Dairy Production Potential and Challenges in Western Oromia Milk Value Chain, Oromia, Ethiopia

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Abstract

Challenges and opportunities of milk production potential in western Oromia Dairy value chain was studied with the general essence of understanding the status of milk production, marketing and utilization of the area along with the constraints hindering the development of the sector. Seven Towns, namely Ambo, Naqamte, Gimbi, Dambi-Dollo, Baddalle, Mattu and Jimma were purposively selected on the basis of their significance in the dairy production of the region. Altogether 161 dairy farmers dwelling in these peri-urban dairy farming systems were purposefully selected and interviewed individually using a semi-structured questionnaire. The questions posed to the farmers include aspects of dairy cattle production and productivity breeding management, available feed resource and feeding strategy, milk and milk product consumption patterns and marketing, Challenges in milk production and potential opportunities

available for the improvement in the dairy sector were assessed. Perusal of the results revealed that there are location differences in cattle holding, milk production, consumption and marketing system. It was found that both local breeds and dairy types (crosses) of animals were kept in the area. The dairy types are mostly Holstein Friesian with different blood levels, and were reported to produce on average more than 3 folds (6.5 lt vs 2.2 lt) of the local animals. Large number of lactating cows and high milk production per household was being reported from Jimma. While small number of cows and low milk production per household was reported from Gimbi of west Wollega zone. It is evident from the result that the demand in dairying is steadily increasing in all the study sites. Results also emphasized the important role of dairying in generating employment in the peri-urban system of Oromia regional State. However, unavailability of improved dairy stock and in adequate A.I. services, shortage of feeds and cost of concentrates, disease challenges and price fluctuation in milk and milk products are some of the bottlenecks that requires systematic planning and intervention from all development practitioners.

Key words: West Oromia, Dairy value chain, challenges, opportunities

1. INTRODUCTION

Ethiopia holds large potential for dairy development due to its large livestock population, the favorable climate for improved, high-yielding animal breeds, emerging market opportunity, improved policy environment for involvement of private sectors, and the relatively disease-free environment for livestock. Given the considerable potential for smallholder income and employment generation from high-value dairy products, development of the dairy sector in Ethiopia can contribute significantly to poverty alleviation and nutrition in the country. Though different classifications have been used to characterize the dairy production system in the country; based on their locations, Ahimed et al. (2003) classified into three broad categories, namely, urban, peri-urban and rural dairy

production. Peri-urban dairy production system is the production, processing and marketing of milk and milk products that are channeled to urban centers (Rey et al., 1993) and smallholder and commercial dairy farmers near the capital city Addis Ababa and other regional Towns (Tsehay, 2002). This sector controls most of the country's improved dairy stock. Because of steadily increasing demand in milk consumption, peri-urban dairy farms are growing around cities and towns (Satal and Shapiro, 1996).

Even though Ethiopia is home to the largest population of cattle in Africa, with the latest estimate 52,129,017 head of cattle (CSA, 2011), are mostly maintained by smallholder, commercial and pastoral farmers; and more than 99% are indigenous low yielders that greeneries a high gap between demand and supply of milk and milk products. The demand for milk is even expected to grow more as Ethiopia's population of 93,815,992 (CAI World Fact Book, 2012) expands and demographic changes result in an increasingly urbanized population, the fastest-urbanizing country in Africa with 4.3 percent growth per year, has unmet demand for milk and milk products. Despite the existing high potential for dairy development due to huge livestock resources, conducive climatic conditions and urbanizations, the performance of the dairy industry in Ethiopia has not been encouraging when evaluated against even the dairy performance of Eastern African countries. The annual growth rate in cow milk production reported in 1990 in Ethiopia was nearly 1% as opposed to 6.2% in East Africa and 3.3% in the whole of Africa. The per capita milk consumption in Ethiopia, 18.68 liters is very low as compared to the global average of 100 liters and even far below the average for Africa, 26 liters (Alemu *et al.* 2000). The dependence on import milk and milk products remain increasing, for example, in 2001 import of milk & milk product was about 3.1million USD and increased to about 9 million USD in 2008. This will be worsening with the high population growth rate (3.1%). Ethiopia's human population is projected to reach 140 million by the year 2025 and the urban population will shoot up to 40 million. This justifies the need for increasing the production of milk and milk products both horizontally and vertically in areas

where favorable climatic conditions exist and feed resources are not limiting. For the appropriate intervention to be implemented, understanding the current production performances of the particular system is a pre-requisite. To this essence, the current survey study was carried out to bridge information gap on the production, consumption and marketing of dairy and dairy products in western Oromia and provides up to date baseline data on the dairy production system performance, constraints and opportunities available along with appropriate suggestions for the development of dairy sector in the region.

2. MATERIALS AND METHODS

To carry out a broad and multi-level diagnosis, a purposive survey of households was conducted in western Oromia peri-urban dairy system. To this effect a semi structured questionnaire was prepared using secondary data available about the survey area and interview method of data collection was employed by a group of researchers with the help of an open ended questionnaires.

