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A REVIEW ON URBAN AND PERI -URBAN MILK PRODUCTION AND MARKETING SYSTEM IN ETHIOPIA

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Table of content

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ABBREVATIONS AND ACRONOM

AFC ----------Age at First Calving

AFS----------Age at First Service

CSA---------- Central Statistical Authority

GDP----------Gross Domestic Product

IGAD----------Inter Governmental Authority on Development

ILRI----------International Livestock Research Institution

NSPC-----

ABSTRACT

Income generation and employment can be used as important opportunities for the development of the sector in urban and peri-urban production system. In Ethiopia dairy production systems can be broadly categorized into urban, per-urban and rural milk production systems.

The dairy milk yield reproductive performances like lactation length, age at first calving, age at first service,number of services per conception etc. were better in the urban and peri-urban production system as compared to the traditional production system. Since Ethiopia is one of the first Africa's developing country with a large potential in livestock and particularly in dairy production from small scale to market oriented production systems. The urban and peri-urban dairy operations depend mainly on the natural pasture hay as a source of roughage feed in the central highlands of Ethiopia. The major roughage feed resources for dairy animals across all the different production systems include natural pasture/grasslands, grass hays, crop residues and non-conventional feed resources. The main constraints in the production are land shortage; feed shortage, low genetic potential of indigenous cows, disease prevalence inadequate extension and training services. 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 in direct to unlicensed traders or retailers. The formal marketing system milk is collected at the cooperative or private milk collector centers and transported. The informal milk marketing system it involves direct delivery of fresh milk by producers to consumers in the immediate neighborhood and sells to traders or individuals nearby town.

Key words: Constraints, Ethiopia, Milk marketing system, Milk production,

1. INTRODUCTION

Ethiopia possesses the largest livestock population in Africa. Estimates for farmer holding in rural areas indicate that the country has about 57 .71 million heads of cattle, 29.11 million goats, 29.33 million sheep, 2.03 million horses, 7.43 million donkeys, 0.4 million mules, and 1.16 million camels (CSA 2014 /15). The livestock sector contributes to about 15–16% of the GDP, and 35-49% of agricultural GDP excluding the values of draught power, transport and manure, and contributes to the livelihoods of about 37–87% of the Ethiopian population (ILRI, 2010). A study conducted by IGAD showed that the value of the animal draught power input into arable production is about a quarter (26.4%) of the value of annual crop production, and if the value of draught power services is included, the sector contributes up to 45% of agricultural GDP (Behnke and Metaferia, 2011).

In Ethiopia dairy production depends mainly on indigenous livestock genetic resources; more specifically on cattle, goats, camels and sheep. Cattle have the largest contribution (81.2%) of the total national annual milk output, followed by goats (7.9%), camels (6.3%) and sheep (4.6%), (CSA 2009). Despite its potential for dairy development, productivity of indigenous livestock genetic resources in general is low, and the direct contribution it makes to the national economy is limited. A recent report by (CSA 2014/15), indicated that the total production of cow milk is about 3.07 billion liters, and this translates to an average daily milk production/cow of 1.35liters/day. As a result the per capita milk consumption of the country is only 19.2 kg (MoA, 2012), which is much lower than Africa and world per capita average of 27 kg/year and 100 kg/year, respectively (CSA, 2014/2015). A large proportion of livestock feed resources in Ethiopia is natural pastures, crop residues and aftermath grazing (Adugna *et al*, 2007).

Objective:-

To review urban and peri-urban milk production and marketing system in Ethiopia.

