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SOCIO-ECONOMIC CHARACTERISTICS AND PURPOSE OF KEEPING DAIRY CATTLE IN CENTRAL ZONE OF TIGRAY, NORTHERN ETHIOPIA

[a]Gebrekidan Tesfay, [b]Zeleke Mekuriaw [c]Gangwar, S.K. and [a]Aklilu Hailemichael

[a] Deptt. of Animal Science, College of Agriculture, Aksum University, Aksum, Ethiopia
[b]Deptt. of Animal Science, College of Agriculture, Bahir Dar University, Bahir Dar, Ethiopia
[c] Deptt. of Animal, rangeland and wildlife Sciences, College of Agriculture, Mekelle University, Mekelle, Ethiopia

ABSTRACT

The purpose of this study was to explore the socio-economic status of dairy producers in central Tigray Zone, Northern Ethiopia. A total of 160 dairy holding households were selected by systematic random sampling technique for the study. The study employed multiple methods of data analysis including descriptive statistics, Chi-square test, T-test, ANOVA, ranking and qualitative analysis. The finding of this study showed similar average family size across urban and peri-urban areas but an increasing trend in average family size was observed from small to large farms. The average family size of small, medium and large farms was 4.98±0.22, 5.71±0.33 and 6.86±0.36 persons, respectively. Literacy rate was higher in urban areas than the peri-urban areas. Majority of the urban dairy farmers were business persons whereas farmers took the higher proportion in the peri-urban areas. Significantly (P<0.05) larger land holding in the farming area was reported from the peri-urban farmers as compared to the urban dwellers. There is significant difference (P<0.05) in the major agricultural activity between Urban and peri-urban areas that could contribute most of the households' income. Income from sale of dairy products, kiosks and house rent showed significantly (P<0.05) higher in Urban areas than peri-urban areas

KEYWORDS: Dairy production, Socio-economic status, family size, household etc.

INTRODUCTION

Livestock performs multiple functions in Ethiopian economy by providing food, input function for crop production (i.e. they enable optimum use of land and labor in a given household), output function (i.e. the production of milk, meat, hides and skins, manure, etc.), integrated function (i.e. perform various activities in the crop production sub-sector), and soil fertility management, raw material for industries, cash income as well as promoting savings, fuel, asset function, security function and socio-cultural function and employment (Bee *et al.,* 2005). The livestock sub sector contributes 12-16% of total and 35-40% of agricultural Gross Domestic Product (GDP), respectively. Livestock also contributes 12-15% of total export earnings. The sub sector is the second major sources of foreign currency earnings through export of live animals, hide and skins (Ayele *et al.,* 2003).

In Ethiopia, the human and animal populations are very much affected by nutritional problems, primarily due to lack of food of high nutritional value. Therefore, to sooth this problem and to ameliorate the nutritional status of the population, measures should be taken to improve animal production so as to ensure better supply of animal protein of high nutritive value (Ashebir, 1992). In this regard, milk is among livestock products whose demand continues to increase and plays a very important role in feeding the rural and urban population of Ethiopia (Asaminew, 2007).

In order to meet the growing demand for milk in Ethiopia, milk production has to grow at least at a rate of 4 % per annum which in turn entails design of appropriate and sustainable dairy development strategies based on socio-economic, institutional and agro-ecological circumstances that build on the demand of consumers and the needs and

opportunities of producers (Azage *et al.*, 2001). Hence, in order to design relevant dairy development strategies and implement context specific interventions for future development of the urban and peri-urban dairy production, exploring the socio economic characteristics of the dairy producers is very crucial. Therefore, the objective of this study is assessing the socio-economic status of dairy producers and the purpose of dairy keeping in relation to urban and peri-urban areas.

MATERIALS AND METHODS
Area description

The study was carried out in central zone of Tigray region, Northern Ethiopia. The Central Tigray Zone is one of the five zones in Tigray National Regional State. The zone approximately extends between $13^0 15'$ and $14^0 39'$ North latitude, and $38^0 34'$ and $39^0 25'$ East longitude. The altitude of the zone mainly falls within the category of 2000 to 3000 masl. The larger part of the zone receives mean annual rainfall ranging from 400 to 800mm. The mean monthly maximum and minimum temperatures of the zone are $30^0 c$ and $10^0 c$, respectively (NMSA, 1996). Central Tigray zone is bounded by Eritrea in the north, East Tigray zone in the East and south east, West Tigray zone in the west and Amhara National Regional State in the south. The zone with its capital in the ancient city of Aksum encompasses ten woredas. The zone has the largest human population in the region.

