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Production Performances of Holstein Friesian Crossbred Dairy Cows in Hadiya Zone, (Southern Ethiopia)

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Abstract

This study was conducted to assess productive performances of crossbred (Holstein-Friesian) dairy cows and factors affecting their performances in Shashogo and Anlemo distinct of Hadiya Zone, Southern Ethiopia. Purposive sampling techniques were used to select district and kebeles. A total of 196 respondents were randomly selected and interviewed with semi-structured and structured questionnaire to obtain information on the management practices of farmers, productive performances of crossbred dairy cows. The data were analyzed using the general model of SAS version 9.2. Chi-square test was carried out to assess the statistical significance among categorical variables. Pro LSD test was used to identify a significant difference between districts and seasons mean. Mean herd size of crossbred (HF) dairy cows for Shashogo and Anlemo per households was 4.74 ± 0.114 TLU and 3.63 ± 0.115 TLU, respectively. The major feed resources were natural pasture, crop residues, and crop-after math, concentrate feeds, improved forages and non-conventional feeds, whereas zero-grazing/stall feeding, semi-grazing and free grazing system practiced in both districts. The major sources of water in the study area were river, wells, ponds and tap water. The overall means ± SE of milk yield per day/cow, lactation length and lactation milk yield was 7.61 ± 0.19 liters, 8.99 ± 0.14 months and 2057.16 litres, respectively. In the study period the main constraints were Shortage of feeds, diseases, poor management practices, Lack of services, like Seasonal fluctuation are the main factors hindering dairy productive and reproductive performances in the study areas. Generally, productive performances obtained in current study were low. Therefore, the Sustainable extension service should be established to improve feed resources and management practices in the study area.

Keywords: Productive; performance; Cross breed; Management; Constraint

Introduction

Ethiopia is believed to have the largest livestock population in Africa. The total cattle population of the country is estimated to be about 57.83 million. Out of this the female cattle constitute 55.38 percent and the remaining 44.62 percent, are male cattle in number. It is estimated that 98.59 percent of the total cattle in the country are local breeds and remaining are hybrid and exotic breeds that accounted for 1.22 percent and 0.19%, respectively [1]. This livestock sector has been contributing a considerable portion to the economy of the country and still promising to rally round the economic development of the country. Livestock production in Ethiopia contributes to about 80% of the farmers' income [2] 45% of the agricultural GDP (including draught power), 20% of all the national exports (official and cross border trade) and 5% of the total manufacturing GDP [3]. It was also reported that, livestock contributes about 16.5% of the national Gross Domestic Product (GDP) and 30% of agricultural employment [4].

Livestock productivity in Ethiopia is said to be poor due to a number of reasons, among which, low genetic capacity of the indigenous cattle for milk and meat production is a major one [5]. Substandard feeding, poor health care and management practices, are also the others main contributor to low productivity [6]. In order to improve the low productivity of local cattle, selection of the most promising breeds and crossbreeding of these indigenous breed with high producing exotic cattle has been considered as a practical solution [7]. Crossbreeding work in Ethiopia was initiated to cross indigenous zebu with Holstein-Friesian or Jersey cattle to improve milk production in the early 1950s. Unfortunately the activities were not based on clearly defined breeding policy with regard to the level of exotic inheritance and the breed types to be used [8].

Although efforts were made at developing breeding program for various livestock species in the country, all did not materialize due to lack of commitment and consultation with various stakeholders. The success of dairy production in general and crossbreeding programs in particular needs to be monitored regularly by assessing the productive performance under the existing management system and it is essential for the development of appropriate breed improvement strategies [9]. The productivity of dairy cattle breeds depends mainly on their reproductive performances and efficiency of service per conception. Reproductive performance is a characteristic of outstanding importance in dairy cattle business [10].

A number of researches have been conducted to evaluate productive performance of indigenous and crossbreds especially for different exotic blood levels crossbred of dairy cows under a relatively controlled conditions at research centers, government owned farms and in some urban and peri-urban dairy areas of a country. However, there are a few of such works conducted in rural areas, especially under the small holder dairy farming areas. Hadiya zone is one of the places where that research was not conducted.

