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Factors Affecting Volume of Milk Procurement: The Case of Dairy Cooperative in Aysaita Wereda, Afar Regional State, Ethiopia

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Abstract
This study was conducted in Aysaita wereda, Awusa Zone of Afar regional state to find out the underlying factors influence Arrado dairy cooperative in raw milk marketing from the targeted pastoralists and to improve the position of dairy cooperative in milk value chain. Purposive, Census and simple random sampling was employed as sampling techniques to select a total of 50 respondents. An interview was conducted to collect the required information from a total of 25 respondents. Questionnaire were used to collect the required data from dairy cooperative members. Secondary data from published and unpublished sources were also used in the study. Descriptive statistics inferential statstics such as, frequency, percentage, mean, and standard deviation, X^2-test & independent t-test were used to analyze the data. The results revealed that there are different factors and actors affecting the volume of milk procurement by Arrado dairy cooperative. Among these factors and actors, side selling of milk by its members, competition from private trades and Hotel/Cafes, high cost feeds which leads to reduced/influence volume milk produced, are some of the major factors and actors that cause decline of milk procurement by Arrado dairy cooperative. There were different factors that affects household's milk marketing choices such as, family size, children less than seven years old, education level of the respondent, milk price offered by different marketing outlets, milk produced per household per day, and access for extension service. The dairy cooperative should provide strong economic benefit for its members through sharing and pooling of resources to collect huge volume of milk from them.
Keywords: Arrado dairy cooperative

1.Introduction

Agriculture is the basis of Ethiopia economy and is the most important economic sector in terms of generation of foreign currency. The sector is the primary sources for livelihood for more than 85%of Ethiopian rural households who practice subsistence crop and livestock production (MOARD, 2005). The significance of agriculture to Ethiopian economy arises from the facts that it contributes 45.9% of GDP, more than 88% of export earnings and about 85% of employment opportunities (CSA, 2008).

The livestock sub-sectors play vital role as sources of food, income and foreign exchange to Ethiopia economy and contribute about 12 and 33% of the total and agricultural GDP, respectively. Ethiopia holds the largest livestock population in Africa estimated about 63.1 million head of cattle, 23.6 million of sheep and 16 million goats (CSA, 2008). Livestock and their products are estimated to compose a third of total value of agricultural gross output in developing countries and this share is rising from time to time (CSA, 2008).

The total annual national milk production in Ethiopia from about 10 million milking cows is estimated about 3.2 billion liters, which is 1.54 liters/cow on average (CSA, 2008). The dairy value chain entailed about 500,000 smallholder rural farmers who produce about 1,130 million liters of milk of which 370 million liters is raw milk, 280 million liters is processed in to butter and cheese and 165 million liters is consumed by the calves (Mohammed, 2009). The remaining 315 million liters is marketed through both informal and formal retailers through cooperatives and farmers' organizations.

The promotion of dairy product marketing through cooperatives as a means of linking smallholders to market is a key pillar of Ethiopia's rural development strategy (PASDEP, 2010). Cooperatives can be expected to help the smallholders to increase market access and so help them to increase their wealth.

2. Statement Of The Problem

The livelihood of pastoral communities is highly dependent on the cash income from livestock and livestock products to buy food and other necessities. However most livestock products produced by smallholder pastoralists and farmers are marketed by private entrepreneurs who are operating as a marketing chain, collect, regroup and distribute the livestock and livestock products to terminal markets.

Although there is a growing concern in domestic, regional and global demand for livestock and livestock products, will not necessarily benefit smallholder producers and pastoralists. These pastoralists may receive only a small fraction of the ultimate value of their output, even if, in theory, risk and rewards should be shared down the chain (Mohammed, 2009). Distribution of risks and gains varies among different market value chain actors. Hence the value chain analysis will be a market-based, commercially viable and sustainable solution that, in the

long term, will equally benefit all the various actors of the chain.

