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Responses of farmers on reproductive performance of dairy cows in urban and peri-urban small scale dairy production system: The case of south east Oromia, Ethiopia

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ABSTRACT

The study was carried out to assess the reproductive performance of dairy cows in urban and peri-urban small scale dairy production system. The response of the farmers were involved factors affecting the reproductive performances such as; household characteristics, cattle management system, feed and feeding system, breeding method used and the reproductive performance parameters. A total of 180 dairy producer households (90 from Urban and 90 from peri-urban) were selected randomly from 6 Towns (Mojo, Batu, Shashemane, Dodola, Robe-Bale and Goba) and interviewed using structured and semi-structured questionnaire. The result of the study indicated that 25.9% of Urban and 22.3% of peri-urban dairy producer households were literates. The mean number of cattle/per household was 4.1±0.28 and 5±0.36 for urban and peri-urban dairy producers respectively. Bellow 15% of the farmers uses regular follow up on estrus detection and herdsman information. More than 90% of the respondents were indicated livestock production was constrained from getting year round feed supply both in quality and quantity. Out of the total respondents 55% were only AI service beneficiaries, 24.4% both natural matting and AI beneficiaries, and 20.6% non-AI beneficiaries. Based on this; the overall average of main parameters such as Age at first calving (AFC), Calving intervals (CI), Days open (DO) and Number of Services per

Conception (NSC) are 36.97±0.58 months, 5.76±0.19 months, 14.75±0.19 months and 2.52±0.22 respectively. The result of study suggests that the overall production system observed could be categorized as fairly good in urban and poor in peri-urban. The overall production and reproduction parameters are bellow the standard level for optimum production. The major constraints mentioned by farmers and other stakeholders are; feed and feeding problem, poor cattle management, poor genetic potential and health problem in precedence.

1. Introduction

Ethiopia has the largest livestock population compared to any other country in Africa. This sector contributes 45% of the agricultural GDP (IGAD, 2010). The Agriculture output covers about 12-16% of national Gross Domestic Product (GDP) and also contributes to the livelihoods of 60-70% of the population, 15% of export earnings and 30% of agricultural employment (USAID, 2010). Report of CSA (2014) indicates that the national cattle population is about 55.03 million of which 55.38% are females. The main source of milk production in Ethiopia is from the cow. Cattle contributes a total of 1.5 million tones of milk and 0.331 million tones of meat annually (FAO, 2005). In addition, 14 million tones of manure is used annually primarily for fuel, and six million oxen provide the draught power required for the cultivation of cropland in the crop-livestock mixed production system (Azage and Alemu, 1997).

Urban and peri-urban milk production system is the type of production system mainly supplying dairy products. This system is developed in and around major cities and towns which have a high demand for milk. Population of urban dwellers is alarmingly increasing while the production and productivity change is insignificant. According to the estimation of CSA (2013) by the end of 2017G.C the urban population of Oromia region will increase by more than 10% while total population will increase by 5.3%. In contrary to this the government and none government organization effort towards comprehensive milk productivity improvement to meet the over increasing demand in the town was not reasonable.

In Ethiopia almost studies related to dairy production system so far are not exhaustive and timely. Nevertheless, they are not representative of the farming condition in the country (Mekonnen, 1994). Further, despite the spectacular development of the urban population which highly increased the demand of milk and milk products, there is limited information on implementation of dairy development technologies. The Reproductive Performance of Dairy Cows under Small Scale Dairy Production System in the country in general and in urban and peri-urban in south east Oromia in particular was not well studied.

Therefore, this study was conducted with the objective of assessing reproductive performance of dairy cows under small scale dairy in urban and peri-urban dairy production system in some selected towns of south east Oromia, Ethiopia.

2. Materials and methods

2.1. Description of the study area

The study were conducted six towns such as; Mojo, Batu, Shashemane, Dodola, Goba and Robe which located at south east Addis Ababa (Finfine) on the distance of 75, 165, 251, 320, 430 and 445km respectively. According to the population projection of Ethiopia, these towns will have the population of 286’102 in 2009 G.C and at the end of 2017 this population will reach more than half million. These towns are located in different agro-ecologies from the lowest position of Batu to the highest altitude of Goba which ranges 1450 to 3568 m a.s.l.