2.1 Site and Household selection

Seven Towns were purposively selected based on their representativeness to the different administrative zones of milk value chain. Distance from the capital city, Addis Ababa was taken into consideration during site selection with the convention that the distance from Addis has great influences on the disposability of any agricultural products. Accordingly Ambo, Naqamte, Gimbi, Dambi Dollo, Jimma, Baddalle and Mattu were purposively selected.

Households were also purposively selected based on their involvement in dairy activities to collect more reliable information. This is because of the fact that it could have been meaningless to interview non-dairy farmers about dairy system in the area. A minimum of 16 farmers and a maximum of 30 farmers were

approached and interviewed from each location. The question posed to the farmers include aspects of dairy cattle production and productivity, cattle inventory, breeding management, status of A.I. service, veterinary services, available feed resource and feeding strategy, milk and milk product consumption patterns and marketing, constraints and potential options in the dairy sector. Data were analyzed using simple descriptive statistics of SPSS computer package.

3. RESULTS

3.1 Cattle Numbers and Breed Types

Cattle genotype differs according to the system for keeping cattle with improved animals being present where the system is mostly stall-feeding or zero grazing while local animals are found in grazing area. Perusal of Table 1 shows the mean number of local and crosses and/or grade cattle per household in the peri-urban production system of western Oromia. Highest number, 12 local animals per household of indigenous cattle was reported from Baddalle while lowest number, 3 and 2 animals per household, was reported from Ambo and Jimma, respectively. In contrast, highest number, 13 animals per household of crossbred animals was reported from Jimma followed by Baddalle 4 crossbred animals per household but very few crossbred animals were reported from Gimbi (0.1) and Mattu (0.4). Besides the unavailability of improved dairy breeds or crossbred heifers, this very less figure indicates poor livestock extension service in the area.

Predominant dairy breed reported in all the surveyed towns was Holstein Frisian crosses. Holstein Friesian crosses are preferred due to their colour and higher milk production. The majority of the respondents from different towns reported that local animals predominantly the Horro breed is kept. While some reported that they solely keep crossbred animals under stall-feeding system.

The farmers were also asked whether they have a potential or interest to adopt dairy technologies. Majority of the respondents from Dambi Dollo (75%), Gimbi (63%), Jimma (63%), Ambo (60 %), Naqamte (53%), Mattu (40%) and Baddalle (33%) indicated that they have strong interest and potential to buy and rear crossbred animals. While the rest of the proportions of respondents reported that they do not have the potential as such but have interest and they are aspiring for the availability of credit facilities that enable them to adopt dairy technologies.

Table 1. Mean (±SD) for number of cattle per household in western Oromia peri-urban dairy production system

| Location	Local		Dairy		Herd size	
	Mean	SD	Mean	SD	Mean	SD
Ambo	2.9	1.1	2.2	1.4	5.1	1.3
Baddalle	12.1	1.3	4.1	1.6	16.2	1.5
Dambi-Dollo	6.6	1.0	2.0	1.3	8.5	1.1
Gimbi	8.9	0.9	0.1	1.1	9.0	1.0
Jimma	1.8	1.3	13.4	1.6	15.0	1.5
Mattu	5.9	1.1	0.4	1.4	6.0	1.2
Naqamte	4.8	0.9	3.3	1.1	8.1	1.0

3.2 Herd Size and Structure

From Figure 1. below it can be seen that overall herds are composed of mostly adult cows (31%) which together with heifers and female calves account for nearly two thirds of the animals in the herd. Steers formed only 15% of the herd as opposed to 22% of heifers. The similarity in number of female and male calves suggests that the males did not leave the herd until after weaning. The numbers of female calves in all the towns were similar except those in Jimma and Baddalle where three and four heifers were kept, respectively. The number of lactating cows from Jimma (4.3 cows/ household) was high as compared to those in the other towns that were more or less similar. Generally, the number of male animals was few in all the towns. The reasons behind keeping fewer number of male animals is that, in the urban and peri-urban dairy production system cattle are primarily kept for milk production as opposed to that of rural production system where cattle are primarily kept for draught power.

Figure 1. Over all Herd Composition of Western Oromia peri-urban dairy system
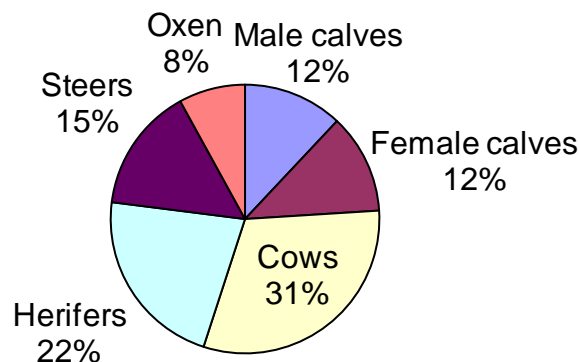
3.3 Livestock Breeding Management

Except in Jimma and Naqamte where relatively artificial insemination (A.I),
service is available, the smallholder farmers mostly rely on use of communal bulls
of unknown pedigree. These results in poor performances of the sector and
breeding management become an overall constraint to peri-urban dairy system of
the area. Over 93 % of the households used bulls as natural sources of service
with the rest using A.I. For example in Ambo and Gimbi, 100% of the dairy
farmers reported using bulls for natural service. But only small proportion of the
households, 25% from Jimma, 6% from Mattu and 13% from Naqamte reported
using A.I. service. The lack of either A.I. service or selected bulls in the area leads
to the inadvertently use of bulls with unknown pedigree which eventually poses
threats of inbreeding.

