Gender Disaggregated Analysis of Milk Value Chain in Major Milk Producing Towns of Jimma Zone, Southwestern Ethiopia

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Abstract

Milk value chain was analyzed by combining, analytical and participatory tools to identify and prioritize constraints and come up with strategic interventions in major milk producing towns of Jimma zone, southwestern Ethiopia. Information at the study area and actors level was collected through discussions and individual expert contacts. In addition, group and focus group discussions were conducted with representatives of value chain actors. Random samples of 238 dairy farmers, 50 consumers, and 17 traders were surveyed. Analytical tools including descriptive statistics. The result show that mean milk of 3.03 liter per day produced by local breed and 7.01 liter per day produced by cross breed and 19.3% of local breed milk sold per month and 80.7% of cross breed milk sold per month. Milk is mainly used for household consumption for family daily food, supplied to the market. Lack of land, feed shortage, lack of improved dairy animals, diseases, labour shortage, lack of credit facilities, and lack of artificial insemination were major constraints. The major factor that hinder women's from the participation of dairy production in the study area is lack of access to and control over assets, lack of women's control over income, poor participation in decision making regarding livestock production and limitation on access to/use of land. Based on the finding of the study it could be recommended that in order to improve dairy production in the study area, there is a need for technical and institutional intervention to alleviate the identified constraints through dissemination of appropriate technologies for better feeding, artificial insemination service, improved dairy animals supply and access to land, which will significantly increase milk production and animal performance.

Keywords: value chain, Gender, value chain Map, constraints

INTRODUCTION

Value chain can be analyzed through mapping value chain which describes the full set of activities required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), and delivery to final consumers (Kaplinsky and Morris, 2001). It enables to highlight constraints that control the chain and to clarify the possibilities for change. It incorporates product transformation and value addition at each stage of the chain. It has common objectives such as poverty alleviation, employment creation, food security, agricultural and rural development and economic growth (Vermeulen et al., 2008). Specifically, it enables dairy farmers to adapt complex set of interacting and diverse factors through capacity building, increasing social capital by strengthening entrepreneur skills, improving access to market information, improving contract and building trustworthy relationships. Its advantages to consumers are increased locally produced dairy products which are traded fairly. Wholesalers, retailers, cooperatives and hotels/restaurants access high tech trekking and tracing technologies to ensure quality and safety. Therefore, ensuring the resilience of dairy value chain to rapidly changing markets is a key policy issues. These all require constructive engagement and effective partnerships between value chain actors that require a joint learning among actors.

Value chain analysis has a long tradition in industrial production, organizational and global export commodities but its application in international development and agriculture has gained popularity only in the last decade (Rich et al., 2008). In Ethiopia value chain analysis was conducted for export commodities such as coffee, hides and skin and sesame. Even though there is a set forward global derives influencing markets worldwide for these commodities, factors at the domestic level have a significant influences. Consequently, the nature and pace of change vary between different countries or even different regions. Therefore, analysis of value chain for commodities such as dairy is paramount importance to meet demand through improving competitiveness and efficiency. Furthermore, media attention and lobbying groups are bringing issues of health to consumers" attention and governments are looking for sustainable models for rural development to bring widest benefits to the society.

Gender specifically women smallholder farmers generally produce for more localized spot markets and in smaller volumes than men. Where they are active in trading in agricultural markets, women tend to be concentrated at lower levels of the supply chain or value chain, in perishable or low value products (Baden 1998). As agricultural activities become more commercialized, the relative position of women often weakens such that they are under-represented in or excluded from more profitable markets in the sub-sector.

In Ethiopia, as in many other African countries, there is a sharp contrast between men and women in terms of ownership of assets (land and livestock) and decision-making power, access to information, training,

mass media and markets. Although customary laws afford some level of access to productive resources to women in certain ethnic groups (Flintan et al. 2008), men are, by and large, relatively better equipped to take advantage of new market opportunities and to adopt new production methods. In pastoralist communities such as the Gujji of southern Ethiopia, for instance, women may have control over the milking, processing and even marketing of milk but their capacity to influence other decisions, such as breeding, feeding, utilization of income, etc, remains very limited (Ridgewell and Flintan, 2007).Therefore this research analyzed gender disaggregated milk value chain by identifying constraints and come up with strategies for leveraged intervention and determinants of participation decision and level of participation in milk value addition and milk supply in Jimma area including Jimma town and Serbo, Seka, and Yabu local towns.