There are two ways of diary marketing; informal and formal. The formal channel is the flow of milk that falls within the local business regulatory net including registration of business and payment of taxes. The informal channel often used to describe marketing channel in which the government do not intervene substantially in marketing (Lakes, 2010).There may be different main players in both formal and informal channels. The main players in each channel affect the benefit in the milk value chain. Thus, identifying major actors and service providers in the chain is important to establish consistent market linkage.

In pastoral and agro-pastoral areas of Ethiopia especially in Afar region, there is large number of cattle reared by the pastoral households. Aysaita district is one of these areas which have 136925 cattle population and produces about 10,803, 540 liters of milk per year.Despite this fact of immense cattle population and milk production, the market and processing potential of dairy cooperatives found in this district is reduced and the dairy plant work under its efficiency.

Even though the dairy cooperatives have the opportunity to sell their milk to the nearest markets, they may have limited market linkage. Due to this reason, even if the dairy cooperatives of this district possess a significant number of milk provision from its members it may not necessarily benefit them to make enough money and enhance better livelihood in one hand and lack of enough volume of milk procurement of dairy cooperatives has a great effect on income that will be distributed to its members. If the trends continue for some years, discourage people from involving in dairy business and hence it becomes a bottleneck to the development of market oriented dairy production in the area on the other hand.

Having this reality on the ground there is no any attempt made by researchers to conduct any study so far as far as the knowledge of the researcher. Thus, it is worthy to study the milk marketing channels; the marketing service providers and the different marketing actors involved in the dairy cooperatives market chain, to identify constraints important in determining factors that affect milk procured by Arrado dairy cooperative.

3.Objectives

- To determine factors affecting the volume of milk marketed by Arrado dairy cooperative.
- To determine factors affecting households milk marketing choices
- To identify the major opportunities and constraints of value chain in Arradodairy cooperatives farmers in the study area

4.Literature Review

4.1.Market Participation By Smallholders And Dairy Cooperatives

Field surveys have shown that many potential liquid milk-marketing households are hours distant away from any milk group. Setting up new groups would clearly reduce the travel time to group, and the actual number of households that would benefit depends on local population densities. It is also important to keep newly emerging milk groups small and geographically limited to ensure proximity and avoid large groupsthat would tend to increase average travel times (Holloway et al., 2000). Another study showed that the creation of new market outlet for fluid milk brought major improvements inthe production, marketing and consumption behavior of smallholder households. The new marketing outlet may also promote involvement in more intensive dairying (Nicholson et al., 2000).

Co-operatives, by providing bulking and bargaining services, increase outlet market access and help farmers avoid the hazard of being encumbered with a perishable product with no rural demand (Jaffee, 1994). In short, participatory co-operatives are very helpful in overcoming access barriers to assets, information, services, and the markets within which small-holders wish to produce high-value items (Jaffee, 1994).

Like contract farming, producer co-operatives can offer processors/marketers the advantage of an assured supply of the commodity at known intervals at a fixed price and controlled quality (Delgado, 1999). They can also provide the option of making collateralized loans to farmers. The schemes also provides better relations with local communities than large scale farms, avoiding the expense and risk ofinvesting in such enterprises, sharing production risk with the farmer, and helping ensure that farmers provide produce of a consistent quality (Delgado, 1999). Dairy development along the cooperative lines was consideredto be the most effective strategy for helping the rural poor without altering the village social structure and providing guaranteed market for milk at fixed prices, supply of cattle feed at a reasonable cost and efficient veterinary and extension services (Bavikar, 1988).