2. LITERATURE REVIEW

2.1. Urban and Pre-Urban Milk Production and Marketing Systems in Ethiopia

Dairy production is an important component of livestock production in Ethiopia. It is an important source of food, income and creates job opportunity for many people in urban and rural settings. However, despite its huge number, the performance of subsector in general is low compared to its potential, and the direct contribution it makes to the national economy is limited (Sintayehu*et al.,* 2008). In Ethiopia the national average milk yield per cow per day is 1.35 liters for indigenous cows and the per capita/ milk consumption in the country is about 19.24 kg/year, which is much lower than African and world per capita average of 27 kg/year and 100 kg/year, respectively (CSA, 2014/2015; MOA, 2012). According to the report of the Central Statistical Agency (CSA, 2010) the indigenous cattle breeds accounted for 99.1%, while the hybrids and pure exotic breeds counted for about 0.72% and 0.09%, respectively. Despite its large livestock resource base and an ecological setting suitable for dairy production, it is not yet self-sufficient in milk production. Although it was difficult to trace the ownership of improved dairy animals, it is estimated that state and private farms own a total of 128,745 grade and pure female dairy animals of which the small holders sector owns 32,204 crosses and improved female dairy cattle (CSA, 2010). The indigenous zebu breed produces about 400-680 kg of milk/cow per lactation period compared to grade animals that have the potential to produce 1,120-2,500 liters over 279-day lactation (Mohamed *et al.,* 2004).

2.1.1Dairy production system in Ethiopia

In Ethiopia dairy production systems can be broadly categorized into urban,

per-urban and rural milk production systems. The urban and per -urban systems are located in urban and Pre-urban areas of major cities and towns (Mohamed *et al.,* 2004). The pre-urban milk system includes smallholder and commercial dairy farmers in the proximity of Addis Ababa and other regional towns. This sector controls most of the country's improved dairy stock. The rural dairy system is part of the subsistence farming system and includes pastoralists, agro pastoralist, and mixed crop livestock producers mainly in the highland areas (Mohamed 2004). Dairy production system can also be categorized into three based on market orientation, scale, and production intensity. These are traditional small holders, privatized state farms, and urban and pre-urban systems (Gebre*et al.,* 2000). The traditional smallholder system contributes to about 97 percent of the total national milk production and 75 percent of the commercial milk production.

2.1.2. Management Practices of Urban and Pre-Urban Dairy Production System in Ethiopia

2.1.2.1. Feed resource and feeding system

The urban and pre-urban dairy operations depend mainly on the natural pasture hay as a source of roughage feed in the central highlands of Ethiopia (Fekede, *et al.,* 2013). The major roughage feed resources for dairy animals across all the different production systems include natural pasture/grasslands, grass hays, crop residues and non-conventional feed resources (Asaminew and Eyassu, 2009,Yitay, *et al.,* 2009; Azage*et al.*, 2013). The crude protein content of pastures most often is lower than 7%, which could not support maintenance requirements of ruminant's Good grass and legume hays are adequate for maintaining most classes of livestock, particularly those in a non-productive state (Streeter, 2006). The dairy cows which is depend on poor quality basal feeds will not express their full genetic potential. According to (Azage, *et al.* 2013), agro-industrial by-products such as bran, middling, oil seed cakes and molasses are fed as supplement to crossbred dairy cows in urban and peri-urban areas. 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. The general belief that feed is abundant during the wet season is not true in all production systems and agro-ecologies.

2.1.2.2. Health management

Urban dairy units are often very close to high concentrations of people which increase the chance of transfer of zoonotic diseases from animals to humans. About 61 percent of human infections are zoonotic and some of the important zoonotic diseases include bovine tuberculosis, brucellosis and anthrax. In the dairy sector, zoonotic pathogens are present in dairy animals, raw milk, milk products, meat and the farm environment (Prain, *et al.,* 2010).

The most important dairy cattle diseases affecting the performance of urban and pre-urban dairy units include reproductive disorders, mastitis, calf scour and pneumonia. Others are East Coast Fever (ECF), anaplasmosis and trypanosomiasis.

