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Full Length Research Paper

Handling, processing and marketing of cow milk in urban and peri urban area of Dangila Town, Western Amhara Region, Ethiopia

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Abstract

The study was conducted in Dangila district, Awi Zone of the Amhara regional state with the following objectives: to assess the existing urban and peri urban dairy production, milk handling, milk processing practices and marketing systems; to determine the microbial quality and chemical composition of raw milk in the urban and peri urban of Dangila district. A total of 90 Dairy farms (45 urban and 45 peri-urban) were purposively selected and considered for survey study. Dairy farm owners were interviewed using a pre tested semi-structured questionnaire. Both quantitative and qualitative data collected during the survey were analysed using Statistical Package for Social Sciences (SPSS). The local or indigenous breeds in the study area are fogera breeds and unidentified indigenous zebu breeds while the cross breeds are unidentified local breed X Holstein Friesian breeds with different blood level. Butter making, Butter preservation, ghee making, ripened soft cheese making, blended soft cheese making were traditional dairy processing practices observed in the study area. Marketing channels or sale outlets in both urban and peri-urban areas for milk and milk products were individuals, hotels and cafeteria, and cooperatives. This study shows that shortage of feed was the most important factor responsible for low milk yield and productivity of dairy cattle in both urban and peri-urban areas. Therefore, further work is needed to improve feed resources available to alleviate feed shortage in the study area.

Keywords: Handling, processing, urban and peri urban.

INTRODUCTION

The livestock population of Ethiopia is believed to be one of the largest in the world and the largest in Africa. The total cattle population for the country is estimated to be about 53.99 million. Out of this total cattle population, the female cattle constitute about 55.48 percent and the remaining 44.52 percent are male cattle (CSA, 2012/13).

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Livestock sector has been contributing considerable portion to Ethiopia's economy, and still promising to rally round the economic development of the country. Despite its huge number, the livestock sub-sector in Ethiopia is less productive in general, and compared to its potential, the direct contribution to the national economy is limited. The poor genetic potential for productive traits, in combination with the sub-standard feeding, health care and management practices that animals are exposed to are the main contributors to the low productivity (Zegeye,

2003). The sector contributes about 43.5% of the GDP and 61% of total export (NABC, 2010).

Milk and milk products play an important role in human nutrition throughout the world. Milk is also highly perishable and can easily be adulterated whilst the quality of the milk is highly dependent on farm management. Strict and comprehensive dairy regulations are therefore customary and necessary (Banda, 2010). The fluid or semi-fluid nature of milk and its chemical composition renders it one of the ideal culture media for microbial growth and multiplication (Mogessie and Fekadu, 1994).

The safety of dairy products with respect to food-borne diseases is a great concern around the world. This is especially true in developing countries where production of milk and various dairy products take place under rather unsanitary conditions and poor production practices (Mogessie, 1990; Zelalem and Faye, 2006)

In the past, most of the interventions to develop the dairy sector focused more on increasing production, with less attention to input supply and marketing. Government engagements have focused on input supply oriented systems aimed at tackling problems restricting increases in milk production, with little attention to the development of appropriate milk marketing and processing systems. In general, the development of improved marketing system is pivotal to increase production (Tsehay, 2002).

Urban and peri-urban dairy production systems are among the many forms of dairy production systems in the tropics and sub-tropics. The systems involve the production, processing and marketing of milk and milk products that are channelled to consumers in urban centres (Rey *et al*., 1993; Staal and Shapiro, 1996). These urban and peri-urban dairy production systems evolved to satisfy the increasing demand for milk in urban centres as a consequence of increasing urbanisation, rising per capita income and increasing cost of imported milk and milk products. They contribute to overall development through income and employment generation, food security, asset accumulation, poverty alleviation and improving human nutrition and health.

Urban and peri-urban dairying plays an important role in Amhara region. Dangila district for instance, is among the major urban and peri urban areas of the region where livestock farming is an important component of agriculture. This district is also among the high potential areas for milk production in Awi Zone. According to 2013 report of Department of Animal Agriculture of Dangila town 5,538 cattle (879 indigenous breed and 198 crossbred cows), 16232 sheep and 710 equine exists in the district.

Even if the area has potential for production of milk and milk products, little is known about the merits and limitations of the existing milk handling, processing methods and marketing conditions in the study area. In order to design development interventions that meet the need of the farmers, identification of problems and understanding of the existing milk handling, processing and marketing conditions in the area is the first step in the right direction.

The traditional milk handling and processing practices and raw milk quality in Eastern Wollega was reported by Alganesh (2002); traditional handling practices, preservation, utilization and consumption of dairy products and marketing systems in East Shoa Zone was reported by Lemma *et al*. (2005a, b) and production, handling, traditional processing practices and quality of milk in Bahir Dar milk shed area, was reported by (Asaminew, 2007). However, little is documented about the dairy situation in the Awi Zone in general and in Dangila District in particular. This study is thus aimed at filling the gap in this regards. The specific objectives are therefore:

- To assess urban and peri urban dairy production, milk handling, processing practices and marketing systems in Dangila town

MATERIALS AND METHODS

Description of the Study Area

The study was conducted in Dangila district, which is found in Agew Awi zone, Amhara Regional State, in north-western Ethiopia , along the main road between the cities of Addis Ababa and Bahir Dar about 472 km from Addis Ababa, the capital of Ethiopia. From the regional capital, Bahir Dar, Dangila district is about 72 km. Astronomically, Dangila is located at 11˚ 18' N latitude and 36˚ 57' E longitude. The capital of the district is Dangila town which is divided in to ten administrative kebeles (the lowest administrative unit), five urban kebeles and five rural kebeles around the town. Geographically, it is located on elevation of 2200 m above the sea level on area coverage of 9486.4 hectare with Woina Dega (temperature) climate. The annual average rainfall and temperature are 1576 mm and 17 ^{0}c, respectively. The total population of the district is 50,755, practicing three major religions. Orthodox 88.34%, Muslim 11.06% and Protestant 0.6%. The boarders of the district are, on the south Faggeta Lekoma, on the southwest Guangua, on the northwest Jawi, and on the northeast West Gojjam Zone (Assaye, 2009).

Sample Selection Procedure

Study households were purposively selected from each of the two production systems (urban and peri urban) based on their involvement in the dairy farming. Based on the above stratification by production system, lists of farmers in each of the production systems were obtained from kebele administration, agricultural extension officer and development agents (DA) and from official land registry list. Kebele 01, 03, 04 in the urban and Grarghe,

Table 1: The household Religion, family size, age group and educational status per household in the study areas

Religion (%)	Urban N=45	Peri urban N=45	Over all Mean
Orthodox	82.22	100	91.11
Muslim	6.67	0	3.335
Protestant	11.11	0	5.555
Total	100	100	100
Family size (mean ±SD)	5.74±1.88	6.0±2.22	5.87±2.05
Age distribution (%)			
1-14 years of age	30.6	26.30	28.45
15-55 years of age	58.9	62.22	60.56
>55 years of age	10.5	11.48	10.99
Total	100	100	100
Educational status of HH (%)			
Illiterate	9.3	32.6	20.95
Reading and writing	10.5	21.85	16.175
Primary	19.4	17.4	18.4
Junior	16.2	9.63	12.915
Secondary	24.8	12.22	18.51
>diploma and above	19.8	6.3	13.05
Total	100	100	100

N= number of respondents; SD= standard deviation; HH= household.