Methodology

Description of the study area

The study was conducted in Jimma town, and Serbo, Yabu, and Seka local towns of Jimma zone of Oromiya Regional State. Jimma is located 352 km south-western of Addis Ababa. The area lies between a latitude of a latitude of 7°41'N and longitude of 36°50'E and has an elevation of 1704 meters above sea level. The area was characterized by a humid tropical climate of heavy annual rainfall that ranges from 1200-2000 mm per year. About 70% of the total annual rainfall were received during rainy season, which lasts from the end of May to early September. The area has a relatively higher temperature of about 25°C-30°C from January to April and having a minimum temperature of 7°C-12°C during the months of October to December (OPEDJZ. 2002). Serbo, Yabu, and Seka local towns are the direct supplier of the city salesmen/women and consumers in Jimma town.

Data Types and Sources

Both quantitative and qualitative data types were used for the study. In order to generate these data types, both secondary and primary data sources were used. Secondary sources include reports of line ministries, journals, books, CSA and internet browsing, national policies, zonal and woreda reports, among others. Primary data sources include zonal and woreda Agricultural and Rural Development Offices, zonal and Woredas Agricultural Marketing Offices, zonal cooperative office, cooperative management, nongovernmental organizations, dairy farmers, traders, hotels/restaurants, cooperatives and consumers.

Methods of Data Collection

The major data collection methods were used include discussions with individual, groups and key informant and focus groups, rapid market appraisal, observation, formal survey and visual aids. A preliminary assessment was conducted to collect basic information about the study area. This information was generated through discussions and individual expert contact at zonal Agricultural and Rural Development Office. In addition, using secondary data sources of the zone and woreda and guided visits to already proposed study area, visualization of dairy value chain activities were done.

Following participatory research, formal survey was performed to quantify the qualitative data. Survey questionnaires were prepared for each value chain actors operating within the study area. Using the questionnaire, interviews were conducted to gather data from the study area. Moreover, gender disaggregated data was collected across production to consumption.

Sampling technique

Based on total production volume Jimma town, Seka, Serbo and Yabu local towns from surrounding of Jimma town were selected purposively. Within the selected production area major producing farmers were selected by purposive sampling. From total producers of the study area representative farmers were selected by random sampling techniques for primary information collection. Representative traders and processors were consulted. Major actors involved in dairy production were considered as the population of the study in the selected area. Specifically input suppliers, farmers, traders and processors were included in the study.

The total population in dairy production was very large; therefore sampling was necessary for the sake of study. By using the formula of Yamane (1967:886), and the 90% confidence level and P= 0 .1% assumed, the sample size is determined as:

$$N = \frac{N}{1+N(e)^2}$$

Where n is the sample size, N is the population size of dairy producers, traders and consumers, and e is the level of precision.

Methods of Data Analysis

Data analysis employed descriptive statistics such as percentage and mean comparison.

RESULTS AND DISCUSSIONS

Socio-Demographical characteristics of traders

Number of actors and volumes of flow within the value chain; degree of transparency and circumstances of entry to and exit from dairy trading is computed to signify barriers of entry and exit in market. Thus managerial knowhow (education level, experience in trading and age of HHH); legal and policy constraints such as: access

to credit and licensing procedure; Degree of transparency (market information) are represented as points of exploration to signify chain structure.

Managerial Know-How:

Level of education, age of household head and business experience are examined in reference to managerial know to depict barrier to entry and exit in dairy trading towards sketching structure of trading link. These assessments are listed below in the Table 1.

Table 1 Socio demographic characteristics of dairy traders

Variables	Mean (std.deviation)
Age of traders	41.3636 (6.42497)
Education level of traders	9.1818 (4.21469)
Business experience of traders	5.9091 (2.66288)

The average age on this demographic characteristic indicated that, dairy traders are adolescents with age group of 35-55 years old. Although these actors are categorized in productive age. The assessment on the education level of traders is crucial factor for skill development and marketing decisions signified. The average education level of traders is 9.1818 and 80.2 % of traders are entitled to formal education. 56.9 percent of traders have less work experience (less than 5 years) and worse to this reality is same the rest 43.1 of traders have exhibited work experience of less than 10 years. But the respondents have indicated as they were being actively participated in trading link; whether they are experienced much or not. The result implicated that, age, education level and experience of traders was not a barrier to participate in dairy trading.

