



A Review on Factors Affecting Dairy Cooperative Membership and Its Impact on Household's Livelihood in Ethiopia

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Abstract: Livestock sector particularly dairy and dairy products have a huge contribution regard to small holders as income generation and employment creation in Ethiopia. But the contribution of the sector is below its potential due to different dairy production and marketing constraints. Cooperatives by bringing buyers and sellers together, can contribute towards reducing price risk and enhancing bargaining power of producers. But number of cooperatives and farmers membership on it is very low in the country. Hence, it is pertinent to understand factors affecting dairy cooperative membership and its impact the livelihood of households in Ethiopia. Factors such as age, educational level, credit access, and crossbreed cow ownership, livestock holding, family size, farming experience, extension service, awareness level, information access and income of the households are the determinant factors of dairy cooperative membership. Moreover, Membership in dairy cooperatives has a positive significant effect on households' livelihood. however, Dairy cooperatives are hindered by the challenges like: lack of milk processing facilities, limited number of milk collection centers, low initial capacities, insufficient production area, low stakeholders' participation, inadequate support and weak regulation and supervision, weak linkage of cooperative sectors with stakeholders, lack of awareness, low milk yield per cow, low use of crossbred cows, high cost of feed and non-availability are the major among others.

Keywords: Collective Action, Dairy, Dairy Cooperative, Ethiopia

1. Introduction

In Ethiopia, agriculture remains to be the most important economic activity by providing cash income, employment and foreign exchange. The sector contributes 34.1% to the GDP, employs some 79% of the population, accounts for 79% of foreign earnings [32]. It is also the source for most of the raw materials for Ethiopian agro-industries. This sector is dominated by crop production which accounts about 71.2% of the agricultural GDP; On the other hand, livestock production contributes to about 20.5% of the agricultural GDP and the remaining 8.3% is contributed by the forestry and fishery sector [12].

Livestock sector particularly dairy and dairy products have a huge contribution to smallholders as income generation and employment creation [31]. It contributes about 30% of the total Agricultural Gross Domestic Product (GDP) and 16% of

export earnings [19]. Ethiopia holds large potential for dairy development due to its large livestock population, which comprises 63.2 million cattle, 1.2 million camels, 34 million goats, and 31.8 million sheep's [13].

Global milk production has been strong over the last several years leading to expanded increase trade in most years. For example, from 2005 to 2013, the world milk production increased more than 16% [14]. An average of 594.4 million metric tons of cow milk was produced throughout the world over the observed nine-year period. During the last four years more than 80% of the world's cow milk production was contributed by the EU-28, the US, India, China, Russia, and Brazil [20]. Ethiopia cow milk production was also estimated to be 3.06 billion liters [6]. But, it rose to 3.3 billion liters in 2019 which shows 7.8% increment from 2016 [13].

In Ethiopia small holder farmer's milk production is

primarily for household consumption. Only 25-33 percent of the production is sold while the majority is consumed in mixed crop-livestock and pastoral / agro-pastoral systems. However, in the commercial dairy sector, milk is produced

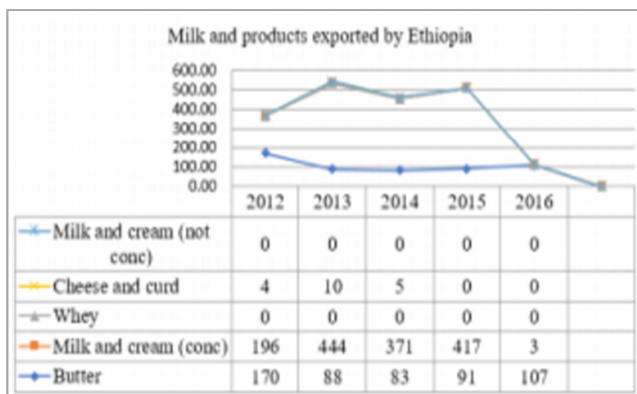
for market and the average annual net income from milk production is noticeably higher than in the other production systems [13].