Bacha Dimsa and simalta in the peri urban were selected. From each selected kebeles', 15 households were selected for the survey study. Proportional sampling method was employed to select 45 households from each of the selected production systems. In due regard, total sample size of 90 households were selected from the study district, of which 45 households were selected from urban areas, and 45 households were from peri urban areas for survey data collection.

Data Collection Techniques

Primarily, overview of the area was perceived through preliminary survey conducted to gather information relevant for this study. The target sampling population was defined as all households in the study area who currently owned two or more lactating cows. The dairy production system in the study area was categorized as urban and peri-urban. Farms located at a distance accessible to nearby towns were considered as peri-urban farms. These farmers deliver milk to urban center. A questionnaire-based survey was used to collect data needed for assessment of production, handling, processing and marketing of milk in the area. Milk production, handling, processing and marketing data was collected from respondents. The survey was conducted between October and November 2013. For data collection, semi-structured questionnaire were prepared and pre-tested and the survey was conducted by interviewing people who were purposively selected based on their dairying activities, dairy cattle population, and access to fresh milk market outlets.

A questionnaire-based survey was used to collect data needed for assessment of handling practice of milk in the area. The questionnaire was used to point out information about milk handling practice, barn facilities of the dairy cows' house, ease of cleaning and drainage system, milking method, hygienic practices of milkers and milking equipments used ,source of water for cleaning and other related handling activities.

Milk processing and preservation was collected for assessment of processing and preservation data of milk and its products in the district. The pre tested questionnaire was used to generate information about milk production, amount of milk processed milking equipment, main common processed dairy products, processing methods and materials, traditional methods and practices used to increase shelf life of dairy products, storage and packing methods of dairy products and other related practices of milk and its products processing in the study area.

Marketing of milk and its products related information were collected by structured questionnaire, which was designed to point out information about how much milk is produced in the study area, how much is sold, for whom to be sold, place of selling, type of milk and its product to be marketed, marketing system and other market related data of milk and its products in the study area.

Data Management and Statistical Analysis

Means and frequency procedures of statistical package for social scientists (SPSS 16.1) were used to analyse the data collected through the survey.

RESULTS AND DISSCUSION

Household Characteristics

The household size, Religion, age group and educational status in the study area are shown in Table 1. Out of the

Table 2: Cattle herd size and structure per household in the study area (Tropical Livestock Unit)

Cattle	Urban			Peri urban		
	N	Mean ± SD	%	N	Mean ± SD	%
Milking and pregnant	123	2.08±0.73	23.56	136	2.20±0.95	19.18
Milking not pregnant	35	1.59±0.66	6.70	46	1.53±0.63	6.50
Dry and pregnant	23	1.21±0.53	4.40	42	1.68±0.75	5.92
Dry not pregnant	8	1.00±0.00	1.53	45	1.67±0.62	6.35
Heifer	46	1.59±0.63	8.81	99	2.36±1.16	13.96
Bull	2	1.00±0.00	0.38	33	1.18±0.39	4.65
Oxen	8	2.00±0.82	1.53	118	2.88±1.03	16.64
Male calf	73	1.55±0.75	13.98	94	1.81±0.79	13.26
Female calf	86	1.48±0.63	16.48	96	1.78±0.84	13.54
Total	522	9.83±0.71	100	709	13.36±0.70	100
Herd size per family	11.6			15.76	13.68	
Breed types (%)						
Local breed	43.49				87.59	
Crossbred (HF)	56.51				12.41	

total interviewed dairy cattle producers in the peri urban milk production system (N = 45), 77.78 % were male headed and the rest (22.22%) were female headed household members while in the urban milk production system (N = 45), 73.33 % were male headed and 26.67 % female headed household of different age and educational status. Out of the total sampled households in the urban 82.2% were Orthodox Christians; while the rest 11.1% and 6.7% of the respondents were protestant and Muslim, respectively while in the peri urban milk production system all (100 %) of the households were Orthodox Christian faith followers. The religion of respondents found in this study is comparable with the finding of Adebababy (2009), who found that almost all of the total sampled milk households (97.8%) were Orthodox Christians, while the rest 2% of the respondents were Protestants in Bure district.

The average family size per household in the urban and peri-urban areas was 5.74±1.88 and 6 ± 2.21, respectively with an overall mean of 5.87 ± 2.05 persons per family. The average household size observed in this study (5.87) is smaller than that reported by Adebabay (2009) who reported the overall mean household size of 6.22 in Bure district. However, it is comparable with that reported by Tesfaye (2007) who found the overall mean family size of 5.7±0.134 persons/HH in Metema district. The proportion of children who are not able to participate in working activity (1- 14 years of age) in the urban and peri urban areas was 30.62 and 26.30 percent, respectively while the older people who are not in working age (> 55 years of age) in the urban and peri-urban was 10.5 and 11.48 percent respectively in the study area. The proportion of the working age group (15-55 years of age) in the urban and peri urban was 58.90 % and 62.22 % respectively. In this study, higher proportions of the population are in working age, which is important to undertake dairying activities. This indicates that family members in the productive age group are higher in both the urban and peri urban areas of the district. This in return implies that in Dangila district households have good sources of labor to utilize for different dairying activities.

Comparing the education status of household heads in the urban and peri urban areas of the study district, proportionately there were more illiterate in the peri urban (32.6%) than in the urban (9.3%) because households in peri urban are highly involving in the farming activity than proceeding learning. Household heads that can able to read and write were higher in the peri urban (21.85%) than urban (10.5%) but the proportion of respondents who receive primary, junior, secondary and diploma and above education were higher in the urban milk production system.

The current study is comparable with the report by Fayo (2006) that urban farms (36.3%) have secondary and above secondary level of education while 3% of small peri-urban farms have secondary level of education. But In per-urban most farm owners are illiterate in and around Dire Dawa town.

According to the respondents, dairy farm owners in the urban have better education level than those who are from the peri urban due better access to education institutions in the urban. Education is important for dairy men to perform different dairying activities, productive and reproductive evaluation of the dairy farm and to increase the productivity of the dairy farm by following scientific procedures and manuals.

