



**COLLEGE OF AGRICULTURE AND NATURAL RESOURCE
DEPARTMENT OF ANIMAL PRODUCTION AND TECHNOLOGY**

**ASSESSMENT OF LACTATION PERFORMANCE OF LOCAL COWS OF GURAGE
ZONE IN CHEHA WOREDA, GURAGHE ZONE, SNNPR, ETHIOPIA**

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APPROVAL SHEET

WOLKITE UNIVERSITY
COLLEGE OF AGRICULTURE AND NATURAL RESOURCE
DEPARTMENT OF ANIMAL PRODUCTION AND TECHNOLOGY

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LIST OF ABBREVIATIONS

AFC	Age at First Calving
AOW	Administration Office of Woreda
CI	Calving Interval
DMY	Daily Milk Yield
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
HH	House Hold
IAR	Institutes of Agricultural Research
ILCA	International Livestock Centre for Africa
LL	Lactation Length
NMA	National Metrology Agency
NSC	Number of Service Per Conception
SNNPRS	Southern Nations, Nationalities and Peoples Regional State
SPSS	Statistical package for social science

ABSTRACT

This study was carried out in Susinamate, Gasore and Ewan kebeles of Cheha woreda Gurage Zone, aiming to assess the overall lactation performance of local cows, daily milk yield, and lactation length of local cows. The data were gathered using semi-structure questionnaire and interview with agriculture and extension workers. The data collected includes lactation length, calving interval, number of service per conception, age at first calving, management practices and constraints in relation to lactation performance of cows. Then both qualitative and quantitative data were analyzed by using Statistical Package for Social Science (SPSS) version 20. The average milk yield of local cows in 1st, 2nd and 3rd stage of lactation was 1.29 ± 0.068 , 1.76 ± 0.065 , 1.24 ± 0.066 respectively with overall mean value of 1.43 ± 0.199 which is the average daily milk yield. The average lactation length of local cows was found to be 8.31 ± 0.203 months. The average calving interval, age at first calving and number of service per conception was found to be 28.53 ± 0.877 months, 53.07 ± 0.894 months, and 1.58 ± 0.074 respectively. Most of the respondents (86.7%) reflected that feed shortage is the major factor that reduces milk production. Most of the cattle herd in the study area was local breed which is very low in lactation performance as compared to exotic breeds available in the area. The overall performance of local cows in the study area was lower than other study results in Ethiopia. This is due to lack of quantity and quality feed, lack of credit from governmental organizations, lack of extension services. To avoid this problem we should: practice Introduction of exotic breed, integrated type of development program for genetic improvement, forage development and feeding strategies, Promotion of input and output supply of dairying and Provision of timely and adequate extension service will be essential.

Key word: *Age at First Calving, Average Daily Milk yield, Calving Interval, Lactation Performance. Local Cows, Service per Conception.*

1. INTRODUCTION

1.1 Background

Ethiopia is endowed with the largest livestock population in Africa and tenth internationally. Cattle production has provided a total of 3.2 million liters of milk and 0.331 million tons of meat annually (FAO, 2014). Ethiopia has over 53.4 million indigenous cattle and about 10 million cows crossed with local cows with annual calving rate of 45% (CSA, 2013). These huge livestock number and suitable agro-ecologies are taken as a good opportunity for under taking genetic improvement of our endogenous cattle.

Livestock are important components of nearly all farming systems in Ethiopia and provide with great socio-economic and cultural values. The diversified use of livestock contributes on average 45% of the total Agricultural Gross Domestic (GDP) of the country (IGAD, 2010). The total milk production per year from indigenous cattle is 0.8 million tons out of 10 million tons from all the species put together in Ethiopia (Melaku *et al.*, 2011).

Accurate evaluation of the lactation performance of local cattle is a prerequisite for sustainable dairy production system. However, little research efforts have been made in Ethiopia in general and in Guraghe Zone in particular on lactation performances of local cows as most of the efforts are directed towards cross breed dairy animals.

The Guraghe highland breed is small East African Zebu type found in the Guraghe Zone in close proximity to the tsetse infested Ghibe valley, Ethiopia (DAGRIS, 2007). This is because the dairy sector of the Gurage zone does not have specific institution or custodian which collects and analyses dairy related data that can be used to inform investors, policy makers and other industry stakeholders (SNV, 2008). Hence, in order to design relevant dairy development strategies, understanding of the breeding objectives, trait preferences and lactation performances of local cows under existing management is indispensable. This study was therefore directed to assess over all lactation performance and the major factors influencing lactation performance of Gurage local cows in Cheha woreda of Gurage zone.

1.2 Statement of the problem

Ethiopia has huge livestock populations; first in Africa and tenth in the world. Milk cow's production as one component has significant role in livelihoods of smallholder farmers. Milk cows in Gurage zone in Chewa woreda is constrained by different factors like feed shortage, poor genetics, climate shocks, poor veterinary services, poor and others. Several factors that hindered milk cows productivities in the Chewa woreda were diseases, poor genetics of stock, poor quality and quantity of feeds and lack of clean water of milk cows. Among those, water and feed quality are major constraints in the study site. The available feed resources in the study area are mainly natural: free grazing in compound of Chewa woreda and hay during dry season though they are not enough as quality and quantity feeds. Insufficient in feeds and poor feeding and housing system and low nutrient composition of available feeds resulted in low performance of milk cows. On other hand, lack of clean water may also result in performance reduction and lactation length of milk cows become longer. Finally, further study on this title is very mandatory to evaluate whether improvement is done or not in Gurage Zone in Chewa woreda.

1.3 Objective of the study

1.3.1. General objective

This study was mainly intended to assess over all lactation performance of local cows of Gurage zone in Cheha woreda.

1.3.2. Specific objectives

- To assess daily milk yield, calving interval and lactation length of Gurage local cows in Cheha woreda.
- To Point out the major factors influencing lactation performance of cows in Gurage zone of Cheha woreda.

1.4 Research Question

1. What does lactation performance of local milk cows in Gurage zone in Chewa Woreda looks like?
2. What are the major factors influencing lactation performance of local cows in Gurage in Chewa Woreda?

