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Characterization of Dairy Production Constraints, Existing Feeding Practices and Mineral Supplementation in Dairy Feeds in Two Districts of East Shoa Zone, Ethiopia

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Abstract

Study was carried out in Adaa and Adama zuria districts of Oromia Regional State with objective of assessing the existing dairy feeding practices, major dairy feeds and mineral resource at farm level. A cross-sectional study design was employed to assess dairy cattle feed and mineral resources. Then multistage sampling method was employed to select the study sample units, which had expected to be representative of the whole population, found in the study area. The districts were selected purposively, based on the number of dairy farm concentration. The result showed that the primary constraints for dairy owners were shortage of land (17.3, 14.6%); followed by feed shortage (13.4, 11.4%) in Ada'a and Adama Zuria districts, respectively. In the current study, 67.7% of respondents from Ada'a and, 89.4% from Adama zuria district did not grow any improved forages due to different cases. The survey indicated that 48.8% of dairy farmers from Ada'a and 43.9% from Adama zuria district did not supplement dairy animals with minerals due to lack of awareness and mineral availability.

The results showed that feed type difference and feeding practice variability based on feed availability and season of the study area. Therefore, Alternative feed production awareness and skills such as development of improved forages, proficient feed application technologies and natural pastureland improvement measures should be taken. The contribution of improved forage in dairy feed was very low due to lack of awareness and shortage of improved forage seeds and land in the area. To alleviate this problem, awareness creation and model nursery sites should be established for demonstration in potential districts so that dissemination and utilization of these feeds are very important. Due to unaffordable costs of commercial dairy feeds including concentrate feeds and, minerals, provision of common salt and locally available natural soil/bole as mineral source should be encouraged.

Keywords: Dairy cow; Dairy feed; Minerals; Adama zuria; Mineral Deficiency; Ada'a; Forage

Introduction

Livestock feed resources are classified as natural pasture, crop residue, improved pasture and forage, agro industrial by products, other by-products like food and vegetable refusal, of which the first two contribute the largest feed type [1]. Understanding type of feed resources and its nutritional quality are important for improving production and productivity for enhancing food security. Dairy productivity is the function of nutrition, health status and genetic potential of the animal. Among these factors, nutrition plays the most important role as it represents the major cost dairy production. Seasonal inadequacy of the quantity and quality of available feeds are the major problems facing dairy cattle production [2]. Additionally the efficiency with which the available feed is utilized is constrained by failure to use recommended management practices that could improve dairy output. Dietary nutrition plays a substantial role in any dairy development and the best appearance of genetic potential for milk production depends on satisfactory supply of nutrients. Dietary nutrients favor the metabolic pathways that empower the animal to catch up its genetic potential. The, nutrients (minerals, vitamins, carbohydrate, proteins and fat) are equally important as imbalances or deficiencies of one or more of these nutrients barricade the production, productivity and health status. Micronutrients, chiefly the mineral elements considered inevitable for the normal metabolic and physiological processes in animals' body. In tropical countries, grazing livestock often do not obtain minerals in required quantities and must depend almost exclusively upon forages for their requirements. Forages grown on tropical soils have shown to be highly deficient in a number of macro and micro mineral elements needed by the animal [3].

In Ethiopia, dairy cattle are chiefly fed on crop residues, natural pasture (grazing and/or hay), different agro-industrial, and locally available by-products as supplementary feeds. Such feeds are often lacking adequate macro and micro mineral concentrations.

Information on the mineral content of feeds of the central and western parts of Ethiopia as influenced by season and altitude are scanty [4,5]. When dietary concentrations of the feeds are unknown or highly variable due to availability, season, location, forage species and animal potentials, it is important to determine mineral concentrations in animals. To estimate needs, assessment of the quantity and quality of available feed resources in relation to livestock requirement has not been yet well addressed in most livestock production areas of the country [6].

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To obtain improvement in animal production and productivity, an assessment should be done on the types and sources of dairy feed resources and feed requirement as well as mineral nutrition, whether the animal is in a free ranging system or under confinement. Therefore, the current study was conducted with objective of characterizing on the types and sources of dairy feed including mineral resources, and challenges in improvement of dairy production in the study area.

Materials and Methods

Description of the study area

The study was conducted in East Shoa Zone with total area of approximately 10241 km^2. Of which two districts namely Adama zuria, and Ada'a, were purposively selected based on dairy farm availability. Urban and peri-urban production systems of selected districts were included. The temperature of the zone varies from 10°C-30°C with the mean annual temperature of 20°C and the rain fall varies from 600 mm to 1000 mm with mean annual rain fall of 816 mm [7].