Cattle Herd Structure

The average herd size owned per household and herd compositions in the study area are shown in Table 2. In this study the average cattle herd size per household was

Table 3: Responsibilities of family members in the urban and peri-urban of the study area (percentage of total respondents N=45)

	Responsible family members (N=45)		
Dairying activities	**Men %**	**Women %**	**Children %**
Urban dairy production system			
Herding	0.00	0.00	15.56
Milking	17.78	46.67	6.67
Processing	0.00	44.45	22.22
Cleaning	0.00	40.00	37.78
Sale of dairy products	0.00	71.11	17.78
Sale of animals	55.56	22.22	17.78
Stall feeding	11.11	22.22	26.67
Peri urban dairy production system			
Herding	17.78	6.67	28.88
Milking	44.44	26.67	22.22
Processing	4.44	44.45	17.78
Cleaning	11.11	37.78	26.67
Sale of dairy products	6.67	44.44	26.67
Sale of animals	53.34	13.33	22.22
Stall feeding	11.11	4.44	44.45

11.6 in urban and 15.76 in peri-urban areas with overall mean of 13.68.

The overall interviewed households in the urban area the following herd composition were observed; milking and pregnant (23.56%), milking not pregnant (6.70%), dry and pregnant (4.40 %), dry and not pregnant (1.53%), heifer (8.81%) bull (0.38%) oxen (1.53%) male calf (13.98%) and female calf. While in the peri urban area; milking and pregnant (19.18%), milking not pregnant (6.50%), dry and pregnant (5.92 %), dry and not pregnant (6.35%), heifer (13.96%) bull (4.65%) oxen (16.64%) male calf (13.26%) and female calf (13.54%). So the composition differed in the two areas. Respondents reported that pregnancy test was confirmed both by pregnancy diagnosis from animal veterinarian and physical observation confirmed with gluey milk secretion of their cows

The local or indigenous breeds in the study area are Fogera breeds and unidentified indigenous zebu breeds while the cross breeds are unidentified local breed X Holstein Friesian breeds with different blood level. Indigenous Cattle were more dominant in the peri urban 87.59% than in the urban (43.49%) while the crossbred cattle (Holsteins Friesian) were more dominant in the urban (56.51%) than in the peri urban (12.41) of the district as it is reported in Table 2.

In this study the average cattle herd size in the district was large (13.68) because the respondents were selected and interviewed based on their potential of dairy cattle (current milking cow) holding. The average herd size in the peri urban (15.76) area was higher than that of the urban (11.60) which was higher than the report of Deresse (2008) who reported the average herd size of 4.68 and 7.57 in the urban and peri urban in west Shoa zone.

This result is comparable with the finding of Asamnew (2007) who reported that the major cattle breeds kept by farmers in the Bahir Dar milk shed area are local Zebu animals belonging to Fogera breed, unidentified indigenous animals and Fogera-Holestein Friesian crossbreds. Similarly, Derese (2008) reported that Friesian crosses (Friesian x Boran and Friesian x Arsi) were found to be the predominant dairy cow breeds reported in the west Shoa zone areas, whereas Horro breeds were mainly kept as local Zebu breed in the area.

According to respondents, dairy cattle management vary depending on the production system. Zero grazing is the main feeding practice in the urban mainly for cross breed cows but free grazing is mostly practiced in the peri urban dairy cattle production system depending on the availability of land for pasture production.

Dairy farm owners in the study district reported that, the demand of milk and dairy products by consumers, cooperatives milk collectors processors and hotels, is higher than the supply. To improve the income of the community and to meet the great demand of milk and dairy products, milk production is expected to increase in both urban and peri urban with improved infrastructure such as road, water supply, electricity etc.

Husbandry Practices

Purpose of keeping cattle

In the urban production system of the study area, the purposes of keeping cattle were milk production, income generation and meat production; while in the peri urban production system cattle are basically kept for traction, milk production, meat production, income generation, asset, manure production and use for threshing cereal grains according to their priority.

The result obtained in this study is comparable with the results of Asamnew (2007) who reported that the first and second priority functions of cattle are draught power and milk production, respectively in Bahir Dar milk shed area.

Labour and Cattle Husbandry

Tables 3 show the labour division among family members with respect to dairying activity in the peri-

Table 4. Dairy cattle housing and barn facilities in urban and peri-urban farms in the study area (N=90)

	Percent of total respondents	
Variables	**Urban N=45**	**Peri urban N=45**
Type of barn used		
Loose house (separate)	100.00	73.33
Open barn	0.00	22.22
Open camp	0.00	4.44
Together with human	0.00	0.00
Facilities in the barn		
Feed trough	6.67	11.11
Water trough	4.44	24.44
Both water and feed trough	77.78	35.56
No facility	11.11	28.89

N=number of respondents.

urban and urban area of the district, respectively. In the urban and peri-urban, hired labor (84.44 and 46.67%) is mainly responsible for herding cattle, respectively. In the urban milking is done mainly by the women (46.67%) while in the peri urban milking is done by men (Tables 3 and 4). Milk processing, cleaning of barn and milking equipment, and selling of dairy products activity in both the urban and peri urban of the study area were mainly done by women. In current study, women take the major responsibility in dairying activity because men mainly work outside home activity other than dairying activity. Sale of live animals is done by men in both urban and peri urban. The stall feeding activity mainly done by hired labour (40%) and children (44.45) in the urban and peri urban, respectively.

In the current study, dairying gives more opportunities for females to be closely involved in the daily management than other family members. This is consistent with the finding of Fayo (2006) who reported that women members of the family engaged in dairy farm activities in urban and peri-urban areas of Dire Dawa.

Cattle Housing and Facilities

Type of housing and facilities in the barn in urban and peri-urban dairy farms are given in Table 4. House for dairy animals is used to prevent animals from hot condition, draft, theft and rain. All the dairy households (100%) in urban area keep their cattle in loose barn while 73.33% of the farms in the peri-urban areas keep their cattle in separate house. About 22.22% and 4.44% the respondents in peri urban keep their animals in open barn and open camp respectively during night.

This study is in agreement with the report of Derese (2008) who reported that the majority of the farms (90%) in urban area keep their cattle in separate barn (loose house) all the time, except when cleaning the barn and 60% of the households in the peri-urban areas house their cattle at night and during hot weather condition of the day. Barn facilities in both farm includes water and feed troughs, though to a lesser extent in peri-urban farms in west Shoa Zone.

The current finding is comparable with the finding of Fayo (2006) that large urban farms had better barn facility (concrete wall, and water trough) than medium as well as small urban farms. Most large urban farms kept cattle in loose barn; others use stanchion and open barn. Large urban farms with local cattle kept cattle without shed. Farms with loose and/or stanchion type had good drainage facility for ease of cleaning (Fayo, 2006).

The dairy cattle management system is semi intensive and extensive in the urban and peri urban milk production system respectively depending on the amount of land available for grazing and exercise of cows.

About 77.78% of the respondents' farm in urban area had both feed trough and water trough while only 35.56% in the peri urban area had both feed and water trough.