4.2. Dairy Production Systems In Ethiopia

Dairying in Ethiopia was mostly traditional. Modern dairying started in the early 1950s 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 large farms in Addis Ababa and Asmara (Ketema 2000). Government intervened through the introduction of high-yielding dairy cattle

in the highlands in and around major urban areas. The government also established modern milk processing and marketing facilities to complement these input-oriented production efforts. In 1960, UNICEF established a public sector pilot processing plant at Shola on the outskirt of Addis Ababa in order to enhance growth of the dairy sector. The plant started by processing milk produced by large farms. The plant significantly expanded in a short period and started collecting milk from smallholder producers in addition to large farms. This led to further expansion of large dairy farms. During the second half of the 1960s, dairy production in the Addis Ababa area began to develop rapidly as a result of the expansion in large private dairy farms and the participation of smallholder producers with indigenous cattle facilitated by establishment of milk collection centers (Ahmed et al., 2003). Subsequently, different dairy development projects were launched in different parts of the country. The distribution of exotic dairy cattle, particularly the Holstein Friesian, in different parts of the country, especially around the major urban areas, also contributed to the further development of dairying in Ethiopia.

There are different classification criteria for livestock production systems in general and dairy production systems in particular. For example, based on criteria such as integration with crops, relation to land, agro-ecological zones, intensity of production and type of product, the world livestock production systems are classified into 11 systems (Sere and Steinfield, 1995). Dairying is practiced almost all over Ethiopia involving a vast number of small or medium or large-sized, subsistence or market-oriented farms. Based on climate, land holdings and integration with crop production as criterion, dairy production systems are recognized in Ethiopia; namely the rural dairy system which is part of the subsistence farming system and includes pastoralists, agro-pastoralists, and mixed crop–livestock producers; the peri-urban; and urban dairy systems (Yoseph et al., 2003; Zegeye, 2003; Dereje et al., 2005). The first system (pastoralism, agro-pastoralism and highland mixed smallholder production system) contributes to 98%, while the peri-urban and urban dairy farms produce only 2% of the total milk production of the country (Ketema, 2000). The rural system is non-market oriented and most of the milk produced in this system is retained for home consumption. The level of milk surplus is determined by the demand for milk by the household and its neighbors, the potential to produce milk in terms of herd size and production season, and access to a nearby market. The surplus is mainly processed using traditional technologies and the processed milk products such as butter, ghee, ayib and sour milk are usually marketed through the informal market after the households satisfy their needs (Tsehay, 2001). Pastoralists raise about 30% of the indigenous livestock population which serve as the major milk production system for an estimated 10% of the country's human population living in the lowland areas. Milk production in this system is characterized by low yield and seasonal availability (Zegeye, 2003). The highland smallholder milk production is found in the central part of Ethiopia where dairying is nearly always part of the subsistence, smallholder mixed crop and livestock farming. Local animals raised in this system generally have low performance with average age at first calving of 53 months, average calving intervals of 25 months and average lactation yield of 524 liters (Zegeye, 2003). Peri-urban milk production is developed in areas where the population density is high and agricultural land is shrinking due to urbanization around big cities like Addis Ababa. It possesses animal types ranging from 50% crosses to high grade Friesian in small to medium-sized farms.

The peri-urban milk system includes smallholder and commercial dairy farmers in the proximity of Addis Ababa and other regional towns. This sector owns most of the country's improved dairy stock (Tsehay, 2001). The main source of feed is both home produced or purchased hay; and the primary objective is to get additional cash income from milk sale. This production system is now expanding in the highlands among 6 mixed crop–livestock farmers, such as those found in Selale and Holetta, and serves as the major milk supplier to the urban market (Gebre Wold et al., 2000). Urban dairy farming is a system involving highly specialized, state or businessmen owned farms, which are mainly concentrated in major cities of the country. They have no access to grazing land. Currently, a number of smallholder and commercial dairy farms are emerging mainly in the urban and peri-urban areas of the capital (Felleke and Geda, 2001; Azage, 2003) and most regional towns and districts (Ike, 2002; Nigussie, 2006). Smallholder rural dairy farms are also increasing in number in areas where there is market access. According to Azage and Alemu (1998), the urban milk system in Addis Ababa consists of 5167 small, medium and large dairy farms producing 34.65 million litters of milk annually. Of the total urban milk production, 73% is sold, 10% is left for household consumption, 9.4% goes to calves and 7.6% is processed into butter and ayib (cheese). In terms of marketing, 71% of the producers sell milk directly to consumers (Tsehay, 2001).