The Adaa district experiences a bimodal pattern of rainfall with the main rainy season extending from June to September (of which 84% of rain is expected) and a short rainy season from March to May with an average annual rainfall of 800 mm. The mean annual minimum and maximum temperatures are 12.3°C and 27.7°C, respectively, with an overall average of 18.7°C. The highest temperatures are recorded in May and the mean relative humidity is 61.3%. The adama district receives an average annual rainfall ranging from about 600 to 1150 mm, which is erratic in nature. There is a significant seasonal variation for rainfall. More than 67% of the mean annual rainfall occurs in the four rainy months: Juneto September. Some additional rains (about 23%) occur in the remaining dry months. The minimum and maximum daily temperatures of the area are 12°C and 33°C, respectively [7].

Sample size and sampling method

Study design: A cross-sectional study design was employed to assess dairy cattle feed and mineral resources. Before starting formal data gathering, a mini or reconnaissance survey and discussions were held with districts agricultural extension workers on socio-economic characteristics, farmland characteristics, dairy feed and mineral resource.

Study population and sample size determination: Then multistage sampling method was employed to select the study sample units, which were expected to be representative of the whole population, found in the study area. The sampling frame comprises those farmers keeping crossbred dairy cows and willing to participate in the study. A total of 250 households were included in the study according to the formula given by [8]. As a standard error of 0.063 was taken to calculate the total households to be involved in the questionnaire survey. Therefore, in order to have a 93.7% confidence level with a 6.3% margin of error in our results, we would need to survey at least 250 of our 600 population. Selection of households was in collaboration with Adaa and Adama zuria District Agricultural Office livestock experts from a total of four production systems a list of 600 households were used as sampling frame. Then, using simple random sampling 250 households were selected to be included in the study.

$N=0.25/SE^2$

Where, N: Sample Size; SE: Standard Error

Method of data collection and sources of data: Both primary and secondary data were collected following qualitative and quantitative research methodologies involving surveys, focus group discussions and feed composition analysis and farm visits.

Questionnaire survey: Semi-structured questionnaires were prepared and used to collect the information in one visit interview. The questionnaire was pre-test for clarity and appropriateness of the questions. The data were collected by interview, personal observation and group discussion. Moreover, field observations on feed resource type, feeding practice, and mineral resources for dairy cows were an important component of the study process.

Data analysis

Data collected were entered in Microsoft excel. Descriptive statistics were employed to summarize data on household characteristics; feeds and feeding systems with respect to farm management and mineral supplementation. For analysis of the data Statistical Package for Social Science (SPSS) (version 20) was used.

Results

Socio economic characteristics of the households

Results indicated that from household members involved in dairy production activities, 70.9% were male and 29.1% were female from Adaa district while 75.6% were male and 24.4% female in Adama district. The details of households involved in dairy production activities at urban and peri-urban dairy productions were indicated in Table 1.

Survey result revealed the age of farmers involved in dairy cattle production activities ranged from 27 to 60 years old. The details of household ages involved in dairy cattle production in Adaa and Adama zuria, were indicated in Table 1.

The percentage of households with 1-3 family members involved in dairy cattle production was 31.3%, for Adaa district and 43.1% for Adama zuria district, and those with 4-6 family members were 25.4% for Adaa district and, 13.8% for Adama zuria district (Table 1). Depending on household responses, family size is considered as an asset and a factor, which guarantees social security at the household level.

In the current study, based on the educational status households involved in dairy production 6.3% were illiterate from Adaa district and, 0.8% from Adama zuria district while 4.7% were degree graduates in Adaa district and 5.7%) in Adama zuria district (details of education level of individuals involved in diary production were indicated in Table 1.

Concerning the dairy cattle breeds owned by dairy producers in the study area, 45.7% were, pure Holstein Friesian in Ada'a district while it was 8.1%, in Adama zuria district. However, the highest proportions of dairy cattle breed were composed of cross local breed with Holstein Friesian (45.7%, 48.8%) Adaa and Adama zuria district. Details of dairy cattle breed composition in the study areas were indicated in Table 2.

survey result indicated that (33.9%, 21.1%) respondents were engaged on full time dairy activities as source of income, whereas (3.1%, 14.6%) of the respondents, were civil servant and among the respondents (5.5%, 6.5%) were found under retirements in the study area of Adaa and Adamazuria districts, respectively (Table 2). Majority of the respondents (57.7%) in both districts relied on extra business.