The specific study sites were Adwa & Aksum urban and peri-urban areas with 1006 & 1024 kilometers far from Addis Ababa, respectively. These two districts were selected purposively based on their conducive agro-

ecological conditions for dairy production and for existence of large human population.

Data Collection

A cross-sectional survey was used in order to collect data on the socio economic characteristics of the dairy cattle producers. Pre-tested formal questionnaire was used in the cross sectional survey. The collected data included age at first calving, calving interval, lactation length, average daily milk yield per cow per day. A multi-stage sampling technique was used in the cross-sectional survey. First, cattle holding households were clustered in to urban and peri-urban. Aksum and Adwa, the larger towns in the zone, were considered as urban. The smaller towns of Wukro, Dura, and Mahiber-selam are found around Aksum. The remaining small towns of Bete-Hanis, Debregenet and Gendebta and Mariam-shewito are found around Adwa. These small towns found within a radius of 20km from the centers of the two larger towns. Hence the small towns were considered as peri-urban. Then farms were categorized in to large (> 10 dairy cattle), medium (5-10 dairy cattle) and small (<5 dairy cattle) according to the guideline of IRLI (1996). Finally, based on the sampling frame obtained from the district office of Agriculture, a total of 160 cattle holding households were chosen using systematic random sampling technique.

Data analysis

Qualitative and quantitative data from the cross-sectional survey, which were collected in the local language (Tigrgna) were translated and entered to Microsoft Office Excel 2007. The same software was used for data edition, management, computation of percentages, and presentation of results in the form of charts and tables. Data was transported to and analyzed using SPSS 16.0 (SPSS, 2007) software. In all the comparisons, the level of significance was set at $\alpha = 0.05$.

The following statistical tools were used to test statistically significance of means and frequencies or percentages:

Descriptive statistics

Descriptive statistical quantities such as, Charts, percentage presentations, frequencies, means, standard deviation and standard error of mean were employed to summarize information like level of education, occupation of the respondents, division of labour, trend of farm expansion, feed sources, experience of growing improved forages, housing materials, plant materials for washing and smoking milk utensils and milk and milk product marketing options.

Chi-square test (χ^2)

Chi-square test was conducted to test difference between categorical variables; for instance, on aspects like farming system and source of foundation stock are analyzed by Chi-square test.

T-test

Continuous response variables like landholding and income sources in respect to locations (urban *versus* peri-urban) were tested using both equal and unequal assumptions of independent two sample t-test.

Ranking analysis

In addition to the above, ranking analysis was undertaken for the purpose of keeping dairy cattle and causes of regression of farms. Hence in the preference ranking method, index was computed with the principle of weighted average and indexes were ranked each other using auto ranking with MS-excel 2007. The following formula was used to compute index as employed by Musa *et al*. (2006).

Index $= R_1*C_1 + R_{n-1}*C_2 \ldots + R_1*C_n / \sum R_n*C_1 + R_{n-1}*C_2 \ldots + R_1*C_n$;

Where, R_n=value given for the least ranked level (example if the least rank is 5th, then R_n=5, R_{n-1}=4, R_1=1)

C_n = Counts of the least ranked level (in the above example, the count of the 5th rank =

C_n, and the count of the 1st rank = C_1)

Qualitative analysis

Moreover, qualitative information obtained from exploratory study, group discussion, cross-sectional survey and observations were analyzed using narrative (qualitative) analysis.

RESULTS AND DISCUSSION

Various socio-economic factors, for instance farmer's off-farm income, availability of capital investment, milk price, farmer's level of education and training, and availability of family labour and their occupation have direct influence on dairy farmers' decisions as to whether they want to expand and improve their dairy operations. From personal observation, a number of farmers became involved in dairy farming as a secondary career, while either the husband or wife had another form of regular employment in town.

Family size, sex, occupation and educational level of dairy cattle producers

The overall mean family size of sample households was 5.44±0.24 in the urban areas and 5.46±0.25 in the peri-urban areas (Table 1). Average family size of small, medium and large farms was 4.98±0.22, 5.71±0.33 and 6.86±0.36 persons, respectively. The average family size per household in this study is smaller than reported by Asamnew (2007) which was 8.22 and 7.2 persons, respectively for Bahir Dar Zuria and Mecha woredas with the overall mean of 7.71 persons per family. But more or less similar result was reported by Zelalem (2007) where the average family size of dairy farming households in urban areas (5.0±0.16) persons/household and in peri-urban areas (5.6±0.13) persons/household in Bahir Dar urban and peri-urban areas. The largest average family size in large farms may be associated with more hired labor, which was considered by respondents as family members during the survey. Majority of these households were found in the urban areas and are relatively better-off and tended to exploit hired labour and allow education to their family members and increase the ability of the family to adopt improved technologies and the overall management of the dairy cattle improved. Family size may influence the overall labour availability of the households for any livestock activity.

