UTTAR PRADESH JOURNAL OF ZOOLOGY

43(3): 1-10, 2022
ISSN: 0256-971X (P)

CHARACTERIZATION OF LOCAL CATTLE HUSBANDRY PRACTICES IN HADIYA ZONE, SOUTHERN REGION OF ETHIOPIA

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AUTHOR'S CONTRIBUTION

The sole author designed, analyzed, interpreted and prepared the manuscript.

Article Information

DOI: 10.56557/UPJOZ/2022/v43i32905

Editor(s):
(1) Dr. Telat Yanik, Atatürk University, Turkey.
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Received: 05 December 2021
Accepted: 01 February 2022
Published: 02 February 2022

Original Research Article

ABSTRACT

This study was conducted to characterize cattle husbandry practices in Hadiya zone, southern Ethiopia. Three districts were purposively selected. A total of 180 households were selected randomly. Six focus group discussions with key informants were held. There were significant ($p<0.05$) differences across the districts in livestock number per households. Cattle are the dominant livestock species, mainly used for milk and draught power. The mean cattle holding per household were 10.87±1.16, 6.8±.40 and 15.22±1.70 in Shashogo, Misha and Soro districts respectively. The most popular farming system in the areas was mixed crop-livestock production. Local female and male cattle reached sexual maturity in 49.0 and 44.7 months in Shashogo, 52.7 and 48.8 months in Misha, and 50.1 and 46.8 months in Soro districts, respectively. Local female cattle in the research area had an average age at first calving of 53.2 months in Shashogo, 59.1 months in Misha, and 54.3 months in Soro districts. In the districts, natural mating was the most common and common method of mating. Cattle production was hampered by a lack of feed and water, illnesses, repeated draughts, infrastructure, and other factors such as land scarcity, poor capital, and a lack of agricultural extension.

Keywords: Cattle production; hadiya zone; feed resources; husbandry practices; production constraints.

ABBREVIATIONS

CSA : Central Statistical Agency;
ERAO :Ethiopian Agricultural Research Organization;
FAO : Food and Agricultural Organization;
GDP : Gross Domestic Product;
IBC : Institute of Biodiversity Conservation;
ILCA : International Livestock Centre for Africa;
ILRI : International Livestock Research Institute;

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Masl : Meters Above sea Level;
MoA : Minister of Agriculture;
SPSS : Statistical package for Social Sciences;
USAID : United States Agency for International Development

1. INTRODUCTION

Improvement in cattle productivity can be achieved through identification of production constraints and introduction of new technologies or by refining existing practices in the system. In Ethiopia, the cattle production system in different agro-ecological zones is not fully studied and farmers' needs and production constraints have not been adequately identified [1].

Assessment of the cattle production system and identification and prioritization of the constraints of production is a prerequisite to bring improvement in cattle productivity in the country. Prioritization of the production constraints is essential as it helps to use the scarce resources efficiently. Understanding the production system helps to design appropriate technologies compatible with the existing system. In general, assessment of the production system is important to plan development and research activities and bring improvements in productivity [2].

Although cattle play a very significant role in thelivelihood of smallholder farmers in the Hadiya zone, cattle production system, constraints of cattle production and feed resources have not been fully studied yet. Thus, assessment of the cattle production system, identifying and prioritizing the constraints and feed resources of cattle are necessary in order to design appropriate technologies compatible with the existing system and to plan development and research activities aimed at improving cattle production. Therefore, this study was conducted to characterize cattle husbandry practices and to identify and prioritize the constraints limiting cattle production in the Hadiya zone.

2. MATERIALS AND METHODS

2.1 Description of the Study Area

The study was conducted in Hadiya zone; Southern Ethiopia. The zone is located at a distance of 232km to the south of Addis Ababa. Ecologically, 24% of the Zone is "*Dega*" (highland), 65% is "*woynadega*" (mid altitude) and 11% is" *kolla*" (lowland). Average Annual rainfall of the zone is 1260mm; its altitude ranges from 540-2940masl, and the average annual temperature16.5ºC [3].

2.2 Sample Size and Sampling Method

Hadiya zone was surveyed through single rapid exploratory field visits to the study area for gathering available secondary information to define the sampling frame. Three districts were selected purposively based on cattle population agro ecology and production systems. Then three rural kebeles were selected randomly from each district and twenty households were also selected randomly from each selected rural kebele so that total households under study were one hundred and eighty (3x3x20=180).