2. LITERATURE REVIEW

2.1. Lactation Performance and daily milk yield of local cows

The lactation performance of milk cows is usually measured by determining the total milk yield per lactation or per year, average daily milk yield, and lactation length. Generally, the reproductive and lactation performance of local cows is closely associated with each other. Breeding failure has a clear negative influence on milk production (Mohammed *et al.*, 2012). Milk production level and lactation persistency are crucial factors determining the appropriate calving interval.

According to CSA (2013), 99.4 % of the total cattle population in Ethiopia belongs to local breeds and the remaining are the hybrids (0.5 %) and the exotic breeds (0.1 %). The average lactation period per cow at country level is estimated to be about eight months and the average milk yield per cow per day is about 1.284 liters (CSA, 2013).

2.1.1. Lactation length of local cows

The lactation length is the period between parturition and drying off. Table 2 shows that lactation length difference among indigenous breeds of Ethiopia (Zewdu *et al.*, 2013).

Table 2: Lactation length of different local breed cows

Breed type	Lactation length in days	Source
Arsi breed	237	Zewdu, <i>et al.</i> , 2013
Fogera breed	175	Zewdu, <i>et al.</i> , 2013
Barka breed	185	Zewdu, <i>et al.</i> , 2013
Zebu cows	303	Zewdu, <i>et al.</i> , 2013
Horro breed	229	Zewdu, <i>et al.</i> , 2013

It is believed that the extended interval from parturition to resumption of estrous cycle is mainly responsible for the poor reproductive efficiency of indigenous cows (Addis *et al.*, 2015). Ideally, a milk cow should calve at yearly intervals and should have a lactation length of about 300 days, but in practice calving intervals are often longer and lactation periods are shorter for all local breeds (Shiferaw *et al.*, 2003).

2.2. Major factors influencing lactation performance of milk cows

2.2.1. Age at first calving

First calving marks the beginning of cows 'productive life. Body condition is an important variable that indicates the reproductive status and the expected performance of cows (McDowell, 2003). Early sexual maturity and young AFC (age at first calving) is very much perceived in light of increasing the total productive and economic efficiency. Age at first calving for all local cows including Gurage, is in general after two years. Early calving is important to decrease the unproductive period of cow's life and to reduce the generation interval in response to selection (ILRI, 2005).

2.2.2. Number of service per conception

Number of service required for conception (NSPC) is one of the factors considered in determining reproductive efficiency of cows. It also reflects the management efficiency. Number of service per conception (NSPC) depends on the breeding system. It is higher under uncontrolled natural breeding than controlled breeding. Haile *et al.* (2008) reported that NSPC greater than 2 should be regarded as poor. NSPC for indigenous breeds (Boran, Barka, Arsi and Fogera) ranges from 1.06 to 2.6 (Gebeyhu *et al.*, 2005; Million *et al.*, 2006; Lema *et al.*, 2010; Genzebu *et al.*, 2016). No written information was found about Gurage local cows.

2.2.3. Calving interval

Calving interval (CI) is the interval between consecutive calving. Calving interval of 12 months is considered as ideal assuming average gestation period of 280 days, nearly 85 days would remain for post calving conception to occur. Long calving intervals would indicate prevalence of reproductive problems or poor management of the herd. Estimates of calving interval ranges from 11.8 to 15.6 months in indigenous breeds (Tadesse and Dessie, 2003; Lema *et al.*, 2010; Haile *et al.*, 2008). The mean calving interval was higher for Horro (15.6) and Boran breed (15.5 months) while lowest for Barka breed.

2.2.4. Calf rearing practices

The major calf rearing systems practiced in Ethiopia are restricted on partial suckling and bucket feeding. Bucket feeding was practiced with households who own crossbred cows only; whereas

partial suckling was mainly practiced with households who own local zebu cows. The major reasons for termination of suckling (weaning) for all zebu cows is cows and calves refusal to be sucked and suckling respectively. The methods of pre-weaning milk feeding are partial suckling and bucket feeding. The main reason for weaning calves is to prepare the cow for mating to get more milk and give rest time for next calving. Calf weaning systems for all Ethiopian cows is isolation of calves from cows and smearing of teats with manure (Tsegaye *et al.*, 2015).

Lactation performance in local cows depends on two major factors, genetic and environmental factors. Genetic background, climate, diseases, feeding, year and season of calving have been reported to affect milk production, lactation length and dry period (Hammoud *et al.*, 2010). Breed, age, stage of lactation, parity and milking frequency also influence performance production (Hammoud *et al.*, 2010). Management, nutrition, lactation turn or the age, year and season in which lactation started are the leading environmental factors affecting lactation performance in cattle. Beside these factors, the persistency level of the highest milk production period reached on lactation is a significant factor (Amasaib *et al.*, 2011).

2.2.5. Pregnancy period

During pregnancy milk yield declines more rapidly. Studies on milk cows showed that there is a significant difference in milk yield allegedly due to the increasing divergence of nutrients from the mammary glands to the uterus for fetal growth and maintenance (Hammoud *et al.*, 2010).

2.2.6. Estrus

Milk secretion in cattle generally reduces when the cow is in heat. This occurs primarily from the physical activity associated with estrus behavior rather than from a direct effect of reproductive hormones on lactation. The reduced milk production is temporary. To minimize milk loss during estrus, cows should be confined (Tesfa and Garikipati, 2014).

2.2.7. Disease

A number of diseases significantly reduce the amount of milk produced. Disease may affect heart rate and therefore, the rate of blood circulation through the mammary gland influences milk secretion. The major disease in dairy cattle is mastitis, inflammation of mammary gland. Milk production is reduced when a cow has clinical mastitis, which is recognized when there are clots

or flakes in the milk and often accompanied by increased body temperature and reduce appetite. Sub clinical mastitis is more difficult to recognize because change in the milk are not obvious and systematic symptoms are minimal (Tesfa and Garikipati, 2014).

2.2.8 Feed availability

Inadequate nutrition limits milk secretion in cows to a greater degree than in any other animals (Epapharas *et al.*, 2004). Feed scarcity is a common problem for all local cows of Ethiopia; particularly during long dry season, the scarcity is highly pronounced. Most parts of Ethiopia feed scarcity is not supported by feed conservation as hay and silage making.