Reproductive and Productive Performances of Cows

Age at first calving (AFC)

AFC is the time in which the dairy cows give first birth. During first calving the cow does not complete its growth meanwhile produces milk for the calf. Several authors stated that substantial delay in the attainment of sexual maturity might mean a serious economic loss due to investment on unproductive animal. Both the productive and reproductive performance of dairy cows is affected by AFC. Long AFC influences the milk production potential and the number of calves that the cow can produce in her life time (Table 5).

In the Urban area, the average age at first calving (AFC) were 45.96±4.89 and 33.33 ±3.58 months for local and crossbred cows, respectively. However in the peri urban AFC were 49.20±7.04 and 35.23±3.78 for local and cross bred, respectively. The AFC obtained in the present study for both local and crossbred cows is shorter than the result reported by Asaminew (2007) that the average

Table 5: Average (± SD) age at first calving (AFC) of dairy cows in urban and peri-urban farms in the study area

Cow breed type	AFC (months) Urban (Mean ± SD)	Peri urban(Mean ± SD)	Overall mean
Local cows	45.96±4.89	49.20±7.04	47.58
Crossbred cows	33.33 ±3.58	35.23±3.78	34.29

SD= Standard Deviation ns = not significant (P> 0.05) * = significant (P< 0.05) ** = highly significant (P< 0.01), Sig. = Significance

Table 6: Average (± SD) calving interval (CI) of dairy cows in urban and peri-urban farms in the study area

Cow breed type	CI (months) Urban (Mean ± SD)	Peri urban(Mean ± SD)	Overall mean
Local cows	17.07±2.53	19.09±3.44	18.08
Crossbred cows	14.00±1.94	13.14±2.38	13.57

SD= Standard deviation ns = not significant (P> 0.05)
* = significant (P< 0.05) ** = highly significant (P< 0.01), Sig. = Significance.

Table 7: The average (± SD) daily milk yield and lactation length of dairy cows in urban and Peri-urban farms in the study area as reported by farmers

Variables	Urban farms Mean ± SD	Peri urban farms Mean ± SD	Overall mean	Sig
Lactation length (months)				
Local cows	8.90±1.61	9.16±1.92	9.03	*
Crossbred cows	10.45±1.3	10.00±1.23	10.23	ns
Average milk yield/day				
Local cows	2.45±0.59	2.03±0.29	2.24	*
Crossbred cows	6.00±1.12	5.77±0.97	5.89	ns
Lactation milk yield	2535.15	2288.84	2412	-

SD=standard deviation, ns = not significant (P> 0.05)
* = significant (P< 0.05) ** = highly significant (P< 0.01), Sig. = Significance.

AFC for the native cows is 57.12 months whereas the average AFC for crossbred cows was 36.6 months in Bahir Dar milk shed area. Average AFC obtained in the current study is shorter than the finding of Fisseha (2007) the overall mean of AFC 43.13 ±1.7 months for Holstein Frisian cows in Alage.

Calving Interval (CI)

CI is the time gap between two consecutive calvings. In this study, the estimated calving interval for crossbred cows was 14.00±1.94 and 13.14±2.38 months in urban and peri-urban farms, respectively (Table 6).

This figure is shorter than the findings of Ike *et al.* (2005) who reported average CI of 14.1 and 17.3 months for crossbred cows in urban and peri-urban farms, respectively at Awassa town. Similarly, Kefena (2004) observed CI of 16.04 ± 0.87 months for Boran crossbred cows.

The overall mean CI for local cows was 17.07±2.53 and 19.09±3.44 months in urban and peri urban farms, respectively (Table 6).The CI of local cows significantly vary(P<0.05) between urban and peri-urban farms while the calving interval for crossbred cows did not vary between urban and peri urban.

The value obtained in this study is shorter than the findings of Ike et al. (2005) who reported average calving interval of 19.4 and 22.1 months in urban and peri-urban farms, respectively at Awassa town.

Milk production performance

Daily milk yield and lactation length of dairy cows in urban and Peri-urban farms in the study area are shown in Table 8.The mean (± SD) daily milk yield of local cows in urban and peri-urban farms were 2.45±0.59 and 2.03±0.29 liters, respectively, while daily milk yield of cross bred cows in the urban and peri urban were 6.00±1.12 and 5.77±0.97liter, respectively.

The daily milk yield result of local cows was greater than the daily milk yield reported by Alganesh (2002) who reported 1.8 liters/cow/day for Horro cattle in eastern Wollega. However, the average daily milk yield of crossbred cows was found to be less than the finding of Derese (2008) who reported 9.14 and 6.47 liters for urban and peri-urban dairy farms, respectively, in west

Table 8: Feed resources for dairy cattle in urban and peri-urban farms in the study area (percentage of total respondents)

Feed resources	Urban farms N=45		Peri urban farms N=45
	Dry season	Wet season	Dry season
Free grazing	44.44	35.56	100
Zero gazing	53.33	71.11	8.88
Crop residue	64.44	4.44	93.33
Agro industrial by product	40.00	44.44	20.00
Local beverage by product *atela*and *brint*	97.78	93.33	71.11
Conserved feed (hay)	91.11	97.78	42.22

N=number of respondents.

Shoa zone. The lower milk yield of the local cows in the current study might be attributed to a number of factors including lack of proper supplementary feeding for the dairy cattle, poor nutritive value of pastures and forages offered to the animals.

The average lactation length of local cows in urban and peri-urban farms was 8.90±1.61months or (267days) and 9.16±1.92 months or (274days) with an estimated lactation yield of 654.15 liter and 557.84 litter, respectively, which is greater than that reported by Zelalem and Ledin (2001a) and Lemma (2004) in the central highland of Ethiopia (233 days) and 255 days in east shoa zone but less than that reported by Alganesh (2002) eastern Wollega (288 days). Lactation length of local cows in peri-urban farms was significantly longer ($P< 0.05$) than cows in urban farms. This may be attributed to the availability of crop residues and access for grazing lands in peri-urban farms than the urban farms.

The average lactation length of crossbred cows in urban and peri-urban farms in the study area was 10.45±1.3and 10.00±1.23 months with an estimated lactation yield of 1881 and 1731 liters, respectively.

This result is shorter than the average lactation period reported by Ike et al. (2005) which was 11.2 months with lactation yield of 3949.6 liters for cows in urban farms and 12.2 months with lactation yield of 2596.2 liters for cows in peri-urban farms in Awassa.

In the present study a total of 2535.15 and 2288.84litres of milk were produced in urban and peri-urban areas, respectively. The daily milk yield of local dairy cows in urban farms was significantly higher ($P< 0.01$) than milk yield of local cows in peri-urban farms as shown in Table 7. This may be due the difference in feeding management and selected mainly for milk production. The daily milk yield of crossbred cows did not vary between urban and peri urban farms.

