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Commentary

Review on Characteristics of Dairy Value Chain: Way Forward to Design Viable Strategies for Upgrading in Ethiopia

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ABSTRACT

Ethiopia is endowed with diverse and large livestock populations resides in suitable environmental condition. The aim of this review is to review characteristics of dairy value chains as a way forward to design viable strategies for upgrading of the Ethiopian dairy sector. Dairy production systems are classified as small scale, peri-urban and urban based on climate, production intensity, land holding and integration with crop productions. Moreover, considering market orientations, scale of operation and production intensity, it is classified as traditional smallholder, private state far, and urban and peri-urban systems. Ethiopian value chain is characterized by both formal and informal channels and exist complex. From the total amount of milk produced nationally only 5% of it is marketed. In Ethiopia, the dairy sector has an immense role in securing household income and job creations. Understanding the value chain definitely starts with consumer demand and continues with different levels of production, processing and marketing. For describing all activities, actors, relationship among different levels of the chain and connections between producers and intermediaries the designing value chain map is found vital. There are various challenges that restrain the dairy sector to express to its potential. There is limited contribution from the scholars with regard to dairy value chains and designing viable strategies for upgrading. Therefore, it is found difficult to realize, formulate and implement desirable intervention measures to upgrade the dairy value chain development actions. Hence it is vital to go with construction of viable strategies for upgrading existing value chain systems.

Keywords: Dairy; Value chain; Strands; Upgrading; Strategies

INTRODUCTION

In Ethiopia, the considerable dairy potential resides in large livestock population associated with conducive environment to produce [1]. Ethiopia is endowed with 57.83 million cattle and from which females contribute 55.38%. Besides, from the total female cattle population, the contribution of dairy cows is 20% [2]. National average milk yield of (1.35 liter), lactation length (6 months) and lactation yield (242.8 liters) is reported. Ethiopian economy is highly dependent in livestock productions. It contributes 10% formal export earning which accounts 150 million USD per year and 300 million USD per year from the informal market sources. Moreover, it contributes 70% of household livelihoods [3]. However, the dairy sector is constrained with various challenges like unimproved technologies, high disease prevalence, limited feed supply, poor extension service, poor marketing and infrastructure and limited credit services [4].

It is possible to improve the standard of living by dairying [5]. It serves as a development mechanism for the way out from poverty; securing the assets, enhancing small holder and pastoral productivity, and increase market participation by poor [6]. Dairying is practiced in different production systems like pastoral, agro-pastoral, crop-livestock farming and urban and peri-urban varies from small scale to large scale practices. Based on climate, land holding, crop production variability the dairy sector is classified as small scale rural, peri-urban and urban

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production systems [7]. Moreover, with regard to market orientations, scale of operation and production, it can be classified as traditional small holders, privatized state farms and urban peri urban systems [8]. In traditional dairy production, the objective of production is not market oriented and most of the products are used for home consumption [9]. In here, there is variation in milk production with seasonal differences and mostly characterized with poor yields. However, in large scale privatized farms, the objective of dairying is for market purpose with intensification of feeding and over all managements to generate profit [10]. Urban and peri-urban dairy productions account the major milk supplies for the urban market [4]. The major source of milk in Ethiopia is dairy cows with the contribution of 83% of the total milk and the remaining 17% is comes from goats and camels [11].

In Ethiopia, there are 500, 000 small holder rural farmers who contribute 1,130 million liters of milk, out of this 370 million liters raw milk, 280 million liters butter and cheese and 165 million liters consumed by calves [12]. The remaining 315 million liters are marketed by formal and informal retailers through cooperatives and farmers organizations. There is expectation of rapid increase in the dairy sector through increased urbanization and income [13]. Dairy value chain is important to understand markets and their relationship, participation of different actors and critical constraints that limit the dairy sector and ultimate competitiveness of smallholder farmers [14,15]. It also identifies the benefits of actors in the chain. Through dairy value chain analysis one can determine margin and profit with in the chain, beneficiary, actors that could benefit from the overall support and organization. This fact is very important for developing countries like Ethiopia where the poor are the most vulnerable for globalizations [16]. In Ethiopia, complex nature of dairy value chain residues in both formal and informal channels. Out of the total milk produced only 5% is sold in commercial markets [17]. Therefore, this review reviews characteristics of the dairy value chains in Ethiopia.

CHARACTERISTICS OF DAIRY VALUE CHAIN IN ETHIOPIA

Concepts and definitions

Dairy value chain analysis refers to different stages where the dairy products pass from farm to consumer [18]. This encompasses the various stages of value chains like production, processing and marketing [19]. Value chain is the overall activities which are necessary to create produce and add value to end products or services. Value chain include different levels of production like producing raw materials, processing, distribution, marketing, provision of services/products and disposing it after use [16]. Supply chain is the network of establishments which involves, through upward and downward stream, the linkage of various process and actions in the form of products and services of customers or consumers is observed [20]. Moreover, it is concerned with harmonizing flow of materials and services from producers up to consumers in a way which improves value and profit [21]. Dairy value chain goes in similar way as it is described.