4.3.Milk And Milk Product Marketing In Ethiopia

Milk is channeled to consumers through formal and informal marketing systems. Until 1991, formal market of cold chain and pasteurized milk exclusively dominated by dairy development enterprise which supplied 12% of total fresh milk in Addis Ababa (Holloway et al., 2000). Even then, proportion of total production being marketed through formal markets remains small (Muriuki and Thorpe, 2001). The informal market involves direct delivery of milk by farmers to individual consumers in immediate neighborhood and sales to itinerant traders or individuals in nearby towns. In informal market, milk may pass from producers to consumers directly

or it may pass through two or more market agents. It is characterized by no licensing requirement to operate, low cost of operations, high farmer price and no regulation of operations. In some parts of the country, creation of new market accesses through milk marketing cooperative brought major improvement in production, marketing and consumption behavior of dairy households. The new market accesses may promote involvement in more intensive dairy production (Nicholson et al., 1998).

Marketing outlets, marketing channels and marketing chains are used to describe dairy marketing systems (Sintayehu et al., 2008). Marketing outlet is the final market place to deliver dairy products into which it may pass from different channels. Different studies have identified different product flow channels and outlets. From observation we infer that milk channels are narrower than butter channels due its relatively high perishable nature. As a result, butter can travel long distance from remote areas to Addis Ababa markets. Therefore the possible outlets for butter from rural farmers can be restaurants, traders, consumers, retailers and wholesalers. However, marketing outlets, marketing channels and marketing chains differ from location to location, commodity to commodity, culture to culture and objective of actors' engagement.

Milk, butter and cottage cheese are a central part of Ethiopian food culture. Milk is consumed either in fresh or fermented (sour) form. Milk is used for different purposes including home consumption, processed into butter, ghee and cottage cheese. Out of the total annual milk production in rural Ethiopia, 48.48% was used for household consumption, 6.55% was sold, 0.41% was used for wages in kind and 44.57% was used value addition. Out of the total butter .production in rural Ethiopia per year, 58.97% was used for household consumption and 36.58% was sold. Out of the total cottage cheese produced in rural Ethiopia per year, 81.85% was used for household consumption, 14.35% was sold and 3.8% was used for wage in kind and other purposes (CSA, 2011). However consumption pattern and preference of consumers vary from culture to culture and from urban to rural.

In peri-urban, farmers use milk as cash generating commodity by directly selling milk. In most urban centers especially smaller towns, residents tend to own a few cows for milk production for home consumption and sales. Buttermilk, a byproduct of butter making is usually used for cottage cheese making for human consumption. Milk in the lowlands is primarily used as fresh for home consumption followed by sales to urban centers. Where there is no access to fluid milk markets, farmers process it into products (butter, and cottage cheese). However, even if market for selling fluid milk is available, decision making for processing depends on economic factors and meeting family needs for the products. InArsizone raw milk is taken alone, taken with other foods, processed into milk products. Cottage cheese, pasteurized milk and cosmetic butter are mostly taken alone while powder milk and edible butter are taken with other foods (Asfaw, 2009).

5.Research Methodology

The research was used both Quantitative and qualitative type of data. This research is designed to identify factors affecting the volume of milk procured by Arrado dairy cooperatives operating in Assayita woreda. In doing so, market channel of the dairy cooperatives, actors and service providers and constraints in the chain identified and analyzed. In addition to this as the study was a descriptive case study that a cross sectional design was employed rather than longitudinal design.

A total sample size of 50 individuals were selected as respondents to serve as a primary data source for both the qualitative and quantitative data that was used in the study. In this research, all of the 25 dairy cooperative members were included in the study by using census sampling technique. The 15 respondents' selected using simple random sampling technique were milk value chain actors in the study area, these were hotel/cafeteria owners, milk retailers, milk processors, and consumers. The remaining 10 purposefully selected respondents were key informants who provide support service for milk value chain in the study area.