2.2.9 Water availability

Water is a scarce resource in most rural areas of Ethiopia. Both people and their cows need to travel long distance searching for water particularly during dry season. Much time and energy is wasted during daily trekking to distant water supplies. As a result, animal's condition and their productivity are reduced (Abebe, 2008). In general most animals have to drink water at least every day to be productive (Ayele *et al.*, 2002). Therefore the provision of water is primary important in good lactation performance of cows.

2.2.10 Poor genetic potential

Mating in the context of animal breeding means pairing of female and male animals for the purpose of reproduction on a farm using natural or artificial (AI) methods (Willam and Simianer, 2011). The genetic of Ethiopian livestock have involved largely as result of natural selection influenced by environmental factors. This has made the stock better conditioned to withstand feed and water shortage, diseases challenges and harsh climate. But the capacity for the high level of production has remained low (Yilma, 2011).

3.2. Data Collection Method

Both primary data as lactation performance of local cows, major factors influencing lactation performance of local cows etc. and secondary data such as, demographic structure, altitude, rainfall, topography, temperature etc. were used for the study. The primary data was collected through using semi-structured interview, and through questioners and personal observation. The secondary data was collected from annual reports of zonal agricultural development office, and reviewing different written documents.

3.3 Sampling Method

3.3.1 Sampling Technique

Both purposive and random sampling techniques were used. Purposive sampling technique was used to select representative *kebeles* for their proximity and livestock potential, while random sampling techniques was used for house hold selection.

3.3.2 Sample Size

From the total of 39 *kebeles* in the woreda 3 representative *kebeles*(*Susinamati, Gasore, and awen*) from Cheha woreda were selected purposively. From each *kebele* we randomly selected 15 households (hh); and a total of 45 hh were used in the survey.

3.4 Data Analysis.

The collected data was coded and tabulated for descriptive statistical analysis as frequency, percentage, standard deviation and mean using SPSS version 20.0. The result is presented in the form of tables and figures. The disease parameter was ranked using this index:-

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

Where R_n = Value given for the least ranked level (example, if the least rank is 7th, then $R_n=7$, $R_{n-1}=6$, and ..., $R_1=1$); C_n = Count of the least ranked level (in the count of the 1st rank = C_1).

The opposite matching for R and C value can be presented as follows:-

R_1 for R_n , R_2 for R_{n-1} ..., R_n for R_1 and C_1 for C_n , C_2 for C_{n-1} ... C_n for C_1 .

4. RESULT AND DISCUSSION

4.1. Household Characteristics

The general household characteristics of respondents were distributed by sex, age, marital status, religion and educational status (table 1).

Table 1: Household characteristics of the study area (N=45).

Characteristics	Item	No of respondent	Percentage (%)
Sex	Male	29	64.4%
	Female	16	35.6%
Age	≤14	0	0
	15-45	25	55.6%
	≥46	20	44.4%
Marital status	Single	5	11.1%
	Married	31	68.9%
	Divorced	6	13.3%
	Widowed	3	6.7%
Household size	1-3	13	28.9%
	4-5	25	55.6%
	≥6	7	15.5%
Religion	Orthodox	14	31.1%
	Islam	25	55.6%
	Protestant	5	11.1%
	Catholic	1	2.2%
Education level	Illiterate	20	44.4%
	Elementary	14	31.1%
	Secondary	8	17.8%
	High school and above	3	6.7%

Source: survey result, 2019, N= is total numbers of respondent

Table 1.shows that out of the total 45 respondents 64.4% were males and 35.6% were females. Since we used simple random sampling technique, most respondents were found to be females.

The majority of the respondents were in the age range of 15-45 years. This shows that the majority of the respondents were in productive age group. From the above table 68.9% of the respondents were married. This indicates that the respondents have family who can participate in milk and milk product production.

Regarding educational status, 44.4% of respondents were illiterate, while 31.1% were attained elementary education only. This result clearly shows that there is clear limitation of the effectiveness of training programs related with dairy animal husbandry and problem on adoption of improving breeding technologies.

4.2. Cattle herd Composition

The average cattle composition per household in the study *kebeles* is summarized in table 2. The advantage of this composition is to increase productivity through improve management by separating the cattle based on, age, sex, their productivity and others. The disadvantage of this composition is when the households separating the cattle; they need large land size. Need additional cost for construction and extra man power is needed for management.

Table 2: Average livestock number per household

Cattle types	Mean	SD
Bulls	2.02	0.812
Lactation cows	2.80	0.134
Pregnant cows	1.82	0.834
Dry cows	1.24	0.908
Heifers (>6 months) of age	2.30	0.949

4.3. Lactation performance of local cows

The lactation performance of milk cattle is usually measured by determining the average daily milk yield, and lactation length calving interval, number of services per conception and age at first calving.

4.3.1. Lactation length and average daily milk yield

Lactation length and average daily milk yield of local cows in the study area is presented in the table 3 below

Table 3: Lactation length and average daily yield of local cows

Lactation length (months) and Average daily milk yield				
	Min.	Max	Mean±SE	
Lactation length	7	10	8.31±0.203	
Average daily milk	0.5	2	1.43±0.199	

The above table shows that the lactation length of local cows in the study area was 8.31±0.203 months. The average lactation length of our result was higher than what was reported (7.90±0.08months) by Ayalew and Feyisa(2017) for Guraghe local cows. Average daily milk yield of local cows in study area was 1.43±0.199 liters/cow/day. In the study area, cows are milked two times per day in all households - morning and evening. The average daily milk yield of the cows in our result was different from the result that reported by (1.7±0.02 liters/cow/day) Ayalew and Feyisa(2017) about Guraghe highland cows.

4.3.2 Average milk yield of local cows in different stages of lactation

Average milk yield of local cows in different stages of lactation in the study area is presented in the table4 below.

Table 4: Daily milk yield of first (early), second (pick) and third (late) lactation

Type of lactation	Lactation stage of milk yield of local cows
	Mean±SE
Early stage (0-2 months)	1.29±0.068
Mid stage (3-5 months)	1.76±0.065
Late stage (> 6 months)	1.24±0.066
Overall mean	1.43±0.199

According to table 4, there is about 0.5 liter difference between early and mid-lactation ($1.76 - 1.29 = 0.47$ lit). This very slight difference shows that there was very poor feed management during early lactation which has a direct influence on mid lactation.