Feed Resources and Feeding of Dairy Cattle

According to the dairy farmers, different feed resources are used for dairy cattle feeding in the study district. These feed sources include: communal land natural grazing lands, crop residue (straw and stover), conserved pasture (hay), local beverage by products (*attela* and *brint*), agro industrial by products (oil seed cake, *furshka*, flour sieve residue) and leaves of different plants like *susbania susban* spp. Among these feed resources, local beverage by products are the most common feed source in the urban and peri urban for dairy cows and for fattening beef cattle. In the urban, the majority of the respondents reported that local beverage by products (97.78%, 93.33%) and conserved hay (91.11%, 97.78%) were fed to their cattle during dry and wet season respectively. In the peri urban, free grazing was dominant (100%, 91.11%) during the dry and wet season followed by crop residue (93.33%) in the dry season and conserved hay (71.11%) during wet season.

This result agrees with the report of Ike *et al*. (2005) where 95 percent of dairy farms in the urban and 92.1 percent of peri-urban farms use zero grazing and semi-grazing in and around Awassa town. This indicates that there is shortage of land in urban areas for the production of natural pasture for grazing purpose.

The availability of feed resources in the area depends on location and season. Free grazing and crop residue were available in the peri urban especially in dry season while local beverage by products, conserved feed (hay) and zero grazing feed resources were more dominant in the urban area. Majority of the respondents used conserved feed (hay) and agro industrial by products during wet season where there is shortage of grazing land in the out skirt of the town due to the grazing land being covered with crops.

The urban farms used concentrate (maize) as a supplement for crossbred dairy cattle which is less practiced in peri-urban farms. No concentrate was supplemented to local cattle in the study areas. However, a by-product of local beverage (*Atela* and *brint*) were commonly used as supplement to local cows both in urban and peri-urban areas.

Source of Water for Dairy Cattle

The majority of the respondents in the urban areas use tap water both in wet and dry seasons, while both ground

Table 9: Sources of water for dairy cattle in urban and peri-urban farms in the study area

Source of water	Urban farms N=45		Peri urban farms N=45
	Dry season	Wet season	Dry season
River	17.78	28.89	35.56
Tap water	84.44	73.33	6.67
Well	17.78	4.44	8.89
Pond water	33.33	13.33	8.89
Both well and river	22.22	17.78	66.67

N=number of respondents

Table 10: Milking frequency and procedure used in urban and peri-urban dairy farms in the study area

	Percent of total respondents	
Variables	**Urban farms N=45**	**Peri urban farms N=45**
Milking frequency (%)		
Once a day (evening only)	2.7	8.2
Two times a day	92.8	83.7
Three times a day	4.5	8.1
Milking procedure (%)	%	%
Udder washing before milking	37	21
Hand washing	100	100
Use of towels (%)		
Individual towel	2.3	1.8
Common towel	3.7	10
Does not use towel	94	88.2

N=number of respondents.

water and river water together accounts the main water sources in the peri-urban farms both in wet and dry seasons. (Table 9).

Milk Handling Practices

Milk handling practices followed in the study area are given in Table 10. All of the respondents in both urban and peri urban of the study area practice hand milking. Cows were hand milked twice a day in both urban and peri-urban dairy farms during early and mid-lactation season but milked once in the afternoon during late lactation especially local cows. In the study area, washing of udder and milker's hands before milking.

About 2.3% and 3.7% of the respondents reported to use individual and common towels to clean the udder of cows in the urban farms, respectively while 1.8% and 10% of the respondents used individual and common towels in peri-urban farms, respectively. In the current study, 88.2 % of the respondents in the peri-urban farms don't use towel at all. This is a potential source for the contamination of milk with microorganisms during milking. Use of common towel is a potential means of transmission of mastitis and other diseases from infected cow and teats to healthy ones. This indicate the need of training for dairy producers about the importance of proper milking procedure before milking and the consequence of using common towels, which may contribute in reducing the risk.

Milk can be contaminated by microorganisms at any point from production to consumption. FSA (2006) indicated that cleaning of the udder before milking is important to remove both visible dirt and bacteria from the outer surface of the udder. Getachew (2003) also indicated that milk producers should follow hygienic practices (clean utensils, washing milker's hands, washing the udder, use of individual towels) during milking and handling, before delivery to consumers or processors.

Containers used for milking and churning milk in the study area are given in Table 11. The majority of urban farms (60%) used Gourd for milking, while about 44.44% of the respondents used both plastic materials and stainless steel for milking. All of the respondents (100%) in urban and peri-urban areas used clay pot for churning milk (Table 11).

Washing and smoking milk vessels

The plants that are used for washing and smoking milk vessels are showed in Table 12. All the respondents practice washing the milk utensils used for milking,

Table 11: Containers used for milking and churning in urban and peri-urban farms in the study area

Containers	Percent of total respondents		
	Urban farms %		Peri-urban farms %
	Milking	Churning	Milking
Gourd	60.00	0.00	66.67
Clay pot	0.00	100	0.00
Plastic material	44.44	0.00	46.67
Stainless steel	44.44	0.00	8.89

N=number of respondents.

Table 12: Plants used for cleaning and smoking of milk utensils in the study area

Amharic name	Scientific name	Purpose	Urban	Peri urban (%)
Cheba	*Acacia* spp.	Smoking	38.4	30
Kega	*Rose abyssinica*	Smoking	19.5	14.5
Woyira	*Olea Africana*	Smoking	32.1	21.6
Dokima	*Syzygiumguineense*	Smoking	5	13.3
Embuay	*Solanum incanum*	Smoking	3	12.1
Maize cobe	*Zea mays*	Smoking	2	8.5
Bsana leaf	*Croton macrostachyus*	Washing	94	78
Nacha leaf	Unidentified	Washing	6	22

N = number of respondents (45 respondents from each location).

storing and processing of milk. The procedure for cleaning milk vessels was, washing with warm water together with plant leaves and finally rising with cold water. The most common plant leaves used for washing milk vessels were, *bsana* leaf *(Croton macrostachyus)* and *nacha* leaf depending on their availability. Most of the respondents use *bsana* in both urban and peri urban (94% and 78%), respectively. The remaining respondents use *nacha* leaf in urban and peri urban (6% and 22%) respectively. *Cheba (Acacia* spp.*), Woyira (Olea Africana), Dokima, Embuay (Solanum incanum)* and maize cob are common plants used for smoking milk vessels in the study area. The most common procedure for smoking is, that milk vessels are washed and turned upside down on a burning plant to make sure entrance of smoke in to the milk vessel. Respondents mentioned that, the purpose of smoking is to facilitate fermentation and to bring good taste or aroma to the dairy product.

According to dairy farmers, the majority use *cheba* for smoking purpose in both urban (38.4%) and peri urban (30%) followed by *woyira* (32.1% and 21.65) in the urban and peri urban, respectively. This report is consistent with the report of Asaminew (2007) and Deresse (2008) who reported similar practices in Bahir Dar milk shed area and east Shoa Zones of Oromia region, respectively.

