (Smallholder Dairy Development Project) proceedings, MOA (Ministry Of Agriculture), Addis Ababa.

Ketema, H., Tsehay, R. (1995): Dairy production system in Ethiopia. In: Strategies for market orientation of small scale milk producers and their organizations. FAO (Food and Agricultural Organization of the United Nation. Proceeding of the workshop held at 20-24th march, Morogoro, Tanzania, Pp 125.

Kibru B., Berihan T. and Teka F., 2015. Characterization of Smallholder Cattle Milk Production System in Aleta Chukko District, Southern Ethiopia. Jigjiga University, College of Dryland Agriculture, Ethiopia.

Land O'Lakes, 2010. The NEXT STAGE IN DAIRY DEVELOPMENT FOR ETHIOPIA Dairy Value Chains, End Markets and Food Security Cooperative Agreement 663-A-00-05-00431-00.

Matthewman (1993): Dairying. The tropical agriculturist. CTA publication, Waginingen, the Netherlands. pp. 23–31.

MOA, 1996. Animal and Fishery Resource Main Department, Dairy extension manual, Addis Ababa, Ethiopia. Pp 122

Muriuki, H.G. and W. Thorpe, 2001. Smallholder dairy production and marketing. Constraints and opportunities. P Smith. Princeton, New Jersey: Princeton University Press, pp: 206-247.

Siegefreid, D. and Berhanu A. (1991): Dairy marketing in Ethiopia: Markets of first sale and producers' marketing patterns. ILCA Research Report No.19. ILCA (International Livestock Centre for Africa). ILCA. Addis Ababa, Ethiopia

Sinishaw, W., 2005. Study on semen quality and field efficiency of AI bulls kept at the National Artificial Insemination Center. M.Sc. Thesis presented to school of graduate studies of Addis Ababa University, Faculty of Veterinary Medicine Debre Zeit, Ethiopia.,

Tangka D.K., Emerson R.D. AND Jabbar M.A., (2002): Food Security effects of intensified dairying: Evidence from the Ethiopian highlands. Socio-economics and policy Research working paper 44, ILRI (International Livestock Research Institute), Nairobi, Kenya, 68 pp.

Tesfaye, A., 1990. Livestock development in the peasant sector of high lands of Ethiopia: some policy analysis network (SLPAN), Network paper No. 24, June 1990, ILCA, Addis Ababa, Ethiopia.

Tsehay R, 2001. Small-scale milk marketing and processing in Ethiopia. In proceeding of the south-south workshop on smallholder dairyproduction and marketing: constraints and opportunities, Anand, India.

Tsehay, R. (2002): Small-scale milk marketing and processing in Ethiopia. 352-367 pp. In: Smallholder dairy production and market opportunity and constraints. Proceeding of a south south workshop held at NDDB, Anand, India, 13-16 march 2001. NDDB (National Dairy Development Board), Anand, India, and ILRI (International Livestock Research Institute), Nairobi, Kenya.

Ulfina G., Jiregna D., Alganesh T., Shiv P. and Late M., 2013. Dairy Production Potential and Challenges in Western Oromia Milk Value Chain, Oromia, Ethiopia.

Woldemichael Somano, 2008. Dairy marketing chains analysis: The case of Shashemane, Hawassa and Dale districts milk shed, Southern Ethiopia. MSc thesis. School of Graduate Studies, Haramaya University, Ethiopia.

YONAD, 2009. Value chain analysis of milk and milk products in Borana pastoralist area, unpublished manuscript.

Yoseph, M., Azage, T., Alemu, Y. (2003): Evaluation of the general farm characteristics and dairy herd structure

in urban and peri-urban dairy production systems in Addis Ababa Milk Shed. In: Yilma Jobre and Getachew Gebru (editors), Proceedings of the 10th annual conference of the Ethiopian society of animal production, Addis Ababa, Ethiopia, August 21-23, 2003: 139-144

Zegeye, Y. (2003): Challenges and opportunities of livestock marketing in Ethiopia. In: Proceeding of the 10th Annual Conference of Ethiopian Society of Animal Production (ESAP) 22-24 August 2002. ESAP, Addis Ababa, Ethiopia. 47-54 pp.