4.3.3 Calving Interval

In this study, the average calving interval was found to be 28.53 ± 0.877 months. This result was higher than the mean calving interval Gurage cows reported to be 22.03 ± 0.37 months by Ayalew and Feyisa(2017).The relatively longer calving interval might be an indicative of poor nutritional status, poor breeding management, lack of own bull and artificial insemination service, longer days open, diseases and poor management practices. The average calving interval is presented in table 5 below.

Table 5- Calving interval of local cows in months

	Minimum	Maximum	Mean±SE
Calving interval	24	36	28.53 ± 0.877

4.3.4 Number of Service per Conception (NPSC)

In this study the average service per conception for Gurage cows was found to be 1.58 ± 0.074 . The present result is lower than the result Kumar *et al.*, (2014) reported (2.2 ± 0.2) for indigenous cows of Ethiopia. However, our result is in agreement (1.06 - 2.6) with what was reported for NPSC of Boran, Barka, Arsi and Fogera indigenous cows of Ethiopia by Gebeyhu *et al.*, (2005); Million *et al.*, (2006); Lema *et al.*, (2010); Genzebuet *et al.*, (2016).

Table 6- Number of service per conception (NPSC) of local cows in the study area

	Minimum	Maximum	Mean±SE
NPSC	1	2	1.58 ± 0.074

NPSC=Number of Service per Conception; SE= Standard error

4.3.5 Age at first calving (AFC)

In the study area the average was found to be 53.07 ± 0.894 month. This result was relatively longer than the mean AFC of Gurage cows reported to be 42.85 ± 0.70 month by Ayalew and Feyisa(2017).The relatively longer AFC might be indicative of poor nutritional status, poor breeding management, and lack of teaser bull, artificial insemination service, diseases and other poor management practices.

Table-7 Age at first calving in months

	Minimum	Maximum	Mean±SE
AFC	48	60	53.07 ± 0.894

4.4. Major constraints of the lactation performance of local cows

Various constraints of local milk cows were identified during the discussion with experts of the study area. The feed availability, poor management, disease prevalence, water availability, and deficiency of veterinary service, are the major constraints identified that can affect the lactation performance of local cows. This result is in line with the report by Tesfaye, (2009) about constraints of Ethiopian milk cows.

4.4.1 Level of feed scarcity in the study area

Feed scarcity has been identified as the major constraint affecting the lactation performance of cows in the study area. Most of the respondents (86.7%) said that feed scarcity is the major factor that reduces milk production. There are no supplementary feeds which resulted reduced milk production. Animal are kept in communal grazing land. During long dry season, the cows are supplied with hay from natural grass. The available grass and natural pasture is declining with increasing demand of cultivation land. Abebe (2008) and Markos (2006) reported the same scenario happened in the country.

Table 8: Level of feed scarcity in the study area

	Frequency	Percent
No	6	13.3%
Yes	39	86.7%)
Total	45	100.0

4.4.2 Level of Water scarcity in the study area

Most of the respondents (88.9%) in study area reflected water scarcity, particularly during dry season, as the major factor that reduces milk yield, lactation length and poor growth of calves. Lack of water may be expressed in terms of quantity and quality.

Table: 9. Level of Water scarcity in the study area

	Frequency	Percent
No	5	11.1%
Yes	40	88.9%

4.4.3. Pregnancy period

During the nine months of gestation period, farmers in the study area never milk the cows if there is shortage of feed (24.4%), not to affect the body condition of the cows (28.9%) and usually (46.7%) the cows never give milk while they are pregnant. Thus, there is no information about the milk yield potential of the local cows during gestation period.

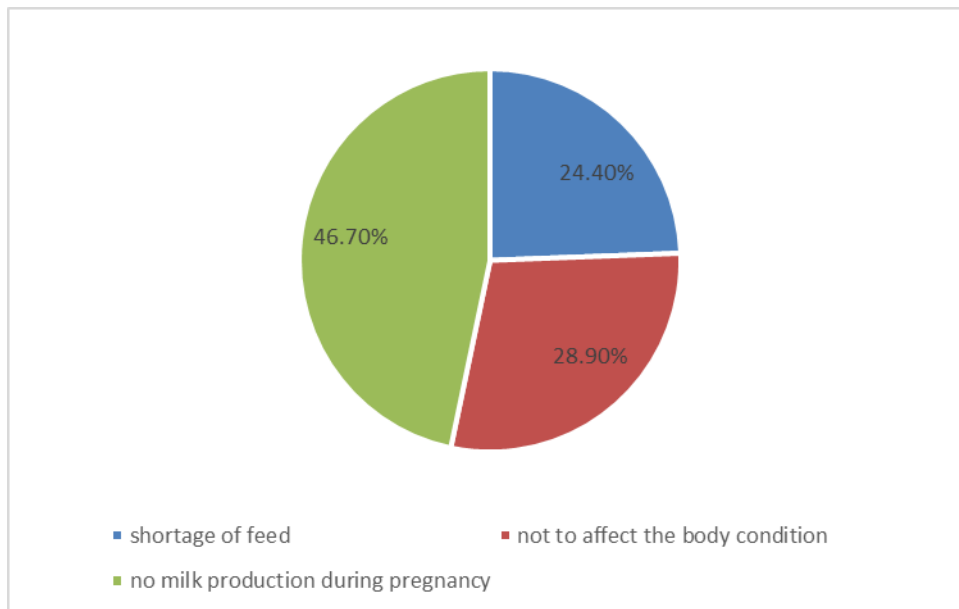


Figure 2: Reasons for not milking the cows during gestation

4.4.4 Estrus

During the cows in heat period, the farmers in study area never milk the cows, because; the cows become restless (20%), uncontrolled or behaviors change of cows (44.4%), and aggressiveness of the cows (36.6%).