Among the major constraints of dairy production in the study areas as reported by respondents, shortage of land was first in Adaa district

Variable	Adaa (n=127), n (%)		Total	Adamazuria (n=123), n= (%)		Total	Overall total N =250
	Urban (60)	Peri-urban (67)		Urban (55)	Peri-urban (68)		
Sex							
Female	13 (21.7)*	24 (35.8)	37 (29.1)	14 (25.5)	16 (23.5)	30 (24.4)	67 (26.8)
Male	47 (74.5)	43 (76.5)	90 (70.9)	41 (74.5)	52 (76.5)	93 (75.6)	183 (73.2)
Age							
≤ 30	12 (20.0)	7 (10.4)	19 (15.0)	13 (81.2)	3 (18.8)	16 (6.4)	35 (14)
1-3	28 (46.7)	28 (41.8)	56 (44.1)	24 (50.0)	24 (50.0)	48 (19.2)	104 (41.6)
4-6	11 (18.3%)	20 (29.9)	31 (24.4)	10 (35.7)	18 (64.3)	28 (11.2)	59 (23.6)
≥ 51	9 (15.0%)	12 (17.9)	21 (16.5)	8 (25.8)	23 (74.2)	31 (12.4)	52 (20.8)
Education							
Illiterate	-	8 (11.9)	8 (6.3)	-	1 (1.5)	1 (0.8)	9 (3.6)
Basic education	3 (5.0)	15 (22.4)	18 (14.2)	1 (1.8)	4 (5.9)	5 (4.1)	23 (9.2)
primary school**	17 (28.3)	31 (46.3)	48 (37.8)	9 (16.4)	19 (27.9)	28 (22.8)	76 (30.4)
Junior school***	9 (15.0)	7 (10.4)	16 (12.6)	23 (41.8)	31 (45.6)	54 (43.9)	70 (28)
high school@	18 (30.0)	3 (4.5)	21 (16.5)	10 (18.2)	8 (11.8)	18 (14.6)	39 (15.6)
Diploma	8 (13.3)	2 (3.0)	10 (7.9)	7 (12.7)	3 (4.4)	10 (8.1)	20 (8)
Degree & above	5 (8.3)	1 (1.5)	6 (4.7)	5 (9.1)	2 (2.9)	7 (5.7)	13 (5.2)
Family							
1-3	28 (46.7)	29 (43.3)	57 (44.9)	18 (32.7)	35 (51.5)	53 (43.1)	110 (44)
4-6 4-6	24 (40.0)	21 (31.3)	45 (35.4)	26 (47.3)	27 (39.7)	53 (43.1)	98 (39.2)
≥ 7	8 (13.3)	17 (25.4)	25 (19.7)	11 (20.0)	6 (8.8)	17 (13.8)	42 (16.8)
Marital status							
Single	3 (5.0)	2 (3.0)	5 (3.9)	-	3 (4.4)	3 (2.4)	8 (3.2)
Married	56 (93.3)	63 (94.0)	119 (93.7)	52 (94.5)	64 (94.1)	116 (94.3)	235 (94)
Divorce	1 (1.7)	2 (3.0)	3 (2.4)	3 (5.5)	1 (1.5)	4 (3.3)	7 (2.8)
*figures in parenthesis are percentages for a given category,**1-6, ***7-8, @9-12							

Table 1: Composition of age, sex, education family size and marital status, of individuals involved in dairy production.

Variable	Adaa (n=127) n (%)			Adamazuria (n=123) n (%)			Overall total N=250
	Urban (60)	Peri-urban (67)	Total	Urban (55)	Peri-urban (68)	Total	
Dairy cow breeds							
Pure Holstein	34 (56.7)	24 (35.8)	5 8 (45.7)	6 (10.9)	4 (5.9)	10 (8.1)	68 (27.2)
Pure Jersey	3 (35.0)	1 (1.5)	4 (3.1)	5 (9.1)	1 (1.5)	6 (4.9)	10 (4.0)
Holstein´ Jersey	4 (6.7)	3 (4.5)	7 (5.5)	10 (18.2)	37 (54.4)	47 (38.2)	54 (21.6)
Family income							
Civil servant	2 (3.3)	2 (3.0)	4 (3.1)	3 (5.5)	15 (22.1)	18 (14.6)	22 (8.8)
Extrabusiness (trader)*	37 (61.7)	36 (53.7)	73 (57.5)	34 (61.8)	37 (54.4)	71 (57.7)	144 (57.6)
Retired employees	6 (10.0)	1 (1.5)	7 (5.5)	2 (3.6)	6 (8.8)	8 (6.5)	15 (6.0)
Full time Dairy farmers	15 (25.0)	28 (41.8)	43 (33.9)	16 (29.1)	10 (14.7)	26 (21.1)	69 (27.6)
*Extrabusiness- it includes petty trading, figures in parenthesis are percentages for a given category							