Figure 2. Breeding Methods of the area as reported by respondents
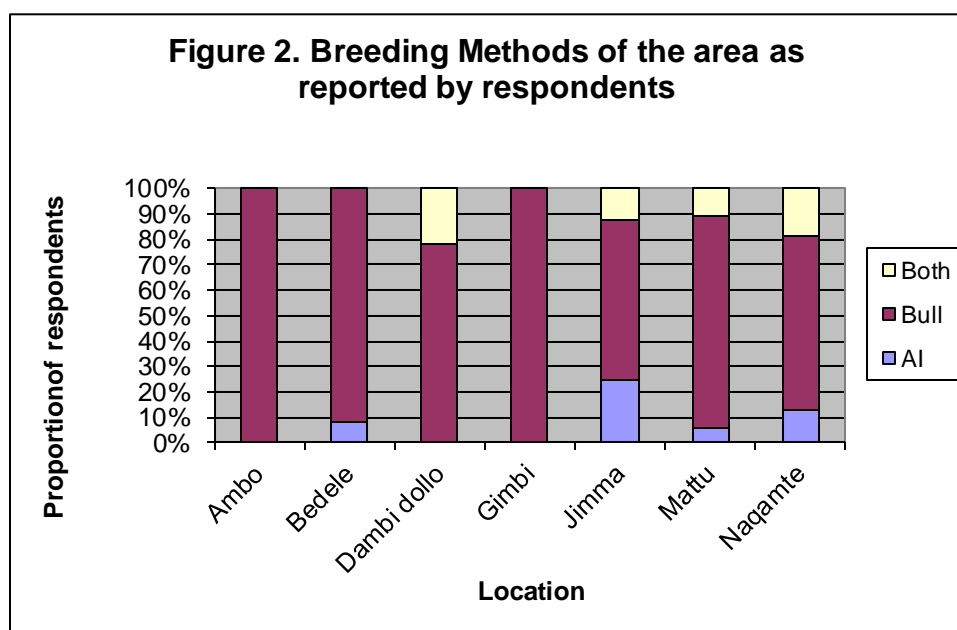
3.4 Cattle Performance

Since the surveyed sample households had both dairy and local cattle, it was
considered more useful to analyze performances by cattle genotype. For the

purpose of this study, two genotypes were identified, and these are dairy and local cattle. Dairy animals include all exotic breeds and blood levels while local animals are mainly Horro type. The result of the average daily milk production is shown in Table 2. Location differences were observed in milk production and lactation length for both local and crossbred cows. For local animals high average daily milk yield of 3.3 and 2.8 liters were reported from Ambo and Naqamte, respectively. While, lowest average daily milk yield of about 1.2 litres and higher lactation length were reported from Gimbi for local animals. For crosses, highest milk yield and lactation length were reported from Jimma and Mattu, respectively. The amount of daily milk production has direct relationship with the number of crossbred cows available in particular area.

Table 2. Some production and productive performances of cattle

Location/ Towns	Daily milk yield per liter per cow		Lactation length in months	
	Local	**Dairy**	**Local**	**Dairy**
Ambo	3.3 (0.51)	7.8 (1.0)	8.7 (1.0)	9.9 (1.0)
Baddalle	2.2 (0.5)	4.0 (1.5)	7.5 (0.9)	9.8 (1.8)
Dambi Dollo	2.2 (0.4)	6.8 (0.7)	9.6 (1.0)	11.1 (1.4)
Gimbi	1.2 (0.3)	6.0 (2.3)	10.1 (0.6)	10.3 (0.2)
Jimma	2.1 (0.6)	9.3 (0.9)	9.5 (1.2)	10.2 (1.0)
Mattiu	1.9 (0.4)	5.0 (2.3)	7.5 (0.7)	13.0 (3.6)
Naqamte	2.8 (0.3)	6.9 (0.8)	8.8 (0.7)	10.6 (0.9)
Overall	2.2 (0.4)	6.5 (1.5)	8.8 (0.8)	10.7 (1.4)

● Values in the parenthesis are standard deviations

3.5 Feed resources and Production

The dominant feeding systems for keeping cattle were grazing and grazing with some stall-feeding (semi-grazing). Stall-feeding (zero-grazing) is also practiced in Jimma. Figure 3 shows major feed resources in the study area, which include natural pasture, fodder/conserved forage, crop residue and agro-industrial by products (flourmill scraps, oil seed cake, and brewery by products). Based on the availability, the majority of respondents across all towns use combinations of different feed resources. But in Jimma area, natural pasture has little importance as the system is almost zero grazing. Forage conservation in the form of hay is mostly practiced in Jimma by 46% as opposed to the rest of peri-urban dairy system. Even though few farmers reported the hauling of noug cake from Naqamte, brewery by products and scraps of flourmill were the only feed supplements available in Baddalle and Jimma areas, respectively.