TABLE 1. Household characteristics of respondents in the study area

Variables	Parameters	Urban(N=80)		Peri-urban(N=80)		Total	
		N	%	N	%	N	%
Sex of the respondent	Male	69	86.25	65	81.25	134	83.75
	Female	11	13.75	15	18.75	25	15.62
Occupation of the respondent	Farmer	17	21.5	53	65.82	69	43.67
	housewife	6	7.59	4	5.06	10	6.32
	business person	35	43.03	12	15.18	46	29.11
	government employee	14	17.72	7	8.86	21	13.29
	Retired person	1	1.26	3	3.79	4	2.53
	Others	7	8.86	1	1.26	8	5.06
Educational background of the respondent	illiterate	13	16.25	13	16.45	26	16.35
	Elementary	29	36.25	44	54.42	72	45
	Secondary and above	38	47.5	23	29.11	61	38.13
Position of respondent	Head	80	100	78	98.73	158	99.37
	Member	0	0	2	1.26	1	0.62
Family Size by location	mean±S.E	5.44±0.242		5.46±0.254			
		Large		Medium		Small	
Family size by farm size		6.86±0.36		5.71±0.33		4.98±0.22	

N=Number of respondents   S.E= Standard error

Regarding respondents' sex structure, the proportion of males was higher than females when total numbers of respondents were taken into account. About 86.25% of the males and 13.75 % of females were urban dwellers and 81.25% of males and 18.75% of females were living in peri-urban areas. The higher proportion of female in the peri-urban area could be because of more single women in the peri-urban due to more men went to urban areas to search for other businesses and others engaged in the previous civil wars. The percentage of female dairy farmers is low as compared to the reported values for Addis Ababa milk shed area (Yoseph *et al.,* 2003) in which the proportion of female to male owners is 24% and 76% respectively. These shows, higher proportions of males were involved in dairying than the females in the study area.

The proportion of farmers, businessmen, and government employees took the leading with regard to ownership of dairying in the study area as a whole. Housewife, retired person and others (like: truck drivers, mason, and police men) are also involved in dairy production though they are in small proportion. Business persons (43%), farmers (21.5%) and government employee (17.7%) took the leading in their proportion in the urban areas whereas, farmers (65.8%) followed by business persons (15.2%) and government employee (8.8%) took the rank one to three, respectively, in the peri-urban areas.

Business persons and farmers are those who capitalized on the potential of dairy cattle, as an investment and they owned medium and large dairy farms both in the urban and peri-urban areas. These farms mainly raised high-grade dairy animals, whereas, small dairy farms were generally found in both urban and per-urban areas possessing local and crossbred animals. About 99.4% of the respondents were household heads and the remaining were household members as a whole in the study area. In the urban, all were household heads but in the peri-urban areas 98.73% of the cattle holding households who participate in dairying were household heads and the remaining were household members.

Educational level of all interviewed cattle holding households of the farms revealed that 36.25 % and 47.5% of the urban farmers were elementary school complete and secondary school and above, respectively. But the proportion of dairy keepers in peri-urban areas indicated that 54.42% and 29.11% are elementary school complete and secondary and above, respectively. There were higher illiteracy rate in peri-urban areas than the urban areas. This obviously has negative impact on transfer of improved technologies to the communities, as anticipated by Mulugeta (2005). The proportion of illiterates in this study are much lower than reported by Yoseph *et al.* (2003) who showed high proportion of illiteracy among dairy farm owners (46%) in Addis Ababa milk shed area.

The better literacy in the urban area might be due to better basic educational infrastructure and hence have access in larger towns than the village towns. Considering farm size, illiteracy rate decreased from small to large farms. This indicates that member in large farms had better access to education and the management of the farm improved and the problem in relation to poor record keeping is also decreased. Better literacy level means better cattle

management practices as literacy enhances societies to be aware of efficient utilization of natural resources and adopt new technology in improving livestock productivity.