Both primary and secondary data sources were used in this study. Primary data on cooperative members' socio-economic characteristics were collected using close and open ended questions. The data collection was conducted with trained enumerators who are capable of speaking the local language. Enumerators administered the questionnaire with the close supervision of the researcher. Semi structured interview were employed to collect data from key informants and milk market chain actors. The market value chain actors in the study area include hotels/cafeteria, processors, retailers and end userfound in the study area. Whereas, key informant interview were conducted with Regional Pastoral Agricultural Development Biro marketing experts, Cooperative Agency of marketing experts and Kebele administration, Marketing experts and cooperative promoter from Ayssaita wereda pastoral and rural development office, Afar pastoral and agro pastoral research institute and development agents operating in the study area.

Secondary data was also collected from various published and unpublished sources. Different documents of agricultural schemes and regional level reports and consultants' reports as well as Central Statistics Authority publications were reviewed to gather relevant information.

The data obtained from dairy cooperative members' through questionnaire analyzed using descriptive statistics and inferential statstics. The descriptive statistics was used to present the result of quantitative data.

Statistical tools like tables, frequency, percentages, and mean were used to summarize the data. Chi-square and t-tests were also used to identify the existence of significant relationship of independent variables. Chi-square test was used for nominal characteristics that can be represented by non- numerical categories, such as sex, marital status, educational level and access of extension service. For continues variables, a t-test that compares the means of two groups were used. The results gained using descriptive statistics tool displayed using, pie chart, graphs and flow charts.

6.Findings

6.1.Factors affecting volume of cattle milk procured by Arrado dairy cooperative

Reduction in volume of milk production

According to data gained from survey of dairy cooperative members and annual report of Arrado dairy cooperative, the trend of their milk production was decreased. The respondents from Arrado dairy cooperative mentioned that there was shrinkage of grazing land in the study area because of an expansion of cereal production. As a result of the reduction in volume of milk produced by dairy cooperative, the members could not deliver the same volume of milk as they have been delivered in the past. On top of this during dry season pastoralists move their cattle to other place in search of food for their cattle. Thus, unavailability of the required amount of feeds create a big problem to produce and deliver the volume of milk needed by different milk marketing outlets in general and in Arrado dairy cooperative in particular.

Reduction in herd size

The leader of dairy cooperative said that shrinkage of grazing land and recurrent drought reducedthe herd size. The data collected from dairy members through questionnaire also mention that the trend of their herd size is steadily decreased as compare to the previous years. This reduction lead to an overall reduction in volume of milk produced in the study areas .