Table 1. Average share of sales and consumption in milk production.

Production system	Average revenue from milk production	Percentage of milk production sold	Percentage of milk production consumed
Mixed crop-livestock	4 333	25%	75%
Pastoral/agro pastoral	9 105	33%	67%
Urban/peri-urban	9 624	44%	56%
Dairy commercial	17 918	87%	13%

Source FAO [13]

Dairy production plays a paramount role in poverty reduction and nutrition fulfillment of the smallholder farmers in the country. In this respect the country generates foreign exchange through exporting milk and milk products to different countries. Figure 1 below shows milk and milk products export volume from 2012 to 2016.



Source: Gezu and Zelalem [20]

Figure 1. Milk and milk products exported by Ethiopia from 2012 to 2016.

Given the large livestock population and large potential for it, the contribution of the sector in general and the dairy sector in particular is below its potential. In this respect, the projected cow milk production potential of the country as reported by Delgado et al. [8] shows more than 7 billion liters in 2018 but the actual cow milk production reported by FAO [13] during the year is about 3.2 billion liters only. Which shows under potential production level of the country. This below potential production might be because of dairy production in the country is constrained by dairy production and marketing challenges including lack of production inputs, low productivity animals, meager management and disease occurrence, lack of improved market infrastructure, and poor institutional arrangements [11]. Mojo et al. [34] also coined out that, smallholder dairy farmers in developing countries like Ethiopia faces several constraints starting from production to marketing. In such case, dairy cooperatives can play an important role in reducing price risk and enhancing bargaining power of producers [7].

Dairy cooperatives play a significant role in ensuring sustainable supply of raw milk to the dairy industry by coordinating the flow of milk from their members and

assisting them by supplying the required dairy farm inputs [23]. Cooperatives can also provide credit services to member farmers that ease production constraints [41]. Membership in agricultural cooperative was found to have a positive significant impact on consumption per adult equivalent [2], and on household income [34].

However, the development of co-operatives will face different challenges; such as, weak leadership, dependence on others, capital shortage and little participation of farmers in cooperatives [5]. In this regard, while around 40 percent of the households in the rural areas have access to cooperatives, only 9 percent of smallholder farmers' are members of agricultural cooperatives [24].

The literature on dairy cooperatives and collective action consists of large number of studies in Ethiopia e.g. [11, 9, 3]. There is a great deal of research on the cooperative membership determinants and performance of cooperatives. However, there are a few empirical studies examining on effect of dairy cooperative membership on households income. Thus, this study aims to review factors affecting farmer's membership in dairy cooperatives and its impact on household's livelihood. Therefore, this review will provide valuable insights on these issues. The review can have important policy implications for designing appropriate policies to improve smallholder farmer's livelihoods through dairy cooperative.

Therefore the study was initiated with a general objective to review the factors affecting dairy cooperative membership and its impact on small holder farmer's livelihood in Ethiopia.

Specific objectives

- 1) To review factors affecting farmers membership in the dairy cooperative,
- 2) To review the impact of dairy cooperative membership on the livelihood of smallholder farmers.
- 3) To review major challenges that negatively affects the dairy cooperatives.

2. Methods of Research

Narrative review approach was employed for meeting the above stated objectives. Relevant and related data's to the topic were gathered from secondary sources especially from published articles and journals. In this review both theoretical/conceptual and empirical recent findings were

reviewed exhaustively and presented using tables and narrations.

