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Challenges and Opportunities of Milk Production and Management in Ethiopia: Review

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Abstract

This review conducted on current challenges of small holder production and management in Ethiopia, that the major identified factor affecting dairy milk production is low due to the favor less number of lactating cows, Availability of quality and quantity feed, in adequate market facility, distance of the market from producer, lack of transport facilities and seasonal variation of price milk and milk products and challenges of dairy milk production is seasonal availability of feed and lack of supplementary feed, poor management include back ground of hay making system poor housing system, under the tree or traditional housing system, distance from grazing and water point, Less productivity breeds, Disease outbreak, lack of Market and transport facility, feed shortage, seasonal price variation of milk products, lack of awareness. And Ethiopia hold large potential for dairy development due to its large livestock population, Most of the initiate dairy milk production are High demand for dairy product, Optimum price of dairy products, Rapid population growth and urbanization, Sufficient water available, Fertility of soil, Availability of improved dairy breeds, Availability of AI service, Availability of improved forage variety, Full service of animal health, Availability of improved bull and Low cost, family labor in small holder. Awareness creation is important about conservation of feed in proper manner for extended period of dry season so as to use during long dry season. Strong supervision and permanent advisory practice on the disease outbreak control is very important to increase the dairy milk production and productivity in the Ethiopia.

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Introduction

Background

Ethiopia hold large potential for dairy development due to its large livestock population, the favorable climates 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. Give the considerable potential for small holder income and employment

generation from high value dairy products development of the dairy sector in Ethiopia can contribute significantly to poverty alleviations 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.*, (2000) classified into three broad categories namely, urban, peri-urban and rural dairy production system. Peri-urban dairy production system is the production processing and marketing of Milk and milk product that are channeled to urban centers (Rey *et al.*, 1993) and small holder and

commercial dairy farmers near the capital city Addis Ababa and other regional towns (Tsehay, 2002). This sector controls most of the country's improved dairy stock. Because of steadily increasing demand in milk consumption peri-urban dairy farms are growing around cities and towns (Satal and Shapia, 1996). Even though Ethiopia is home to the largest population of cattle in Africa, with the latest estimate 52,129,017 head of cattle are mostly maintained by small holder commercial and pastoral farmers and more than 99% are indigenous low yielders that greeneries a high gap between demand and supply of milk and milk products (CSA, 2011). The objective focuses on challenges and opportunities of milk production and management in Ethiopia.

Historical events of dairy production development in Ethiopia

In the first half of 20th century, dairying in Ethiopia was mostly traditional (Ahmed *et al.*, 2003). Modern dairying started in the early 1950, when Ethiopia received the first batch of dairy cattle from united nations relief and rehabilitation administration (UNRRA) with the introduction of these cattle in the country commercial liquid milk production started on the large farm. The government intervened through the introduction of highly yielding dairy cattle in the high land in and around major urban area and also involved by establishing modern milk processing and marketing facilities to complement these input oriented production effect milk production can be broadly categorized into three systems based on marketing situation such as urban, per-urban and rural milk production system (Tsehay, 2002). The main source of milk production in Ethiopia is from camel and goat is also use in same region particularly in pastoralist areas (Ips, 2000).

Dairy production in Ethiopia

Ethiopia is reported to be endowed with the largest livestock population in Africa. According to the 2015 report of the Central Statistical Agency (CSA) the cattle population was estimated at about 56.7 million. The indigenous breeds accounted for 98.66 percent, while the hybrids and pure exotic breeds were represented by 1.19 and 0.14 percent, respectively. From the total cattle population, 44.55 percent are males and 55.45 percent females. This indicates the importance of male cattle particularly oxen for draft power. However, in the crop/livestock mixed farming system, oxen work for a maximum of 100 days in a year. This means that for the rest of the year oxen compete for the meager feed

resources though unproductive. An appropriate alternative strategy needs therefore to be put in place to reserve the feed for dairy cows that produce not only milk but also replacement stock. In spite of such a substantial potential, the dairy sector is not developed to the expected level. The milk production system is traditional and dominated by indigenous breeds of low genetic potential for milk production, accounts for about 97 percent of the country's total annual milk production (Felleke, 2003). The low productivity of the country's livestock production system in general and the traditional sector in particular is mainly attributed to shortage of crossbreed dairy cows, lack of capital by dairy producers, inadequate animal feed resources both in terms of quality and quantity, unimproved animal husbandry systems, inefficient and inadequate milk processing materials and methods, low milk production and supply to milk processing centers and poor marketing and market information systems.