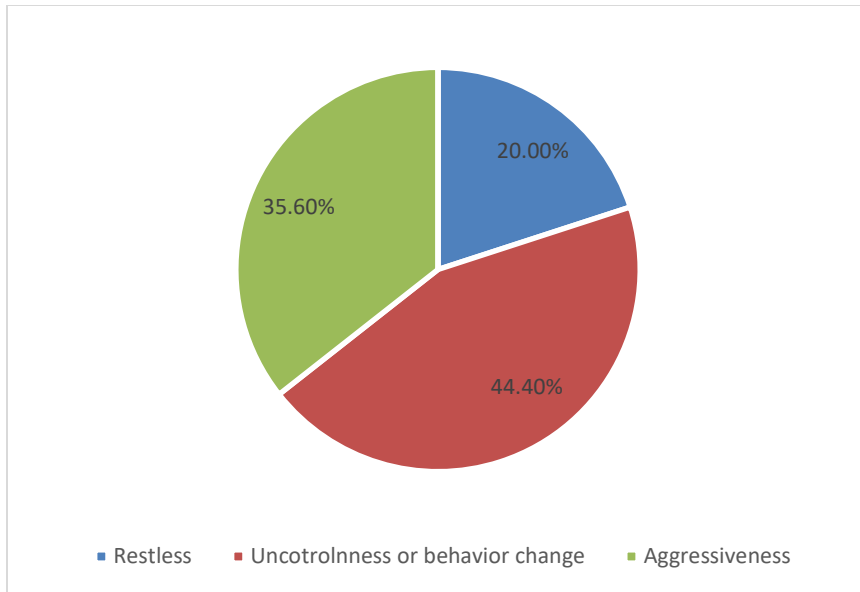


Figure 3: Reasons for not milking the cows during estrus

4.4.5 Poor genetics potential

The breeding methods of the study area is only natural mating, there is not practicing artificial insemination. Though production potential of local cows is low, they are highly resistant to feed and water shortage, disease prevalence and harsh climate. As a result poor production performance has identified as major constraints affecting the local cows in the study area. A poor genetic potential constraint of the present study was in lined with the reported by Yilma (2011).

4.4.6 Disease prevalence

Disease is one of constraints affecting lactation performance of cows. In the study area the most common disease that is highly affects the production are tick, trypanosomiasis, and mastitis are first, second and third rank respectively.

Table 10: Common diseases of cows

NO	1	2	3	4	5	6	sum	Index	rank
1.Brucellosis	5	2	12	14	3	9	145	0.14285714	4
2.Tuberculosis	7	6	4	8	10	10	142	0.13990148	5
3.Trypanomasis	19	9	4	8	3	1	206	0.20295567	2
4.Anthrax	1	3	7	11	13	10	118	0.11625616	6
5. Ticks	15	20	4	2	1	3	217	0.2137931	1
6. mastitis	10	8	15	4	7	1	187	0.18423645	3
Sub Total							1015	1	

Source field survey, 2017, $Index = \frac{\text{the sum of } [6*1st\ rank + 5*2nd\ rank + 4*3rd\ rank + 3*4th\ rank + 2*5rd\ rank + 1*6rd\ rank]}{\text{sum of all purposes mentioned by the respondents}}$.

Tick is the first rank that is the most cause substantial losses in cattle production, in terms of reduced productivity and fertility. In the study area we have observed udder of cows affected and damaged by ticks, which made milking impossible. We also observed that extensive grazing is one of the major factors for prevalence of tick in the study area. Our study was somewhat similar with what was reported; the tick is the major problems of affect the udder of the cows and the productivity is reduction in terms of udder affect by Gizachew (2007),

4.5. Management practices

4.5.1. The housing system

Poor housing system is another challenge of cow's production and productivity in study area. In the study area there was no house separation of animals based on age, and sex; all animal live together in single house and are affected by overcrowding. This finding is not in line with Asirat *et al.*, (2012) and Abebe *et al.*, (2012) who run a survey in the Gurage area and observed separation of animals in different rooms.

4.5.2 Birth Complication

Most of the respondents (71.1%) in study area reflected there are not occurred of birth complication during parturition. Whereas sometimes the birth complicating is (28.9%) occurred and the miss position of calf is the most problems in study area. The extension service is give

some treatment for parturition cows and also practice to change that miss position of the calve during parturition.

Table-11 Birth complicating

	Frequency	Percent
No	32	71.1%
Yes	13	28.9%
Total	45	100.0%

4.5.3. Calf rearing practices

The major calf rearing practice in the study area till weaning period is restricted on partial suckling. After weaning the calf may has access to fresh grass, and/or hay if there is feed shortage. The household are separate the calf during day and night; and allow it to suck its mother in the morning and afternoon. This partial suckling is practiced during early lactation periods. The cows due to poor management, they stop milking and the calf suckling during morning and evening. Similar information was reported by Tsegaye *et al.*, (2015).

4.5.4. Major feed resources

In the study area the major feed resource was found to be indigenous grass 51.1%, crop residues 33.3% and others like hay 15.6%. In the study area there is no supplementary feeds. This has a direct negative impact on milk yield.

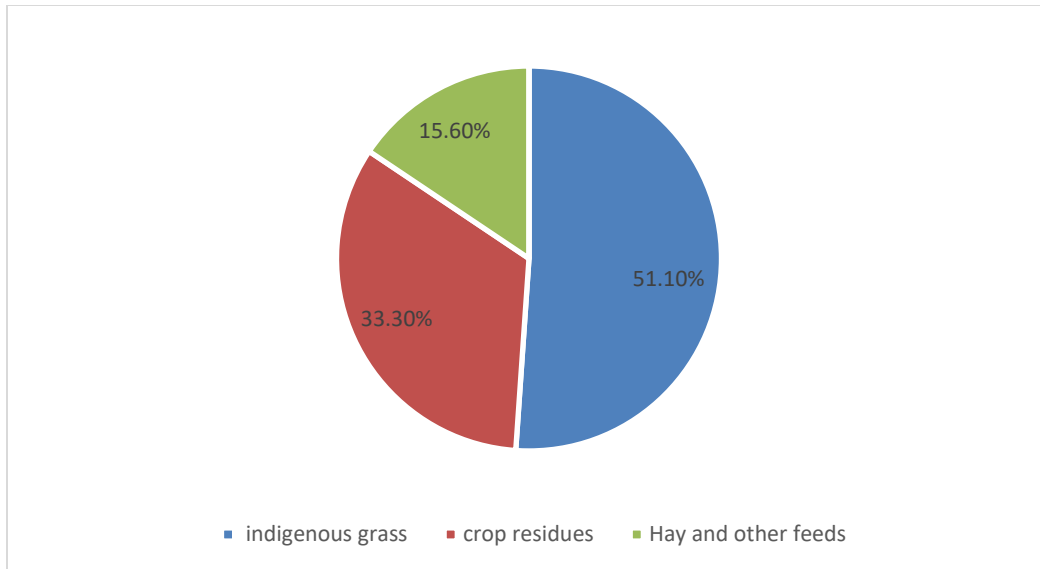


Figure 4. Major feed sources for the cows

4.5.5 Feed conservation technique

Hay making is the only feed conservation taking done in the study area. Local grasses, crop residues are the major sources for hay making. In study area there is no feed conservation practice through silage. This hay conservation is used when the shortage of feed is occurred especially during dry season in the study areas.