2.2. Sampling method

Random and purposive sampling techniques were employed for data collection. The target populations were defined as dairy producers intra-urban and around the selected towns. Small holder dairy producers are

households those live intra-urban and around urban. They produce and supply milk and milk products to processors, café/restaurants, traders and consumers. They keep dairy cattle in intensive and semi intensive system. Special inputs are linked to the production system which is intra-urban and peri-urban dairy production system usually varied by types of genotypes cattle, involved breeding methods and supplementary feeds used. In this study, intra-urban dairy producers are those who have dairy farm in urban administration area, usually depends on purchased feed (concentrate, Industrial by products and roughage) and zero grazing, while peri-urban are those who possess dairy farm around the town/urban within 10km radius usually characterized by producing his own roughage and using purchase concentrates and industrial by products.

Thus for the survey work, a total of 180 sample households were selected from 6 towns and 2 cluster of production systems (intra-urban and peri-urban) which gives a total of 12 study sites. The numbers of households interviewed from each study sites was 15 and the total sample size was 180 (15*12). The AI service center managers and experts were also consulted for supportive data collection.

2.3. Sources of data and collection procedures

The study was designed on primary and secondary data. Primary data related to the socio-economic characteristics of the milk producers such as educational level, land size, livestock owned, their view on dairy development extension service and also production system related information were gathered from the sampled dairy producers through questionnaires. Key informants interview was also made with administrative body of the livestock agency, experts and other stakeholders of the area who have better knowledge on AI service delivery system.

In this study data were collected from both primary and secondary sources using structured semi-structure questionnaires (survey). Primary information was collected from targets using semi-structured questionnaires. The survey started with questionnaires, which were developed and pre-tested to check appropriateness and clarity of the questions. Primary data collected from urban and peri-urban dairy farmers across the six towns (Mojo, Batu, Shashemane, Dodola, Robe and Goba) included socio-economic characteristics of the milk producers such as educational level, cattle owned and also production system related information like feed, cows breed type and other service related information.

2.4. Statistical data analysis

Data which is obtained from survey (questionnaires) were analyzed using descriptive statistics using SPSS version 20.

3. Results and discussion

3.1. Dairy cattle production system characterization

Household characteristics: House hold characteristics of the respondents were significantly different ($P<0.0001$) with respect to sex, educational status and age of the respondents across the study area (Table 1). Out of the total households involved in the study (53.9%) were headed by females. Concerning educational status, majority (44.4%) of the respondents' had completed primary education while about 24.4% were illiterates. In Goba town more than 53% of the respondents were educated from secondary to college level, while in Batu up to 50% of the respondents were illiterates. More than 50% of the respondents were aged greater than 40 years, while 17 to 25 years aged participants was less than 6%. This indicates that less number of youngsters are participating in dairy cattle production.

Herd size: The average number of crossbreed and indigenous cattle owned by the respondents by production system and location in the study area is presented in Table 3. The overall mean (±SD) number of cattle per household in the study area was 4.63±3.3. There were no significant difference ($p>0.05$) in average number of cross breed dairy cattle per house hold across the different production systems.

Table 1
Household characteristics of the respondents in six towns.