Dairy production and marketing system in Ethiopia

The dairy sector in Ethiopia has large potential and role in the commercialization of the agriculture sector due to the country's large human and livestock population. The other contributing factors to dairying are the favorable climate for improved dairying, and the relatively disease-free highland environment with potential for animal feeding (Anteneh *et al.*, 2010) and a huge gap between demand and supply of milk (Tegegne *et al.*, 2007). In the commercial dairy sector, improved crossbreed cows contribute to more than half of the dairy output in urban centers like Addis Ababa (Tegegne *et al.*, 2007).

Milk Production System in Ethiopia

Traditional Milk Production System

This dairy system is a part of the subsistence farming system including pastoralists, agro-pastoralists, and crop and livestock mixing production. Largely, the system is based on low producing indigenous of zebu cattle. The livestock are kept under tradition management condition and generally obtain most of their feed from native vegetation after month grazing and crop residua (Tsehay, 2002). Among the three milk production system the pastoralism is the major system of milk production in low lands. However, because of low rain, shortage of feeds and inadequate water availability, milk production is low and highly influenced by season (Ips, 2000). The system is not market oriented and most of the milk is produced in it is retained for home consumption or

household processing (Ahmed *et al.*, 2003). Processing is usually done using traditional technology in to products such as, butter, ghee, cheese, and sour milk, milk and milk products are usually marketed through the in formal market after the house hold satisfy their need (Tsehay, 2002 and IPS, 2000).

Modern milk production system

This system is developed in major cities and regional towns which have a high demand for milk and they are a largest source of milk produces. The total of about 5167 small, medium, and large scale dairy exist in and around Addis Ababa. Total milk production from these farms amount to 34.64 million liter per annum (Ahamed *et al.*, 2003). This system includes small holds and commercial dairy farmers near Addis Ababa and other regional towns (Ahmed *et al.*, 2003). Most of the improved dairy stock is used for this type of dairy production. Currently, small holder farmers milk marketing unit the DDE (Dairy development enterprise). Mama agro industry and private dairy farmers in and around Addis Ababa are supplying dairy products to the city market (Tsehay, 2002).

Socio-Economic Importance of Milk Production in Ethiopia

The ability of dairy enterprise to generate regular income and to contribute to the house hold diet on regular basis throughout the year is an advantage over the other agricultural business enterprises (Muriuk, 2001). In addition, apart from providing employment to the process it also provides to informal milk traders, cooperatives and other dealing with markets. Milk and milk products is a part of the diet for many Ethiopia. They consume dairy products either as fresh milk or in fermented or sour form. The demand for milk depends on many factors including consumers preference consumers income, population size, price of the product, price of substitutes and other factors (Azag Tegegn, 2003).

Felek and Geda (2001) estimated that about 68% of the total milk produced is used for human consumptions fresh milk, butter, cheese and yoghurt while the rest is given to calves wasted in the process of all the total milk produced around 40% is allocated for butter and about 9% is for chees. Traditionally dairy animals have performed multiple functions for producing milk for house holders consumptions male animals for source of drought power in agricultural operate (Tanejo and Birthal, 2005).

Major challenges of milk production in Ethiopia

Challenges and problems for dairying vary from one production system to other and from one location to other location (Ibrahim and loluku,2000).The structure and performance of livestock and its marketing both from domestic consumption and for export is generally perceived poor in Ethiopia. Under development and lack of market production, lack of adequate information on livestock resource, inadequate permanent trade routes and other facilities like feed, water, housing ground, lack or non-provision of transport, in effectiveness and in adequate infrastructural and intercultural set up, prevalence of disease, illegal trade and in adequate market information are generally mentioned as some of the major reason for the poor performance of these sector (Belachew and Jemberu, 2003).