Legal and policy constraints

License of dairy traders

Even though 63.6 percent of the respondents are not licensed for dairy trading, most traders perform their businesses without licenses which implied that license is not prohibiting factor from participating in dairy trading.

Access of market information

36.4 percent of respondents have reported as they are in short of timely and reliable information; whereas 63.6 percent of the sample traders got price information from personal observation, producers, and other traders guess market information from the acts of other. Thus the market information has relied on self endeavor of actors to access which is desperately influenced by lack of information in timeliness and reliability. This implied that, degree of transparency is barrier to enter and exit in dairy trading business.

Shortage of supply

72.7% of dairy traders respond that there is high demand for dairy and its product but there is high shortage of supply of dairy and its product Because Jimma town is highly condensed in population. This is directly related with the type of cows owned by producers in the area. This implied that shortage of supply highly affects market participation of dairy and it is a barrier to enter and exit from dairy business.

Table 2 shows that legal and policy constraints of dairy traders

Variables		Percentage (%)
Access to credit	Yes	45.5
	No	54.5
Access to market information	Yes	63.6
	No	36.4
License of business	Yes	36.4
	No	63.6
Shortage of supply	Yes	72.7
	No	27.8

Endowments of traders

81.8 percent of dairy traders have access to cell phones which assisted them to govern the chain through buyer driven approaches. The result further showed 63.6 percent of the dairy traders have experienced on additional trading activities other than dairy; while 36.4 percent of them are involved in dairy trading constantly. According to the survey result brokers did not participate in dairy marketing (see table 9). Pricing strategy relies on producers and wholesalers because consumers/retailers buy the product from the producer/wholesaler. 56.6% dairy traders take their money instantly at the time of selling and the rest 43.6% take on the other day after sale.

Table 3 Economic realities of traders

Economic realities of traders		Percent (%)
Ways of selling	Direct to the consumer/retailer	100
	Through broker	
Price setting	Set by Buyer	-
	Set by demand and supply	-
	Set by producer	72.7
	Set by wholesaler	27.3
Time of payment	Instantly at the time of selling	56.6
	On the other day after sale	45.5
	After some hours of selling	-
Participating in activity other than dairy	Yes	63.6
	No	36.4

Socio-Demographic Characteristics of Consumers

Age of consumers

The survey result has revealed that the mean age of dairy consumers by location is between 30 and 45. The information also highlighted that, about 78 percent of the respondents are male leaving the rest viz. 22 percent to females.

Education level versus Level of Consumption

58.6 percent of dairy consumers are under the category secondary education; while 17.1 percent of them are Degree holders and college graduates. The assessment indicated consumption of dairy is better among the educated and those who are economically better off. For this reason the consumption level is higher in Jimma local town than others because the average education level of consumer is 12 and it is higher than other local towns (Table 10). Moreover it is often consumed at the household level, but its consumption rate is low. Thus all of respondents reported that, they are more familiarized to drink milk mekiyato from cafés but not more than thrice or four times in a week. But its consumption has apparently increased when consumers buy milk directly from markets and consumed it at home.
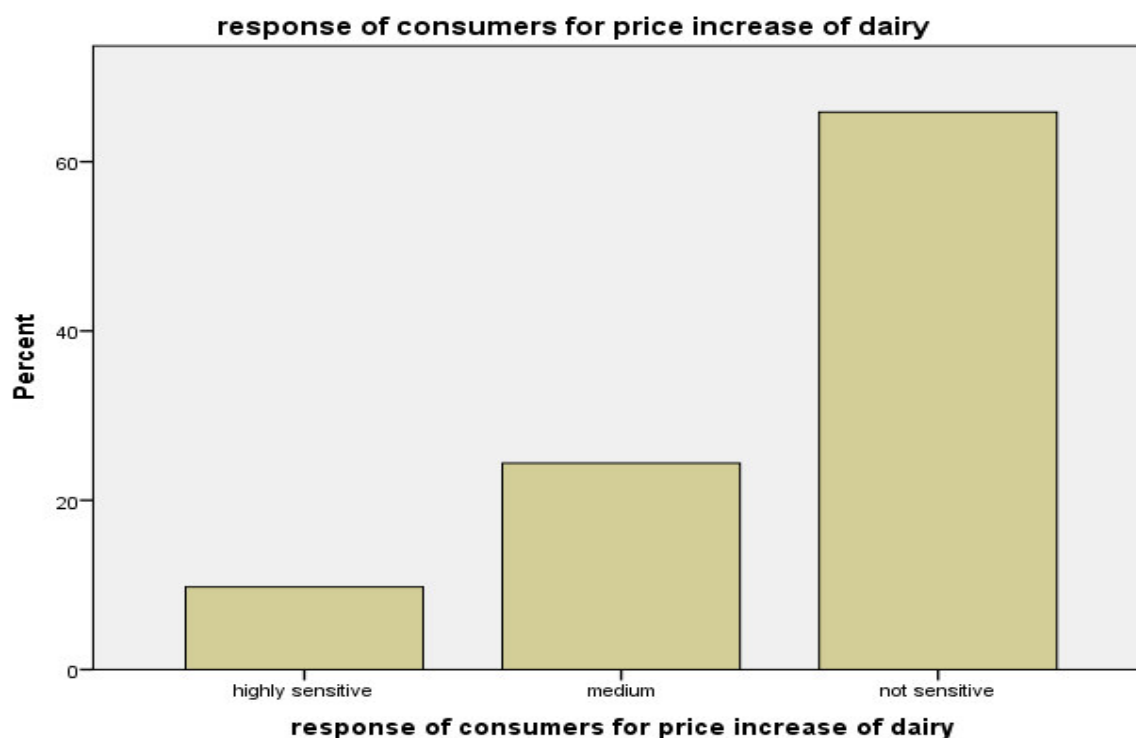
Table 4 socio demographic characteristics of consumers