Figure 3. Proportion of feed resource available in the area
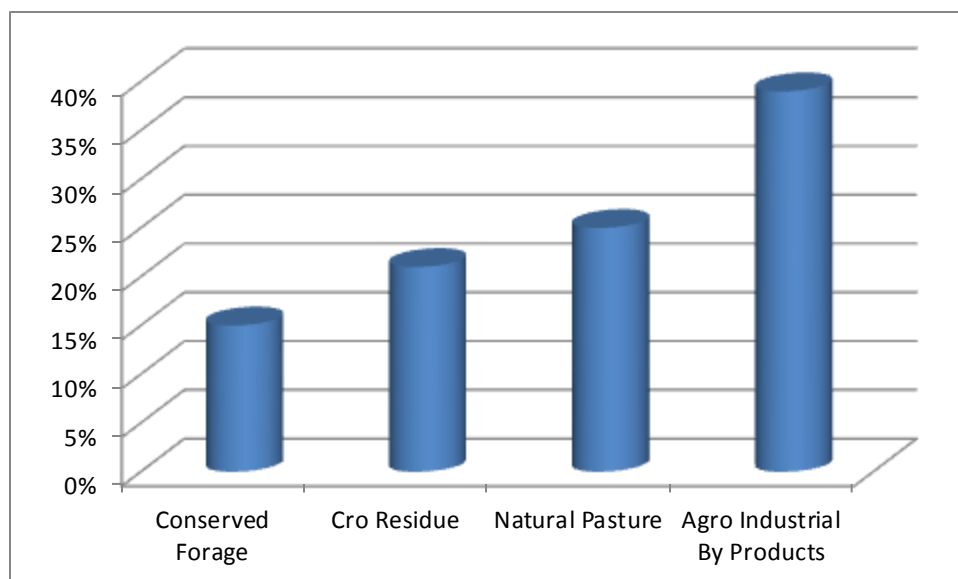
In general, among different categories of cattle lactating cows are given the first priority in feed supplementation. Accordingly, 82%, 71%, 58% of respondents from Jimma, Baddalle and Naqamte practice supplementation of lactating cows, respectively. While, in the other towns different combinations of cattle categories are supplemented. As expected the priority in supplementation practice deviates from that in rural areas where priority is given to the draught oxen.

3.5.1 Future directions for feed resource improvement

Strategies employed to alleviate the limited feed supply include the feeding of crop by products, agro-industrial by products, and fodder cultivation on roadsides and reliance on fodder market. There is an increasing shift towards intensification of dairying through growing of fodder crops with "cut-and-carry" feeding systems and keeping of improved dairy breeds on the ever decreasing land available for agriculture. The majority of the respondents from Ambo (67%), Gimbi (64%), Jimma (63%) and Naqamte (53%), Mattu (40%), Baddalle (33%) and Dambi Dollo (33%) suggested different options to improve the feed resource

situations in western Oromia (Table 6). In that order, the rest of the proportions of respondents suggested that there are no possible options for feed improvement. Accordingly, only 33 % of the respondents in Jimma suggested the introduction of improved forage in to the system. 50% of the respondents from Ambo and Baddalle stressed the use of agro industrial by products. While the rest of the dairy producers indicated reduction of herd size as a resort for feed shortage. The strategy of reducing herd size to improve feed situation was suggested by 92%, 67%, 67%, 67%, 50%, 50% and 33% of dairy producers in Gimbi, Dambi Dollo, Mattu, Naqamte, Ambo, Baddalle and Jimma, respectively. Feed conservation practices were put as options by respondents from Dambi Dollo, Jimma (33 % each), Naqamte (17%) and Gimbi (8%).

Transhumance *(daraba)* is also used as a copying mechanism to feed shortage in the area. This strategy is largely practiced in almost all the highland mixed crop-livestock farming system. In peri-urban dairy farming system this practice is used in such a manner that they move dry, pregnant cows and heifers to nearby rural farming systems until parturition due to lack of grazing areas and other economic reasons. Accordingly, 75, 74, 65, 61, 55, 53, and 47 % of the respondents from Jimma, Ambo, Mattu, Gimbi, Dambi Dollo, Baddalle and Naqamte, respectively use the strategy. In all the peri-urban farming systems studied bulls, bullocks, oxen are also moved to rural areas.