Town	Mojo		Batu		Shashemane		Dodola		Robe		Goba			P-value
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N%	
	12	40.0	13	43.3	14	46.7	12	40.0	15	50.0	17	56.7	46.1	
	18	60.0	17	56.7	16	53.3	18	60.0	15	50.0	13	43.3	53.9	
Education														
Illiterates	1	3.3	15	50.0	11	36.7	7	23.3	7	23.3	3	10.0	24.4	
Primary	18	60.0	6	20.0	9	30.0	16	53.3	20	66.7	11	36.7	44.4	<.0001
Secondary	9	30.0	7	23.3	8	26.7	5	16.7	3	10.0	13	43.3	25.0	
Collage	2	6.7	2	6.7	2	6.7	2	6.7	0	0.0	3	10.0	6.1	
Age(year)														
17-25	2	6.7	2	6.7	3	10.0	0	0.0	1	3.3	2	6.7	5.6	
25-33	4	13.3	4	13.3	5	16.7	6	20.0	7	23.3	6	20.0	17.8	<.0001
33-40	11	36.7	6	20.0	4	13.3	9	30.0	6	20.0	7	23.3	23.9	
>40	13	43.3	18	60.0	18	60.0	15	50.0	16	53.3	15	50.0	52.8	
Marital status														<.0001
Unmarred	1	3.3	1	3.3	2	6.7	0	0.0	0	0.0	3	10.0	3.9	
Marred	25	83.3	24	80.0	21	70.0	26	86.7	22	73.3	21	70.0	77.2	
Divorced	3	10.0	1	3.3	2	6.7	2	6.7	6	20.0	5	16.7	10.6	
Widow	1	3.3	4	13.3	4	13.3	2	6.7	2	6.7	1	3.3	7.9	
Widower	0	0.0	0	0.0	1	3.3	0	0.0	0	0.0	0	0.0	0.6	

N=Number of observation; Illiterates=Unable to read and write. Source: the survey.

Table 2
Mean number of cattle per household by production system.

Variables	Mean number of cattle/hh	SE	Min.	Max.	P-value
Urban	4.1	0.28	1	20	
Peri-Urban	5.0	0.36	2	15	
Total Mean (n)	4.5	0.23	1	20	
Urban	3.7	0.3	0	20	
Peri-Urban	3.5	0.3	0	15	
Mojo	3.4	0.5	0	13	
Batu	3.4	0.5	0	9	
Shashamane	4.6	0.6	0	20	
Dodola	3.1	0.5	0	12	
Robe	2.4	0.3	0	6	
Goba	4.7	0.6	0	15	
Urban	0.4	0.1	0	7	
Peri-Urban	1.5	0.3	0	15	
Mojo	0.2	0.1	0	3	
Batu	0.8	0.2	0	5	
Shashamane	0.3	0.2	0	5	
Dodola	1.1	0.3	0	6	
Robe	1.9	0.6	0	15	
Goba	1.3	0.7	0	15	

SD=Standard Deviation; SE=Standard Error; hh=House hold; Min=Minimum; Max=Maximum. Source: the Survey

The total number of cattle per house hold is significantly different ($p<0.05$) across the towns with the average number of cattle per house hold is 4.54 and the maximum and minimum number of cattle owned is 1 and 20

respectively. Even thought the difference is not significant (p>0.05) across the production systems, cross breed types of cattle owned by the farmer in peri-urban area was slightly lower than the number of cross breed cattle owned by urban farmers. In contrary to this the number of indigenous cattle owned in peri-urban area was significantly (p<0.05) higher than those owned in urban.

The average number of cross bred dairy cattle per household between the towns was significantly different (p<0.05) which was 4.54. In addition the participants of the survey also have local breed cattle (Arsi breed) and Boran breed. The average number of Arsi and Boran bred cattle per household slightly decreases as we go from Goba to Mojo. This indicates that extension service of improved dairy cattle breeding might have not evenly implement throughout the country.

Management of cattle: The higher proportion of dairy producers (55.0%) in urban and peri-urban who depend on AI service manage their breeding cows differently from the rest of the producers who use both AI and Natural matting, and non-beneficiaries of AI covering 45.0%. The management practice includes keeping of breeding cows separately and supplementing with different feeds like oil seed cakes, wheat bran, and wheat short, hay and by product of local beverage *"atela"*. Out of the total participant of the survey 72.22% do not let male animal to go with their herd and 57.69% of the households in the urban production system were practicing controlled breeding method. The participant of the peri-urban on the study indicated that more than 70% of them are releasing their heard with male animal which implies less controlled breeding. The controlled breeding either through artificial insemination or selected breeding bulls is more used in Shashemane and Mojo which is 90% and 80% respectively where as less controlled breeding is practiced in Dodola which is less than 60%. Among the sampled households, 42.55% of those who use AI service only and 57.45% of those who use both AI and natural service raise heifers at home for replacement.