4.5.6 Availability of veterinary services in the study area

In the study areas out of the 45 respondents 31.1% of them have already received vaccination service while 68.9% have no any service of vaccination by house hold level. The vaccination service is given by extension service. Whenever there is tick and tick born disease outbreak the bureau of agriculture make a kind of complain for spraying.

Table 12: Availability of veterinary services in the study area

	Frequency	Percent
No	31	68.9%
Yes	14	31.1%
Total	45	100.0

5. CONCLUSION AND RECOMMENDATION

5.1. CONCLUSION

This study was conducted in Cheha woreda, west Gurage zone, and south nation nationality people region with the aim of assessment of lactation performance of local cows. The lactation performance of milk cows is usually measured by determining the total milk yield per lactation or per year, average daily milk yield, and lactation length. The research included assessing the milk yield per lactation, lactation length, daily milk yield and related constraints of milk production on local cows. From the total respondents 64.4% were males, 35.6% were females. Out of the total respondents, 68.9% were married. Regarding educational status, 44.4% of the respondents were illiterate, 31.1% had received elementary education, 17.8% had received only secondary education and 6.7% had received high level and above. As mentioned so far, 44.4% the respondents were illiterate which in turn limits the effectiveness of formal training programs, problem on adopting improved breeding technologies.

The lactation length of local cows in the study area was 8.31 ± 0.203 . The overall daily milk yield of local cows in study area was 1.43 ± 0.199 , number of service per conception 1.58 ± 0.074 and age at first calving was 53.07 ± 0.894 . The major calf rearing practiced in the study area was restricted partial suckling and sometimes feeding fresh grass during and after weaning. The result of the present study also indicated that the calving interval (CI) of local cows were 28.53 ± 0.877 month. In the study area the feed shortage, water shortage, lack of improved breed, disease prevalence, and poor management were considered as the most important constraints of lactation performance local cows. The feed resources commonly used in the study area are natural pastures, indigenous grass, crop residues and hay during dry season. Water shortage was also a common problem in the study area particularly during dry season. Generally, this study showed that the performance of local cows was very low due to many constraints like feed, water, disease and management related ideas.

5.2. RECOMMENDATION

➤ As a result the following recommendation should be noticed;

- ✓ Feed conservation on available natural pasture and improved forage production with proper feeding management system should be implemented.
- ✓ Assessment on the production potential of local cows with full management packages should be implemented.
- ✓ Extension services including veterinarians follow up must be incorporated as production enhancement tools.
- ✓ The strategic improvement of feeding, breeding, management and follow up must be incorporated to boost up the reproductive and productive performance as well as genetic makeup of the local breed.
- ✓ The government as well as non-government bodies and private sectors should play their corresponding role in training farmers and expanding extension services.

6. REFERENCE

- Abebe B., Zelalem Y & Ajebu N. 2012. Hygienic and microbial quality of raw whole cow's milk produced in Ezha district of the Gurage zone, Southern Ethiopia. *Wudpecker Journal of Agricultural Research*. 1(11): 459.
- Abebe, H., 2008. Supplementation of graded level of concentrate mix on feed intake, digestibility, live weight change and carcass characteristics of dairy cows feed urea treated rice straw. An, MSC, This presented to the school of Graduate studies of Haramaya University. 65 Pp.
- Addis D., Yisehak K. and Janssens G.P.J. 2015a: Socio-economic factors influencing urban small-scale dairy management practices in Jimma Town, Ethiopia. *Libyan Agriculture Research Center Journal International*, 3(1): 07-12.
- Amasaib, E. O., Fadel-Elseed, A. M., Mahala, A. G. and Fadlelmoula, A. A. 2011. Seasonal and parity effects on some performance and reproductive characteristics of crossbred dairy cows raised under tropical conditions of the Sudan. *Livestock Res. Ru. Develop.*, 23: 4-9.
- Asrate Ayza, Yilma Zelalem and Ajebu Nurfeta. 2012. Quality of fresh whole milk produced in and around Boditi town, South Ethiopia. *African Journal of Animal and Biomedical Sciences* 7(2), pp 95.
- Ayalew W and Feyisa T. (2017). Productive and reproductive performances of local cows in Gurage zone, South West Ethiopia. *Online J. Anim. Feed Res.*, 7(5): 105-112.
- Ayele, S., Assegid, W., Tabbar, M. A., Ahmed, M. M. and Belachew, H. (2002): Livestock stock marketing in Ethiopia a review Of structure, performance and development initiatives, in; socio- economic and policy research Working paper. Nairobi Kenya; ILRI (International Livestock Research Institute).
- Ball P. J. H and Peters A. R. 2004. *Reproduction in Cattle*. Third edition, Fibiol. Pp. 1-13.
- CSA (Central Statistics Authority), 2012/13. Agricultural sample survey 2013/2014. Vol. II. Report on livestock and livestock characteristics. Statistical Bulletin. Addis Ababa, Ethiopia: CSA.

CSA(Central Statistical Agency),2016/17.Ethiopia Agricultural sample survey. Vollll.Report on livestock and livestock and livestock characteristics. statisticalBulletin 388.CSA, Addis Ababa, Ethiopia.

DAGRIS, 2007.International Livestock Research Institute, Addis Ababa, Ethiopia. (Available from <http://dagris.ilri.cgiar.org>), June 1,2012.