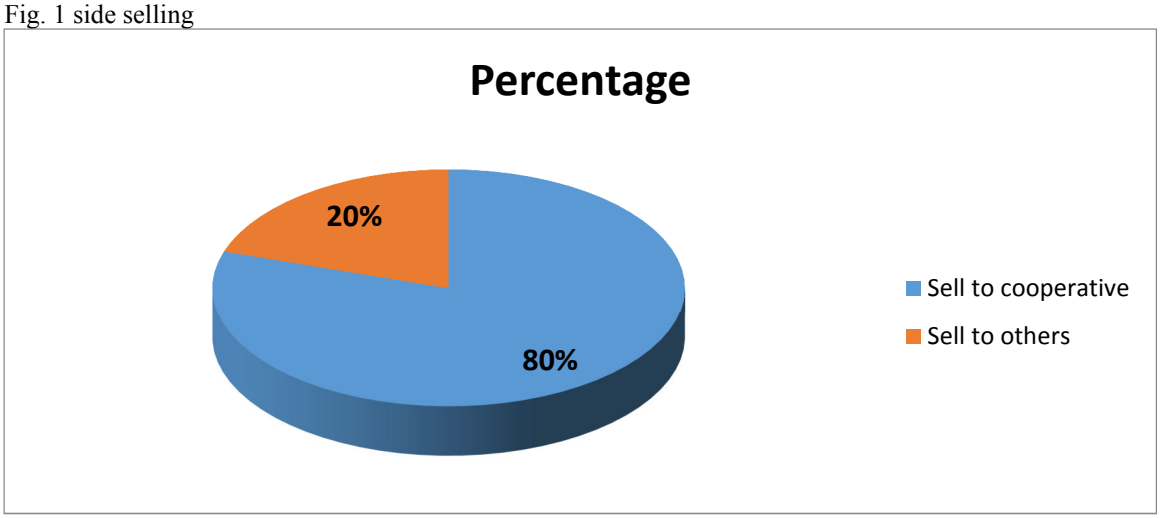
Production cost

For the question asked regarding cost of animal feeds, out of the total respondents 67.5% of the respondents indicated high cost of animal feeds was the main problem of milk production in the study area. Dairy cooperative incurs onaverage costof 29 ETB to feed one milking cow per day to produce 1.5-2.5 liters of milk per day. But surprisingly they were sold 1 liter of raw milk in 15 birr. From this, one can conclude that milk producers in the study area may not provide sufficient amount of animal feeds, this in turn influence the amount of milk supplied to dairy cooperatives in the study area.

Side selling

As shown in figure below, among the total respondents 80% and 20% of dairy cooperative members were sold their raw milk to their dairy cooperative and informal market outlets respectively. All of the respondents who sold their raw milk to informal market outlet mentioned that the price as a major factor influenced them to sell their raw milk to informal outlets. This implies that the amount of price of milk set by informal market outlets negatively affected the volume of milk procured by Arrado dairy cooperative in the study area.

Fig. 1 side selling



Source- Own survey result (2018)

Competitors

There are different milk marketing outlets who strongly compete with Arrado dairy cooperative to purchase milk from dairy pastoralists in the study area. According to interviews made with Arrado dairy cooperative leader and Hotel/Café owners, Arrado dairy cooperative purchase 1 litter of milk in 15ETB whereas, other milk marketing outlets such as, Hotels/cafes, and traders purchase 1litter of milk in 16.6ETB. Because of this and other reasons

most of individual producers and some of the dairy cooperative members prefer to sell their milk to other non-cooperative marketing outlets**.** From these we can understand that competitors purchasing price of raw milk highly affected the quantity of milk obtained by Arrado dairy cooperative

6.2. Determinants of Household Milk Marketing Choices

To show the presence of significant statistical association and mean difference between Formal milk marketing outlets and Informal milk marketing outlets, both t-test and chi-square test were employed.

Table below provides the summary of the differences in the mean difference of continuous variables hypothesized to influence household milk marketing choices. The differences in the mean values of the continuous variables for the formal and informal milk marketing outlets were assessed by using an independent t-test. The t-test allows predicting the potential power of the variables that influence household milk marketing choices. As Table shows, the continuous variables hypothesized to influence household milk marketing choices in the study area. The differences in the mean values of all variables were statistically significant except Age of the respondents. More specifically, the differences in the mean values of family size, children less than 7 years old and total milk produced per household were found to be significant at less than 5% probability level; and price of milk per litter at less than 1% probability level. From these result we can understand that family size, children less than 7 years old, total milk produced per household, and price of milk offered by different milk market outlets affect the volume of milk procured by Arrado dairy cooperative.

The mean family size difference between formal choice and Informal choice are statistically significant. This finding is in agreement with the a priori expectation. A large family size was assumed to increase the consumption of milk at household level. Which intern affect the volume of milk supplied to Arrado dairy cooperative. The mean of children less than 7 year's old difference between formal milk marketing choice and Informal milk marketing choice are statistically significant. This finding is in agreement with the a priori expectation. Households who had few children of less than 7 years old were assumed to increase the consumption of milk at household level. Which intern affects the volume of milk supplied to the cooperative.

The mean price of milk difference between formal milk marketing choice and Informal milk marketing choice is statistically significant. This finding is in agreement with the priori expectation. A better price is expected to attract dairy cooperative members and non-members. Therefore, one can understand that the price of milk offered by different milk marketing outlets affect the volume of milk procured by Arrado dairy cooperative.