Variables	Yabu	Seka	Serbo	Jimma	
	Mean	Mean	Mean	Mean	F-value (P-value)
Age	43	34	34.5714	38.1000	2.517(0.073)
Education level	10	8.8	9.1429	12.1000	5.010(0.005)
Experience in dairy trading	3.7778	3.8	4.000	5.8500	13.633(0.045)
Number of market days/week	6.4444	7.000	6.7143	7.000	7.277(0.001)
Total produce to market/liter	3.222	3.8	2.1429	7.8	30.680(0.000)
Trading other than dairy	1.000	1.000	1.0000	.8000	1.579(0.211)

Price vs. consumption

Price of dairy is lower at Yabu, Seka, Serbo local towns than Jimma local town but hugely increases along the channel into consumption. But weekly purchase of dairy is remarkably high all weeks; while mekiyato are highly consumed on weekends. This is significant in Jimma town than other local towns because consumption of dairy is high on market days in Yabu, Seka, and Serbo local towns.

The assessment has further highlighted birr 18 and 24 birr are the lowest and highest purchase price for a liter of raw milk at Jimma; while from birr 5 to 8 is required to buy a single glass of milk at cafés and restaurants and from birr 3-5 is required to buy a single cup of mekiyato in Jimma. Simultaneously, larger proportion of respondents (60%) explained whatever increase in price doesn't delay them to consume dairy; while 20 % of respondents are sensitive for any changes in price (fig. 1).

response of consumers for price increase of dairy

response of consumers for price increase of dairy

MILK Value Chain Actors, Functions and Relationships
In today's complex and highly interconnected dairy production, innovation, competitiveness, efficient operation and change require different actors to work together (Anandajayasekeram and Berhanu, 2009). To enhance opportunities for value chain actors, we need to understand the main value chain actors affecting the entire value chain. In the course of analysis, we looked at the basic components of value chain such as functions, information flows and actors. With these components, milk and value added milk products pass through different channels before it reaches the end users. The major actors in milk and value added products value chain are input suppliers, producers, milk processing cooperatives, hotels, traders (wholesalers and retailers), and consumers. Based on the functions, potential value chain actors were identified; their roles, functions, value adding processes, marketing and relationship were sorted out.

Input suppliers: value chain function starts from inputs use to produce milk and value added products. Inputs such as AI (semen and bulls), veterinary services, and improved forage and pasture seeds, and credit services, value addition technologies, among others have been obtained from many sources. Major actors that support through supplying inputs include World Vision, Jimma zone livestock development and health, LIVES project, Private sector and agency, Jimma zone agricultural development office, Jimma Agricultural Research Center, Jimma dairy cooperative offices and Jimma University. Nongovernmental organizations provide improved forage and pasture seeds, demonstrate dairy technologies and trainings. Jimma livestock development and health center and Lives project provide AI services. Jimma Agricultural Research Center, livestock development and health center, agricultural development office, LIVES project and world vision supports in forage seed development, technical and information services. However, limited capacity of value chain actors in supplying inputs and high demand from Oromiya Regional Government for crossbred cow were among the challenges. Development of the center capacity, importation of improved cow and provision of credit service to invest in dairy value chain is options to overcome actors" constraints.