2.3 Focus Group Discussion and Questionnaire

Preliminary field visits were conducted for gathering secondary data. Then key informant focus group discussions were held with representatives of farmer groups, extension staff and the district sector administration officers. A total of six focus group discussions were held – two per district, each having 8–12 farmers plus a representative of the extension staff. The discussions were facilitated by the researcher at all districts. The questionnaire was administered to the randomly selected households (180) by a team of enumerators recruited and trained for the purpose with close supervision by the researcher to gather information on general socio-economic household characteristics, herd structure, breeding management, feeds and feeding management, disease prevalence, production and reproduction constraints.

2.4 Statistical Analysis

The SPSS statistical software (SPSS, version 20) was used to analyze the survey data using General linear Mode l (GLM).

3. RESULTS AND DISCUSSION

3.1 Family Size and Livestock Holding

Table I shows the mean SE for family size and livestock holding per household by district. In the districts of Shashogo, Misha, and Soro, the average family size was 6.72±.26, 6.18±.25, and 5.72±.24, respectively. The average family size in Misha district (6.18±.25) was similar to the average family size in Bure district (6.22) recorded by Adebabay [4].

Table I. Mean (±SE) family size and livestock holding per household

Descriptor	Districts					
	Shashogo	**Misha**	**Soro**	**Over all**	**F-value**	**Test P-value**
Family size	6.72±0.26	6.18±0.25	5.72±0.24	6.21±0.15	3.97	0.02
Livestock						
Cattle	10.87±1.16	6.80	15.22±1.70	10.96±.74	9.15	.000
Goats	3.73±0.35	±0.40	4.73±0.50	3.07±0.24	31.12	.000
Sheep	1.90±0.23	0.78±0.14	3.05±0.18	2.38±0.12	8.50	.000
Donkey	1.08±0.09	2.21±0.20	1.33±0.10	1.02±0.06	15.56	.000
Chicken	6.85±0.66	0.63±0.07	7.56±0.79	6.31±0.38	5.40	.005
Horse	0.43±0.06	3.46±0.44	0.45±0.06	0.55±0.04	6.42	.002
Mule		0.72.	0.32±0.06	0.20±0.03	4.635	.011
		±0.06				
		0.18±.05				

According to USAID [5], the average family size in Shashogo district was 6.72±.26 per home, which was lower than the Ethiopian national average (7.4) but higher than the Sub-Saharan average (5.6). In the Soro district, the average family size was 5.72±.24 per household. Tesfaye [6] in Metema district and Kedija et al. [7] in Meiso district both indicated 5.7± 0.13 as the average family size. The size of a family is determined by factors such as social and cultural beliefs. Having a big number of children is considered an asset for farming activities, and having a large number of children in a household provides social prestige, demonstrating the family's power. Similarly, study by Tonamo et al. [8] in Essera district indicated that having many wives is one of wealth indicators and commonly practiced type of marriage.

As shown in Table I, there was a significant ($p< 0.05$) difference in the numbers of cattle per household among the districts. This disparity could be related to differences in the environment's fitness for keeping animals, the purposes of keeping cattle, land availability, and the importance of animals in the keepers' livelihood. In the Shashogo, Misha, and Soro districts, the average cattle holding per household was 10.87±1.16, 6.8±0.40, and 15.22±1.70, respectively. The numbers for Shashogo and Misha districts were lower than those of Tesfaye [6] in Northwestern Ethiopia, who had 12.25±6.23 cows per home and higher than those of Belay et al. [9] in Dandi district, who had 4.530.4 cattle per household. The number of cattle per households (15.22±1.70) in Soro district is larger than the reported figure (14.7±0.55) by Ayantu et al. [10] in Horro district of Oromia region and (14.00±0.58) by Tonamo et al. [8] in Essera district of Southern region. Mean number of livestock is highest in Soro district compared to the other two districts.