Hadiya zone is one of milk shed areas in southern nations, nationalities and peoples regional state where a large number of

smallholder dairy farms and cross breed dairy cattle are available. However, information on productive performance of cross breed dairy cows under small holder dairy production systems is limited and not well documented.Furthermore, the constraints against cross breed dairy production at smallholder farmer's management circumstance were not identified. Hence, there is a need to evaluate the sector in a scientifically organized manner so as to use as an input for designing alternative dairy improvement program.

Therefore the objectives of the study were:

To assess management practices of farmers for cross breed dairy cows in the study area.

To assess productive performances of crossbred dairy cows.

To identify constraints for cross breed dairy cows production in the study area.

Material and Methods

Sampling techniques and sample size determination

There are a total of ten (10) Districts are found in the Hadiya Zone. From ten Districts of Hadiya Zone, two Districts i.e. Shashogo and Analemo was purposively selected based on accessibility and crossbred dairy cows production potential. From each district totally six peasant association namely (Bonosha, Hoyawa and Jalo) from Shashogo and, (Semen Fonko, Kabecho and Wogila) from Analemo were purposively selected based on their crossbred dairy cattle population. Farmers who have at least two cross breed dairy cows were selected randomly.

Selection of participating households

District	Kebele	Households
	Bonosha	38
Shashogo	Hoyawa	32
	Jalo	25
	Wogila	23
Analemo	Semen Fonko	41
	Kabecho	37
Overall		196

Table 1: Participating household's selection frame work.

Sample size of the participating households was determined according to the formula given by Cochran's.

$$n_o = \frac{Z^2 * (p)(q)}{e^2} \quad (1)$$

n_o = sample size of infinite population (desired sample size(Cochran's 1977) when population greater than 10,000; Z=standard normal deviation (1.96 to 95% confidence level); P=0.5 (estimated population variability proportion, 50% the conservative population variability)

q = 1-P i.e. (0.5)

e = level of precision (0.05).

$$n_1 = \frac{n_0}{(1 + n_0 - 1/N)} \quad (2)$$

n_1=finite population correction factors (Cochran's formula) less than 10, 000 N=is the total number of population; n=corrected sample size.

Thus, using the standard error of 0.05 with 95% confidence level, 196 households was included in the study.

Based on the determined sample size adequate numbers of households was randomly selected from each of the six Kebeles and a total 196 households was used to conduct the study, to be selected from each districts 98 households from Shashogo and 98 households from Analemo, as shown in Table 1.

Method of data collection and data types

The overall survey data were collected from primary and secondary data sources. Primary data were gathered through semi structured and structured questionnaire from randomly selected farmers from each kebeles. The questionnaire was pre-tested before being administered then, refining and corrections were made in accordance with the respondents' perception.

Through the questionnaire, social-economic characteristics of farmers, cross breed dairy cattle management practices of farmers, productive traits like daily milk yield, lactation length, lactation yield and reproductive traits like age at first service, age at first calving, calving interval, day's open, and number of services per conception and constraints of cross breed dairy production were gathered. Secondary data like climate (temperature, rain fall) and cross breed dairy owners was obtained from the office of district Livestock and Fishery development resources.

Data management and statistical analysis

All data gathered during the study period were coded and entered in to Microsoft Excel 2007. Preliminary data analysis like homogeneity test, normality test and screening of outliers was employed for quantitative data before conducting the main data analysis. Different types of statistical analysis were used depending upon the nature of the data. All data were analyzed by SAS version 9.2.

The data were described and summarized by using descriptive statistics. Chi-square test was carried out to assess the statistical significance among categorical variables. An index was calculated to provide overall ranking. The ranking being expressed as Index=the sum of (6 times first order+5 times second order+4 times third order +3 times fourth order+2 times fifth order+1 times sixth order) for individual variables divided by the sum of (6 times first order+5 times second order+4 times third order+3 times fourth order+2 times fifth order+1 times sixth order) for all variables [11].