Traditional Processing of Dairy Products

Butter making

Butter is one of the most desired dairy products produced in the study area. All of the respondents in the urban as well as the peri urban of the study area involve in butter making. Milk was collected in one container until sufficient amount is collected and repeatedly fresh milk added to the sour milk. Butter is made by churning sour milk (*Ergo*) which has been collected over 2-3 days and allowed to ferment naturally. After sufficient amount of milk is collected, it is transferred to a churn made of clay pot. Before churning, sour milk is gently disturbed by hand to break the curd and to mix the sour milk. According to the farmers in the study area, clay pot is the only churning material used both in the urban and the peri urban of the district. Grass, straw or cloth is used to make the churning clay pot pad. The churning clay pot has narrow opening around the neck which is used to remove the gas produced during the first phase of churning. This gas may be released due to breakdown of bonds by churning of the fermented milk. Clay pot, the churn is placed on a grass or hay pad on the floor and rocked it back and forth until milk fat is recovered in the form of butter. According to farmers' practice the breakpoint, i.e., the point when butter grains formation is detected by inserting a grass stick into the churning clay pot through a vent on the neck of the churning clay pot and churned back and fro two times to make sure contact between the grass stick and the milk fat grains . If there are small butter grains adhering to the surface of the grass stick, churning is over. Farmers in the study area reported that, the change in sound of the milk churned during the last phase of churning is also considered as indicator for breakpoint of butter recovery. After churning completed, the churning clay pot will be opened and large butter grains will be collected together

Table 13: The average volume of milk processed at a time, volume of milk used to produce 1 kg of butter, Volume of buttermilk to produce 1 kg cottage cheese and churning time taken

Production system	Quantity of milk churned at a time in Lt.	Volume of milk to produce 1 kg butter	Volume of buttermilk to produce 1 kg cottage cheese	Churning time in minute
Urban	25.36	17.15	8.05	87.78
Peri urban	24.91	17.76	8.28	97.67
Overall mean	25.14	17.46	8.17	92.73

Table 14: Different types of spices used for ghee making in the urban and peri urban of the study area

Amharic name	Botanical name	Scientific name	Urban	Peri urban	Overall mean
Netchshinkurt	Garlic	*Allium sativum*	84.6	91.3	87.95
Zingebile	Ginger	*Zingiberofficinale*	100	100	100
Zekakibe	Basil	*Ocimumspp.*	100	100	100
Irid	Turmeric	*Curcuma domestica*	98.5	76.9	87.7
Mekimeko	Spinach Rhubarb	*Rumex abyssinicus*	100	100	100

by hand to make butter. The remaining dairy product after butter skimmed off is butter milk which is used for direct consumption or for cottage cheese production.

The average volume of milk processed at a time, volume of milk used to produce 1 kg of butter, volume of buttermilk to produce 1 kg cottage cheese and churning time taken are indicated in Table 13. The average volume of fresh whole milk churned at a time was 25.14 liters. Volume of milk required to produce one kilogram of butter was 17.46 liters in the district.

In the present study, the average volume of fresh whole milk required to produce one kilogram of butter was 17.46 liters. This result is relatively higher than that reported by Alganesh (2002) who found that an average of 16.2 liters of milk are required to produce 1 kg of butter in eastern Wollega. However the result is lower than the report of Asaminew(2007) who found that an average of 18.1 liters of milk are required to produce 1 kg of butter in Bahir Dar milkshed area. According to the respondents, volume of fermented milk churned at a time depends upon the number of milking cows, the breed type (blood level) of milking cows (i.e., local or crossbred), the amount of fresh whole milk and sour milk (Ergo) used for sale, consumption or for *zureshekefign* production. Volume of buttermilk used to produce 1 kg cottage cheese was 8.17 liters in in the district. The average churning time taken to produce butter in the district was 92.73 minutes.

Butter preservation (*Gure* making in local language)

Traditional butter preservation method was practiced in the study area. As the respondents reported this practice of butter preservation is called *Gure* making by the local farmers. The reasons for *gure* making are three: the first reason is to preserve and store the product during surplus production as it has less demand due to long distance from market. The second reason is those farmers who do not have either milking cows or better access to market buy butter from market and store for long time by making *gure*. The third reason is value addition to get profit by buying butter when there is less demand especially during long fasting season and sell in the form of *gure* during the holiday or after the end of fasting season. This traditional butter preservation practice is mainly practiced in the peri urban area of the district. The respondents reported that butter is preserved to prolong increase the shelf life of the product for marketing or consumption. Different spices are used to *gure* making to increase the shelf life as they arrest the multiplication of microbes in the product by making unfavourable condition for microbes.Similar practices are followed in eastern Wollega (Alganesh, 2002) and in east Shoa Zone of Oromia region (Lemma, 2004), in Bahirdar milk shed (Asaminew, 2007) to preserve butter.

Gure was different from ghee in spices mixed and the procedure used. Butter is heated and then taken off from fire and water were added and stay for 1day. In the next day spices in the form of powder is mixed with butter and stored in airtight container. During ghee making, spices boiled together with butter with high heat and then clarified with sieve. The spices used for *ghee* making were in chopped form especially green leaves, flowers and stems of herbs which was removed by clarifying.

Ghee making

Ghee (clarified butter) is made by melting butter together with different spices available in the area. It is marketed for holidays and at the end of fasting season in the study area. Ghee is mainly used for coffee making instead of sugar, cooking stew (*wot*), for eating raw meat and consumption of other homemade foodstuffs.

Different spices are used during ghee making which varies from household to household. The different types of spices used in both urban and peri urban area of the study area are shown in Table 14.

Table 15: Different types of spices that are used for metata making in the urban and peri urban of study area

Vernacular Name (Amharic)	Common Name	Scientific Name	Urban N=45%	Peri urban N=45%	Overall mean
Gomenzer	Mustard	Bracicanapus	100	100	100
Nechire	Unknown	*Unknown*	*10*	*65.3*	*37.65*
Dimbillael	Coriander	*Coriandrumsativum*	*83.7*	*23.5*	*53.60*
Zingebile	Ginger	*Zingiberofficinale*	*100*	*100*	*100*
Korerima	Korerima	*Aframomumkorerimao*	*67.9*	*73.6*	*70.75*
Netchshinkurt	Garlic	*Allium sativum*	*100*	*100*	*100*
Zekakibe	Basil	*Ocimumbasilium*	*100*	*100*	*100*
Tosign	Thyme	*Thymus serrulatus*	*22.4*	*78*	*50.20*
Tenadam	Rue	*Rutagraveolence*	*100*	*100*	*100*
Netch-azmud	Bishop's weed	*Trachyspermumammi*	*16*	*27*	*21.5*
Tikur-azmud	Black cumin	*Nigella sativa*	*45*	*18*	*31.5*
Keyshinkurt	Onion	*Allium cepa*	*100*	*100*	*100*