Household age structure

Majority of interviewed Cattle holding households in the study area were aged between 31-60 years both in urban and per-urban areas (figure 2). In line with this study, higher proportion of households was obtained in Hawassa

where 33.3% and 30% were in the age range of 41-50 and 51-60 years, respectively (Ike, 2002). This age distribution pattern may reflect that young people are less depended on urban livestock keeping as they can find alternative formal and informal employment. For people between 31 and 60 years, urban livestock keeping seems to supplement other informal or formal employment. For older people, livestock keeping provides a coping strategy for retirement.
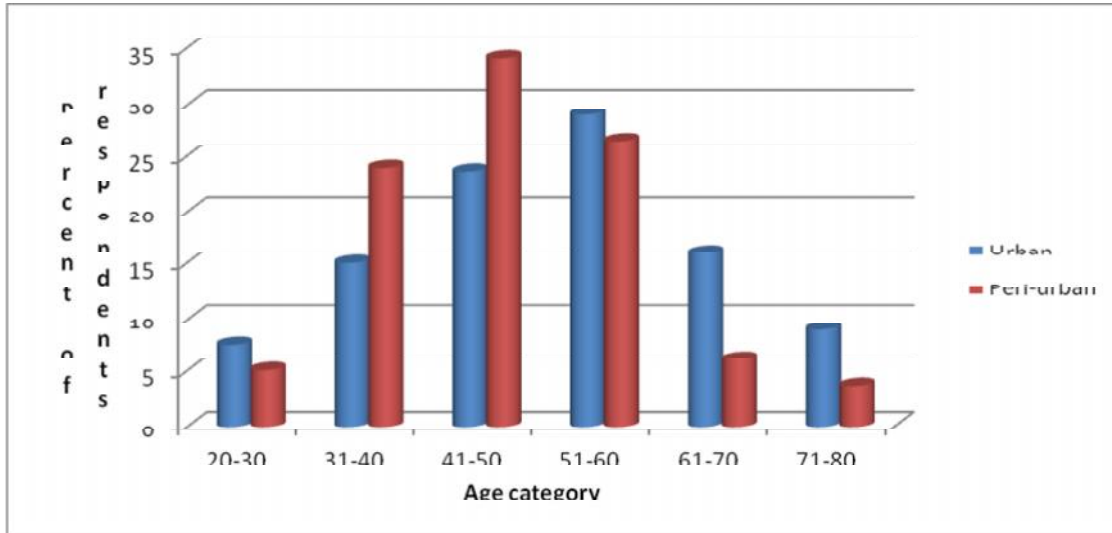

FIGURE 1. Age category of respondents in urban and peri-urban areas of the study area (%).

The distribution of age along the different age groups within the three farm size category is similar with the urban and peri-urban areas. Higher proportion of respondents was concentrated within the age interval of

31-60 years in all the farm sizes (Fig. 3). Therefore, the middle aged groups were actively involved in dairying than the younger and older age groups both in urban and peri-urban areas and within the farms sizes.
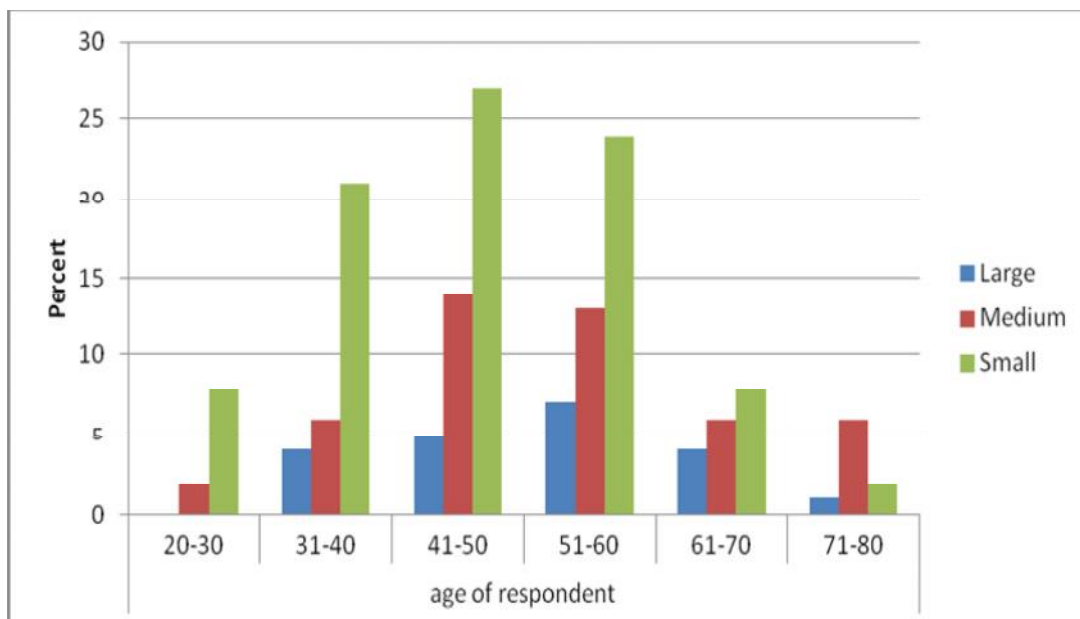

FIGURE 2. Age category of respondents across the different farm size.