3.6. Dairy Health management practices

Livestock disease is one of the challenging issues for dairy development in the region. The problem is further exacerbated with the either absence or insufficient veterinary services. The farmers were asked whether the veterinary services are available and/or give sufficient service or not. Almost all of the dairy producers in the respective towns make utilization of veterinary services in their locality for treatment and vaccination of their animals. But only about half of the proportions of the interviewed farmers reported that the existing veterinary services are

sufficient. While the other half of the proportions of the respondents indicated the veterinary services being rendered is insufficient.

As a remedy they also practice use of ethno veterinary service/different cultural practices such as spices mostly ginger, garlic, hot pepper, tobacco leaves and butter, salt and feaces of hyena for treatment of internal parasites and mastitis. Branding is also used for treatment of blackleg. For example, in Ambo (29%, 29% and 43%), Dambi Dollo (33%, 33% and 33%) of the respondents use spices, herbal plants and butter, salt, feaces of hyena and branding, respectively. But 100 % of the respondents from Baddalle and Mattu solely use spices and butter, and salt, feaces of hyena and branding, respectively.

3.7 Milk and milk products utilization and marketing

3.7.1 Daily milk utilization

As it is true for the rest of the country milk and milk products form part of the diet of the region. They consume dairy products either as fresh milk or in fermented or sour form. It was reported that, as shown in Figure 5, 58% of the total milk produced is sold, 8% is consumed as whole milk, 19% is fed to calf and 15% is allocated for butter production. As expected only small proportion of the total milk produced is allocated for butter production, because of the relative better infrastructure and demand for raw milk in peri-urban areas as oppose to rural system. Nevertheless, Ahimad et al. (2003) reported that 40% of the milk produced in Ethiopia is allocated for butter production. Traditional butter, which ferments slowly at room temperature, can be kept for a year or longer, offering rural consumers a readily storable and durable dairy product. The result indicated that the amount of daily milk utilization for different purposes is highest in Jimma and it is lowest in Gimbi. This is because of the fact that the presence of comparatively large number of crossbred cows in Jimma while

crossbreds are exceptionally few in Gimbi. From Figure 6, it can be seen that from the milk and milk products consumed at farm level 35% is cottage cheese, and followed by whole milk 29% and fermented milk 22% indicating that most of the raw milk is sold as the system is market oriented.
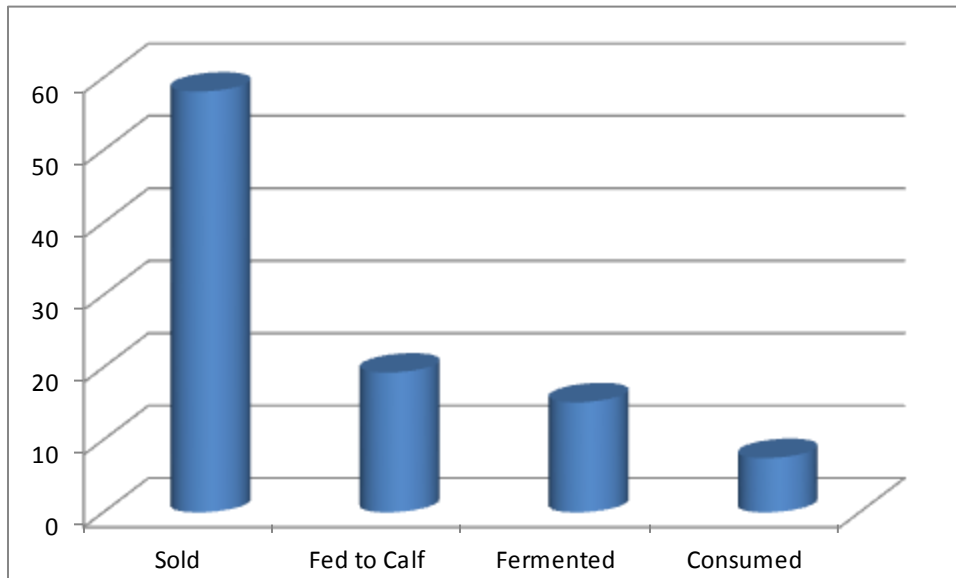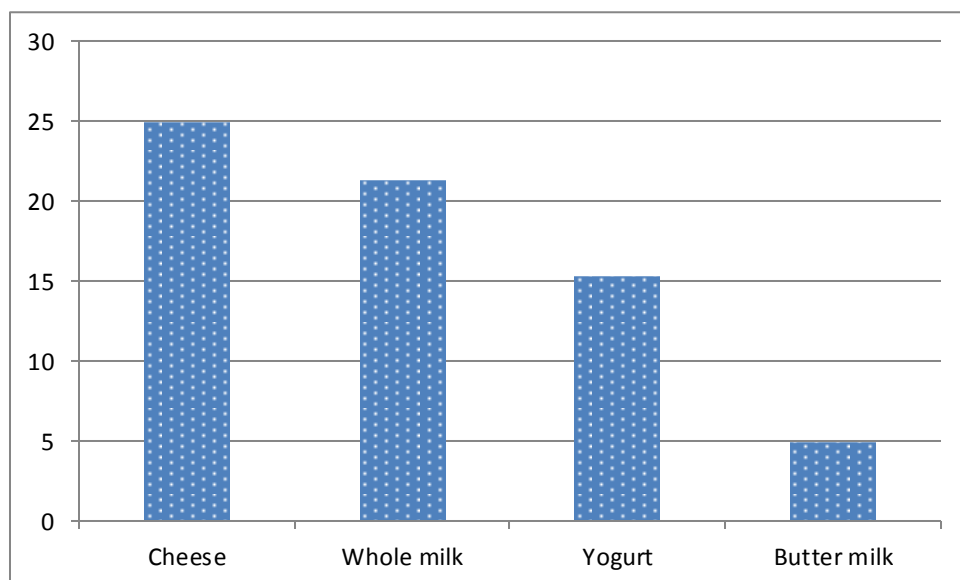
*Figure 4. Daily Utilization of Milk*