Generalized linear model procedure (PROC GLM) was used to detect variation across districts and seasons for quantitative variables. LSD test was used to identify a significant difference between districts and seasons mean. The model employed was:

$y_{ijk} = \mu + L_i + S_j + e_{ijk}$

Where,

μ = overall mean

yijk = the crossbred cows, performance parameters estimate for the ijk trait (MY, LL, AFS, AFC, CI, DO, NSPC);

L_i = the effect of the ith location (1=Shashogo, 2=Anlemo);

S_j = effect of jth season (1=dry season, 2=wet season) eijk= the random error associated with the ijk observation.

Results and Discussions

Household characteristics

The characteristics of respondents in study areas are presented in Table 2. From the total households used for this study, 81.1% of them were male headed. There was no significant difference (P>0.05) in sex of the household heads between the two districts. About 51.0% of the respondents were within the age class of 41-50 years which is the productive age group and the dairy cattle owners can actively manage their dairy cows. With respect to marital status 1.0%, 4.6%, and 2.1% were widower, divorced and single respectively while about 92.3% of the respondents were married, which helps in dairy production to provide family labor like feeding and milking in the absence of hired labor so that production level can be maintained.

The overall average family size of the respondents in the study area was 6.05 which is less than the report of the national average family size of 6.5 [12]. The crossbred dairy cattle owners in the study area had different educational background. About 36.7% of them can read and write while 17.3%, 14.8% and 11.2% of the farmers have further completed primary, secondary and College/University education, respectively. This educational status helped them to communicate with extension service providers in different ways and to adopt new technologies of cross breed dairy animal production.

	District				**Overall**	
	Shashogo		**Anlemo**			
	Mean ± SE		**Mean ± SE**		**Mean ± SE**	
Family size	6.3 ± 0.16		5.8 ± 1.69		6.05	
	Frequency	**%**	**Frequency**	**%**	**N**	**%**
Sex						
Male	83	84.7	76	77.6	159	81.1
Female	15	15.3	22	22.4	37	18.9
Chi square Value						1.63
P- value						0.2
Age structure						
20-30	3	3.1	4	4.1	7	3.6
31-40	20	20.4	18	18.4	38	19.4
41-50	52	53.1	48	49	100	51
51-60	16	16.3	22	22.4	38	19
>60	6	6.1	7	7.1	13	6.6
Chi square Value						1.43
P- Value						0.83
Marital status						
Married	92	93.9	89	90.8	181	92.3
Single	1	1	3	3.1	4	2.1
Widow	1	1	1	1	2	1
Divorced	4	4.1	5	5.1	9	4.6
Chi square Value						1.16

P- Value						0.76
Educational status						
Illiterate	26	26.5	13	13.3	39	19.9
Read and write	29	29.6	43	43.9	72	36.7
Primary	19	19.4	15	15.3	34	17.3
High school	12	12.2	17	17.3	29	14.8
College/University	10	12.2	12	10.2	22	11.2
Chi square Value						8.6
p-value						0.07
ES=standard error; N=total number						

Table 2: Family size, age, marital status and educational level of households.

However, 19.9% of cross breed dairy cattle owners were illiterate. This could be difficult to sustainably expand dairy cattle production in to improved and profitable manner. In view of the fact that, education is an important means to bring prompt and sustainable development and had roles in affecting household income, adopting technologies, and as a whole the socio economic status of the family as well.

Cattle herd size and composition

Average cattle holding size in both Districts are presented in Table 3. The overall mean cattle holding per household in the present study was 10.81 TLU. This result is in line with [13] Andualam who reported that the overall mean of cattle holding per household was 11.12 ± 0.69 in Essera Woreda, Dawuro Zone, and Southern Ethiopia.

However, the result found in present study area was less than that of who reported 12.25 ± 0.6.23 cattle per household in Northwestern Ethiopia and greater than that of [14] Belay et al. who reported 4.53 ± 0.4 cattle per HH in Dandi district. Shashogo district had significantly (P<0.05) more cattle per household (11.77 TLU) than Anlemo (9.86 TLU).