Most of the farmers in the study area detect cows in heat by observing the animals during morning and night regularly. From the sampled farmers, about 67.5 % of the households practices regular follow up during morning and night to detect estrus. The household used either herdsman information or both regular follow up and herdsman information as means of heat detection are 12% and 20.5% respectively.

Feed resources and feeding system: The availability of feed resources in urban and peri-urban dairy production system was not similar across the different towns studied with respect to types of feed, season and price. The principal/basal dry season feed resources available to livestock in the peri-urban area included crop-residue, stubble grazing, natural pasture and hay where as agro-industry byproducts and by product of local beverage *"atela"* is used as supplement. Respondents of Goba and Robe towns indicated that availability and price of feed processed in different food processing and feed processing industries is different from the rest of towns located in the center of the country. In urban area most of the farmers use supplemental feeds purchased from livestock feed processing industry and from different agro-industry byproducts processing industries and basal feed such as hay and crop-residue is bought from nearby rural areas. The most common supplemental feeds are oil seed cakes, cotton cake, wheat bran, wheat short, malt industry by product, product of local beverage and others. Whereas, during the wet season, the principal feed resources were natural pasture, preserved crop-residue and hay in their descending order of intensity of use by producers in peri-urban area. Almost all respondents of urban milk producers were dependent on purchasing of agro-industrial by products from livestock feed processing industries and local beverage. However, more than 90% of the respondents were indicated that livestock production was constrained from getting year round feed supply both in quality and quantity across the study area. This may be due to lack of feed management and inappropriate feeding system.

More than 94.2% the respondents indicated that they feed their animals by mixing different concentrate feeds with roughages. Dairy cows are fed with mixture of crop residue and wheat short, wheat bran and byproduct of local beverage *"atela"* and oil factory by-products like sesame seed cake in both urban and peri-urban production system. However; oil seed cakes are not preferred by more 63.9% farmers for lactating cows, since they have their own perception on harmful effect of oil seed cake on butter quality. In Mojo town and around more than 93% of the respondents were supplementing in both dry and wet season which is almost the same in urban and peri-urban area. The availability of byproduct of local beverage *"atela"* and malt industry by product feed is highly scarce in Dodola, Robe and Goba since the malt industry is not found in the area and because of the fact that most of the local residents in these areas are Muslim religion followers.

Methods of breeding: This study showed that out of the total sampled household heads, 55% were only AI service beneficiaries, 24.4% both natural matting and AI beneficiaries, and 20.6% non-AI beneficiaries (Fig 1). The number of AI beneficiaries was higher in urban (64.4%) than in peri-urban production system (45.6%). This indicates that adoption of AI technology was better in urban than in peri-urban areas which might be related to better awareness of the milk producers and accessibility of AI service in the urban. Lack of bull service in urban area than peri-urban might be additional reason for high frequency of AI only beneficiaries in urban production system.