Production: 35.6% of milk is produced by smallholder dairy farmers that own local breed cows and 64.2% of milk produced by crossbreeds cow owners. Milk is mainly used for household consumption for family daily food, supplied to the market.

Processing: is the act of converting milk into milk products such as butter, cottage cheese, ghee, skimmed milk, among others. Dairy farmers are the main actors who process milk into value added products which they either consume or sales to chain actors. Besides to farmers, dairy cooperatives of the area process milk into butter, cottage cheese and skimmed milk. Most of the processing function in the value chain is carried out by traditional technologies made from clay soil. There are no actors who provide improved processing and packaging technologies to ensure safe and quality products to the consumers.

Trading/marketing: milk and value added products are traded products of the study area. Milk and cottage cheese are traded within the zone.
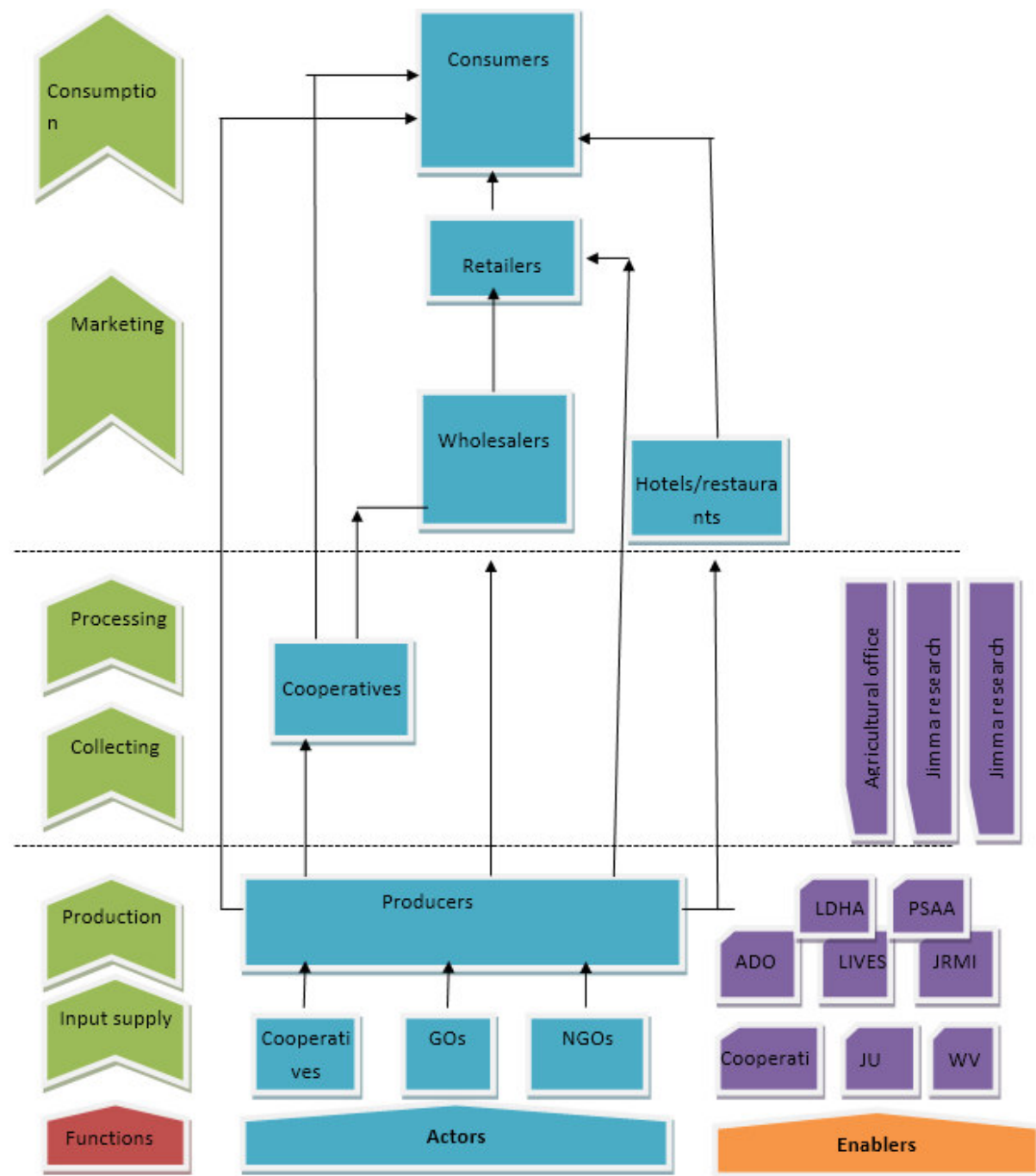
Figure 1 value chain map Source personal survey