The overall average HF crossbred holding size per household was 4.19 TLU. Analemo had significantly (P<0.05) less (3.63 TLU) HF crossbred/hh cattle as compared to Shashogo (4.74 TLU). Shashogo district had more crossbred milking cows (2.02 TLU) and growing hefeirs (0.50 TLU) than Anlemo (1.70 TLU) and (0.23 TLU), respectively. The average herd size and composition of the study area were listed in the Table 3.

Variables	**Shashogo (n=98)**	**Anlemo (n=98)**	**Overall (n=196)**
Total cattle/hh	11.77 ± 0.188a	9.86 ± 0.240b	10.81 ± 0.167
Local cattle/hh	7.02 ± 0.152a	6.22 ± 0.231b	6.62 ± 0.141
HF crossbreds/hh	4.74 ± 0.114a	3.63 ± 0.115b	4.19 ± 0.090
Herd structure of HF			
Crossbred milking cows	2.02 ± 0.56a	1.70 ± 0.59b	1.86 ± 0.042
crossbred pregnant cows	0.43 ± 0.060	0.35 ± 0.58	0.39 ± 0.042
crossbred dry cows	0.49 ± 0.078	0.38 ± 0.067	0.43 ± 0.52
crossbred male calves	0.35 ± 0.48	0.23 ± 0.043	0.29 ± 0.033
crossbred female calves	0.72 ± 0.079	0.52 ± 0.52	0.62 ± 0.055
Crossbred hefeirs	0.50 ± 0.094a	0.23 ± 0.061b	0.37 ± 0.057
crossbred bulls	0.05 ± 0.022	0.06 ± 0.024	0.06 ± 0.16
crossbred oxen	0.18 ± 0.044	0.15 ± 0.42	0.17 ± 0.030
a-b means in the same row with different superscripts are significantly different (P<0.05); n=number of observation.			

Table 3: Average herd size and composition.

Feed resources and feeding system in study area

Table 4 shows farmers' ranking of feed resources by the crossbred dairy farmers in the study area. The respondents were asked to rank the identified major feed resources for feeding crossbred dairy cows. The respondents prioritized the identified feed resources according to their perceived importance. The results indicated that in both districts the major feed resources were natural pasture, crop residue, crop-aftermath, concentrate feeds, improved forages and non-conventional feeds (leaf and stem of enset, banana and sugarcane).

Similar reports had also been reported by [15] Zinesh in Sekota District in Waghima Zone, Ethiopia. Additionally, this result is agreed to report that the major feed resources in Ethiopia were natural pasture grazing lands and crop residues. The current result revealed that, natural pasture grazing was ranked the primary feed resources for cross breed dairy cows in both districts and crop residue was the second available feed resources.

Crop aftermath and concentrate feeds were the 3rd and 4th available feed resources, respectively. Improved forages (disho grass, elephant grass) and non-conventional feeds were ranked 5th and 6th in Shashogo districts, respectively while in Anlemo districts the rank was vice versa.

Natural pasture grazing was ranked as the first most important feed resources and the predominant form of dairy cows feeding system in both districts. These feed resources are generally poor in quality and their productivity and supply is seasonal, particularly during the critical time of the dry season. This result is in agreed to Zinesh who reported in Essera Woreda, Dawuro Zone, and Southern Ethiopia.However, the result obtained in current study area is disagreed to Belay and Janssens who reported that Natural grazing lands had the lowest ranking within the common feed resources ranked by the farmers in Jimma Town, Ethiopia.

District	Feed resources	Ranking						Index	Rank
		1	2	3	4	5	6		
Shashogo	Natural pasture	50	28	10	0	0	10	0.2	1
	Crop residues	10	40	28	10	10	0	0.2	2
	Crop after math	0	10	50	28	10	0	0.2	3
	Non-conventional feed	0	0	10	40	28	20	0.1	6
	Improved forage	10	10	0	20	40	18	0.1	5
	Concentrate feed	28	10	0	0	10	50	0.1	4
Anlemo	Natural pasture	45	23	18	0	0	12	0.2	1
	Crop residues	12	30	23	18	15	0	0.2	2
	Crop after math	0	12	45	23	18	0	0.2	3
	Improved forage	0	0	12	45	23	18	0.1	6
	Concentrate feed	18	15	0	12	30	23	0.1	4
	Non-conventional feed	23	18	0	0	12	45	0.1	5

Index=the sum of (6 times first order +5 times second order +4 times third order +3 times fourth order +2 times fifth order +1 times sixth order) for individual variables divided by the sum of (6 times first order +5 times second order +4 times third order +3 times fourth order +2 times fifth order +1 times sixth order) for all variables.