Labor use for dairy animal production

As depicted in Table 2, Household members are participating in various dairy animal managements in both urban and peri-urban areas and this was dependent not only on the sex of the family members, but also on age of the family members. The allocation of labour to different

tasks by different age and sex groups of the family member could be a strategy used to overcome labour shortage and to utilize the available labour efficiently. Proportions were computed as the numbers of dairy cattle holding households reported a given labour category for a farming activity over the total number of the interviewed

farms in both the urban and peri-urban areas. According to the survey result, most of the farming activities including purchasing, selling cattle, breeding, caring sick animals and feeding animals, herding as well as watering were the responsibility of adult family members.

TABLE 2. Division of labor for dairy production in the study area

Activity	Percentage of adult and children labors for dairy production							
	AMF	AMH	AFF	AFH	CBF	CBH	CGF	CGH
Urban								
Purchasing	86.1	1.3	12.7	-	-	-	-	-
Selling	84.6	1.3	14.1	-	-	-	-	-
Herding	30.2	19.5	20.8	5.7	18.9	1.3	3.8	-
Watering	28.3	20.1	22	5	18.2	2.5	3.8	-
Cleaning	26.2	21.2	22.5	6.2	16.2	1.9	5.6	-
Breeding	58.6	20	13.6	1.4	6.4	-	-	-
Caring sick animals	48.8	14.4	30.6	2.5	2.5	1.2	-	-
Feeding	38.8	19.4	23.1	5.6	11.2	1.9	-	-
Milking	27.1	18.1	50.3	4.5	-	-	-	-
Making dairy	15.5	15.5	63.1	4.8	-	-	-	-
Selling dairy products	24.8	15.8	47.4	4.5	4.5	0.8	2.3	-
Calf caring	18.8	20.8	37.7	5.8	12.3	1.3	3.2	-
Peri-urban								
Purchasing	83.3	2.5	14.10	-	-	-	-	-
Selling	83.1	2.5	14.28	-	-	-	-	-
Herding	35	12.5	16.25	6.25	25	1.25	3.75	
Watering	32.5	12.5	18.75	5	23.75	3.75	3.75	
Cleaning	28.7	12.5	20	6.25	23.75	2.5	6.25	
Breeding	68.5	8.5	15.71	-	7.14	-	-	-
Caring sick animals	58.7	10	25	2.5	2.5	1.25	-	-
Feeding	38.7	11.2	25	6.25	16.25	2.5	-	-
Milking	31.1	10.38	51.94	6.49	-	-	-	-
Making dairy products	20.4	10.20	67.34	2.04	-	-	-	-
Selling dairy products	35.5	11.86	45.76	3.38	-	-	3.38	-
Calf caring	25.9	11.68	33.76	6.49	18.18	1.29	2.59	-

Adult male family member (AMF), Adult male hired (AMH), Adult Female family Member (AFF), Adult Female hired (AFH), Children boys Family member (CBF), Children Boys hired (CBH), Children girls Family member (CGF), Children girls hired (CGH)

Adult male hired labor contributed next to adult male and female family members to dairying as this labor was mainly involved in feeding, milking, herding, calf caring, cleaning and watering in the urban areas, whereas adult females were second following the adult males as they were involved more in milking, calf caring, making and selling dairy products in the peri-urban areas. And the highest participation of adult female family members was observed in making dairy products, milking, selling dairy products and calf caring in the urban areas.

Family children boys were mainly involved in herding, watering and barn cleaning in both the urban and peri-urban areas. Family children girls had less involvement in the farms and none of the hired children girls were involved in any dairy activities as reported by the cattle holding households in both urban and peri-urban areas. Similar to this study, most of farming activities including purchasing and selling cattle, breeding, milking and feeding animals as well as caring for sick animals was the responsibility of adult family members (Negussie, 2006;

kedija, 2007). But this finding is in contrast to the findings of Adebabay (2009) who found in Bure district that milking is primarily undertaken by adult male. The participation of females in the decision of household affairs (i.e. selling and purchasing cattle) was less both in urban and peri-urban areas. Decisions are made mainly by men. Therefore, this result indicated, the necessity of short term training and gender education in the study area so that women can be empowered in every social, economic, cultural and political aspects.