Table 2: Composition of dairy breed and source of family income in Adaa and AdamaZuria districts.

(17.3%) and Adama Zuria (14.6%) followed by feed shortage 13.4%, and 11.4%, respectively in Adaa and Adama Zuria district, which are the most important limiting factor for productivity of their dairy cattle, and indicated the importance of improving their feeding regime as an essential step towards any improvement program (Table 3).

Feeding system and dairy feed sources

Concerning the feeding practice 40.9% of respondents from Ada'a and 34.1% from Adama districts used stall feeding/ zero-grazing while, 13.4% from Ada'a and 16.3% from Adama district totally use free grazing (Table 4).

The major feed sources for dairy cows were grass hay (25.2%, 18.7%), natural pasture (11%, 17.1%), crop residue (15.0%, 13.8%), concentrates (24.4%, 30.1%), and industrial brewery by products (12.6%, 8.9%) in Ada'a and Adama zuria districts, respectively (Table 4).

Improved forage production practices

In the current study, the majority of respondents, 67.7% from Ada'a and 89.4% from Adama zuria district didn't growing improved forages. The major limitations to grow improved forages were land scarcity for forage development (45.7%, 52.0%), lack of awareness (11.0%, 13.0%), both scarcity of land and lack of awareness (6.3%, 8.1%) and lack of input supply (3.9%, 5.7%) and shortage of labor (33.1%, 21.1%) in Ada'a and Adama zuria, respectively (details on practice of growing improves forage (Table 5).

According to the respondents frequently grown improved forages in Adama and Adama zuria districts were Alfalfa (*Medicago sativa*), (17.3%, 16.2%); Elephant grass (*Pennisetumpurpureum*), (11.0%, 4.4%); vetch (*Viciadasycarpa*), (25.2%, 10.3%); cow pea (*Vignaunguiculata*) (3.1%, 11.4%); vetch (*Viciadasycarpa*) and cow pea (*Vignaunguiculata*) together (15.0% ,19.5%) and Sasbania sesban (0%, 4.9%) (Table 5).

The survey indicated that majority of dairy owners didn't supplement minerals for their dairy,the reasons were lack of mineral source (48.8%, 43.9%); no idea about minerals (31.5%, 28.5%) and both lack of mineral sources and absence of awareness (19.7%, 27.6%) in

Variable	Adaa n=127 n (%)			Adamazurian=123 n (%)			Overall total N=250
	Urban (60)	Peri urban (67)	Total	Urban (55)	Peri-urban (68)	Total	
Dairy Problems							
shortage of land	19 (31.7)	3 (4.5)	22 (17.3)	17 (30.9)	1 (1.5)	18 (14.6)	40 (16.0)
Feed shortage	12 (20.0)	5 (7.5)	17 (13.4)	11 (20.0)	3 (4.4)	14 (11.4)	31 (12.4)
Diseases	6 (10.0)	17 (25.4)	23 (18.1)	5 (9.1)	9 (13.2)	14 (11.4)	37 (14.8)
Lack of extension service	3 (5.0)	7 (10.4)	10 (7.9)	-	10 (14.7)	10 (8.1)	20 (8.0)
Inefficient AI service	3 (5.0)	16 (23.9)	19 (15.0)	7 (12.7)	14 (20.6)	21 (17.1)	40 (16.0)
Market problem	-	13 (19.4)	13 (10.2)	3 (5.5)	13 (19.1)	16 (13.0)	29 (11.6)
Shortage of labor	14 (23.3)	2 (3.0)	16 (12.6)	10 (18.2)	7 (10.3)	17 (13.8)	33 (13.2)
Inadequate veterinary service	3 (5.0)	4 (6.0)	7 (5.5)	2 (3.6)	11 (16.2)	13 (10.6)	20 (8.0)

Table 3: Dairy cows production constraints in the study area.