Table 4: Feed resources in study areas.

Crop residues was ranked as the second most important feed resources were the main source of feed during the dry season when pasture from grazing area not able to provide reasonable quantity of feed in the study districts. This result is in line with Andualam who reported that crop residues were ranked second feed resources in Essera Woreda, Dawuro Zone, and Southern Ethiopia. The availability of crop residues varied according to the type of crops grown across the districts. The nature of crop residues produced depends on the amount and types of crops grown in the area. Mainly, the wheat and barley crops are grown in Anlemo districts while the teff and maize grown in Shashogo district. Concentrate supplementing feeds mainly wheat bran was ranked as the fourth most important feed resources in study area.This result is dissimilar with Belay and Janssens who reported that concentrated feeds were ranked second feed resources in Jimma Town, Ethiopia. The types of agro industrial by-products used by respondents were wheat bran in the both districts.

Wheat bran was the predominantly used agro-industrial by-product used in both districts due to its high accessibility and relatively low cost obtained at dairy cooperative and retailers. However, the majority of the dairy producer was used agro industrial by product to supplement their cow by prioritizing lactating cows, pregnant cows and dry cows, respectively. It was observed that dairy farmers in the study area did not restrict themselves to the use of conventional feed resources only, but made use of locally available non-conventional feed resources, particularly during the dry seasons. Banana leaves and enset leaves and stem were utilized most by farmers who cannot have the funds to purchase agro-industrial by-products due to financial limitations. In general, in the present study, the availability of feed resources varied across seasons, and farmers utilized whatever is available for feeding dairy cattle. During the wet season, concentrate supplements and green feeds are the most widely used feed resources, whereas during the dry season the poor quality natural pasture for those who grazed their animals, concentrates, nonconventional feeds are important feed resources. According to the respondents, this variation in seasonal feed availability and quality resulted in low milk production and low income.

Feeding system of dairy cattle

Feeding practices of dairy cattle in the current study areas was presented in Table 5. In the present study areas, three types of dairy feeding systems were practiced which zero-grazing/stall feeding, semi-grazing and free grazing. The crossbred dairy cows are managed indoors and farmers used cut-and-carry feeding systems.

Variables	Shashogo		Anlemo		Overall
	Frequency	Percent (%)	Frequency	Percent (%)	(n=196)
Feeding system					
Zero-grazing/stall feeding	40	40.8	31	31.6	36.2
Semi-grazing	38	38.8	49	50	44.4
Free grazing	20	20.4	18	18.4	19.4

Table 5: Feeding practices in the study area.

Mainly farmers in Shashogo (40.8%) practiced zero-grazing as compared to Analemo (31.6 %). However, low proportion of respondents in the Shashogo (38.8%) practiced semi- grazing while about 50% of respondents practiced in Analemo. About 19.4 % of respondents practiced free grazing in both districts which might be due to lack of capital to purchase and feed concentrate feeds. This result observed in present study was disagreement with the previous findings, 72% of the smallholder dairy farmers in Dire Dawa town practiced zero-grazing system.

Water sources and watering system in study area

The sources of water during dry and wet season were presented in Table 6. The major sources of water in the study area are river, wells, ponds and tap water. The similar reports had also been reported by Destalem [16] in Central Zone of Tigray, Northern Ethiopia.

The major source of water during dry season for crossbred dairy cows in study area (both district) were tap water 1st, river 2nd, wells 3rd and pond 4th as reported by respondents, respectively. Dissimilar reports had also been reported by Zinesh that major water sources for livestock during dry season was borehole (58.3%) followed by spring water (25%) and river water (16.7) in Sekota District in Waghima Zone, Ethiopia. Also the major source of water during wet season was wells 1st, ponds 2nd, tap water 3rd and river 4th as indicated by respondents in study areas.