3.2 Livestock and Crop Farming Systems

The farming method is characterized by mixed crop-livestock production, according to focus group discussions. Cattle are the most popular livestock species, and they are primarily used for milk and draught power, with a variety of other use following. Tonamo et al. [8] found similar results in the Essera district, where cattle were the most prevalent species reared by farmers and were primarily used for draught power and milk. Hadiya cattle play an important socio-cultural function in the studied area. This matched the findings of Belay et al. [9] in the Dandi district. In this location, crop cultivation was mostly done with oxen/draught power, and oxen are given extra attention next to nursing cows, particularly in terms of better feeding. In Soro district feeding oxen separately from other animals is most common and the farmers give due attention to feed them properly during and after ploughing season. Dominantly growing crops in the study area include wheat, *teff*, sorghum, bean and pea, barley, maize, potato, *enset*, coffee, kchat and tomato.

3.3 Cattle Herd Structure

The average herd size in the study area varied significantly ($p<0.05$) between districts. Adult male and female cattle made up a larger share of the herd in all of the areas. Mature male and female cattle accounted for 19.7% and 35.7% of total cattle in Shashogo, 18.1% and 30.9% in Misha, and 13.9% and 36.65% in Soro districts, respectively, in the research region. This finding is in line with that of Belay et al. [9], who discovered that oxen and milking cows made up a larger proportion of overall cattle holdings in the Dandi district. Tesfaye's [6] data from Metema area corresponds with the higher proportion of adult females (cows) in this study. The utilization of adult

females in the herd for milk production and the development of replacement heifers/young bulls as required by the keepers is the main reason for the higher proportion of adult females in the herd across the districts. In systems where the primary utilitarian function is milk supply, such a high proportion of adult females is expected [11]. Based on the number of breeding bulls in each herd, the mating ratio was 1:9 in Shashogo, 1:8 in Misha, and 1:10 in Soro. The ratio of breeding bulls to breeding females in each district was much higher than that recommended by Rege et al. [12] for natural service, which was 1: 50. Mwachero and Rege [11] reported on East African Shorthorn Zebu cattle, and the ratio of breeding bulls to breeding females in this study (1:10.5) is comparable.

3.4 Purposes of Keeping Cattle

Farmers raise cattle for a variety of reasons, including milk, meat, blood, hides, and horns [13]. Cattle have socio-cultural roles such as being used as a bride price and being used to settle conflicts in communal areas by paying fines [14]. They're also used for specific ceremonial occasions like wedding feasts, weddings, funerals, and other circumcisions. Cattle are presented as gifts to family and friends, as well as a source of starting cash for young men and newlyweds. They are utilized to maintain family links and develop relationships with in-laws by entrusting them to other family members [15]. Hadiya people are comparable to other people in that they have diverse reasons for keeping cattle. They keep large herd size The society's goal is to earn the cultural titles of 'Tibima/ Abegaz/ Garad and Kumima,' which are earned in increasing order after achieving the first stage/title "Tibima/Garad," which requires owning at least 100 cattle, and the second, 'Kuma,' which requires owning more than 1000 cattle [16]. As a result, farmers in the Soro district own more cattle, and the district has the highest livestock population of all the zones' districts. Individual interviews with farmers in the research area revealed that livestock serve multiple purposes. These are draught power, milk/meat production, source of money, cultural purpose, social security, and manure.

In the Amhara region, Fasil and Workneh [17] published a similar report on the motivations for keeping cattle. Milk and draught were ranked as the most important reasons for keeping cattle by the majority of respondents in the research region across the districts. According to the data, Shashogo and Soro respondents keep cattle largely for milk, while Misha respondents keep cattle mostly for meat. In Shashogo and Soro areas 93.3% respondents said cattle were usually used for draught, while 81.7% of Misha respondents said cattle were mostly used for draught. According to Etafa et al. [18], 99.4% of Hararghe respondents kept oxen only for draft power, whereas 86.6% kept cows solely for milk sale.

3.5 Feed Resources and Feeding System

As indicated by Ulfina et al., [19] inadequate supply of feed both in quantity and quality is the single most important problem for low productivity of livestock. Based on interviews and focus group discussions made in the study districts, natural pasture for communal/ individual grazing/ cut and carry system (48.7%, 28.3%, 35%), and crop residues (20%, 16.7%. 28.3%) were found to be the major feed sources for cattle in Shashogo, Misha and Soro districts respectively. Natural pasture that is utilized by either grazing or cutting, '*enset'* and its byproducts were also found to be major feed sources for cattle in Misha district (Table II). Similarly, Belay et al [9], Berso et al. [20] and Tonamo et al. [8] reported that natural pastureland was the most dominating feed source for cattle in Dandi, Aleta Chuko and Essera districts respectively.