3. Results and Discussions

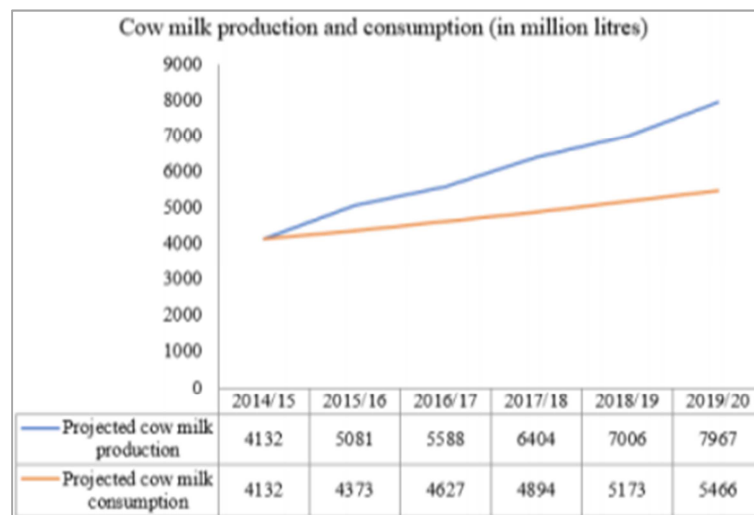
3.1. Dairy Production Potential of the Country

Ethiopia has one of the largest livestock inventories in Africa with a national herd estimated about 63.28 million cattle, 1.28 million camels, 34.04 million goats, and 31.85 million sheep's. However, majority of the cattle population is local breeds accounting about 98.59 percent, while about 1.19 percent and 0.14 percent are hybrid and exotic breeds, respectively [13]. Ethiopia has large potential for dairy development, and it is favorable for dairying due to its diverse topographic and climatic conditions [20]. Smallholder dairy farms in Ethiopia mainly in regional and zonal cities are alarmingly increasing because of high demand of milk and milk product. Nevertheless, the existing farming system which holds maximum of 10 or 15 cows per individual is not satisfactory to fulfill the demand. Furthermore, farming system has a major problem with regard to feed source, feed supply and the amount given per animal below the minimum standard, which entails in reduction in production and reproduction in the farms [21].

A number of recent studies have been recommending modernization options for the livestock sub-sector [25, 13]. Milk productivity is very low estimated 2,160 Hg/annum for an average cow milk, for the years 2000 - 2010 in Ethiopia;

as compared to Kenya, Egypt, and South Africa (5,500 Hg/An, 14,500 Hg/An and (32,700 Hg/An), respectively, suggesting Ethiopia has considerable potential to increase milk production. Currently, 90% of milk production in Ethiopia is undertaken by smallholder farmers, depending almost entirely on natural grazing and most of the milk produced retained for household consumption [10].

Due to governments concern on dairying through policies and strategies it has bright prospects. Thus, dairy farmers are on the way to accessing to services and inputs that could help promote dairy production and productivity. The government tried to provide production inputs, marketing services; diseases control mechanisms and different extension services. These services include feed and feeding, breeding services, credit, extension, training, veterinary services, and appropriate marketing system that addresses consumers demands. The sector supports the government policy on employment creation at the household level because it is labor intensive in nature. As a result it improves employment, income and nutrition values of the family of the producers and the consumers; and plays an important role in improving food security. This in turn promotes dairy production due to arousing government's attention for the sector. The contribution of medium specialized dairy to GDP increases from 353 million Ethiopian Birr (ETB) in 2015 to 751 million ETB in 2020 [20]. The projected milk production and consumption potential of the country is shown as follows in figure below.



Source: Delgado et al. [8]

Figure 2. Projected cow milk production and consumption potential of the country.

3.2. Dairy Cooperatives in Ethiopia

A dairy cooperative is a business, which is possessed and controlled by the dairy farmers who produce the milk used by the cooperative. At foremost farms, we use our member-owners' milk – more than 5 billion pounds a year – to manufacture cheese, dairy ingredients, butter and fluid products for various markets and applications. According to

Ministry of Agriculture and Rural Development (MoARD) [33] dairy cooperatives enhance dairy smallholder's livelihood through helping them market their milk and lower their operating costs, and providing scale economies. The analysis conducted by MoARD [33] indicated that dairy cooperatives could reduce a farmer's transaction costs by 45%. As Land O'Lakes [28] explained that, a great deal of variability in cooperatives performance and ability to

effectively serve their membership. Many cooperatives lack technical, managerial and marketing skills, and are severely undercapitalized in terms of their working capital, investment capital and startup assets (which are often not properly maintained). Many cooperatives struggle to find reliable markets. Governance is weak in some cases and membership may have stagnated or declined.