Variables	Adaa (n=127) n (%)			Adamazuria (n=123) n (%)			Overall total N=250
	Urban (60)	Peri-urban (67)	Total	Urban (55)	Peri-Urban (68)	Total	
Type of feeding							
Free grazing	-	17 (25.4)	17 (13.4)	5 (9.1)	15 (22.1)	20 (16.3)	37 (14.8)
Stall feeding	51 (85.0)	1 (1.5)	52 (40.9)	25 (45.5)	17 (25.0)	42 (34.1)	94 (37.6)
Free grazing & stall feeding	9 (15.0)	49 (73.1)	58 (45.7)	25 (45.5)	36 (52.9)	61 (49.6)	119 (47.6)
Source of feed							
Local feed source	5 (8.3)	14 (20.9)	19 (15.0)	15 (27.3)	21 (30.9)	36 (29.3)	55 (22.0)
Purchased source	38 (63.3)	21 (31.3)	59 (46.5)	11 (20.0)	1 (1.5)	12 (9.8)	71 (28.4)
Both local &purchased	17 (28.3)	32 (47.8)	49 (38.6)	29 (52.7)	46 (67.6)	75 (61.0)	124 (49.6)
Available feeds							
Natural pasture	-	14 (20.9)	14 (11.0)	1 (1.8)	20 (29.4)	21 (17.1)	35 (14.0)
Grass hay	18 (30.0)	14 (20.9)	32 (25.2)	11 (20.0)	12 (17.6)	23 (18.7)	55 (22.0)
Crop residue*	8 (13.3)	11 (16.4)	19 (15.0)	2 (3.6)	15 (22.1)	17 (13.8)	36 (14.4)
Concentrate**	16 (26.7)	15 (22.4)	31 (24.4)	27 (49.1)	10 (14.7)	37 (30.1)	68 (27.2)
Industrial brewery by products	10 (16.7)	6 (9.0)	16 (12.6)	9 (16.4)	2 (2.9)	11 (8.9)	27 (10.8)
Nonconventional (attela)	8 (13.3)	7 (10.4)	15 (11.8)	5 (9.1)	9 (13.2)	14 (11.4)	29 (11.6)
Source of water							
Natural pasture	-	14 (20.9)	14 (11.0)	1 (1.8)	20 (29.4)	21 (17.1)	35 (14.0)
Grass hay	18 (30.0)	14 (20.9)	32 (25.2)	11 (20.0)	12 (17.6)	23 (18.7)	55 (22.0)
Crop residue*	8 (13.3)	11 (16.4)	19 (15.0)	2 (3.6)	15 (22.1)	17 (13.8)	36 (14.4)
Concentrate**	16 (26.7)	15 (22.4)	31 (24.4)	27 (49.1)	10 (14.7)	37 (30.1)	68 (27.2)
Industrial brewery by products	10 (16.7)	6 (9.0)	16 (12.6)	9 (16.4)	2 (2.9)	11 (8.9)	27 (10.8)
Nonconventional (attela)	8 (13.3)	7 (10.4)	15 (11.8)	5 (9.1)	9 (13.2)	14 (11.4)	29 (11.6)

*wheat straw, barley straw, teffstraw,maize Stover, sugar cane top ** noug seed cake, cotton seed cake, wheat bran, lean seed meal, soya bean meal; figures in parenthesis are percentages for a given category

Table 4: Dairy cattle feed type, feed and water resource and feeding practices.