2.1.2.3. Waste management

Waste disposal in the urban production system is one of the major problems of dairy producers in Ethiopia. Almost all the interviewed dairy cattle producers in the mixed crop livestock system (97.4%) used animal dung primarily as fertilizer while only few (2.6%) households used primarily as household fuel. Similarly, 72.5% of households did not use animal dung other than as fertilizer and the rest 18.2% used it for house hold fuel. Manure from these animals played a vital role for their perennial crop farming particularly for coffee, *enset*and fruit crops. In Ethiopia enset usually requires a large quantity of organic fertilizer and thus animal dung in the enset–coffee system had special attention than the cereal based areas. Some people who do not have their own cattle in the *enset*–coffee based areas kept dry

and pregnant cows that belonged to other people until calving for the benefit of using the manure to fertilize their enset plantation. According to Yousef, 2003), Moses, *et al. (*2004) and Yitaye, *et al. (*2009) waste disposal is significantly problematic in urban (36.25%) area as compared to pre-urban (13.75 %) areas. Wastes such as urine, wastewater, and feed leftover were removed either manually as was the case in small and medium farms or through concrete drainages in the case of large farms and in the urban areas manure collection, transport and disposal in generally chaotic.

2.1.3. Productive and Reproductive Performance of Urban and Pre-Urban Dairy Cattle Production

Reproductive efficiency of a herd is an important component of dairy cattle productivity in Ethiopia. Economic losses because of poor fertility can be attributed to the cost of prolonged calving interval, increased insemination costs, reduced returns from calves born and forced replacements in the event of culling. A delay in conception because of poor fertility increases calving interval mostly due to the increase in the number of days from calving to conception (Nishida et *al,* 2006).

2.1.3.1. Average milk yield and lactation length

Average milk production of indigenous cattle per cow is very low. The total milk production is further affected by relatively short lactation length, and extended postpartum anoestrus period resulting in lower reproductive efficiency. This is basically due to the fact that these animals have been selected primarily for survival trait and possess well-established adaptive traits.

The environment in which they are expected to survive and produce. In general, the reproductive efficiency of a breeding cow is determined by factors like age at first calving, calving interval and number of services per-conception.

2.1.3.2. Age at first calving

Age at first calving is the earlier measure of reproductive performance in dairy cattle; only after first calving production cycle commences (Dabdoub, 2009). The age at first calving changes the heifer from a non-producing expensive item into an income generating cow. AFC reduces unproductive period and a higher the AFC will be the additional rearing cost of the animal (Panja and Taraphder, 2012) Age at first calving is closely related to generation interval and the influences response to selection. Under controlled breeding, heifers are usually mated when the mature enough to withstand the stress of parturition and lactation. This increases the likelihood of early conception after parturition. In traditional production systems, however, breeding is often uncontrolled and heifers are bred at the first opportunity. This frequently results in longer subsequent calving intervals (Dayyani, *et al.,* 2013).

2.1.3.3. Age at first service (AFS)

Age at first effective service is one of the most important fertility properties in dairy cattle. It is direct impact on age at first calving since duration of gravidity is physiologically constant value. Age at first effective service includes the period from the birth of heifer to first insemination at the age when animal has reached breeding maturity enabling it normal gravidity. Age at first effective service is determined within defined time limits. Bottom limit is date of birth, and top limit date of conception (Novaković, *et al.,* 2011).

2.1.3.4. Number of service per conception (NSPC)

NSC is one of the measurements for reproductive efficiency. It expresses the fertility level of the dairy herds. It is simple and easy to calculate and understand and it is a good measure of reproductive status. But still it usually does not indicate reasons on heifers and cows that fail to conceive. The NSC is significantly affected by herd, season, placenta expulsion time, lactation length and milk yield (Abdel and Alemam, 2008). The number of service per conception is directly related to the conception rate in a herd. Number of services per conception (NSPC) is the number of services (natural or artificial) required for successful conception (Gidey, 2001).

The number of inseminations required to produce a live calf is one of the most useful parameters of reproductive efficiency, which mainly depends on the breeding system and also it expresses the fertility level of the dairy herds and it is higher under uncontrolled natural breeding than hand-mating.