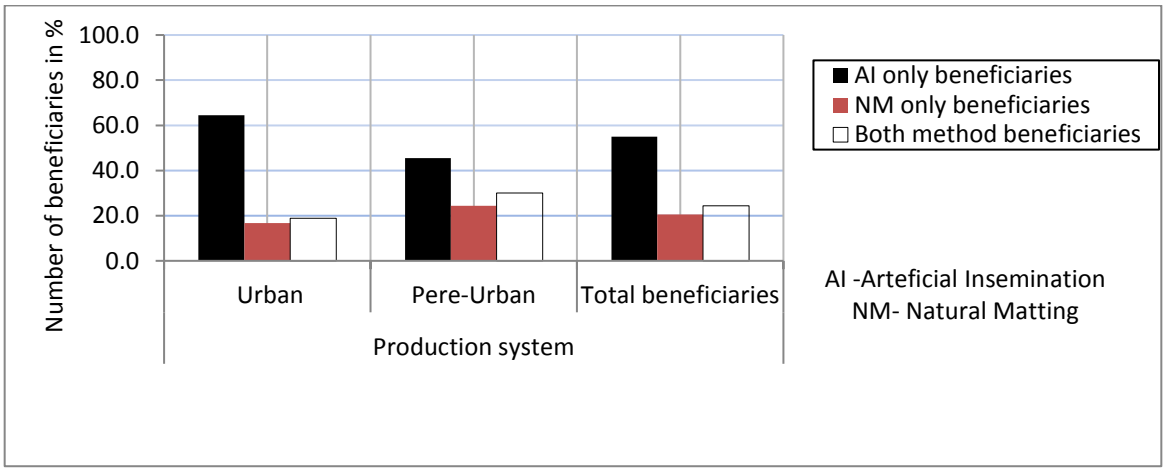

Fig. 1. Distribution of beneficiaries and breeding methods used across the production systems (source: the survey).

The highest percent (90%) of AI only users were recorded in Mojo town and Batu (66.7%) were as Goba and Robe town receive the highest percent of non-beneficiaries and both natural matting and AI beneficiary respondents (Fig 2). The number of AI only beneficiaries was indicated decreasing pattern from Mojo to Goba and vice versa for the percents of non-AI beneficiaries and both AI and natural matting beneficiaries. This might related to unevenness of farmers awareness and service quality.

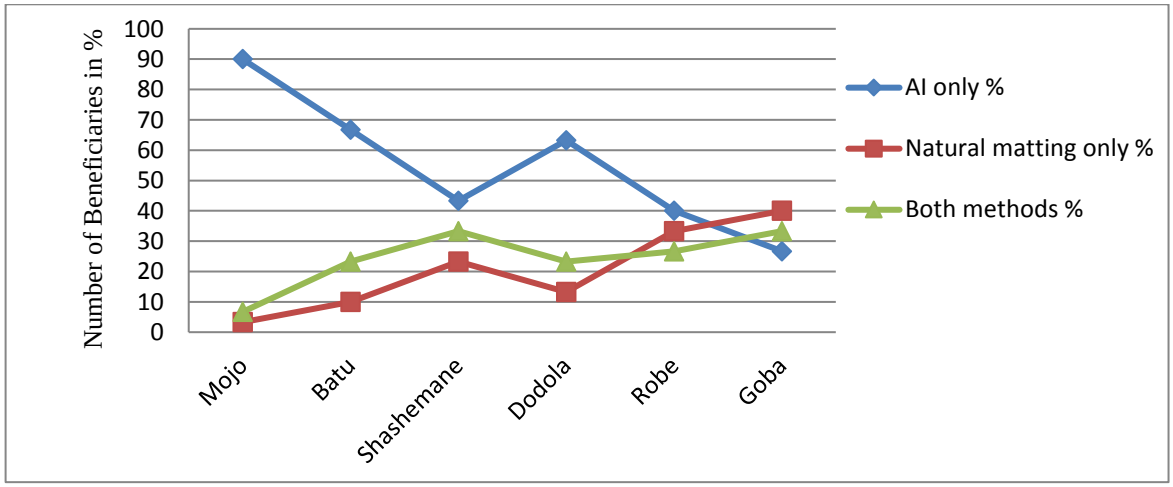

Fig. 2. Distribution of beneficiaries and breeding methods used across the towns (source: the survey).

Bull service charge: All the towns and the areas around them included in the study have same owners of improved bull in which the service charge is paid for single matting. The service charge per matting varied across the towns and production systems.

Table 3
Mean number of service charge for Bull matting using improved bulls (in $).