Variables	Water source	1st	2nd	3rd	4th	Index	Rank
Dry season	Tap water	136	60	0	0	0.37	1
	River	60	136	0	0	0.33	2
	Wells	0	0	136	60	0.17	3
	Ponds	0	0	60	136	0.13	4
	Wells	152	44	0	0	0.41	1
Wet season	Ponds	44	152	0	0	0.27	2
	tap water	0	0	152	44	0.19	3
	River	0	0	44	152	0.13	4

Index=the sum of (4 times first order+3 times second order+2 times third order+1 times fourth order) for individual variables divided by the sum of (4 times first order +3 times second order +2 times third order+1 times fourth order) for all variables.

Table 6: Major water sources during dry and wet season in study areas.

Watering frequency

The frequency of water during dry and wet season for crossbred dairy cattle in the study area is presented in Table 7. About 85.7% of respondents indicated that they watering dairy cows twice per day during dry season while 95.9% is watering once a day during the wet season. The reason for variation may be due to the reality that during the wet season there is an adequate amount water sources around their grazing land while the dairy cows get additional water from the feed (green pasture, fodders) they consumed.

	Shashogo		Anlemo		Overall
Variables	**Frequency**	**Percent (%)**	**Frequency**	**Percent (%)**	**(N=196)**
Dry season					
Twice per day	13	13.3	11	11.2	12.2
Once a day	84	85.7	87	88.8	87.2
Once in two days	1	1	0	0	0.5
Wet season					
Twice per day	4	4.1	5	5.1	4.6
Once a day	93	93.9	93	93.9	94.9
Once in two days	1	1	0	0	0.5
Water shortage during					
dry season					
Yes	87	88.8	86	87.8	88.3
No	11	11.2	12	12.2	11.7
N=number of observation.					

Table 7: Water frequency and shortage during dry season.

This was agreed with the findings to Zinesh who reported that during dry season watering of their livestock is conducted two times a day (99.6%) while during the wet season watering is once a day (97.5%). Moreover, this result in line with reports of Andualam who reported that 79.5% of the respondents give water to their cattle twice a day during dry season, while 10.56% of the respondents offer water to their cattle once a day and 9.9% of the respondents offered water freely during dry season in Essera Woreda, Dawuro Zone, and Southern Ethiopia. In both District respondents indicated that 88.8% face water shortage during the dry season and 11.7% of respondents indicated that they were not faced water shortage during dry season. These observations were in line with those of who reported that respondents revealed that they face water shortage during dry season, in and around Adigrat, north Ethiopia.

Housing system and barn facility of dairy cows in the study area

Housing system of dairy cows in study area is also presented. About 81.6% of the sample households manage their cattle within family house and the remaining 18.4% of households manage their cattle in the separate house, which is made up of wooden wall and grass roof and some corrugated iron roof types in both district. This result in agreed to Andualam who reported that 93.3% kept their animals in their living house, which was not separated from the owners living houses in Essera Woreda, Dawuro Zone, and Southern Ethiopia Table 8.

However, the result found in present study area was dissimilar with the findings to Alemesht et al. who reported that housing systems in Adigrat area. As respondents reported that about 70.9% of floor was mostly made of compacted soil and 26.5% households used concrete floor types. Also there were 2.6% households used floors which made up of woody materials in the study areas.

Barn facility and milking frequency of crossbred dairy cows in study area is presented in Table 8. About 34.2% and 44.4% of the households use both feeding trough and watering trough and no facility, respectively in study area. About 74.5% and 57.1 of the respondents in Shashogo and Analemo cleanse barn of dairy cattle once per a day, respectively.

Variables	Shashogo		Anlemo		Overall
	Frequency	%	Frequency	%	(n=196)
Housing pattern					
Separate house	15	15.3	21	21.4	18.4
Within family	83	84.7	77	78.6	81.6
Floor type					
Concrete	24	24.5	28	28.6	26.5
Hard soil	72	73.5	67	68.4	70.9
Woody materials	2	2	3	3.1	2.6
N=number of observation.					