The demand for milk and dairy products is very much affected by seasonal fall of demand among the Orthodox Christians (that comprise about half of Ethiopia's population) during the fasting season and the fasting days. The majority of the Orthodox Christians practice fasting more than 200 days per year, during which time they abstain from consuming animal products. When dairy enterprises process only pasteurized milk with a short shelf life, this means that processed volumes go down during the time when people (fast) consume less. For example, during the fasting season in 2012, the Ada'a Dairy Cooperative decided to receive only 75% of milk produced by its members. The price per litre of milk also dropped by ETB 1.00 which was later adjusted to the previous price. The cooperative also dumped about 10,000 litres of fluid milk due to storage problem (Alemayehu *et al.*, 2012).

Poor animal health and management are major constraints of dairy development in Ethiopia which cause poor performance across all dairy production systems. Many of these problems result from the interaction among constraints themselves e.g. poorly fed animals develop low disease resistance, fertility problem, partly because the animal health care system relies heavily on veterinary measure. Poor grazing management systems continue to cause high mortality and morbidity (e.g., internal parasites) (Belachew, 1998).

Inadequate supply of quality feed is the major factors limiting dairy productivity in Ethiopia. Improved feeding is crucial to provide satisfactory environment for animal growth and feed supplements stimulate higher milk productivity. 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 yields, high mortality of young stock, longer parturition intervals, and low animal weights (Belachew and Jemberu, 2003).

The productivity of indigenous stock is a major constraint in dairy development. In the indigenous herds genetic potential for milk production is low. However, there is still a potential for increased production through improved management; selection of the best animals; improved reproduction; etc. Similarly, the potential for production of marketable milk is not fully exploited in the indigenous herd. The selection of efficient breeds specifically adapted to respond to those elements in the environment that are subject to man's control is the necessary step to improve the dairy sector (Yonad, 2009).

Adulteration is the major problem in processing and marketing. Milk adulteration is usually done by farmers and brokers. Both hygienic and nutritional aspects are important in milk quality. It is important to identify where adulteration in particular occur in the marketing chain: - farmer level, middlemen, distribution (Ayele *et al.*, 2003)

Moreover, the structure and performance of livestock and its products including dairy products marketing both for domestic consumption and for export is generally perceived poor in Ethiopia (Ayele *et al.*, 2003 and Betela, 2015) due to underdeveloped and lack of market-oriented production, lack of adequate information on livestock resources, inadequate permanent trade routes, facilities like feeds, water, holding land, lack or non-provision of transport, ineffectiveness and inadequate infrastructural and institutional set-ups, and Prevalence of diseases, illegal trade and inadequate market.

Problems associated with dairy cow feed

The problems are at dry season the price of the feed become very high due to its shortage, the distance of the market to purchase the feed and Lack of additional grazing. During this time the feed like banana leaf and some other purchase concentrate feed from local market. Indicate the respondents developed the habit of using roughage, concentrate, improved forage feed, Crop residues, natural grazing and supplementary feed for their dairy cows but the above maintained problems are familiar in the study area (Felke and Geda, 2001).

The opportunities of milk production

Ethiopia holds large potential for dairy development. In addition, the country enjoys diverse topographic and climatic condition favorable for dairying. These consist of high central platen use ranging from 1800 to 3000 meters above sea level rift valley that divide the country. From the north to south with altitude ranging from 1000 to 8000 meter above sea level in altitude. Moreover, the rain fall in most of the country is adequate for crop and pasture production favorable climate throughout the country supports use of improved high yielding animals breeds and offers a relatively disease free environment for live stocks development (Alemayehu, 2005). In the high land area the agricultural production system is predominantly subsistence small husbandry typically practiced with in the same management unit. Diverse topography climate and seasonal forage source necessary for small holder dairy development (Belachew and Jemberu, 2003).

The large livestock population, the favorable climate for improved, high yielding animal breeds and the relatively disease-free environment for livestock make Ethiopia to have a significant potential for dairy development. Considering the important prospective for smallholder income generation and employment opportunities from the high value dairy products, the development of the dairy sector can contribute immensely to poverty alleviation and improved nutrition in the country. With the present trend characterized by transition towards a market-oriented economy, the dairy sector appears to be moving towards a takeoff stage. Liberalized markets, involvement of the private sector and promotion of smallholder dairy are the main features of this stage (Ahmed *et al.*, 2004).