Consumption: dairy products are consumed by the people of the zone or transported to other parts of the country and be consumed by others. They are either taken alone or taken with other food stuffs. Children are prioritized in consumption allocation of milk followed by husband in the study area. Since butter and cottage cheese are taken with other food stuffs, they are not prioritized among household members.

Policy environment: includes policy regards quality and standard assurance, good environment for chain actors to work together for common benefits. It is observed that chain actors do not get many opportunities to talk with each other about issues affecting the entire value chain. Moreover, there is no public or private body to assure quality and standards of dairy products in the course of production, processing, marketing and consumption. In general, there is no formulated policy regarding dairy product marketing, processing, and quality assurance at the national as well as at the zonal level.

Constraints to Milk Value Chain

The analysis of the result shows that there are several problems hampering dairy production in the study area. The major constraint facing dairy farmers in dairying was lack of land. This problem was reported by 50% of the

farmers. The result of the present study is in agreement with the (Belay D. et al., 2011, Sintayehu Y. et al., 2008, Yitaye A. et al., 2007, Yosef M. et al., 2003). As a result most of the respondents use residential compound for dairy production. Other problems were feed shortage (25%), lack of improved dairy animals (7%), diseases (5%), labour shortage (4%), lack of credit facilities (2.5%) and lack of artificial insemination (6.5%), respectively. Moreover, lacks of extension service, were also mentioned. Results of the study are in agreement with observations made by (Asaminewu and Eyasu, 2009, Yitaye A. et al., 2007 and Belay D., 2011) parts of urban dairy production in Ethiopia.

Unavailability of feed probably limits the milk production potential of cows with good milk producing ability more than any other single factor and is the most serious constraint to improve dairying (Zelalem, 1999, Nigussie, 2006). It was observed that the demand for improved crossbred cows by the respondents was found to be high. To alleviate this problem, creating credit facilities and services to the farmers to purchase improved cows is needed. According to (Belay D., 2011) unavailability of suitable animals for dairy either as foundation stock or as replacements for milk production are constraints to improved dairying. From the results of this study, it could be suggested that access to quality feed, artificial insemination services, adequate land, improved breeds of cows and access to veterinary services are vital in enabling farmers to improve milk production in the study area.

Gender role in dairy Production

Gender Division of Labour in dairy production

Gender responsibility in dairy production in the study area is shown in table 1. The respondents indicated that the main source of labour for dairy production is family labour (58%), hired labour (3.8%) and the combination of both family and hired labour (38.7%). Dairy activities such as herding (38.7%), cleaning livestock room (40.3%), stall-feeding (42.9%), watering animals (39.4%), feed collection (37%), milking (35.3%) ,milk processing (39.9) ,treatment (42%),caring for new born lamb (45.4%) and birth attending (39%) and marketing of dairy product (39.5%) were done by hired labour. This agree with the reports of (Belay D.et al.,2011Yitaye A.et al., 2007).Men are responsible for herding (25.6%), feed collection (32.4%) treatment of sick animals (25.2%) and whereas women are involved in cleaning (35.7%), stall feeding (37.4%), milking (39.9%), milk processing (35.7%) and dairy marketing (38.7%). Similar findings have been reported (Belay D.et al., 2011, Abay et al., 1989). In contrast, (Asaminew and Eyasu, 2009] reported that 50.4% of milking is done by men in northwest Ethiopia. In treatment for sick animals, caring for new born lamb, attending birth, and watering activities participate both men and women participate. And boys participate in stall feeding (19.7%), treatment for sick animals (16%), watering (21.4%) and birth attending (2.5%); whereas in cleaning (23.9%), milking (24.8%), milk processing (24.4%) and dairy marketing (27.7%) participate. In herding, feed collection, caring for new born lamb activities both boys and girls participate.