The mean difference of total milk produced per household between formal milk marketing choice and Informal milk marketing choice is statistically significant. This finding is in complete agreement with the prior expectation. Pastoralists who produced more milk were more likely to sell their milk to different milk marketing outlets. Therefore, the total milk produced affects the volume of milk procured by the cooperative.

Table1. Means, St. Dev. and t-values of continuous variables for formal and informal choices

Characteristics	Formal (n=20)		Informal(n=5)		T-value	Sig.
	Mean	St.div.	Mean	St.div.		
Age	32.20	14.580	22.20	1.924	-1.506	.146
Family	8.45	3.103	5.40	.548	-2.156	.042**
Children < 7yrs	1.55	.999	.40	.548	-2.457	.022**
Price of milk	13.3000	.00000	15.3200	.71554	13.539	.000*
Total milk produced	5.60	3.899	11.00	3.464	2.822	.010**

Source- Own survey result (2018) *, **- Significant at less than 1% & 5% respectively.

In a similar manner, Chi-square ($\chi 2$) test is used to assess the potential power of the discrete variables that determine household milk marketing choice. The results of the test are presented in table below.Table 2 shows the four discrete variables, hypothesized to influence households milk sells choice in the study area such as, Gender, Marital status, Education level, Access for livestock extension service. Differences between formal choice and informal choice were statistically significant except, marital status. The result of gender and membership is in complete agreement with the a priori expectation.

As table 2 shows that 100% of the formal choice and 60 % of informal choice were male respondents with a chi-square result X^2 (1, N=25) = 8.969, p =0.003 which implied the presence of statistically significant difference between formal choice and informal choice in terms of the sex of the respondents. Additionally the result indicated that being female respondents has a positive association on milk marketing choice. This implies that female milk producers have more likely engaged in formal milk marketing outlets as compared to the male counterparts. Therefore, having female member positively affect the volume of milk produced by Arrado dairy cooperative.

As the table 2 illustrates that 60% of the respondent who sell their milk to formal milk marketing outlets and none of the respondents who sell their milk to informal milk marketing outlets could read and write with a chi-square result X^2 (1, N=25) = 5.769, p =0.016 which implied the presence of statistically significant difference between formal milk sellers and informal milk seller in terms of education. From this, one can

understand that education had effect on the volume of milk procured by Arrado dairy cooperative.The table 2 also illustrates that 75% of the respondent who sell its milk to formal milk marketing outlets and only 20% of the respondents who sell its milk to informal milk marketing outlets have access for livestock extension service with a chi-square result X^2 (1, N=25) = 5.252, p =0.022 which implied the presence of statistically significant difference between formal milk sellers and informal milk seller in terms of livestock extension service. This indicates that, access for livestock extension service had effect on the volume of milk procured by Arrado cooperative.

Table 3. Frequency and χ2 values of discrete variables for the two groups

Characteristics	Formal (n=20)		Informal(n=5)		F/X^2	Sig.
	Frequency	Percent	Frequency	Percent		
Sex: Male	0	0	2	40	8.969	
Female	20	100	3	60	(df=1)	0.003*
Marital Status:						
Single	8	40	3	60	1.67	0.642
Married	4	20	1	20	(df=1)	
Widow	5	25	0	0		
Divorced	3	15	1	20		
Education:						
Formal	0	0	0	0	5.769	0.016**
Read & write	12	60	0	0	(df=1)	
Illiterate	8	40	5	100		
Extension service:					5.252	0.022**
Yes	15	75	1	20	(df=1)	
No	5	25	4	80		

Source- Own survey result (2018) *, **-Significant at less than 1% & 5% respectively

6.3.The major constraint of milk value chain

Inadequate supply of quality feed is the major constraint limiting dairy value chain in the study area. Feed, usually based on fodder and grass, and crop residues are either not available in sufficient quantities due to fluctuating weather conditions and shortage of land or when available are of poor nutritional quality. Technical constraints observed to be responsible for low herd productivity generally revolve around three issues: quantitative and qualitative inadequacy of feed, limited milk production potential of the cattle genotypes in the system and poor management and herd health. Among the key inputs, feed shortage was considered by respondents to be the major constraint to improved production and productivity.