Variable	Mean	S.E	P-Value
Towns			
Mojo	1.56	0.11	0.001
Batu	1.00	0.24	
Shashemane	1.37	0.04	
Dodola	1.20	0.18	
Robe	2.00	0.13	
Goba	1.70	0.09	
Production system			
Urban	1.52	2.50	
Peri-Urban	1.42	3.90	
Overall mean	1.47	2.30	

Source: the survey

The mean service charge is slightly higher for urban (1.51USA $) than peri-urban (1.43USA $) ETB). This slight difference might be related to access to bull for natural matting in peri-urban than in urban production system, lack of awareness and infrastructure. The number of improved bull owned in Goba and Robe town was higher than other areas where the study was covered. Goba and Robe town accounts high number of both natural matting and AI service beneficiaries and also the third highest number of service per Conception were observed. According to the respondents high record of sexually transmitting disease symptoms and Bull death was also documented. The survey also revealed that out of the total respondents, about 56.1% reflect that AI favors male calf in contrast to females.

In this study, more than 57% of the farmers who participated in the surveys bitterly complained that they do not get reliable and consistent AI service at all while 90% of them explained that absence of service on weekends & holidays attributed to shortage of AIT's, lack of AIT's motivation, lack of incentive for AITs and shortage of inputs. Consequently, about 38.65% of the respondents reported that they miss the estrus on weekends & holidays without breeding anticipating AI service in the next estrus, while about 61.35% said they do not want to miss the estrus at anytime and, thus, go for natural mating with bull. Similarly, about 48.3% of all the farmers participated in the study areas showed dissatisfaction with the overall AI service. The results of the surveys also indicated that 61.5% of farmers participated in the study confirmed their willingness to pay more fees for the service provided if they got reliable, efficient and effective services; which contradicts with the result of Belayneh (2012) which was cried out in rural area. This indicates that there is demand for AI despite the low quality of the service. More than 55% of the farmers reported that they usually face herd health problems, which directly and indirectly have impacts on the efficiency of the AI service. The major diseases reported in order of prevalence were mastitis (22.2%), tuberculosis (9.2%), problems associated with calving (4.27%) and the combination of these diseases. The other problems listed by participants during group discussion were bloating which mostly raised by peri-urban dairy producers.

Milk yield: The mean pick time milk yield per day (one month after birth) varied across the towns and production systems. The mean pick time yield per day was the highest in Mojo town (12.10L) followed by Shashemane town (11.22 L) while the lowest record was in Goba town (7.00L). This yield indicates the decreasing pattern from mojo to Gobe. The big variation of the yield is observed between the cross breed cows, Boran breed cows and cow with unknown background of their breed.

This value is slightly higher for urban (10.19L) than peri-urban (7.96L). This slight difference might be related to access to agro-industrial products and better cattle management. For the area where the experiment was included in urban and peri-urban small scale production system East showa zone has better average milk yield (10.12L) followed by West Arsi zone (9.47L) with the lowest record of Bale zone (7.7L). The amount of milk yield per day decreases from the central part of the country to farthest area. This might be due to farmers awareness difference which affected by uneven dairy technology distribution and market availability.

Table 4
Average milk yield/day/cow in liter response of dairy producers.

	Average milk yield per day (Liter)			
Source of variation	Cross B. Cow	Unknown B. history cow	Boran B. cow	Total mean
E/Showa	11.17	3.10	4.30	10.12
W/Arsi	10.65	3.15	4.00	9.47
Bale	9.31	2.11	4.75	7.70
Mean	10.38	2.79	4.35	9.10
Mojo	12.95	3.67	2.00	12.10
Batu	9.25	2.25	4.88	8.20
Shashamane	11.91	1.75	3.00	11.22
Dodola	9.17	3.50	5.00	7.71
Robe	9.55	2.10	4.75	7.00
Goba	9.14	2.13	3.50	8.41
Mean	10.33	2.57	3.86	9.11
Urban	10.87	2.94	4.50	10.19
Peri-Urban	9.81	2.52	4.25	7.96
Mean	10.34	2.73	4.38	9.08

B=Breed, (source: the survey).