Farmers' organization on dairy production can be considered recent intervention in Ethiopia. Producer's dairy cooperatives were first formed during the Derg Regime. However, these cooperatives' were short lived because they were owned and operated communally, very low efficiency and lack responsibility and accountability. As their primary objective was to deal with production, knowledge on market development (market accesses) was limited, and was not operating cost effectively [22].

There are also progresses on organizing cooperatives. As a result of efforts made on dairy development there are a number of milk producers and marketing cooperatives and small scale milk processing and marketing user groups organized in the different regions mainly in Amhara, Oromiya, Addis Ababa and Southern Nations and Nationalities. There are also large numbers of small scale individual processors who are operational especially in Addis Ababa milk shed area which produce/collect and process milk [20]. According to FCA [15] cited by Tefera et al. [41] in Ethiopia there are 6 dairy cooperative unions and 63 primary dairy cooperatives with estimated capital of 4.1 million ETB.

3.3. Determinants of Farmers' Membership in Dairy Cooperatives

Various studies have been conducted on cooperatives membership specifically in determinants small holder farmers' membership in agricultural cooperatives, and the impact of agricultural cooperative membership on small holder farmers' livelihood and welfare. These studies find out membership in cooperatives is determined by different socio-economic, demographic, institutional, infrastructural and many other factors.

Study by Gashaw and Kibret [18], factors influencing farmers' membership preferences in agricultural cooperatives in Ethiopia; revealed age, requiring credit from cooperatives, need to access agricultural inputs, perception of farmers towards the attractiveness of dividend distributed, awareness about the benefit of primary cooperatives, trust, households' need to access cooperative as a market outlet, and training were significantly determine membership decision of smallholder farmers' to agricultural cooperatives in Ethiopia. The authors indicated that policies aimed at provision of institutional and input services, enhancing benefits and making dividends attractive, organize training and awareness creation strategies, avoiding corrupted management bodies from cooperatives to increase cooperative membership. Similarly Haile and Debeb [24]; Jaafar et al [26], indicated farmers who had awareness and knowledge about

cooperatives are more motivated to join agricultural cooperatives.

Another study by Kumar et al. [27], does cooperative membership improve household welfare? A panel data analysis of smallholder dairy farmers in Bihar, India explored that; households' decisions to become members of dairy cooperatives positively influenced by a crossbred animals and milk production. While per capita income and herd size were found to have a negative influence on the probability of becoming cooperative membership. Bayen [4] supports a positive influence of crossbreed cattle ownership on dairy cooperative membership and the negative influence of herd size on it. However the result is in contradict with Mbagwa [30] i.e. income of the household influenced cooperative membership positively.

A study by Mbagwa [30], on factors influencing membership of farmers' in cooperative societies explored farming experience and poverty level positively influenced cooperative membership. In this study household size negatively influences membership of cooperatives. Similarly Ogbonna and Nwaobiala [37] reported farmers poverty level positively influenced by participation and membership of farmers in programs. Contrary to Eshetu and Assefa [11]; Chagwiza et al. [7] family size has a positive significant effect on cooperative membership; and Chagwiza et al. [7] farming experience has a negative significant influence on cooperative membership.

According to Chagwiza et al. [7], a study conducted on cooperative membership and dairy performance among smallholders in Ethiopia, educational level of the household head has a positive relationship with the probability of cooperative membership; while land size, farming experience and distance to milk collection center was negatively affect cooperative membership. Similarly Fischer and Qaim [17]; Abebaw and Haile [1] revealed distance to the road negatively affects dairy cooperative membership. However the result contradicts Ruben and Heras [39]; Nugusse et al. [36] proximity of market center positively influences cooperative membership of farmers.