TABLE 3. Major agricultural activities practiced that can contribute most of the households' income in the study area

Activity	Location						Test	
	Urban(N=78)		Peri urban(N=78)		Overall			
	N	%	N	%	N	%	p-value	χ^2
Crop production only	1	1.28	4	5.128	5	3.205	0.000	19.03
Livestock production only	53	67.94	26	33.33	79	50.64		
Both crop and livestock production	24	30.76	48	61.53	72	46.15		

N=Number of respondents χ^2=Chi-square

As indicated in Table 3, there is significant difference (P<0.05) in the major agricultural activity between Urban and peri-urban areas that could contribute most of the households' income. In the peri-urban areas, majority of the households depend on both crop and livestock production as the farming system in these areas was mainly mixed crop livestock farming. But the urban dwellers rely mostly on dairying due to less land.

TABLE 4. Average land holding in the residence and farming area

Land holding	Location				Tests
	Urban		Peri-urban		
	N	Mean(s.e)	N	Mean(s.e)	p-value
On-plot land holding (m^2)	65	2064(821.67)	70	3482(559.3)	0.151
Off-plot land holding (m^2)	27	2207.6(553.5)	42	10236(3309)	0.021

N=Number of respondents   s.e= Standard error   df= degree of freedom

Farming system and land holding

There was no significant difference (P>0.05) in land holding around the residential areas across the location (Table 4), however, there was significant difference (P<0.05) in the size of land holding in the farming area between urban and per-urban areas. Larger land holding in the farming area was reported from the peri-urban farmers as compared to the urban dwellers. The similarity in the size of land holding around the homestead might be because of small and similar land size allotted for the family in both urban and peri-urban areas. The land holding in this study is much more less than reported by Belete (2006) in Fogera in which the average cropland holding of the most of the respondents ranged from 1.01to 2 hectares.

Source of household income

Household's source of income includes monthly salary, Kiosk, sale of dairy products, house rent, crop production and miscellaneous activities. The respondents' average income from monthly salary did not show significant difference (P>0.05) in urban and peri-urban areas (Table 5). This might indicate that unfortunately those government employees who keep dairy animals earn similar monthly salary. But due to the engagement of some employees of Saba stone and Almeda textile in dairying, the average income from monthly salary is raised in the peri-urban areas. Average income from sale of dairy products, kiosks, house rent, crop production and income from other sources showed significant difference (P<0.05) across the locations (urban and peri-urban).

Income from sale of dairy products, house rent and kiosk indicated higher in urban areas as compared to the peri-urban, depicting that those dairy keepers living in urban were not limited in dairying only but involved in multidisciplinary sectors to increase their monthly income. Relatively richer households had more houses to rent which could add to the monthly income of the household. There were also kiosks from which additional cash income was obtained. Hence, households could obtain income from two or more sources in the urban areas than the peri-urban areas.

TABLE 5. Monthly average income (in birr) of the households from different sources

Income sources	Location		Test	
	Urban	Peri-urban		
	Mean ±S.E(N)	Mean ±S.E(N)	df	p-value
Sale of dairy products	2874.8±548(73)	1282±226(60)	95.18	0.009
House rent	1507±353(35)	280.24±74.99(21)	36.99	0.002
Crop production	206.1±292(27)	600.86±157(55)	31.41	0.008
Monthly salary	1095±125(15)	1366±362(8)	8.71	0.498
Kiosk	2525±581(18)	930±263(10)	22.87	0.020
Income from other sources	2940±639(26)	789±149.7(24)	28.95	0.004

S.E= Standard error   N=Number of respondents   df= degree of freedom

The proportion of dairy holding households whose source of income was sale of dairy products was high both in the urban and peri-urban areas. Since all the respondents included in this study keep dairy, the proportion of dairy holding households with their income from sale of dairy products were high even in the peri-urban areas. Similar results were reported by Azage *et al.* (2006) who concluded that urban and peri-urban dairy production systems could contribute to overall development through income and employment generation. House rent with 43.75% and crop production with 33.75% took the second and third position in urban areas. Whereas crop production and income from other sources were ranked second and third in peri-urban areas of the study site with 68.75% and 30%, respectively (Table 6). Proportion of dairy cattle holding households involved in kiosk and governmental employment took the least from the total interviewed both in urban and peri-urban areas. The average income of the respondents from dairy product obtained in this study was much higher than reported by Tsehay (2001) in which a farmer in small scale milk production stated to earn about 188 birr or more per month from the sale of morning milk.