Table 16: Ranking of major constrains of dairy production in urban and peri urban farms in the study area (N=45)

Variables	Weighted average score (%)	Rank
	Urban farms	
Feed shortage	84.44	1st
High cost of feed	77.78	2nd
Disease problem	71.11	3rd
Lack of improved dairy cows	66.67	4th
Shortage of land	60.00	5th
Lack of access to credit	55.56	6th
AI service problem	48.89	7th
Lack of milk collection center	55.56	8th
	Peri urban farms	
Shortage of land	77.78	1st
Feed shortage	68.89	2nd
High cost of feed	66.67	3rd
Lack of access to credit	48.89	4th
Lack of milk collection center	40.00	5th
AI service problem	37.78	6th
Disease problem	31.11	7th
Lack of improved dairy cows	28.89	8th

N= number of respondents; AI = Artificial Insemination

The procedures to make ghee; butter is placed into a pan or dish and put on open fire to melt. Heating and stirring continue until foam is formed and a clear liquid is obtained. Along heating the butter, different spices are added to induce good aroma and taste. Then the dish is removed from the fire and the liquid is filtered through sieve or piece of cloth into a container to remove the herbs and spices added. Similar procedures have also been reported by Asamnew in Bahir Dar milk shed (2007).

Cottage type cheese (*Ayib*) making and utilization

During butter making, fermented milk is churned then butter and butter milk are produced as the end products. After butter is removed the remaining dairy product is called butter milk or *Arera* by local farmers. Respondents in the study area reported, buttermilk is used for multi purposes such as direct drinking, or further dairy product processing such as cottage cheese and *zureshekefign* production. To produce cottage cheese butter milk is heated by clay pot or stainless steel pan for 30^0c - 40^0c for 30 minutes and then cooled and whey removed. According to the farmers report, the efficiency of cottage cheese production is higher in clay pot heater than stainless steel pan because of slowly warmed and heat absorption capacity of clay pot heaters. The cheese produced should be cooled 6-12 hours to be hard and ready for consumption. Whey is removed and cottage cheese is collected or cottage cheese is removed and

whey is left in the heater clay pot depending on the preference of the person. The cottage cheese is used for home consumption and for sale during the holidays especially after orthodox faith long fasting. Cottage cheese is used for consumption, marketing or further dairy product processing such as *zureshekefign* or *metata* production. Cheese is mostly consumed by mixing with other foods in the peri urban and used as part of food component preparation in hotels and restaurants in the urban area of the district.

Zureshekefign (blended soft cheese) making

Zureshekefign is one of the traditional dairy products produced in the study area. *Zureshekefign* is produced from whole fresh milk, cottage cheese and sour milk. Farmers in the study area reported that, the Amharic name *Zureshekefign* is given from the action of circular stirring practiced to blend fresh whole milk with cottage cheese or sour milk with cottage cheese. There are two types of making *zureshekefign* in the study area depending on the raw material available in which *zureshekefign* is produced.

The first type is prepared from whole fresh milk and cottage cheese: When cottage cheese available, whole fresh milk together with cottage cheese is heated in clay pot or roasting pan at 30-40°c by steering until it produces whey. The whey produced in this process has good flavour for consumption. The solid product left after whey removal with elastic nature is called *zureshekefign*. Then it is ready for consumption. The farmers in the study area reported that they make *Zureshekefign* to get good taste or flavour of freshness combined with nutrition, richness. This dairy product is prepared mostly to be presented to respected guests and relatives who came to visit them. According to the respondents, this type of *zureshekefign* making is more efficient.

The second type of *Zureshekefign* is produced from whole fresh milk and sour milk or fermented milk. Whole fresh milk together with sour milk are heated by clay pot or roasting pan at 30-40^{0}C by steering to ensure burnt. This type of *zureshekefign* is practiced whenever cottage cheese is not available. As the farmers in the study area reported, in this type of *zureshekefign* making more whey is produced and less *zureshekefign* is produced. Both methods of *zureshekefign* making are practiced in the peri urban production system of the study area while the urban farmers did not practice.

Metata (ripened soft cheese) making and Utilization

In the study area, farmers produce a product called *Metata* from cottage cheese. The cottage cheese is collected and placed in clay pot especially (new clay pot is recommended because it absorbs moisture from the cheese). The opening of the container is gently covered with grass and inverted on the clean stone for 3-4 days to withdrawal the whey by changing the covering grass every day. After the whey is completely removed grounded spices prepared from combination of different spices will be mixed gently and evenly distributed in the cottage cheese until it brings colour change from white to light green. Then the clay pot containing the mixture of cottage cheese and spices will be covered with its lid and clean closed to ensure protection of entrance of air and different microorganisms and fermentation will takes place. Then it is stored in dry place for a week or longer depending on the preference of the consumers. After a week fermentation the product is called *metata* which seems ripened soft cheese like blue mould cheese and it is ready for consumption or sale during holiday especially after fasting. For consumption, fresh milk or warm water with salt depending on availability is used to mix *metata* to make it liquid to be well spread. All the respondents in the peri urban production system practice *metata* making during the long Easter fasting period while in the urban production system *metata* making is not well practiced like the peri urban due to lack of knowledge of spices used for and the procedure to be followed during *metata* making.

Constraints to Urban and Peri-urban Dairy Production Systems

In this study the majority of respondents in urban farms ranked feed shortage as the first most important problem responsible for low milk yield and low productivity of dairy cows in urban production systems, which is in agreement with the finding of Fayo (2006) who reported feed shortage as the major problem that contributed to the low production and productivity of cattle in and around Dire Dawa town. Similarly, Derese (2008) reported that feed shortage is the most important constraint to milk production in west Shoa zone of Oromia region. However, in the peri urban area, the majority of the respondents reported, shortage of land is the most important constraint which contributes to low milk production and productivity potential.

The major diseases that affect dairy production and productivity in the study area includes mastitis, blackleg, trypanosomiasis, foot and mouth disease (FMD), Lumpyskin, tick infestation fasciolasis, bloat, plastic and poison consumption(Table 17). According to the respondents, mastitis is one of the major diseases that causes high economic loss in the urban. About 48.89 and 48.89 and 37.78 percent of the respondents from urban and peri-urban dairy farms, respectively reported high incidence of mastitis in the area (Table 17). Tick infestation is the major disease reported in the peri urban of the study district 53.33% followed by mastitis which accounts 37.78 percent.

Generally, appropriate measures should be devised through integrated work with agricultural offices, research centers and extension offices to alleviate the constraints

Table 17: Reported prevalence of diseases of cattle in urban and peri-urban farms in the study area

	Urban farms	Peri urban farms	Over all
Disease	N=45	N=45	N=90
FMD	24.44	31.11	27.77
Mastitis	48.89	37.78	43.34
Lampy skin	4.44	8.89	6.67
Tick infestation	28.89	53.33	41.11
Fasciolasis	6.67	35.56	21.12
Antrax	0.00	0.00	0.00
Black leg	0.00	11.11	5.56
Tuberculosis	0.00	0.00	0.00
Bloat	4.44	15.56	10.00
Poison and plastic consumption	17.78	4.44	11.11
Trypanosomiasis	24.44	13.33	18.89

N=number of respondents.