A study by Haile and Debeb [24], on agricultural cooperatives, opportunities and challenges, the case of Bench Maji Zone: Ethiopia. Shows that awareness level, information access, promotion and supporting role of marketing and cooperative promotion efforts, educational level of the respondents, embezzlements, training, attitude of farmers towards cooperatives, trust among members and management committee and leadership commitment were significant factors influencing farmers' agricultural cooperative.

Eshetu and Assefa [11] revealed that educational level, total livestock holdings, number of dairy cow holding, labor availability, participation in off-farm activities, credit, perception on cooperative organizations, availability of other services and access to extension services, family size and distance of the cooperative milk collection center from the farmers house were significantly influencing households decision to participate in dairy cooperatives.

Njiru et al. [35] study conducted on socioeconomic factors that influence smallholder farmers' membership in a dairy cooperative society in Embu County of Kenya by using Binomial legit model, and The finding shows Gender, age herd size, distance to the market and cost of transportation significantly influences the smallholder farmer's decision to participate in dairy cooperatives. This report is contradicted with Bayen [4] i.e. age and herd size negatively influences dairy cooperative membership.

3.4. Impact of Dairy Cooperatives on Livelihood of Smallholder Dairy Farmers

A study by Ahmed and Mesfin (2017) conducted on the impact of agricultural cooperative membership in western Ethiopia by applying propensity score matching and endogenous switching regression methods. The result indicated that agricultural cooperatives are effective in improving the wellbeing of the rural community. The impact estimation from the propensity score matching suggests that agricultural cooperative members have significantly higher consumption per adult equivalent than nonmembers. Using the nearest neighbor algorithm, cooperative membership was found to have 26.5% higher consumption per adult equivalent than the nonmember counterfactual. Similarly, a radius matching algorithm, the result also showed that the members' expenditure is 22.8% higher than nonmembers. The result is alike with the findings of (Kumar et al., 2018) i.e. membership in dairy cooperative in china shows a positive and significant relationship between dairy cooperative membership and milk yield, net returns per liter, and adoption of food safety measures (FSM). In particular, association with a dairy cooperative society tends to increase milk yield by 1.4 liter per day, net return by 24 percent, and adoption of FSM by 10.3 percent.

Shumeta and D Haese [40] found that membership had a positive effect on production of maize and teff grain, and increased the use of fertilizer and improved seeds. However, the effect on food expenditure and income could not be confirmed. However, Study by Ma and Abdulai [29] shows a disaggregated analysis revealed that cooperative membership exerted larger effects on gross income, and farm profit for farmers.

Bayan [4] employed Propensity score matching model to study impacts of dairy cooperatives in smallholder dairy production systems. The findings of the study show a positive and statistically significant impact of farmers' participation in dairy cooperatives on milk yield, farm income, marketed surplus and employment and without having any adverse effect on household milk consumption. The prices offered by cooperative, however, are less than the open market prices. Cooperatives provide a door-step market access, and inputs and services to their members and ensure a higher yield. These benefits, thus, compensate for the lower price. Further, cooperative members receive dividends at the end of the year. This is reflected in the higher annual net dairy income.

Similarly Study by Chagwiza et al. [7] on cooperative membership and dairy performance among small holder farmers in Ethiopia using propensity score matching explores that, on average, cooperative members have between 14,799 Birr and 15,483 Birr higher total annual dairy income than the non-members, owned crossbred cows by more than between 0.22 and 0.27 from non-members, feed bought between 9872.80 kg and 10910.50 kg more than the non-members, milk production between 10.05 litter (lt) and 10.59 lt more than the non-members and milk productivity between 3.05 lt and 3.23 lt more than the non-members. In addition to this, dairy cooperative membership has a positive significant effect on the level of commercialization of its members; while it has no significant impact on milk and butter price per kilogram. On the other hand, the result is contradicted with the finding of Ma and Abdulai [29] ATEs estimations showed that the causal effects of cooperative membership were on average to increase apple price by 8.82% in china.