Figure 5. Percentage of Milk Products used for home consumption

Dairy products
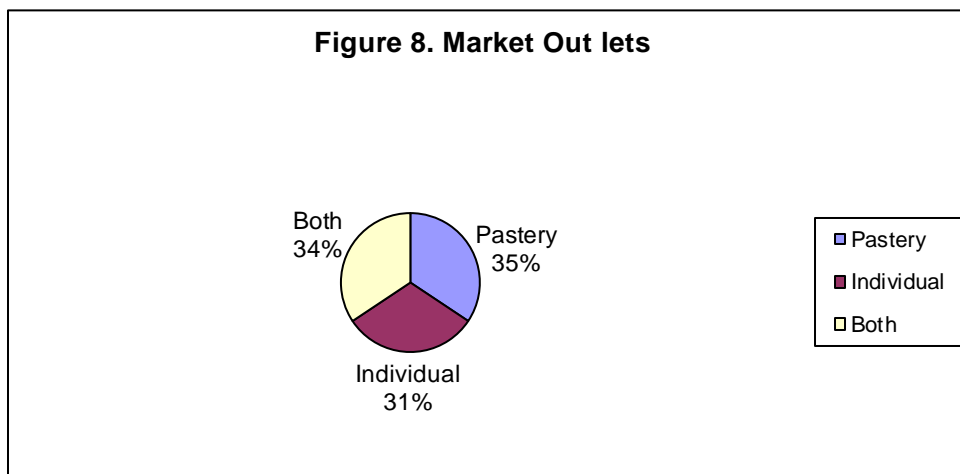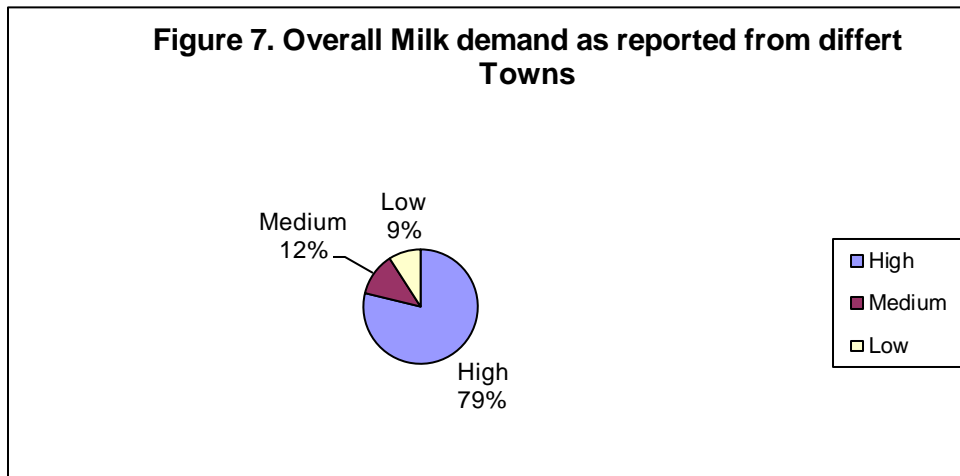
3.7.2 Priority in fresh whole milk consumption

In most of the cases priority in milk consumption, as shown in Figure 7. is given for children, 45%. Nevertheless, depending on the socio-cultural condition of the particular area priority is also given for family head 29%, wife 20% and vulnerable person 6%. About 59, 23, 12, 58, 56, 33 and 35 % of dairy farmers in Ambo, Baddalle, Dambi Dollo, Gimbi, Jimma, Mattu and Naqamte give first priority in milk consumption to children. 62% from Baddalle and 65% of the respondents from Dambi Dollo reported that the first priority is given for family head. Wives are also given priority by 48% and 40% of the respondents from Baddalle and Jimma, respectively.