Epapharas.Berekedu ,B.Berhanu,A.Lakes,S, 2004). . Supplementation of graded level of concentrate mix on feed intake, digestibility, live weight change and carcass characteristics of dairy cows feed urea treated rice straw.An,MSC ,This presented to the school of Graduate studies of Haramaya University. 65 Pp.

Food and Agricultural Organization (FAO), 2012. Selection and breeding of cattle in Asia: Strategies and criteria for improved breeding. Animal production and health section international atomic energy agency, Vienna international center, 1400 Vienna, Austria.

Food and Agricultural Organization (FAO), 2014. Livestock sector brief in Ethiopia. Ethiopia food and Agriculture organization of the United Nations.Livestock information, Sector analysis and policy branch.AGAL. May, 2004.

Gebeyehu G, Asmare A, Asseged B (2005). Reproductive performances of Fogera cattle and their Friesian crosses in Andassa ranch, Northwestern Ethiopia. Livestock Research for Rural Development.Volume 17, Article #131.RetrievedJanuary 15, 2010, from <http://www.lrrd.org/lrrd17/12/gosh17131.html>.

Gebremedhin D. 2005.All in one. A Practical Guide To Dairy Farming. Agri-Service Ethiopia Printing Unit, Addis Ababa. Pp. 15-21.

Getachew (2002) .Livestock Production Systems in Relation with Feed Availability in the Highlands and Central Rift Valley of Ethiopia. MSc thesis, Haramaya University, Haramaya Ethiopia.

GidayYifter, 2001. Assessment of calf crop productivity and total herd life of Fogera cows at Andassa ranch in North -western Ethiopia. MSc Thesis, Alemaya University, Alemaya, Ethiopia

- Gizachew, B., 2007. Major animal health problems of market oriented livestock development in Ketemaworeda, North GONDER zone, Ethiopia, DVM this faculty of veterinary Medicine, Addis Ababa University.
- Hammoud, B.S.J., Bryant, M. J. & Thorne, P.J., 2005. Some factors affecting variation in milk yield in crossbred dairy cows on smallholder farms in North-east Tanzania. *Tropical Animal Health and Production* 37, 403-412.
- Holm D.E., Thompson P.N. and Irons P.C. 2008. The economic effects of an estrus synchronization protocol using prostaglandin in beef heifers. *Theriogenology*, 70.1507–1515.
- IGAD, 2010. The Contribution of Livestock to the Economies of IGAD Member States. IGAD LPI Working Paper No. 02-10. Haile A, Joshi BK, Ayalew W, Tegegne A, Singh A, Yilma Z (2008). Genetic evaluation of Ethiopian Boran cattle and their crosses with Holstein Friesian for milk constituent traits in central Ethiopia. *Journal of Cell and Animal Biology* Vol. 2 (10): 171-176, October, 2008 Available online at <http://www.academicjournals.org/JCAB> ISSN 1996-0867 © 2008 Academic Journals
- ILRI (International Livestock Research Institute)). Study on age at first calving, calving interval and Breeding efficiency of Bos-taurus, Bosindicus and their crosses in the highland of Ethiopia. *Eth. J. Anim. Prod.* 6 (2): 1-16.
- Julio H., Fekadu, B. & Gemedo D. 2013. Dairy Productive Potential, Challenges and Production opportunities of Horro and their F1 Jersey Crossbred Cows. A Case of Guduru Livestock production and Research Center and Its Surroundings, West Oromia, Ethiopia. *Science, Technology and Arts Research Journal*. 3(4).79-84.
- Kumar N., Alemayehu E., Berihu G. & Endale B. Gurmu. 2014. Reproductive performance of indigenous and HF crossbred dairy cows in Gondar, Ethiopia. *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*. Volume 7, Issue 1 Ver. V, PP 56
- Lemma H, Belihu K, Sheferaw D (2010). Study on the reproductive performance of local cows at Wolaita Sodo dairy farm, Southern Ethiopia Wolaita Sodo University, 14 (1): 53-70.
- Markos, T., 2006. Productivity and health of indigenous dairy cows and health of indigenous dairy cows and cross breeds Doctoral thesis. Swedish university of Agricultural science, Department of Animal breeding and Genetics Uppsala, Sweden, 76 pg.

- MC. Dowell. R. E., 2003. Improvement of livestock production in warm climate. W H. Freeman and company, San Francisco , USA. *World animal evolution* 38 p31-36.
- Melaku, M., Zeleke, M., Getinet, M. and Mengistie, T. 2011. Reproductive performances of Fogera cattle at Metekel cattle breeding and multiplication ranch, Northwest Ethiopia. *J. Anim. Feed Res.* 1(3): 99-106.
- Million Tadesse, Thiengtham J., Pinyopummin A. and Prasanpanich S., 2010. Productive and Reproductive performance of Holstein Friesian dairy cows in Ethiopia. *Livestock Research for Rural development*, 22(2). August 28-30, 2014, ESAP, Addis Ababa, pp299.
- Mohammed, E., Sornthep, T., Chaiwat, W., Panwadee, S. and Somkiert, P. 2012. Estimation of Direct Genetic Effects on Milk Yield and Lactation Length in the Aownoi Dairy Cooperative. *Kasetsart J. Nat. Sci.*, 46(4).
- Mulugeta, A. and Belayneh, A. 2013. Reproductive and lactation performances of dairy cows in Chacha town and nearby selected kebeles, north Shoa zone, Amhara region, Ethiopia. *World J.A.*
- Mureda E and Mekuriaw Z (2007). Reproductive Performance of Crossbred Dairy Cows in Eastern lowlands of Ethiopia. *Livestock Research for Rural Development*. Volume 19, Article #161 Retrieved, August 30, 2010 from <http://www.lrrd.org/lrrd19/11/mure19161.htm>
- Muredal Emebet, Zeleke Mekuriaw Zeleke, 2008. Characteristics and constraints of crossbred dairy cattle production in lowland areas of Eastern Ethiopia. *Livestock Research for Rural Development*. 20 (4), pp 157.
- Naceur et al., 2012. The costs of poor fertility and what to do about reducing them. *British Cattle Veterinary Association* 11, 237–250. FAOSTAT, 2004
- Nuraddis. 2011. Analyses of Dairy Cattle Breeding Practices in Selected Areas of Ethiopia. PhD thesis. Humboldt-Universität zu Berlin, Germany. *Prod.*, 37. 247-252. Proceeding of Agricultural economics society of Ethiopia (In press).
- Sekerden O. Relationships between lactation stage with milk yield and constituents, and heritabilities of milk constituents. *Hay Uret J Anim Prod.* 2009;43:61–7.
- Shiferaw., 2003., Alemayehu E., Berihu G. & Endale B. Gurmu. 2014. Reproductive performance of indigenous and HF crossbred dairy cows in Gondar, Ethiopia. *IOSR*