Milk productivity of local cow is a major constraint in dairy value chain in the study area. Local cows have low genetic potential for milk production. Selection of better breeds specifically adapted to respond to improved management is the necessary step to improve dairy value chain. The success of dairy value chain depends on the quality and timely Provision of Support Services like feed inputs and breeding and veterinary services and infrastructural and credit services. Based on field level information, the following constraints associated with provision of support services were outlined: shortage of qualified veterinary service providers; inadequate networking among extension and support service providers; absence of animal breeding services, etc. Inadequate livestock extension service is also an other constraint in dairy value chain in the study area. Livestock extension services requiring fodder production and feeding schemes, husbandry , dairy hygiene, demonstration of dairy technologies, market information utilization are needed.

Promotion of dairy cooperatives is too slow and weak. The dairy cooperatives have technical and financial limitations to meet their objectives. Milk suppliers need to have technical support including nutrition, breeding, milk hygiene, animal health, milk handling, milk marketing, and transportation**.** Poor animal health and management are the major constraints of dairy value chain which cause poor performance. Most of these constraints result from the interaction among constraints themselves. Poor grazing management system continue to cause high mortality and morbidity .

Adulteration is a problem in processing and marketing of dairy products. Milk adulteration is mostly done by farmers. Butter and cottage cheese adulteration is done by a few farmers and most traders. Both hygienic and nutritional aspects are important in dairy products quality. Quality control instruments should be provided to farmers at affordable price to ensure hygienic and nutritional standards to consumers. Moreover, consumers need to be educated in ways of assuring the quality levels.

7.Conclusion and Recommendations

7.1. Conclusion

From the field study conducted different factors were found to be negatively affect the volume of milk produced by Arrado dairy cooperative such as, reduction of milk production, side selling of milk, high competitors and high cost of inputs are identified as the main cause of declining the volume of milk procurement by Arrado dairy cooperative.

The value chain of milk was constrained by different factors in the study area. Among these factors, shortage of animal feeds which leads to reduction of volume of milk produced by small holder dairy farmers is identified as one of the major factors which affect milk value chain of the study area. High cost of inputs especially feed cost negatively affects expansion of dairy farming activities as pastoralists do not use concentrate feeds to improve their milk production. This consequently affects overall reduction of volume of milk produced by smallholder dairy farmers to deliver enough volume of milk to Arrado dairy cooperative and other marketing outlets. Competition from other marketing outlets such as, Hotel/Cafes and Trader also negatively affects the volume of milk procured by Arrado dairy cooperatives. Furthermore, the value chain of milk is constrained by different factors such as, Low genetic potential of local cows which causes low milk production, Inadequate livestock extension service, Poor animal health and management

7.2. Recommendation

- Feed supply is major issues for dairy farmers, as most technologies, such as silage, haymaking and urea treatments are not available for farmers. Fodder trees and mixed tree grass legume banks can be solutions. Hence, improved nutrition through adoption of sown forage and better utilization of crop residues can raise dairy productivity.
- Extension staff also should help farmers cope with social change. Extension systems that are geared towards market oriented dairy value chain increase farmer income, create employment and reduce poverty among farmers are highly deemed.
- Assigning technicians at kebele level and establishing AI centers capable of producing reliable semen at regional level and consequently at zonal level are options to overcome the constraints.
- Creating conducive policy environment for dairy enterprise development, use of crossbred cows and upgrading local cow performance are alternative options forwarded.
- Arrado dairy cooperative should have an external support that supports the cooperative in order to compete with the current high competitors in the study area.
- To overcome the problem of side selling the dairy cooperative should have to modify the agreement made with its members by specified the volume of milk the members should delivered to the dairy cooperative per day.
- The cooperative should expand its collection centers to rural area where they can collect huge volume of milk per day to fulfill the demand of local consumers.

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