Table II. Major sources of feed in the districts

Sources of feed	**Districts (%)**		
	Shashogo	**Misha**	**Soro**
Natural pasture	41.7	28.3	35.0
Established pasture and improved forages	11.7	18.3	6.7
Hay	16.7	6.7	10.0
Crop residue	20.0	16.7	28.3
House made leftover	3.3	6.7	8.3
Others (*Enset* and its byproducts)	6.7	23.3	11.7
Total	**100.0**	**100.0**	**100.0**

According to the respondents and focus group discussions, the availability of cow feed in the research area is seasonal. Crop wastes are a more essential source of feed, especially during the dry season when grazing pasture is less covered. Conservation of various crop residues is a popular practice throughout the districts, especially during the dry season when there are available sources of crop wastes. In the rainy season, before the principal crops are harvested, communal and individual grazing grounds throughout the study region in general, and established pasture in particular, in Misha district, were reported as more valuable sources of feed. In Misha district, (highland), as mentioned above, '*enset*' and its by products are good sources of feed for cattle in dry season and also there are good practices of using established pasture. During focus group discussions and interview utilization of improved forages were also reported as sources of feed for cattle.

They also stated that native pasture (grass) is the most common feed type in the area, and that it is used in three different ways: tethering, herding, and zero grazing. Herding (61.7% and 48.3 %, respectively) was the most common method of use in Shashogo and Soro districts, while tethering (51.7% and 38.3 %) was the most common method in Misha and Soro districts. Seasonal mineral supplementation, colloquially known as 'bole,' was found to be widespread across the districts. Rivers, ponds, and springs were mentioned as sources of water for cattle in the research locations, with rivers being the most common. Cattle pens can be seen all across the areas. The farmers explained that they use housing to protect their animals from theft, harsh weather, and predators. Ayza et al. [21] reported similar reasons, where Boditti cattle were housed together with the family to protect the animals from theft, extreme environmental hazards and ease of husbandry practices such as feeding, watering, milking, and waste management.

3.6 Reproductive Performance

As indicated in Table III, the mean reported age at sexual maturity (months) for female and male local cattle were 49.0 and 44.7 in Shashogo, 52.7 and 48.8 in Misha, 50.1 and 46.8 in Soro districts respectively. Overall mean for female and male are 46.8 and 50.6 respectively in the study area. Those figures are in agreement with the mean reported age at sexual maturity of 45.7 and 49 months for Kereyu female and male cattle respectively [22] However, this is longer than Workneh and Rowlands' [23] stated overall mean sexual maturity of 39.6 months for females and 39.9 months for males of indigenous cattle breeds in Oromia regional state.

In the research region, the reported mean age at first calving (AFC) for local female cattle was 53.2 months in Shashogo, 59.1 months in Misha, and 54.3 months in Soro districts, with an overall mean AFC of 55.5. This result is equivalent to Shiferaw [22]'s overall mean AFC of 54.1 months for Kereyu breeding female cattle. Takele [24] recorded 54.1 months for Sheko cattle and 53.1 months for Raya cattle, whereas Dereje [25] reported 53.1 months for Raya –Sanga cattle. Similarly, for Wegera and Fogera cattle, Zewdu [26] recorded 54.7 and 53.4 months of AFC, respectively. The average AFC for Misha district was determined to be exceptionally long.

Table III. Indicative reproductive performance of local cattle in the study area by district (No.= 60 heads per district)

Performance parameters	Districts							
	Shashogo		Misha		Soro		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
AM(M)	44.7	9.16	48.8	9.06	46.8	9.98	46.8	9.5
AM(F)	49.0	9.08	52.7	9.81	50.1	9.49	50.6	9.54
AFC(m)	53.2	13.4	59.1	11.89	54.3	12.6	55.5	12.8
RLC (yr)	8.1	2.68	8.6	3.07	8.2	2.84	8.3	28.7
LCP	5.6	2.29	6.5	2.72	5.67	2.06	5.9	2.39
CI(m)	20.9	8.05	25.3	8.14	22.5	8.7	22.9	8.45
LB(yr)	7.2	2.13	9.4	4.10	7.9	3.69	8.17	3.52
CA(yr)	5.74	1.40	6.05	1.46	5.9	1.45	5.91	1.43