Figure 6. Priority in Whole milk consumption

Vulnerable person 6%

Wife 20%

Children 45%

Family head 29%
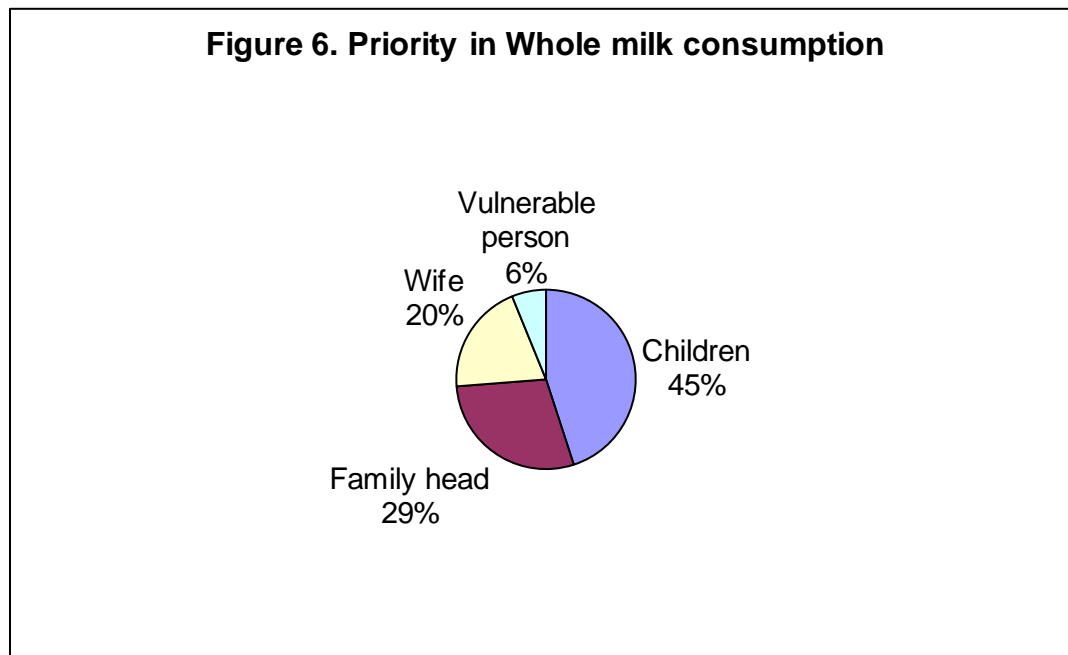
3.7.3 Milk Marketing

Though dairy products in Ethiopia are channeled to consumers through both formal and informal dairy markets (Ahmad *et al* 2003), informal way of dairy market is the only market channel available in this region. Informal market involves direct delivery of fresh milk by producers to consumers in the immediate neighborhood and sale to itinerant traders or individuals in near by towns. The study on the status of the peri-urban dairying showed that about 70, 69, 60, 52 and 43 % of the respondents sell fresh milk in Ambo, Jimma, Naqamte, Gimbi and Dambi Dollo towns respectively. Relatively, small proportions of milk sales were reported from Baddalle and Mattu. As shown in Figure 8, market demand for fresh whole milk was high in all the towns. The highest demand was reported from Jimma (91%), followed by Ambo (86%), Naqamte (85%), Mattu (80%) etc. Only fewer proportions of the respondents reported that there are medium and lower demands for fresh milk market. Perusal of Figure 9, showed that there are different outlets for milk sale. The majority of milk producers in Jimma (73%), Gimbi (53%) and Ambo (50%) sale fresh milk to pastries and individual consumers, while those in Dambi Dollo (67%), and Naqamte (47%) sale their milk

products to pastries only.

Figure 7. Overall Milk demand as reported from differt Towns

Low
9%

Medium
12%

High
79%

High
Medium
Low

Figure 8. Market Out lets

Both
34%

Pastery
35%

Individual
31%

Pastery
Individual
Both

3.7.4 Expenditure of income from dairy products

Perusal of Figure 9 shows the overall milk and milk products income proportions allocated to different purposes. Across all the locations income from sales of milk and milk products is spent for purchase of food (40%), feed items (20%), animal and human health care (17%) and labor cost (23%). But location differences were reported in the proportion of income spent to different purposes. For instance, in Ambo the majority of income from sales of milk and milk products is spent on feed

purchase (46 %), health management (15%), labor cost (19%) and purchase of food items for the household (20%).