- Journal of Agriculture and Veterinary Science (IOSR-JAVS). Volume 7, Issue 1 Ver. V, PP 56-61.
- SNV (Netherlands Development Organization), 2008. Study on Dairy Investment Opportunities in Ethiopia. Addis Ababa
- SPSS (Statistical Program for Social Sciences).SPSS version 20.0 2011.Application guide, SPSS Inc.
- Tadesse M, Dessie T (2003). Milk production performance of Zebu, HF and their Crosses in Ethiopia.Livestock Research for Rural Development. 15(3): 1-11.
- Tesfa and Garikipati,(2014): Use of multivariate analyses for determining heat tolerance in Brazilian cattle. Trop. Anim. Health Prod., 43: 623-630.
- Tesfaye,T.,2009. Analysis of factors affecting the adoption of cross breed dairy cows in the central high lands of Ethiopia. Msc this school of graduated, Alemaya, University Ethiopia.
- TsegayLijalem, AgengewAsefaAshenafiSharo, 2015. Dairy Cattle Production at Small Holder Level in Sidama Zone Selected Districts, Southern Ethiopia. Food Science and Quality Management (IISTE) .40: 7.
- Wassie T, MekuriawG.andMekuriaw Z. 2015. Milk production performances of Holstein Friesian x Arsi and Holstein Friesian x Boran cross-bred cattle at Agarfa Agricultural Technical Vocational and Educational Training (ATVET) College, Oromia, Ethiopia.Livestock Research for Rural Development.26 (154).
- Willam A. &Simianer H. 2011.Tierzucht-Grundwissen Bachelor. UTB Verlag, Stuttgart, 41-274.
- Yifat, D., Bahilibi, W. and Desie, S. 2012. Reproductive performance of Boran cows at Tatesa cattle breeding center. Advances in Biol. Res. 6 (3): 101-105.
- Yilma Z., Emannuelle G.B and., Ameha S. 2011. A Review of the Ethiopian Dairy Sector. Ed. Rudolf Fombad, Food and Agriculture Organization of the United Nations, Sub Regional Office for Eastern Africa (FAO/SFE), Addis Ababa, Ethiopia, 81P.
- Yohannes,T., 2007. Major Animal health problems of market oriented livestock development in Alamataworeda.
- ZewduWuletaw, M. Wurzinger, TadeleDessie and J Sölkner, 2013. Potential of indigenous animal geneticresources as an adaptive mechanism on climate change: The case of Mahibere-Slassie composite.

7. APPENDIX

Annex I Questionnaires

Questionnaire on the lactation performance of local cows of Gurage in chehaworeda, Guraghezone, SNNPR, Ethiopia.

Check list used for data collection

General information for respondent

1. Name of respondents': _____ Sex _____ Age _____
Kebele _____

2. Respondent religion?

A. Islam B. Orthodox C. Protestant D. Other __

3. Agro ecology of the area: A) Highland B) Mid altitude C) Low land

4. Residence: A) Rural B) Urban C) Per-Urban

5. Educational status: A) Illiterate B) Can read and write C) Grade 1-8 D) Grade 9-12 E) Above grade 12

6. Marital status: A) Married B). Un-married C) Divorced D)Widowed

7. Family size: A. 1-3 B. 4-5 C. ≥ 6

1. Cattle composition

Type of breeds	Local breeds	Total
Bulls		
Lactations cows		
Pregnant cows		
Dry cows		
Heifers (>6 months)		
Calves up to 6 months of age		

2. How many of your cattle are local cows?

A. One B. Two C. three D. four E. Other specific

Productive performance

3. How many times do you cow milk per day?

A. One B. Two C. three

Lactation performance

4. Identify the average milk yield of local cows at different stage of lactation?

Stage of lactation	Local Breed(Lt)
1 st stage	
2 nd stage	
3 rd stage	
Total	

5. One stage how long it remains (month)?

- A. 1-2 B.2-3 C.3-4 D 4-5 E. Other specific

6. How long the lactation length of local breed cows (month)?

- A. 4-6 B. 7-9 C. 9-10 D. 11-12

7. How long is the Calving interval of local cows (year)?

- A.1-2 B.2-3 C.3-4

8. Age at first calving (year)?

- A.3-4 B.4-5 C.5-6

9. Number of Service per Conception of local cows (year)?

- A. 1 B.2 C.3 D. 4

10. Is there any complicating (birth problem) is occurred during birthing time?

- A. yes B. no

11. If the answer is yes what type of problem?

_____.

12. If yes Is there calf death is occur during this? _____.

13. During pregnancy do you milk the cows?

- A. yes B. no

14. If yes how much the amount of milk (liter)?

_____.

15. If the answer is no why? _____.

16. During estrous do you milk the cows?

20. Calf feeding practice?

_____.

21. Weaning age? _____.

22. Which type of house is used for the cows? _____.

23. Is there any separating pen for lactating cows?

A) Yes B) No

24. If yes, why you need that?

_____.

25. What are the major feed sources for cows?

A. improved forage species B. Indigenous grass c. crop residue D. Tree species

26. Do you vaccinate your cows?

A. yes B.no

27. If the answer is yes who gives you the vaccination? _____.

28. Do you spray your cow?

A. yes B. no

29. If yes, how many times you spray your cow per year?

A.1 B. 2 C.3 D. 4

30. Which feed is more available in the study areas?

A) Hay B) Improved forage C) Concentrate feed

D) Crop residue

31. Do you practice feed conservation?

A. yes B. no

32. If yes through what?

A. through hay B. through silage C. other specific

Rank 1.____ 2.____ 3.____ 4.____5.____ 6._____.