3.2. Reproductive performance of crossbred dairy cows

Age at first calving (AFC): The effect of town, production system, sex of the cattle owners on age at first calving is presented in Table 5. The result indicated that the overall mean age at first calving was 36.97±0.58 months. This is lower than the Haileyesus (2006), Yifat et al. (2009), Belay et al. (2012) Belayne (2012). Similarly, this is lower than 40.3 months reported by Azage (1981) and 56 months reported by for Friesian crosses. Management factors especially nutrition determines pre-pubertal growth rates and reproductive development Yifat et al. (2009).

Table 5
Average Age at first calving (AFC) response of dairy producers.

Source of variation	Mean	Std. EM	Minimum	Maximum	P-Value
Zone					
E/Showa	35.67	1.02	26	50	
W/Arsi	35.38	0.95	24	60	
Bale	39.23	0.96	26	48	
Town					
Mojo	37.38	1.51	26	50	
Batu	33.53	1.16	27	50	
Shashamane	32.24	0.72	27	39	
Dodola	38.13	1.47	24	60	
Robe	42.64	1.18	30	48	
Goba	35.82	1.21	26	48	
Production system					
Urban	37.20	0.79	24	50	
Pere Urban	36.71	0.86	26	60	
Sex of respondents					
Male	37.42	0.84	27	50	
Female	36.55	0.80	24	60	
Mean	36.97	0.58	24	60	

E/Showa=East showa, W/Arsi=West Arsi, AFC=Age at first calving in months (source: the survey).

The better-managed and well-fed heifers grew faster, served and conceived earlier and resulted in more economic benefit in terms of sales of pregnant heifers and/or more milk and calves produced during the lifetime of the animal. Slight high value of calving age observed male respondents might be related to close management of dairy cattle by females.

Number of services per conception (NSC): Number of services per conception, in this context, refers to conception as a result of bull services as reported by farmers. The overall average service pre conception as reported by dairy producers in urban and peri-urban production system was 2.52±0.22. The score of ASPC slightly varies between only AI and both method users which is 2.39±0.12 and 2.69±0.12 respectively. This slight difference with high value in peri-urban might be due to the influence of distance from AI service centers and poor cattle management. The value might also do to sexually transmitting disease which comes as a result of natural matting using common Bull. This value difference was also slightly observed between the towns.

The average number of services per conception was the highest for Goba and the lowest for Shashemane. The highs records of common bull using, bull death and sing of sexual transmitting disease records responded by focused group discussion in Goba town might be a reason for this. In other cases inconsistent supply of liquid nitrogen in Bale zone was also reasoned by IA technicians of the town.

Table 6
Average number of service per conception (NSPC) response of dairy producers.

Variables	NSPC	S.E	P- value
Breeding method			
Only AI users	2.39	0.12	
Users of both AI and natural mating	2.69	0.12	
Production system			
Urban	2.18	0.12	
Peri-Urban	2.86	0.12	
Towns			
Mojo	2.36	0.21	
Batu	2.47	0.20	
Shashemane	2.25	0.18	
Dodola	2.69	0.23	
Robe	2.51	0.26	
Goba	2.86	0.21	
Over all mean	2.52	0.22	

source: the survey

Calving intervals (CI) and Days open (DO): These two parameters are only done for cow that has previously give birth. The calving interval is a composite trait made up of the three distinct periods, each likely to be affected by a different set of factors (Mukasa-Mugerwa, 1989). These are postpartum anoestrus interval (calving to first oestrus), service period (first postpartum estrus to conception) and gestation length. Days open is composed of the first two periods; postpartum anoestrus and first postpartum estrus to conception. Calving interval and days open are highly correlated, as gestation length is more or less constant for a given breed (Mukasa-Mugerwa, 1989).