Dairy is a development tool because it widens and sustains three major pathways out of poverty: securing assets of the poor, improving smallholder productivity and increasing market participation by the poor" (MoA, 2013). The dairy industry is essential for rural Ethiopia and it is potentially the largest rural employer in the Ethiopian highlands and pastoral/ agro-pastoral areas. With continued urbanization, growing population size, demand for milk by the children and younger generation, it is expected that the dairy industry will become a major player in agricultural development and has further potential to contribute significantly towards increased income and employment.

According to report of (SNV, 2008; Betela *et al.*, 2015; the following are opportunities of value chain Ethiopia dairy sectors at different level:- At the production level include equipment supply and leasing, farm input supplies via organized check-off systems for groups of large farmers, milk testing and recording services, transport services and private extension services. At the farm level, investment potential lies in medium and large dairy farming but also there is potential in food processing and provision of advisory services including breeding technologies. There is opportunities to invest in dairy feed processing and feed technologies. Within the processing and packaging component, emerging opportunities include investment in modern processing equipment, supply of processing inputs and packaging, equipment supply and leasing and marketing support services. A number of existing small and medium scale dairy processors have limited capacity in terms of financial capital, equipment, technology and/or expertise. Some of such firms are interested in joint venture with other private investors local or foreigner to expand their operations. Similarly, some of the existing companies are also seeking for equity participation from foreign companies and individuals while others are considering outright purchase. With the relative fast growth registered in the dairy industry, there is a need to establish firms that provide dairy industry and related support services. Such services include artificial insemination; farm input supplies and market information, establishment of collection centers and distribution facilities, dairy breeding and farming. Post-harvest milk losses are high, especially during the peak seasons, when production level is high. This is due to limited access to milk collection centers. So far only the Sebeta Agro-industry and the LAME Dairy (formerly known as DDE) have limited number of milk collection centers. The other private and cooperative firms lack collection centers and facilities. In addition, substantial amounts of milk are spoiled in transit. This is due to the substandard containers and mode of transport used to collect and transport milk from up to 100km distance which lead to delays and high temperature build up in the milk. Thus, investment opportunities exist in establishing more and better managed milk collection centre as well as reliable milk distribution facilities including transport facilities and cold chains. Establishment of dairy breeding farms is another investment opportunity that is not yet fully exploited. Ethiopia has adequate land for dairy farming and the climatic conditions are favorable for this venture. A well-established dairy farm would produce milk and also breed in-calf heifers for sale. With the growth registered in the dairy industry, the demand

for in-calf heifers is expected to increase. On the domestic market, the cost of an in-calf heifer ranges between Birr 7000 and Birr 12000. Currently most of the heifers on sale are cross breeds type reproduced with in the country. Most of them do not have records of pedigree and production. They are sold for their color (black and white) rather than level of performance.

Livestock genetic resources and production system

Ethiopia is endowed with large and diverse dairy animal genetic resources, which are widely distributed across the various agro-ecologies and climatic conditions prevalent in the country. The country with about 27 breeds of cattle (DAGRIS 2007), 14 breeds/types of goats and about 3 breeds/types of camels, is considered as a center of diversity for farm animal genetic resources. Indigenous animals have evolved over time through natural selection and adaptation to the existing diverse ecological conditions of their habitat. Consequently, dairy production system in Ethiopia forms a continuum with pastoral form of production system dominating the lowland agro-ecological setup (livestock production is dominant to sustain the livelihood of society) to market-oriented urban and peri-urban dairy production systems that exists in mid to upper highlands. The potential of indigenous genotypes as dairy animals have not been fully explored. There are indications that milk yield among the indigenous animals is variable implying that there are opportunities for improvement.

Sale place and selling price of milk

According to the dairy product in Ethiopia are channeled to consumer through both formal and informal dairy marketing system in which the formal markets involves direct delivery of fresh milk. Similarly the dairy producers of in Ethiopia were also mostly sell fresh milk to the individual consumers through informal market channel. The total amount of milk per milk per day is very low which is about two and half liter of milk on average (Mulugeta, 2005).