AM (M)=Age at sexual maturity for male (m), AM(F) = Age at sexual maturity for female (m), AFC= Age at first calving (m), RLC= Reproductive life span of a cow (yr), LCP= Lifetime calf-crop production (No), CI= Calving interval (m), LB=Life span of bull(yr), CA= Castration Age, SD=standard deviation, N=number of households

Table IV. Ranking and% of the reported constraints of cattle production in the study area by district

Constraints		Districts						
	Rank	**1**	**Index**	**2**	**Index**	**3**	**Index**	**Total**
Feed shortage	1st	95	0.16	83.3	0.16	95	0.16	91.1
	2nd	5		16.7		5		8.9
	3rd	-		-		-		-
Water shortage	1st	75	0.14	46.7	0.13	70	0.14	63.9
	2nd	18.3		43.3		20		27.2
	3rd	6.7		10		10		8.9
Diseases	1st	85	0.15	76.7	0.15	85	0.15	82.2
	2nd	15		23.3		13.3		7.2
	3rd	-		-		1.7		.6
Market problem	1st	40	0.11	25	0.11	50	0.12	38.3
	2nd	36.7		45		30		37.2
	3rd	23.3		30		20		24.4
Conflict	1st	18.3	0.09	11.7	0.08	20	0.08	16.7
	2nd	33.3		26.7		11.7		23.9
	3rd	48.3		61.7		68.3		69.4
Recurrent drought	1st	51.7	0.12	40	0.11	45	0.12	45.6
	2nd	35		23.3		40		32.8
	3rd	11.3		36.7		15		21.7
Infrastructures	1st	53.3	0.12	50	0.12	56.7	0.12	53.3
	2nd	11.7		18.3		16.7		15.6
	3rd	35		31.7		26.7		31.1
Other constraints (shortage of capital, land and extension services)	1st	35	0.11	68.3	0.14	48.3	0.11	50.6
	2nd	41.7		25		25		30.6
	3rd	23.3		6.7		26.7		18.9

1= Shashogo 2 = Misha 3 = Soro Index= sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) given for each constraint divided by sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) for all constraints

The AFC recorded in this study is longer than the 51.24) reported by Beriso et al [20] for indigenous cattle in the AletaChuko area. The phenotypic diversity in AFC between districts could be related to changes in local cattle types, management levels, agro-ecological differences, and phenotypic variation in AFC.

Even though longer than the reported mean calving interval (CI) by Beriso et al. [20] of 19.93 months for local cattle in Aleta Chuko district, the overall mean calving interval (CI) estimated for local cattle (22.9 months) was within the range of earlier estimates of CI for Ethiopian zebu cattle ranging from 12.2 to 26.6 months [27]. The average reproductive longevity (RLC) of local cattle breeding females in the research region was 8.3 years, with a lifetime calf crop production (LCP) of 5.9 calves, which is quite close to the results reported by Fasil [17] for Gojam highland zebu. In fact, the mean reproductive period (RLC) and LCP for the three districts included in the study exceeded the figure for African cattle. The mean and maximum LCP for most African cattle was reported to be 2.1 and 8 calves respectively [28].

The age at puberty, the age at first calving, and the calving interval all influence a cow's lifetime production. Local cattle breeding bulls (LB) had a mean reproductive lifespan of 7.2 years in Shashogo, 9.4 years in Misha, and 7.9 years in Soro districts, for an overall mean of 8.17 years, which is longer than the 6.5 years recorded by Takele, 2005 for Sheko breeding bulls. The overall mean age at castration (CA) for local male animals in the study area was 5.91 years, which is comparable to Shiferaw [22]'s (5.4 year) result for kereyu cattle and Takele's (2005) (5.7 year) value for Sheko male animals. According to the farmers, oxen become docile and more powerful after castration in addition to control of breeding and better price.