The overall mean of the days open (DO) variation is significantly different (P<0.01) which is 5.76±0.19 months (Table 19). This value is longer than 5.53 months reported by Haileyesus (2006) for crossbred dairy cows, 4.57 months reported by Yifat (2009) and lower than 5.82 months reported by for crossbred dairy cows. Few farmers related this high length of days open to delayed resumption of ovarian activity after calving and management factors such as in adequate heat detection, decisions of breeding after parturition, nutrition and disease factor. The majority of the respondents was related to poor efficiency of the AI service. This can also be a reason for slightly high Calving interval observed on Bale zone and Goba town though variation is not significant.

The overall mean of the calving interval varies significantly (P<0.01) which is 14.75±0.19 months (Table 19). The record is lower than 15.53 months reported by Haileyesus (2006) for Holstein Friesian cross and for crossbred cows in Dire Dawa. The difference is not significant (p>0.001) between zones, towns and production system.

Table 7
Least squares means (±SE) CI and DO of dairy cows response of dairy producers**.**

Sources of variation	N	CI (LSM ± SE)	DO (LSM ± SE)
Over all Mean	177	14.75±0.19	5.76±0.19
Production system		**	**
Urban	89	14.69±0.26	5.68±0.26
Peri-Urban	88	14.82±0.27	5.83±0.28
Zone		**Ns**	**Ns**
E/Shawa	60	14.84±0.31	5.84±0.30
W/Arsi	58	14.25±0.30	5.27±0.31
Bale	59	15.16±0.37	6.16±0.37
Town		**Ns**	**Ns**
Mojo	30	14.60±0.39	5.60±0.39
Batu	30	15.07±0.48	6.07±0.48
Shashemane	30	13.87±0.44	4.91±0.45
Dodola	29	14.62±0.43	5.63±0.43
Robe Bale	28	14.78±0.38	5.79±0.37
Goba	30	15.53±0.59	6.53±0.59
Breeding method		**Ns**	**Ns**
AI only beneficiaries	98	13.95±0.26	5.43±0.17
Both AI and NM beneficiaries	77	14.41±0.16	5.48±0.15

NM=natural matting; N=number of observations; CI=calving interval in months; DO=days open in months; **=P<0.01; ***= P<0.001; Ns=non-significant (source: the survey).

4. Conclusion

The survey indicated that 25.9% of Urban and 22.3% of peri-urban dairy producer households were literates and more than half dairy producers are females both in urban and peri-urban area. More than 50% of the respondents were aged greater than 40 years, this indicates that less number of youngsters are participating in dairy production. The mean number of cattle per household was 4.1±0.28 and 5±0.36 for Urban and peri-urban dairy producers respectively. Related to uneven distribution of the extension service and farmer's awareness, the average number of the local bred cattle per household slightly decreases from Goba to Mojo relatively nearest town to Addis Ababa vies versa to cross breed cattle holding. In Urban area mmore than half of the total respondents are using only AI service and those in peri-urban area are mostly using Natural and AI interchangeably. Almost all dairy cattle are not herded in urban production system where as herding is common in peri-urban area. The mean bull service charge/matting is slightly higher for urban (1.51 USA $) than peri-urban (1.43 USA $). High record of sexually transmitting disease symptoms and Bull death was documented in the area where high number of bull service is used. High proportion of the participants have complained the issue of AI, animal health, feed and feeing technology extension service. Bloating was the first ranked problem in peri-urban area.

The overall result of study suggests that; the production system observed could be categorized as fairly good in urban and poor in peri-urban. The major constraints mentioned by farmers and other stakeholders are; feed and feeding problem, poor cattle management, poor genetic potential and health problem. The overall production parameters such as Milk yield, service per conception, Calving interval, Days open and age at first calving are bellow the standard level for optimum production.

Recommendations

- Livestock feed production, processing and marketing system has to be paid attention for sustainability of the sector

- Improved husbandry practices (assisted with practical demonstration) should be provided to smallholder dairy producers
- Capacity building of AI technicians through training (both theoretical and skill based) should be looked into, and incentive & rewarding mechanism should be in place to motivate best performing technicians
- Milk shed and Milk producing cooperatives has to be established in the towns such as Dodola, Robe and Goba to harmonize the dairy cattle technology extension service including AI and milk sell.

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