Table 8: Pattern of housing and floor types in study areas.

This result contrasted to Destalem who reported that the frequency of cleaning the house of dairy cattle was 51.1%, 35.0% and 13.9% for daily, weekly and monthly, respectively in Central Zone of Tigray, Northern Ethiopia. About 85.4% of respondents indicated that they milked their crossbred dairy cows twice per a day milking frequency (Table 9). This observation is in agreed to (Belay et al. 2012) who reported that cows are hand milked with twice per day milking frequency, in the Jimma Town, Western Oromia region, Ethiopia.

Variables	Shashogo		Anlemo		Overall
	Frequency	Percent (%)	Frequency	Percent (%)	%(n=196)
Barn facility					
Feeding trough	11	11.2	10	10.2	10.7
Watering trough	9	9.2	12	12.2	10.7
Both	36	36.7	31	31.6	34.2
No facility	42	42.9	45	45.9	44.4
Cleaning frequency of barn					
Once per a day	73	74.5	56	57.1	65.8
Twice per a day	25	25.5	42	42.9	34.2
Once in two days	0	0	0	0	0
Milking frequency					
Once per a day	7	7.1	9	9.2	8.2
Twice per a day	82	83.7	86	87.8	85.7
Three times in a day	9	9.2	3	3.1	6.1
N=number of respondents					

Table 9: Barn facility and milking frequency in the study area.

Production performance of dairy cattle

Daily milk yield: The milk production performances of crossbred dairy cows in study area are shown in Table 10. Mean milk yield of the study area was 7.61 liters. There was significant ($P<0.05$) difference in the mean milk yield per cow per day between the two districts. The highest (7.93 liters) mean milk yield per cow per day was found in the Shashogo district and the lowest (7.17) mean milk yield was found in the Anlemo district. As the report of respondents, the relatively lower milk yield in Anlemo distinct might be due to poor nutritional status and poor management practices. The mean daily milk yield observed in this study was comparable to the findings of Asaminew [17], who

reported that the mean daily milk yield of cross breed cows in Bahirdar zuria and Mecha district was 7.8 liters. However, the mean daily milk yield found in current study was lower than the average values of 8.52±3.04 liters per /day/cow Belay et al in Jimma town, 11.6 ± 3.1 litters and 10.9 ± 2.4 liters per day per cow at Bishoftu and Akaki towns, respectively [18] Dessalegn et al.

The lower milk yield reported here could be related to shortage of feed, poor management practices and variation of season. Season had significant (P<0.05) effect on mean milk yield in the study area. The highest mean milk yield (8.95) per day per cow was found in rainy season while the lowest (6.41) were found in the dry season. The reason for the difference between dry and rainy season in mean milk yield was to due availability of plenty feed and water resources in rainy season. It was in agreement with the finding of [19] Gimbi who reported that high milk yield observed during rainy season due to high availability of energy, protein and minerals for the lactating animals during such period.

Lactation length: The overall mean lactation length of the cross breed dairy cows in the study area was 8.99 months. There was no significant difference (P>0.05) between the districts in lactation length. The lactation length reported in this study was comparable to the lactation length of 9.13, 9.69 and 9.22 and 9.3 months, reported by Belay et al. in Jimma town, [20] Megersa in west Shoa zone and Dessalegn et al. in Bishoftu and Akaki towns, respectively. The lactation length observed in the present study was shorter than the lactation length of 11.05, 11.13 and 10.1 months, reported by [21] Niraj et al. in Mekele, Mulugeta and Belayeneh in north Showa zone and Ketema [22] in Kersa Woreda, respectively.

This longer lactation length in previous study might be indicative that there was proper feeding status and good management practices. Season had significant (P<0.05) difference on lactation length. The highest (9.14 months) mean lactation length was found in the rainy season while the lowest (8.84 months) was found in the dry season. As the result showed that, shorter lactation length might be indicative of shortage of feed both in quantity and quality during dry season.