2.1.4. Constraints and Opportunities of Urban and Pre-Urban Dairy Cattle Production

2.1.4.1. Constraints in Urban and Pre-Urban Dairy Cattle Production

2.1.4.1.1. Genetic limitation

About 99% of the cattle populations in Ethiopia are indigenous that are adapted to feed and water shortages, diseases challenges and harsh climate (Sintayehu, *et al.*, 2008).The productivity of indigenous cattle believed to be poor even if no practical recording (Ahmed, *et al.*, 2003). The main problem of milk production in the country is the poor genetic potential of the indigenous cattle, which gives to low milk output. Crossbreeding practiced with encouraging results; the strictly controlled breeding program is not been practiced.in improving the feeding, water availability and health care of indigenous cattle increases the quantity of milk per day, it did not change sufficient to allow the animals for commercial market-oriented milk production (Belachewand Jemberu, 2003).

2.1.4.1.2. Inadequate animal feed resources

Feed shortage in terms of quality and quantity is the major constraint regardless of the dairy production system. 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. It is the case of rural dairy production system, urban and pre-urban dairying is also constrained by many factors that affect the quantity of

milk produced quality and safety of milk and milk products in the milk value chain. The major constraints to increased milk production under all production systems are inadequate feed resources, poor pasture development and the carrying capacity of their grazing lands (ketema, 2000).

Other important constraints include limited access to clean water, lack of improved dairy breeds and limited market outlet for milk. Generally, feed is the major cost of a given dairy farm. Dairy producers reported that animal feed cost increases regularly and there is limited access to feeds and these are major problems that hamper dairying in cities. Farmers tend to be keep cattle at stoking rates that for exceeds the carrying capacity of their grazing lands. This is resulted in degraded pastures and eroded soils. Stock numbers are not normally reduced in the dry season leading to grazing lands becoming progressively over grazed. In the dominating crop/livestock production system, producers supplement the feeding of their cows with crop residues and farm by products from their farms (Ibrahim and Olaloku, 2000).

2.1.4.1.3. Animal health problems

In addition to availability and cost of feeds, problems related to waste disposal poor animal health services in common dairying constraints reported for urban and pre-urban producers (Ike, 2002; Sintayehu*, et al.*, 2008). The prevalence of various animal diseases, tick borne diseases, internal and external parasite and infectious diseases affect dairy development programs in various scale, depends on ecological zones and management levels. A number of parasite, bacterial, fungal and viral diseases and nutritional deficiency which are prevalent in the country affect the productivity and reproductive efficiency of dairy cattle and make individuals insecure to be involved in and invest on dairy milk handling and marketing, farm management and dairy efficiency are not always available to the dairy farmer. There is no extension to supply information about technologies to improve production and marketing to estimate certain development. Most urban producers keep their cattle within their own residence compound (Sintayehu, *et al.,*

2008*).* Space for waste disposal as lack of sufficient land for proper housing, milking, and farm expansion have been considered as one of the important challenges to produce good quality milk in urban dairy production unlike the rural and pre- urban areas.

2.1.4.2. Opportunities for Dairy Development in Urban and Pre-Urban Areas of Ethiopia

2.1.4.2.1. The existence of diverse genetic resource

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 different breeds of cattle, indigenous animals have evolved over time through natural selection and adaptation to the existing diverse ecological conditions of their habitat (DAGRIS (Domestic Animal Genetic Resources Information System), 2007). Consequently, dairy production system in Ethiopia forms a continuum with postural form of production system dominating the lowland agro-ecological set up (livestock production is dominant to sustain the livelihood of society) to market oriented urban and per-urban dairy production system that exists in mid to upper highland. There are indications that milk yield among the indigenous animals is variable improving that there are opportunities for improvement (Belete, 2006).