3.7 Major Cattle Diseases

Diseases have a variety of detrimental effects on herd productivity, such as animal death, weight loss, growth slowdown, poor fertility performance, physical weakness, and so on. Biological, dietary, and physiological health concerns were revealed to be among the key factors influencing cattle in the study

region in the current study. Through a group discussion comprising key informant farmers, development agents, and veterinary technicians, major livestock illnesses and parasites were identified. Economic losses due to sickness and parasites have quadrupled their effect when conditions such as feed shortages, poor management methods, and environmental factors are present [29-35].

Drought and a lack of feed were identified as two main factors that predisposed cattle to a wide range of infectious and non-infectious disorders. The majority of infectious diseases were found to occur during the dry season, while parasitic disorders were more prevalent at the start and end of the rainy season.

Cattle diseases were frequent in all of the regions evaluated, but the severity of incidence for each disease category varied. The reported common and economically important diseases throughout the study area were infectious diseases (anthrax, blackleg, pasteurellosis, brucellosis, contagious bovine pleuropneumonia, lumpy skin disease and foot and mouth disease), external parasites (ticks and lice), internal parasites (fascioliasis) and vector borne diseases (trypanosomiasis and babesiosis). In addition to these some metabolic diseases were also reported but their occurrence was rare. Lumpy skin diseases and foot and mouth diseases were reported to be occurring widely throughout the study area in the year of study.

During focus group talks, the majority of participants stated that in the event of a disease epidemic, farmers have their own hypodermic needles to inject medicine into their cattle. None of them have ever been taught by veterinarians or obtained prescriptions from them. They mentioned that penicillin is widely used to treat acute illnesses. Doses are measured in bottles and may grow or decrease depending on the number of diseased animals in a herd, the severity of the disease, and the amount of medicine available for use. Fasil [17] observed similar findings in the Amhara region. They also revealed that control measures were vaccination, deworming and spraying. Traditional methods of treatment for some diseases were also reported by farmers. Feeding red colored *'enset'* leaf for cattle when there is placenta retention, branding the area around the ribs with hot iron and incising around the shoulder for anthrax were some reported traditional treatment ways.

The results of focus group discussions in Soro district revealed that cattle in the area are highly impacted by trypanosomosis, particularly in the kebeles along the Gibe-river basin, and that farmers purchase and administer deltametri for tsetse fly prevention. Veterinary professionals stated during a focus group discussion that farmers are using low doses of medicine for cow treatment, which not only reduces the efficacy of the drugs but also leads to drug resistance. Soro district is also known for livestock movement, which could be one of the reasons for the district's high illness prevalence.

Outcomes from group discussion in Shashogo district revealed that there was production loss in the area due to high parasites infestation during summer (*kremt*). Fascioliasis (Fasciola hepatica) was reported to be the cause for this production loss because animals graze around '*boyo*' lake, a local lake in the area, known for parasitic infestation. Deworming animals in early summer season was reported to be the controlling method.

During a focus group discussion, the Misha district veterinary agent, farmers, and extension workers discovered that the most common diseases in the area were parasitic diseases, particularly external parasitic diseases such as ticks, fleas, and lice, for which diazinon was the most commonly used treatment. Internal parasites like fascioliasis and cestodes were also noted as widespread, with broad-spectrum anthelmintic medications like albendazole being used to treat them.

3.8 Breeding and Breeding Management Practices

The majority of responders in all districts said they choose breeding animals. Bulls were chosen based on their coat color and body conformation, adaptation such as disease resistance and heat tolerance, and growth rate. Beriso et al. [20] reported similar bull selection criteria in the Aleta Chuko district. In the Shashogo and Soro districts, mating is generally unregulated (51.7% and 46.7 %, respectively). In Misha district type of mating was mostly natural controlled (23.3%) and natural controlled and AI (45%). Thus, natural mating was the familiar and major mating system in all the districts. Tonamo et al. [8] reported similar case in Essera district about natural mating being the most familiar and common; and larger proportion of mating was uncontrolled.

The communal grazing practice, in which animals from multiple families graze together, is the principal cause of uncontrolled mating in the study area. Bulls reported for mating came from their own herd and neighboring herds throughout the districts. According to the findings, breeding bulls from their own herd and nearby herds are used by 4, 71.7 %, 83.3 %, and 78.3% of respondents in the Shashoho, Misha, and Soro regions, respectively. On the other hand, 28.3%, 16.7% and 21.7% in Shashoho, Misha and Soro

districts respectively, reported that they use breeding bulls from their own herd only. Similarly, Tonamo et al. [8] reported that majority of the farmers in Essera district use the breeding bulls from their own herd and neighboring herd and small portion of farmers use their own herd as source of breeding bulls.