Lactation milk yield: The mean lactation milk yield in the present finding was 2057.16 liter Table 10. It was in line with the result of [23] Gebregziabher who reported that the average lactation milk yield of crossbred cows 2069.16+78.44 liter. The mean lactation milk yield of crossbred dairy cattle observed in the present study was lower than the mean of 2123.43 and 2333.63 liter, reported by Niraj et al. in Mekelle and Belay et al in Jimma town, respectively. However, the mean lactation length observed in the present study is higher than mean of 1508 liters reported for crossbred cows in Central High lands of Ethiopia.

Variables	MY/Lit	LL/M	LMY
Overall means	7.61 ± 0.19	8.99 ± 0.14	2057
Effect of location	*	Ns	
Shashogo	7.93 ± 0.24a	8.99 ± 0.17a	2139
Anlemo	7.17 ± 0.25b	9.00 ± 0.17a	1936
Effect of season	*	Ns	
Dry season	6.41 ± 0.18a	8.84 ± 0.16a	1700
a-b means in the same column with different superscripts are significantly different (P<0.05); Means with the same superscript are not significantly different (P>0.05).Se=Standard error, ns= non-significant,*=p<0.05 MY=milk yield LL=lactation length LMY=lactation length LMY=lactation milk yield M=month.			

Table 10: Productive performance of crossbred dairy cows.

Constraints to productive performance of dairy cows

The findings point out that in both districts shortage of feed, poor management practices, diseases, poor access to the veterinary services, and season are the main problems affecting dairy productivity performances in study areas [24]. Respondents of the present study told that the frequently observed dairy cattle diseases in both districts were anthrax, blackleg, brucellosis, mastitis, and tick borne (Table 11).

Variables	Shashogo		Anlemo		Overall
	Frequency	Percent (%)	Frequency	Percent (%)	%(n=196)
Opportunity					
Increasing demand of milk	56	57.1	48	49	53.1
Suitable agro-ecology	22	22.4	21	21.4	21.9
Increasing price of milk	20	20.4	29	29.6	25

Table 11: Opportunities for dairy production in study area.

The opportunities for dairy production in the studied areas

As respondents indicated that dairy farming supports livelihoods of society under low input production system, generates income and creates employment opportunity under market oriented production system [25].

About 53.1% of households indicated that there were increasing demand by the community for milk and milk products, long-standing culture of dairy products consumption and 25% encouraging price for these products was major opportunity in study areas [26]. About 21.9% of respondents reported that suitable agro-ecology is another opportunities for dairy production in the study areas [27].

Conclusion and Recommendation

The major feed resources in current study areas were natural pasture grazing, crop residue, crop-aftermath, concentrate feeds, improved forages and non-conventional feeds. The three types of dairy feeding systems were practiced, which zero-grazing/stall feeding, semi-grazing and free grazing in study area. The major sources of water in the study

area were river, wells, ponds and tap water, where they watering dairy cows twice per day during dry season while once a day during the wet season. The respondents managing their cattle within family house and in the separate house, which is made up of wooden wall and grass roof and some corrugated iron roof types in both districts. The results of the study revealed that the production performance is low due to poor management, variation of season were the main reasons for low milk production (feed shortage) ,record keeping also have big impact on lactation length, Calving interval, etc. Therefore based on the above conclusion the following recommendations are forwarded.

Shortage of feed, diseases, proper recording system, and getting productive dairy animals could be possible

Awareness creation for farmers in crossing their local cattle with exotic dairy cattle breeds to get higher milk production.

Teach them record keeping especially literate youngsters from each family. so that proper management will enable them achieve their goal in production or reproduction.

Sustainable extension service should be provided to improve animal feed resources management (preservation and proper storage of feeds for shortage period of the year).

If not regular at least visiting vet. Should be arranged to take care of animal health to improve the productive performances of crossbred dairy cows.

To address feed shortage, provision of leguminous plants seeds. A.I services by concerned bodies (governments or non-Governmental Organizations) to enhance productivity of crossbred cows in the area .In addition organizing the farmers in a form of cooperatives will help them to have a say.

Awareness of animal owner and stakeholder should be raised in order to increase their management ability. As management significantly affect productivity and reproductive in dairy farm.

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