3.5. Constraints of Dairy Cooperatives

According to Desalegn and Eweg [9] Low milk yield per cow; Low use of crossbred cows; Issues related to feed: High cost, poor quality, availability; Weak cooperative management Limited access to financial services and Milk production and consumption Culture are the major challenges influencing negatively the performance of dairy cooperatives in Ethiopia. In addition Lack of cooling facilities for Gendashano Primary Dairy Cooperative, which forces the dairy cooperative to collect milk at an inconvenient time (4-5 AM) and transport the milk to Addis Abeba every day to sell it to milk processor through the union, as a result 300 liter of milk per month is rejected because of quality. Alike with this report Panchbhaj et al. [38] studies of Constraints Faced by Co-Operative Dairy Farmers in Adoption of Recommended Dairy Management Practices in India, revealed milk production of local breeds is very low, dairy animals require large quantity of feed, higher cost of concentrate and cross bred animals are the major constraints faced by dairy cooperative farmers.

Fekadu [16] identified that Lack of Awareness is the most major problem of cooperatives in Ethiopia. People are not well informed about the objective of the movement, the contributions it can make in rebuilding the society and the rules and regulations of cooperative institutions. People look upon these institutions as means for obtaining facilities and concessions from the government. This hinders the application of cooperative principle, democratic member control. Similarly Haile and Debeb [24] also reported members little awareness about cooperatives is main constraint of cooperatives. In addition to this Low Stakeholders' Participation, Inadequate Support and Weak Regulation and Supervision, Weak Linkage of Cooperative Sectors with Stakeholders are the other constraints negatively affecting cooperatives [24, 27, 16]. Moreover, study by Haile and Debeb [24] on agricultural cooperatives, opportunities and challenges, the case of Bench Maji Zone, Ethiopia

explores agricultural cooperatives faced many challenges including lack of sense of ownership and low follow up and control system; lack of commitment; mistrust; failure of management committee to serve the members' interest; management committees' little knowledge about cooperative proclamations, rules and by laws; limited training access; failure to adapt the experience of other model cooperatives; little effort to promote cooperative policies, strategies, proclamations, rules and regulations; lack of commitment to find out the problems of cooperatives and fill the gap; fail to organize and provide adequate, quality and timely information on cooperatives and high employee turnover at Zone and Woreda levels.

Study conducted by Mojo et al. [34] on The Development of Agricultural Cooperatives in Ethiopia. Based on the findings, The major challenges of cooperatives are related to legal frameworks, inadequate market regulations and policies, free-rider problems, and poorly developed managerial practices (not based on scientific evidences and skills) that cooperatives have adopted. Additionally, the current negative impacts of cooperatives on environment are also a challenge that cooperatives should overcome to ensure a positive contribution to sustainable development.

4. Conclusions

This paper reviewed factors affecting dairy cooperative membership and its impact on the livelihood of small holder farmers. Although dairy cooperatives have a significant impact on improving the livelihoods of small holder dairy farmers, the number of dairy cooperatives and small holder farmer's membership in these cooperatives are very low. As a result, the country is not benefited from the dairy sector as its potential. Literatures in the area of cooperatives find out different results regarding the determinant factors of small holder farmer's membership in dairy cooperatives. These factors can broadly fall in to demographic, socio-economic, institutional and psychological. Dairy cooperatives in Ethiopia are facing a number challenges hindering its development. Hence after reviewing the above literatures the following policy implications can be forwarded.

- 1) Factors influencing dairy cooperative membership are many and varied from place to place and from time to time. Therefore, area specific research is necessary to better identify the determinant factors under a specified time and place.
- 2) Provision of adequate and relevant agricultural extension services (training on dairy production, and developing farmers awareness level about dairy cooperatives) to facilitate farmer's membership.
- 3) Different inputs (credit, breeding, improved feed, and animal vaccination) should be improved to facilitate farmer's dairy cooperative membership.
- 4) Access to infrastructures (such as roads and transport services) should be given great attention;
- 5) Agricultural information system should be established well to increase farmers exposure for dairy cooperatives,

dairy production and market information (institutional factors);

- 6) Linkage between dairy cooperatives and supporting institutions should be improved in order to enhance the capacity of cooperative's board of directors.

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