Table 1 Gender Division of labour

Activity		Men (%)	Women (%)	Boys (%)	Girls (%)	Hired labour
Productive activity	Herding	25.6	0	18.1	17.6	38.7
	Cleaning	0	35.7	0	23.9	40.3
	Stall feeding	0	37.4	19.7	0	42.9
	Feed collection	32.4	0	16.8	13.8	37
	Milking	0	39.9	0	24.8	35.3
	Milk processing	0	35.7	0	24.4	39.9
	Treatment	25.2	16.8	16	0	42
	Caring for new born lamb	10.1	24.4	11.8	8.4	45.4
	Birth attendant	43.3	14.3	2.5	0	39.9
	Watering	23.5	10.1	21.4	5.5	39.5
Income generating activity	Dairy marketing	0	38.7	0	27.8	33.6

Decision-Making Pattern of Gender in Milk Value Chain

Result of the study illustrates that most of the decisions such as selling of animals (66.4 %) and selling of milk (37.4%) are taken mutually by men and women. Men decide selling price of animals (68.7%); while how much of the milk will be kept for household consumption (45.4%) and selling milk products (63%) are taken by women. In female headed households, every decision is taken by women and children might have participation. Men have the upper hand decision in selling animals and milk. The decision making of male and female observed in this study is in agreement with the work of (Belay et al., 2011, Yitaye A., et al., 2007, Yousuf 2003, Yosef et al., 2003).

Constraints and Obstacles Face Gender Participation in Milk Production

According to the survey result 55.9 percent of respondents supposed that women's doesn't control income generated from livestock. This affects their participation on dairy production. 77.8% of respondents thought that access to livestock affect access to other resources. The major factor that hinder women's from the participation of dairy production in the study area is lack of access to and control over assets (19.7%) and lack of women's control over income (11.3%). The rest factor is poor participation in decision making regarding livestock production (9.2 %) and limitation on access to/use of land (10.1%). 28.6 percent of respondents react that constraints and obstacles that hinder women participation from dairy production is limitation on access to/use of land and lack of access to and control over assets together whereas the rest 21 percent respond that poor participation in decision regarding livestock and lack of women's control over assets.

CONCLUSION AND RECOMMENDATION

Conclusion

The study was undertaken with the objective of value chain analysis of dairy and identifying the role of gender in dairy production. The result was analyzed by using descriptive statistics. The result revealed that the dairy value chain comprises of producers, traders (wholesalers and retailers), hotels and restaurants and consumers. The major constraints that hamper dairy production in the study area were lack of land, feed shortage, lack of improved dairy animals, diseases, labour shortage, lack of credit facilities and lack of artificial insemination respectively. Gender responsibility in dairy production was briefly identified. The main source of labour for dairy production in the study area is family labour, hired labour and combination of both.

Recommendation

Based on the findings of the study it could be recommended that in order to improve milk production in the study area, there is a need for technical and institutional intervention to alleviate the identified constraints through dissemination of appropriate technologies for better feeding, artificial insemination service, improved dairy animals supply and access to land, which will significantly increase milk production and animal performance. To promote milk value chain, public support should formulate appropriate policy in the form of managerial capacity building and institutional support. Policy makers should also encourage through facilitating the negotiation process and raising awareness. Furthermore, the core constraints of Milk value chain could be tackled through appropriate institutional support and extension services. Therefore, there is a need to pool efforts together and make the chain economically viable which requires provision of fully fledged technical backups. Increased availability at affordable prices and promotional activities can increase consumption levels. Dairy farmers" competitiveness depends also on the trade-off between productivity (milk from improved cows) and production quality (butter from local cows). Crossbred cows produce more milk than local cows but are more susceptible to diseases compared to local cows which are better adapted to the study area agro-ecology. Local cows produce less milk but quality butter than crossbred cows. Therefore, research should revisit its breeding and development strategy in line with exploiting the potential of local cows for butter production and the potential of improved cows for milk production. Providing gender training to extension agents to improve their abilities to work with men and women farmers; Designing extension and advisory materials in ways that are accessible to both men and women of varying educational levels and inclusive of relevant content; Supporting the substantive participation of women in mixed- sex producer and trade associations, including in leadership positions; and, Providing information about opportunities for women to find credit, gain access to land, and formalize rights to land and other productive inputs are key issues in designing and implementing policy.

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