2.1.4.1.2. Better accesses to services and inputs

Dairy development depends on reliable inputs and services such as artificial insemination, health service and improved forage seeds supply (Muriukia and Thorpe, 2001). Currently, the numbers of AI service centers have been increasing and cover most urban and per-urban areas and some parts of rural highlands (Ibrahim and. E. Olaloku, 2000). This is an opportunity to improve the genetic potential of indigenous dairy animals in the areas is critical shortage of milk and milk products. Cognizant of the fact that diseases and parasitic infestations are

economically important to reduce production, several public veterinary clinics have been established across the different dairy production systems in the country, although its efficiency of operation is low (Kedija, 2008). public universalities and agricultural and technical, vocational education training (ATVET) colleges are producing quite a large number of development agents in which is better accessible in the urban and pre-urban areas of the country to meet the demands of farmers for service and inputs.

2.2. Milk Marketing System in Ethiopia

Milk marketing is an incentive for farmers to improve production. It stimulates production, raise milk, raise farmer income and living standards and create employment in rural areas (Assaminew, 2007). It also includes all exchange activities of buying and selling, all activities physical performed to give the commodity increased utility all the auxiliary activities such as financing, risk bearing and disseminating information to participants in the marketing process (Sintayhu ,et al., 2008).The Ethiopian milk marketing system is not well developed (Getachew ,2003). Dairy products in Ethiopia are channeled to consumers through both formal and in formal dairy marketing system (hallway, *et al.,* 2000).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 in direct 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 ,super markets and retailers; this system does exist in urban and pre-urban dairy system in Ethiopia milk shed.a(Woldemichael, 2008).

2.2.1. Formal milk marketing system in Ethiopia

The formal marketing system milk is collected at the cooperative or private milk collector centers and transported to processing plants milk acidity using alcohol

and clot on boiling test, clot on boiling , density test are performed on delivery, their by assuring the quality of milk.Generally the total formal market of milk is small. (MurikiandThrope , 2001).

2.2.2. Informal milk marketing system in Ethiopia

The informal milk marketing system it involves direct delivery of fresh milk by producers to consumers in the immediate neighborhood and sells to traders or individuals nearby town. It characterized by no licensing requirement too prate or to work, easy to operation, low cost of operation, high production compare to formal marketing system and The informal milk marketing system exist in Ethiopia both commercial and small holder farmers use the informal channel to sell milk and milk products .Generally informal milk marketing system is low profitable compare to formal.

2.2.3.Characteristics of milk marketing system in Urban and Pre-Urban areas of Ethiopia

Marketing includes all activities performed in moving commodities from the producer to the consumer (Woldemichael, 2008). It also includes all the exchange activities of buying and selling; all the physical activities performed to give the commodity increased utility; and all the auxiliary activities such as financing, risk bearing and disseminating information to participants in the marketing process. It involves the transfer of ownership of products through buying, selling, pricing, and renting and physical movement as well as transformation of the commodity into more usable forms through transportation, handling, storage, processing and packaging. (Sintayehu, *et al*, 2008).

3. CONCLUSION

From the information present in this review urban and pre-urban milk production depend on purchased feed sources but there is better usage of home grown feeds in the pre-urban areas. In the urban areas, pipe water is the most common source of water for dairy animals. But in the pre-urban areas, river played great as source of water for the dairy cattle. However, there are some differences of the Ethiopian dairy cattle production classification; depending on climate, land holding, integration with crop production, market orientation, production intensity or scale, agro-ecologies; four major systems of milk production can be distinguished in the country as pastoral, highland smallholders, urban and pre-urban (small and medium dairy farms in backyards in and around towns and cities) and intensive dairy production system. The major feed sources of dairy cattle in the system were purchased grazing, mineral supplement in different levels in different urban and pre-urban areas.

4. RECOMENDETION

The pre-urban dairy keepers trekked their animals to get veterinary service to longer distance as compared to the urban dairy producers. Hence, establishing animal health clinics and equipping them with the necessary facilities, drugs and animal health professionals could be important to identify, control and monitor dairy cattle diseases and parasites in Ethiopia particularly in the pre-urban areas.

The fact that diseases and parasitic infestations are economically to reduce production, so it should several public veterinary clinics have been established across the different dairy production systems in the country.

The major constraints to increased milk production under all production systems are inadequate feed resources, so it should give balance feed for the dairy cow in terms of quality and quantity.

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