The main reasons for retaining breeding bulls were stated to be for mating, socio-cultural objectives, draught, and both mating and draught purposes in all three areas. For the Shashogo, Misha, and Soro districts, castration (68.3%, 63.8%, and 63.3%), sale (11.7%, .5%, and 10%), and both selling and castration (12%, 26.7% and 26.7%) were reported as the culling techniques, respectively.

The majority of the families polled stated that they utilize visual observation to detect heat. In the research area, willingness to be mounted by other cows and mucus secretion were two of the most commonly reported indications of heat. In Kereyu cattle, Shiferaw [22] found that eagerness to be mounted by other cows and mucus discharge were the most common symptoms of heat.

3.9 Constraints of Cattle Production

Shortage of feed, water shortage, diseases, recurrent draught, infrastructural and other constraints like land shortage, low capital, and shortage of extension services were reported as major livestock production constraints in the study area where feed shortage, diseases and water shortage were ranked first by the respondents in all the districts. Similarly Belay et al. [9] in Dandi district reported that feed shortage and diseases were major livestock production constraints. The principal obstacles affecting cattle output, according to Ulfina et al. [19], include feed shortages, illnesses and parasites, labor scarcity, and a lack of capital and credit. Feed shortages were noted in all three districts due to grazing field shortages, overstocking, rapid population expansion, agriculture and territory conflicts, and seasonal water scarcity. Droughts and the predominance of marshy and swampy areas, particularly in the Shashogo district around Lake 'boyo,' with the related incidence of internal parasite infestation and tsetse fly infestation in lowland (Shashogo) and midland (Soro) areas, harmed cattle productivity on a regular basis.

Veterinary and extension services were not well-developed and dispersed. Cattle production in the research area has been hampered by socioeconomic issues such as a lack of cash to engage in livestock breeding and production, labor scarcity for herding, and the cost of supplementary feeds. Takele [24] identified these primary restrictions as the factors affecting cattle output in the Benchi maji zone.

4. CONCLUSION AND RECOMMENDATIONS

Results of the study showed that mixed crop-livestock production system was the dominant farming system in the study area. Cattle served as a source of draught power, food, manure, and source of income, cultural and social purposes. That the natural mating was the common mating type practiced in the area. Feed and water shortage, diseases, market problem, conflict recurrent drought, infrastructures and other constraints like shortage of capital, land and extension services were identified as major cattle production constraints in the study areas. In addition, poor genetic makeup of local cattle was also reported as the constraints limiting effectiveness of herd productivity. In the study districts, natural pasture and crop residues were the main sources of feed for cattle and the higher proportion of feed was derived from natural pasture and crop-residues including *enset* as one of major sources in highland areas. . The observed low reproductive performances of the local cattle in the area justify the need for designing breed improvement programmes such as using cross breeding between suitable exotic and local cattle taking care not to lose the local cattle population considering the conservation issues of local cattle. Such a plan can fully exploit their genetic potential and thereby enhance their contribution towards poverty alleviation and the balancing of demand and supply of livestock products for the increasing human population.

Based on the above conclusions the following recommendations were forwarded:

- ✓ Feed shortage in terms of quality and quantity was among the major constraints of cattle production in the study area which need to be addressed. Therefore, introduction of improved forages and the proper utilization of crop residues should be emphasized for improving the productivity of the cattle production in the area.
- ✓ The association of production, reproduction performances and the reported levels of tolerance/resistance of the local cattle need to be determined through correlation studies and regular monitoring of the population so that suitable stock can be selected showing all the favourable attributes. Disease prevention and control strategies particularly for tse-tse fly and other prevalent diseases as well as drug administration and distributions should be

emphasized. Hence the veterinary services in the area need to be strengthened.

ACKNOWLEDGEMENT

The author appreciates the cooperation of the sampled respondents and key informants in providing significant information as well as their hospitality during the data collection period. Friends and colleagues, too many to mention, were sincerely appreciated. Ministry of Education (Wachemo University) funding is also acknowledged.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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