TABLE 6. Proportion of households who have got their monthly income from different sources

Income sources	Urban (N=80)		Peri-urban (N=80)	
	N	(%)	N	(%)
Sale of dairy products	73	91.25	60	75
House rent	35	43.75	21	26.25
Crop production	27	33.75	55	68.75
Monthly salary	15	18.75	8	10
Kiosk	18	22.5	10	12.5
Income from other sources	26	32.5	24	30

N=Number of respondents

Source of foundation stock and trend of farm expansion

The source of foundation stock of dairy cattle production in the study area showed significant difference (P<0.05) between urban and peri-urban areas. Both in urban and peri-urban areas, large proportion of the interviewed households purchased their initial stock. But 16.25% and 15% in the peri-urban area got their foundation stock from share owned and gift, respectively (Table 7).

TABLE 7. Source of foundation stock for dairying in the study area

Source of foundation stock	Location							
	Urban(N=80)		Peri-urban(N=80)		Overall			test
	N	%	N	%	N	%	χ^2	p-value
Gift	5	6.25	12	15	13	16.25		
Purchase	74	92.5	55	68.75	129	66.25		
Share owned	1	1.25	13	16.25	14	17.5	15.97	0.000

N=Number of respondents χ^2=Chi-square

Reported percentages on farm expansion of the interviewed farms revealed that 93.75% and 60% of the large farms from urban and peri-urban, respectively, were indicating progressive and only 6.25% from urban and none from the peri-urban farms showed declining rate (Fig. 4). But there were no stable farm in the urban areas whereas 40% were stable from the peri-urban large farms which might be due to destocking because of feed problems and lower capacity of the producers to increase the farms.
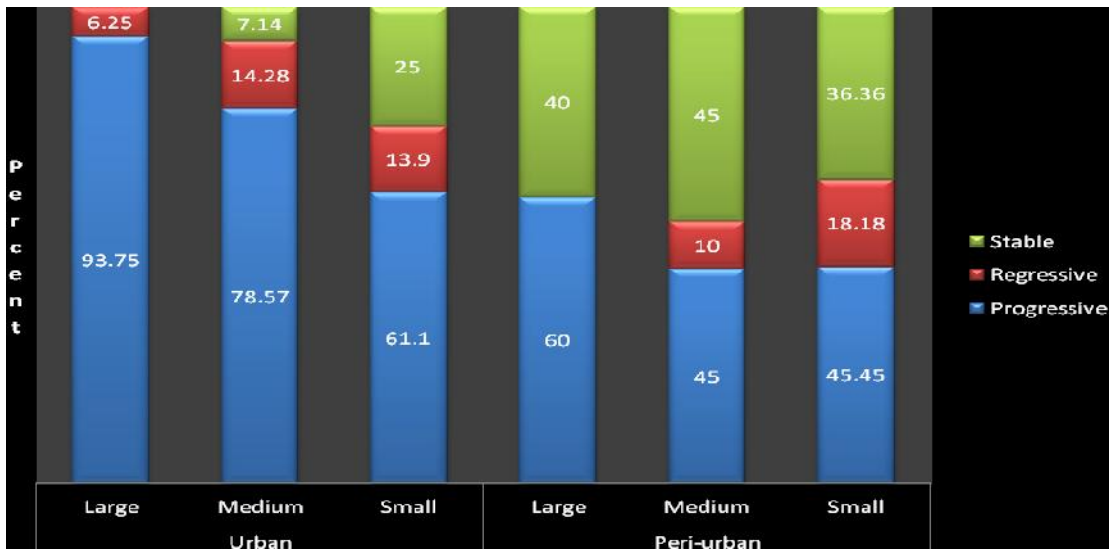
FIGURE 3. Trend of farm expansion across the location and between the farm sizes

In the medium farms, 78 % from the urban and 45% from the peri-urban showed an increment in farm size but there were similar proportion in both urban and peri-urban 14.28% and 10% in the medium farms, respectively, which showed regressive. As compared to the large and medium farms, there were higher proportion of small scale farms that showed stable, indicating advancement in wealth and awareness in dairying in the large farms especially in urban areas.