Table 18: Milk and milk products sold in the study area

Milk and Milk products	Urban farm in %	Peri urban farm in %	Overall mean
Butter	92.4	100	96.20
Raw milk	89.7	67.2	78.45
Metata	42.7	73.5	58.10
Ghee	36.3	55.9	46.10
Gure	0.00	10.8	5.40
Cheese	38.4	12.3	25.35

in urban and peri-urban milk production system to meet the ever increasing demand for milk and milk products in the study areas.

Marketing of Milk and Milk Products

The demand for milk and dairy products in Dangila district is high. According to the respondents, milk, butter, ghee, *metata,* cheese and *gure* are sold in the study area. The results in the current study are comparable with the report of many authors', Fekadu (1994) in southern region, Zelalem and Ledin (2001a) in the central highlands of Ethiopia, Alganesh (2002) in eastern Wollega and Lemma (2004) in east Shoa Zone of Oromia region, where most of the farmers in these areas do not sell fresh milk but selling of butter is a common practice. Butter was the most demanded dairy product to be marketed in the urban and peri urban areas of Dangila district.

Asaminew, (2007) reported that about 15.98 and 14.56 percent of the respondents in Bahir Dar milk shed area sell spiced butter and *Metata Ayib*, respectively. However, 10.8% and 73.5%*gure* (spiced butter) and *metata* ayib sold in the peri urban and 42.7% of respondents were sold in the urban but no respondent sold spiced butter in the urban area of the study district. In the current study all the respondents in the peri-uran stated that they butterin the market.

In the current study, farmers practice informal marketing system where they sell their milk and milk products to neighbors or the local markets as well as formal marketing system where they sell their milk for milk collecting and processing cooperatives. Present result is comparable with the report of Mohamed *et al.,* (2004), as is common in other African countries (e.g., Kenya and Uganda), dairy products in Ethiopia are channeled to consumers through both formal and informal dairy marketing systems. Until 1991, the formal market of cold chain, pasteurized milk was exclusively dominated by the dairy development enterprise which supplied 12 percent of the total fresh milk in the Addis Ababa area (Holloway *et al*. 2000). Recently, however, private businesses have begun collecting, processing, packing and distributing milk and other dairy products.

The most common milk channels in Dangila district were:

Milk producers→ milk consumers (Hotels, Restaurants, Cafeterias' and individual consumers)

Milk producers →dairy cooperatives →Dairy Cooperatives →consumers

Milk producers→ dairy cooperatives →collect and sale for dairy processors found in Bahir Dar→ (distributors, consumers).

According to the respondents, milk has a great cultural role of gift in the study area. It is used as gift when women give birth and milk collected from visitors will be used mainly for porridge making. However, beyond porridge making, the left over milk will be directly consumed after boiling by children or the women.

SUMMARY AND CONCLUSIONS

Summary

The existing urban and peri urban dairy production, milk handling, processing practices and marketing systems in

Dangila district of Awi Zone were assessed. A total of 90 households, 45 households from urban and 45 from peri-urban farms were sampled and studied. These households were purposively selected and interviewed using semi-structured questionnaire.

The survey results showed that the Average (± SD) family size of the district was 5.87±2.05 persons per household. The average cattle herd size in district 13.68 per household. Local breeds were more dominant in the peri urban production system while the crossbreds were dominant herd component in the urban production system.

The dairy animal performance assessment shows that for local cows average calving interval, lactation length, age at first calving and milk yield were 18.08, 9.03, 47.58 months and 2.24 lt/cow/day, respectively, while for the crossbred cows these values were 13.57, 10.23, 34.29 and 5.89 liter/cow/day, respectively.

In the current study different feed resources used for dairy cattle feeding in the study district were identified. These feed sources include communal natural grazing land, crop residue (straw and Stover), conserved pasture (hay), local beverage by products (*atela* and *brint*), agro industrial by products (oil seed cake, *furshka,* flour sieve residue) and leaves of different plants like *susbania susban* spp. Among these feed resources, local beverages by products are the most common feed sources in the areas for dairy cows and for fattening beef cattle. In the urban, the majority of the respondents report that local beverage by products (97.78%, 93.33%) and conserved hay (91.11%, 97.78%) during dry and wet season, respectively. While in the peri urban, free grazing is dominant (100%, 91.11%) during the dry and wet season followed by crop residue (93.33%) in the dry season and conserved hay (71.11%) during wet season.

In the current study, the most constraints responsible for low milk production and productivity of dairy cows in the district were identified. In the peri-urban farms feed shortage was the most important problem responsible for low milk yield and low productivity of dairy cows in urban production systems, on the other hand, in the peri urban area, shortage of land is the most important constraint which contributes to low milk production and productivity potential. The major diseases that affect dairy production and productivity in the study area includes mastitis, black leg, trypanosomiasis, foot and mouth disease, Lamp skin, tick infestation fasciolasis, bloat, plastic and poison consumption

The most important outlet for both urban and peri urban producers were cooperatives, individuals, hotels, restaurants and cafeterias. Dairy products were mostly sold in open market depending on holiday. This study showed that there are two milk collecting and processing cooperatives in the urban however there was no farmers' milk marketing groups (cooperatives) operating in the peri urban of the study area.

CONCLUSIONS AND RECOMMENDATIONS

From this study, it can be concluded that shortage of feed was the most important factor responsible for low milk yield and productivity of dairy cattle in both urban and peri-urban areas. The mean daily milk yields of local dairy cows have varied between the farms groups in the study areas. Absence of farmers' milk marketing groups (dairy cooperative) was observed to affect the return from sale of fresh milk especially in peri-urban farms.

Milk intended for human consumption must be free from pathogens and must, if conditions permit, contain no or few bacteria. Clean milk could only be obtained if effective sanitary measures are taken starting from the point of milk withdrawn from the cow until it reaches the consumers. Hence, Hence, adequate sanitary measures should be taken at all stages from production to consumption. These measures include proper handling of the cow, good personnel hygiene, hygienic milking and processing equipment, improving milk and milk handling environment.

From these findings, the following are recommended:

- Improve the available natural pasture and introduce hay making and silage making and introduce and develop improved forages as sole crops or integrated with cereal crop production.
- Improved straw and maize stover conservation and enhance utilization by chopping, and treating with urea molasses.
- Training of dairy farmers on hygienic milking activity is necessary at all stages from production to consumption.
- The traditional processing methods used to make ripened soft cheese, blended soft cheese and butter preservation need optimization and improvement with scientific investigation.
- Establish milk collecting and processing unit through encouraging the already existing cooperatives and create market linkage between milk producers and consumers.

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