Dairy cattle management practice

In Ethiopia feeding system includes communal or private natural grazing and browsing, cut and carry feeding, hay and crop residues using improved forage and agricultural byproduct is minimal and most of the agricultural byproduct are concentrated in Urban and peri-urban area (Alemayewu2005).Similarly, the feed resource used for dairy cows in the study area is mostly roughage only

such as natural grass, hay, banana and *ensset* leaf and both Roughage and concentrate. Concentrate is locally available feeds like Attala(local alcoholic beverage by product),and cereal byproduct powder. And some amount of Crop residues such as maize, sorghum, wheat, barely stabber or straws and banana, *ensset*, potato leaves and Improved forage like, dash grass, elephant grass (Alemayewu 2005).

Housing system

The housing of the dairy cows Ethiopia is three types somehouse throughout the dry and wet season of the year. Such kind of the housing system is not good enough to meet the animal welfare. Problem observed regarding the housing system is the houses constricted do not have enough space for feeding, watering and drainage system. This is due to the lack of adequate knowledge of constructing dairy houses design and land for house hold to provide confined and sufficient housing for their dairy. Almost all the respondents are living together with very small compound or residence place. This result the animals be exposed to stress (Felke and Geda, 2001).

Milking practice

The milking practice is entirely strip hand milking. The producers milked their dairy cows early morning and late evening for twice a day other milked mid a day for one times a day especially, poor local dairy breed and late lactated cows owners use milk for family consumption (FAO, 2000).

In conclusion, the dairy production system is a part of the subsistence farming system including pastoralists, agro-pastoralists, and crop and livestock mixing production. Largely, the system is based on low producing indigenous of zebu cattle. Give the considerable potential for small holder income and employment generation from high value dairy products development of the dairy sector in Ethiopia can contribute significantly to poverty alleviations and nutrition in the country. The government intervened through the introduction of highly yielding dairy cattle in the high land in and around major urban area and also involved by establishing modern milk processing and marketing facilities to complement these input oriented production effect milk production. Most of the initiate dairy milk production are High demand for dairy product, Optimum price of dairy products, Rapid population growth and urbanization, Sufficient water available, Fertility of soil, Availability of improved dairy

breeds, Availability of AI service, Availability of improved forage variety, Full service of animal health, Availability of improved bull and Low cost, family labor in small holder. Marketing: Reducing the cost of marketing of fluid milk produced in peri-urban areas is an essential element for economically viable dairy production system. To help potential dairy farmers, collectors (cooperatives/private companies) could offer incentives (e.g. subsidized transport cost, reduced membership requirements) to stimulate dairy value chain development. Milk quality is another factor which needs to be addressed on-farm as well as at collection centers. Demand: Fluctuation in the demand of milk and other dairy products is in line with the various fasting periods observed by Orthodox Christians. Milk is traditionally considered in many parts of Ethiopia to be a food item that is essential only for children and convalescent persons. Its nutritional benefits for normal adults tend to be overlooked. The common solution for such seasonal drop in demand is to process fluid milk into butter and cheese. The supply of improved dairy animals can be through creating linkages between suppliers and potential dairy farmers. Keeping proper and up-to-date records is the basis for genetic improvement of dairy animals. Expanding market infrastructure facilities strengthen cooperatives and providing support to enhance their processing capacities, improving feed provision system and seed quality need to be done regularly. Likewise, a careful planning is required for the generation of appropriate and demand driven technologies in order to attain sustainable dairy value chain development from dairy sector.

Recommendation

While analyzing dairy value chain as source of employment and a business opportunity for poverty alleviation, it should be understood in the context of the contribution of dairy production to livelihoods and income generation for smallholder farmers through the production of higher-value products compared to most crops. In this way, this sector is considered as feasible place to dairy farming, but unfortunately people in the sector have to face financial difficulties. And also they don't have the educational background to plan the dairy farming in the large scale; further co-op society has not enough technological facilities to preserve the pure milk. And also they don't have the value added strategies like milk coffee, ice cream, yoghurt in the large scale. Due to that government and non-government organizations should focus their activities toward dairy farming. More over different researcher in the previous section reported

many challenges that hinder the development of dairy value chain in Ethiopia. Dairy ration should be formulated based on age, milk production, physiological stage, climate, and genetic blood level of the animals. However, in the current practice every producer, processor and feed retailer uses his own experience to formulate ration. This requires the attention of the public sector to regulate and monitor the quality of animal feeds.

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