Value chain actors refer to the one who involves in overwhelming of particular agricultural commodities at various levels of input, production, processing and marketing activities. They directly participate in the value chain [22]. Value chain influencer's influences the activities of the value chain by as long as affects the regulators frame works, policies, infrastructures and administrative conditions. It needs addition of value chains as it progress from producers to consumers. Therefore, it transforms and adds value at each stages of the value chain [4]. Value chain map is very important in explaining and showing the relationships and interactions between segments of the value chain. Market analysis can be made from the information provided by the map to understand properly the sourcing, production, delivery [23]. Value chain analysis works on observation and inspection of whole activities and performances from conception to its end [24]. It involves collection of information, identifying strength and weakness, observing challenges and opportunities in all activities to examine the power and positions as well as relationships of various actors [25].

Service providers provide services without taking the ownership of the products. These are very vital in development of the value chains and include sector specific input and equipment which are important for smallholders [16]. Value chain governance exists between actors in the value chain as mechanisms of relationship and coordination [26]. It is classified in to buyer driven and producer driven value chains [16]. This classification is found based on governance structure. Buyer-driven are usually labor industries and important in agricultural developments. Value chain up grading acquires necessary technologies and market linkages to improve the competitiveness and leads to high value activities. This may take different forms as up grading of processes, products, functions and chains [16]. Moreover, it is an innovation to improve competitiveness of the value chain [27].

Dairy production system

In Ethiopia, dairy production is one of the livestock production systems. The diverse livestock species like cattle, camel, goats accounts as the major sources of milk producers [28]. Out of the total milk produced, cattle produce 83% of it. Moreover, from the total milk produced by cattle indigenous breeds contribute 97%. Dairying is practiced in all over the country and classified as pastoral, agro-pastoral, crop-livestock, urban and peri-urban production systems. The production systems involves vast number of small, medium and large scale operation and defined by its location, agro-ecology, production objectives, access to inputs and services, scale of production and management, market orientations and resources uses [29].

Urban dairy system

This system of production is mainly resides in cities and towns and focused in marketing of milk which is characterized by little or no land, using available human and capital resources under stall feeding conditions. In comparison with other production systems, there is better input like fees and artificial insemination services [9].

Peri-urban dairy production system

This production system operates in situations where there is high population growth, reduced land due to massive increase in urbanization and increased labor cost. Producers with such production system mainly found around in big cities like Addis Ababa. In here, there may or may not have land access for forage cultivations and the majority of animals kept in such production system are with 50% to black and white Friesian cattle. The main source of feed is hay which may be produced, purchased or both and may/may not be supplemented with additional supplements [9].

Rural dairy production system

This includes several production systems like pastoral, agro-pastoral and mixed crop-livestock producers. In such production systems most of the milk produced is served for home consumption and marketing is not the objective of it. In here, from the total milk produced majority of it (85%) is used for household consumption but other (7%) is sold to the market [30]. In this system, it is dominated by indigenous cattle populations characterized with low milk production potentials. Hence, there is production of 400-680 kg of milk/cow per lactation period. The level of production is mainly depends on the demand of neighbor and households, production season, production potential, herd size and access to nearby market. There is also traditional milk processing practice for the surplus milk produced like butter, ghee, ayib and sour milk [31,32].

Dairy product marketing

In Ethiopia, there are both formal and informal market channels in marketing of milk [1]. Until 1991 dairy development enterprise was mainly dominated the marketing of pasteurized milk through the formal markets and supplies around 12% of total raw milk in Addis Ababa [33]. However, now a day several private businesses are engaged in milk collection, processing, packaging and distributing milk and other dairy products. Despite of this fact, the proportion of marketed milk is still kept low [34]. The formal way of milk marketing is mainly practiced from peri-urban areas to Addis Ababa [35].

Informal

In Ethiopia, the milk marketing system is not well developed and majority of the small holders has low access to milk markets [36]. This informal milk marketing is characterized by delivery of produced milk to neighbors and individuals reside to nearby towns [37]. In informal, market government does not intervene at all and individuals sell their produce either as raw milk or traditionally processed to butter and/or ayib [38]. In here, there is no any license for operation, low operation costs and no regulations [39]. Hence, hygienic condition of the product is found poor. This might be due to limited knowledge of dairy product handling [32].

Formal

In the formal marketing system, milk is collected by cooperatives and transported to processing plants. In here, milk quality is thoroughly checked throughout the chain and assures food safety. This facilitates to get a due focus by producers for the quality product in storage and transportations in order to avoid rejection from collection centers. This formal marketing is expanding for decade's leads by private businesses from Addis Ababa to other major cities and towns. However, the share of Ethiopian milk marketing relative to other neighboring countries is still less (2%), Kenya (15%) and Uganda (5%) [34]. The majority of milk produced by smallholders outside of urban centers process the milk traditional and sold to neighbors and other households in the local market [37]. Despite the producers incur high production costs the return from their products is still low. The transportation facility is still a problem in marketing of dairy produce for farmers live in remote areas.