The result in Table 8 presents households' ranking for the causes of decline in dairy farm in urban and peri-urban areas. Feed shortage ranked the first most important cause followed by inadequate space to maintain and expand the dairy cattle both in urban and peri-urban areas. The most interesting thing here is the urban dwellers ranked poor extension least whereas; in the peri-urban areas it is ranked third. This indicated that there was variation in awareness between the urban and peri-urban areas. There was less awareness problem in the urban areas as compared to the peri-urban areas. But others (like water shortage and waste disposal) were ranked third in the urban areas. In addition to this, during group discussion, both in the urban and peri-urban areas, feed shortage and shortage of land were identified as the first two most important challenges for not expanding the farms.

TABLE 8. Reasons for decline in farm size of respondents in the study area

	Location			
Causes for regression	Urban		Peri-urban	
	N(index)	Rank	N(index)	Rank
Poor extension	4(0.11)	5	9(0.208)	3
Inadequate space	6(0.24)	2	10(0.22)	2
Feed shortage	7(0.31)	1	11(0.34)	1
Breed problem	4(0.12)	4	7(0.16)	4
Others	6(0.22)	3	3(0.07)	5

Rank 1=most important, Rank 5= less important, N=number of respondents

Purpose of keeping dairy cattle

The result indicated that dairy farmers both in urban and peri-urban areas tend to own cattle mainly for their milk production (Table 9). From this survey result, milk production and saving as live animal rated first and second, respectively, across the locations with no significant difference. Immediate source of income supplementing the cash earnings of the family and achieving other objectives such as children's schooling was third in the case of urban dairy production system whereas in the peri-urban areas, manure production was ranked third which could be due to requirement of manure as organic fertilizer in the peri-urban areas where they have better access to land as compared to the urban farmers. Moreover, traction as a purpose was also rated fifth in the peri-urban whereas it was sixth in the urban supporting better availability of land and need of cattle for traction purposes. Therefore, dairy products and by-products serve multi functions in daily activities of the people. Their roles in social and cultural needs are also very important in smallholder agriculture in general and study area in particular.

TABLE 9. Purpose of keeping dairy cattle among the urban and peri-urban areas

Purpose of keeping	Location			
	Urban		Peri-urban	
	N (index)	Rank	N (index)	Rank
Milk production	80 (0.34)	1	80 (0.28)	1
Saving as live animal (prestige value)	77 (0.26)	2	75 (0.25)	2
Immediate sources of income/sale/	70 (0.21)	3	54 (0.16)	4
Manure	46 (0.1)	4	65 (0.17)	3
Home consumption /meat production/	20 (0.04)	5	7 (0.05)	6
For traction	18 (0.037)	6	21 (0.08)	5
Others	-	-	2 (0.01)	7

N=Number of respondents, Rank 1=most important, Rank 7= less important

Farmers in the study area especially in peri-urban areas, practiced mixed farming system whereby both crop and livestock productions are practiced side by side, one complementing the other. Farmers keeping dairy cattle as a sole means of income especially those living in urban areas, are better-off as compared to peri-urban farmers with regard to the reward for their produce. i.e. milk. In such a case, they tend to keep their animals in-doors and feed them usually purchased feeds whereas; farmers in peri-urban areas keep their animals for their dual purpose and at times for multifunction. In peri-urban areas, both purchased feeds are not available or not affordable to the majority, and hence dairy producers rely on what is available around their area.

Therefore, dairying is regarded as one of the best choices for urban agriculture. On the other hand, in peri-urban areas specialization on certain aspects is not as such a common practice; rather farmers in those areas try to diversify their production objectives in order to deal with uncertainties. They undertake crop farming to have year round food supply for the family. To do this they require animals for drought power for tillage or transport of goods. Simultaneously, by-products of crop are used as one of the main feed resource.

CONCLUSION

The study was conducted in urban and peri-urban areas of Adwa and Axum towns to explore the socio economic characteristics of dairy cattle keepers and purpose of keeping dairy cattle in the area. Majority of the dairy producers in urban area were business persons whereas farmers took the higher proportion in the peri-urban areas. The educational level of the farmers was better in urban areas as compared to the peri-urban areas. The average family size was similar across the locations. But there was increasing trend in family size from small to the large dairy farm possessing households. The larger average family size in the larger farms was associated with more hired labour, which was considered as family member. Off-plot land holding indicated significantly ($P<0.05$) larger in the peri-urban area than urban areas which was used for crop production. Milk production followed by saving as live animal (prestige value) was the main purpose of keeping dairy cattle both in urban and peri-urban areas.

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