Figure 9. Expenditure of income from milk and milk products
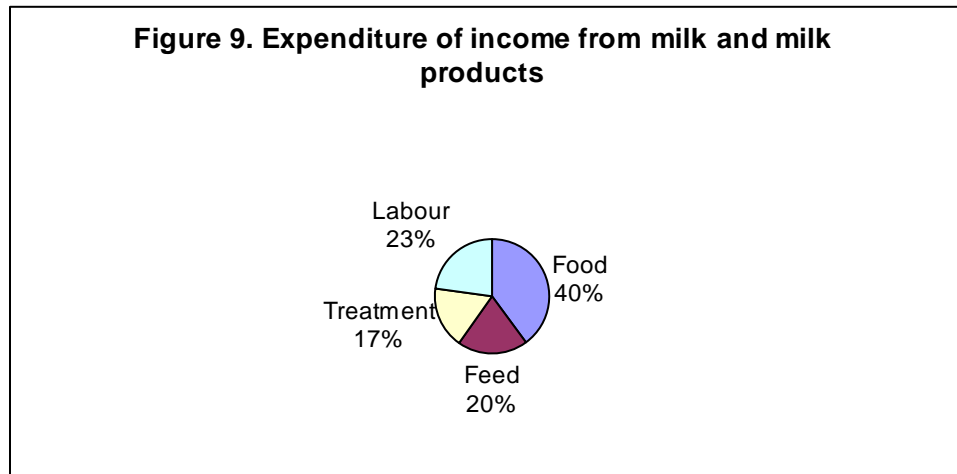
3.8 Constraints in dairy production

3.8.1 Feeds and feeding

Inadequate supply of quality feed and low productivity of the indigenous cattle breeds are the major factor limiting dairy productivity in the region. 42% of the respondents were reported feed shortage as the most single problems responsible for low milk yield and low productivity of the dairy system. About 58% of the proportions of the respondents indicated feed shortage in combination with diseases and poor genetic make-up of indigenous animals as a primary cause for lower productivity. Feed usually based on fodder and grass are either not available in sufficient quantities, or when available, are of poor nutritional quality. These constraints result in low milk and meat yields, high mortality of young stocks, longer parturition intervals and low animal weights (McIntire *et al*, 1992).

3.8.2 Diseases

Mastitis, trypanosomosis, internal and external parasites, bloating anthrax and black leg reported to be a major disease affecting livestock production and productivity in the area. Trypanosomosis was reported in all the surveyed towns

except in Jimma area while the occurrence of mastitis was reported from all locations area. The incidence of bloating was reported only from Gimbi and Naqamte. Anthrax was reported from Ambo, Dambi Dollo and Naqamte. The problem of external and internal parasites was reported in all locations except in Baddalle. According to the respondents *inter alia* mastitis is the one, which causes high economic loss, as a system is market oriented dairy system. About 44, 39, 21, 52, 50, 39 and 3 % of respondents from Ambo, Baddalle, Dambi Dollo, Gimbi, Jimma, Mattu and Naqamte, respectively showed high incidence of mastitis in the area. In that order, 50, 46, 54, 42, 38, 50 and 45 %, respectively reported low to medium incidence of mastitis problem.

3.8.3 Dairy and dairy products marketing

The constraints in milk and milk product marketing were also assessed using the semi-structured questionnaire. Accordingly 10, 13, 29, 52, 44, 5 and 3 % of the respondents from Ambo, Baddalle, Dambi Dollo, Gimbi, Jimma, Mattu and Naqamte, respectively showed that there are different constraints on milk marketing. In Jimma 43.8% of the respondents reported that there is a constraint in fresh milk marketing. But it does not mean that the price of milk is less at Jimma. Even though the highest price 13.5 Birr/l was reported from Jimma against 10.0 birr/l in other towns, still they require milk collection center and large scale processing otherwise there is high demand for fresh milk like that of other surveyed Towns. Workneh and Ulfina (2011) also reported the parallel increases of demand in livestock sector because of the increase in population. The reported marketing constraints include fluctuation in demand and supply of dairy products (as a result of feed shortage and different socio cultural reasons), poor infrastructure (Lack of cooling facilities, simple processing equipments and quality testing skills and equipments) and the long time fasting of the members of the Ethiopian Orthodox church. 100 % of the respondents from Ambo, Baddalle and Dambi Dollo and some respondents from Jimma (14 %) and Naqamte 13%) stressed that poor infrastructure is a major dairy products marketing constraint.

While the majority of the respondents from Jimma (71%), Naqamte (63%) and Gimbi (62%) mentioned fasting as a major constraint. The problem in the fluctuations of demand and supply was reported by 39, 14 and 25% from Gimbi, Jimma and Naqamte, respectively.

4. CONCLUSION

Assessment of Dairy production potential, challenges and opportunities in western Oromia dairy value chain was conducted with an essence to understand the status and identify constraints hindering development of dairy sector in the region. It could be concluded from the study that dairy production is at its infant stage and on contrary there is a high demand for dairy and dairy products in all the surveyed Towns. In general, the peri-urban dairy production system in western Oromia is among the vast potential livestock production systems, with high opportunities for economic development in the region as well as in the country. Nevertheless, different challenges are constraining the development of the system, *inter alia* inadequate feeding both in quality and quantity, shortage of breeding bull or A.I. service, poor veterinary services, unavailability of improved genotypes and poor genetic make-up of indigenous animals which actually reflected in low milk production and dairy products marketing are mentioned worth. Therefore, future research and or development endeavors should have to curtail the bottlenecks so that the vast potentials of the region could be exploited to its maximum and improve the livelihood of the community. This requires coordinated and systematic planning and interventions by all practitioners.

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