Dairy product processing

In Ethiopia, the dairy product processing is mainly dominated by the traditional one where production of ergo (fermented milk) is without using starter culture or with natural starter. Milk is kept in warm environment if it is needed to be fermented [40]. Inhere, the processing is highly limited to adairy farmer level and hygienic condition is generally poor [41]. Processing of the dairy product improves the needs, tastes and shelf life of a product. Processing will enable to store the product longer [26]. In rural highland traditional milk processing, milk is allowed to be fermented for 3 to 5 days before it is processed and converted in to butter and other milk products [42]. Through the traditional processing method, 0.6 kg of butter is produced from 10 litters of milk [29]. The milk to be processed should be priory fermented in plastic containers or local materials made from clay. Butter is the main value added product used for cash income, medicinal and cosmetic purposes, and cooking Ethiopian dishes [43].

CONSTRAINTS AND OPPORTUNITIES

Constraints

Despite the Ethiopia dairy sector shows progressive development for decades, there are still challenges which hinder its progress to utilize its potentials: here below are some of them in each stages of the value chain.

Input supply

In here some of the challenges associated with input supply are shortage of feed both in quality and quantity, limited access to better dairy breeds, low access to credit, insufficient veterinary and artificial insemination services [32]. The majority cost of production is feed which accounts about 60% of operating cost in a commercial dairy business [44]. Moreover, the dairy sector is also constrained with various inadequacies like farm forage production, insufficient input for commercial feeds and lack of quality feed formulations [45]. The improved breeds are with low availability and if they are found the cost is found limiting factor. The price is high priced for smallholder farmers and makes them to stay back in the dairy business [17].

Morbidity and mortality associated with a disease are the major constraints which hinder the progress of the dairy sector and cause poor performance [45]. The dairy development is influenced in varied levels due to the prevalence of various disease and parasites like external parasites, internal parasites and infectious disease. The prevalence of the disease and parasites is highly dependent on ecology and management. Besides to this fact, the health extension service provided is insufficient, high cost of drugs and acaricides and poor diagnostic services. The finance is also a limiting factor in dairy commercial business. Therefore, establishing the credit service facilities is away forward to the dairy sector [36].

Production stage

One of the major constraint which hinder the dairy progress is poor genetic potential of the local cattle populations which are characterized for adaptive than production traits. The milk production of these indigenous cattle populations is as low as 0.5 to 2 liters for lactation period of 160 to 200 days [46]. Moreover, the poor health care services also hinder the reproductive performances [47]. In general the poor husbandry practice of the dairy sector is the major challenge of productions.

Marketing

Poor access to market is directly linked with poor capacity to adapt dairy technologies and choice of production [48]. The marketing constraints are associated with variability in demand and supply of dairy products, poor infrastructures, and long fasting seasons [49]. Moreover, distance from market, seasonal variation in milk supply, cultural taboos to sell milk and high transport costs are also major reasons [29].

Processing

In processing there are challenges like shortage of raw milk supply, poor technical skill to process and add-value, low marketing skill associated with poor labeling, high cost of packaging. The low scale producers and processors are complained with poor demand for their processed product [50,51]. Moreover, most of the dairy producers are ineffective with limited skill and knowledge in dairy husbandry practices, dairy business, lack of transparency and accountabilities [29].

Opportunities

The diverse animal genetic resources associate with varied agro-ecologies makes Ethiopia to endow with large livestock potentials. There are several opportunities emanating from the continued urbanization, growing human population, increased demand for milk consumption, income generation and employment opportunities. Dairying is expected to play a major role in the country economy due to vast potential to contribute towards increased income, employment opportunity and food securities [29].

CONCLUSIONS AND RECOMMENDATIONS

There are different levels of value chains identified like input supply, production, marketing, processing and consumption. The major inputs recognized and used in dairying activities are feed, veterinary service, artificial insemination, extension service and labor. Moreover, the dairy value chain is supported by public and private sectors either directly or indirectly. The one of the major problem in the value chain is market where it affects the profitability and long term plan of the smallholder farmers. Therefore, there is need for institutional interventions save producers from losses due to market access and information. Mostly, traditional dairy production and processing is practiced which results in low milk production and hygiene. Government and other responsible stake holders should work intensively in creating awareness and build capacity on stallholder dairy producers for better quality and quantity milk produce. Hence, all concerned organizations (chain enablers) should focus to use all the opportunities as a way for ward of improvement and provide training for both dairy producer farmers and extension agents on how to manage dairy cattle and incorporate new technologies profitably into farm level production.

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