Variables	Adaa (n=127) n (%)			Adamazuria (n=123) n (%)			Overall total N=250
	Urban (60)	Peri-urban (67)	Total	Urban (55)	Peri-rban (68)	Total	
Type of feeding							
Free grazing	-	17 (25.4)	17 (13.4)	5 (9.1)	15 (22.1)	20 (16.3)	37 (14.8)
Stall feeding	51 (85.0)	1 (1.5)	52 (40.9)	25 (45.5)	17 (25.0)	42 (34.1)	94 (37.6)
Free grazing & stall feeding	9 (15.0)	49 (73.1)	58 (45.7)	25 (45.5)	36 (52.9)	61 (49.6)	119 (47.6)
Source of feed							
Local feed source	5 (8.3)	14 (20.9)	19 (15.0)	15 (27.3)	21 (30.9)	36 (29.3)	55 (22.0)
Purchased source	38 (63.3)	21 (31.3)	59 (46.5)	11 (20.0)	1 (1.5)	12 (9.8)	71 (28.4)
Both local &purchased	17 (28.3)	32 (47.8)	49 (38.6)	29 (52.7)	46 (67.6)	75 (61.0)	124 (49.6)
Available feeds							
Natural pasture	-	14 (20.9)	14 (11.0)	1 (1.8)	20 (29.4)	21 (17.1)	35 (14.0)
Grass hay	18 (30.0)	14 (20.9)	32 (25.2)	11 (20.0)	12 (17.6)	23 (18.7)	55 (22.0)
Crop residue*	8 (13.3)	11 (16.4)	19 (15.0)	2 (3.6)	15 (22.1)	17 (13.8)	36 (14.4)
Concentrate**	16 (26.7)	15 (22.4)	31 (24.4)	27 (49.1)	10 (14.7)	37 (30.1)	68 (27.2)
Industrial brewery by products	10 (16.7)	6 (9.0)	16 (12.6)	9 (16.4)	2 (2.9)	11 (8.9)	27 (10.8)
Nonconventional (attela)	8 (13.3)	7 (10.4)	15 (11.8)	5 (9.1)	9 (13.2)	14 (11.4)	29 (11.6)
Source of water							
Pipe water	53 (88.3)	12 (17.9)	65 (51.2)	44 (80.0)	23 (33.8)	67 (54.5)	132 (52.8)
bore holes	6 (10.0)	23 (34.3)	29 (22.8)	1 (1.8)	11 (16.2)	12 (9.8)	41 (16.4)

Pipe & Pond	1 (1.7)	15 (22.4)	16 (12.6)	10 (18.2)	24 (35.3)	34 (27.6)	50 (20.0)
Spring water	-	10 (4.5)	10 (7.9)	-	4 (5.9)	4 (3.3)	14 (5.6)
River water	-	3 (14.9)	3 (2.4)	-	3 (4.4)	3 (2.4)	6 (2.4)
Other source (rain)	-	4 (6.0)	4 (3.1)	-	3 (4.4)	3 (2.4)	7 (2.8)

*wheat straw, barley straw, teffstraw, maize Stover, sugar cane top ** noug seed cake, cotton seed cake, wheat bran, lean seed meal, soya bean meal; figures in parenthesis are percentages for a given category

Table 5: Dairy cattle feed resource and feeding practices.

Variable	Adaa (n=127) n (%)			Adamazuria (n=123) n (%)			Overall total N=250
	Urban (60)	Peri-urban (67)	Total	Urban (55)	Peri-urban (68)	Total	
Reason for not feeding M							
lack of mineral source	42 (70.0)	20 (29.9)	62 (48.8)	29 (52.7)	25 (36.8)	54 (43.9)	116 (46.4)
no idea about minerals	8 (13.3)	32 (47.8)	40 (31.5)	22 (40.0)	13 (19.1)	35 (28.5)	75 (30.0)
shortage of mineral &lack of awareness	10 (16.7)	15 (22.4)	25 (19.7)	4 (7.3)	30 (44.1)	34 (27.6)	59 (23.6)
Knowledge about mineral							
Through education	14 (23.3)	19 (28.4)	33 (26.0)	4 (7.3)	15 (22.1)	19 (15.4)	52 (20.8)
Cultural knowledge	2 (3.3)	5 (7.5)	7 (5.5)	1 (1.8)	2 (2.9)	3 (2.4)	10 (4.0)
From friends	(0.0)	1 (1.5)	1 (0.8)	2 (3.6)	25 (36.8)	27 (22.0)	28 (11.2)
Through extension workers	17 (28.3)	4 (6.0)	21 (16.5)	12 (21.8)	2 (2.9)	14 (11.4)	35 (14.0)
From different sources	7 (11.7)	9 (13.4)	16 (12.6)	9 (16.4)	4 (5.9)	13 (10.6)	29 (11.6)
No idea	20 (33.3)	29 (43.3)	49 (38.6)	27 (49.1)	20 (29.4)	47 (38.2)	96 (38.4)
Source of minerals							
Cultural/local source	14 (23.3)	24 (35.8)	38 (29.9)	1 (1.8)	-	1 (0.8)	39 (15.6)
Commercial source	40 (66.7)	40 (59.7)	80 (63.0)	24 (43.6)	25 (36.8)	49 (39.8)	129 (51.6)
Both cultural &commercial	6 (10.0)	3 (4.5)	9 (7.1)	30 (54.5)	43 (63.2)	73 (59.3)	82 (32.8)
Types of minerals supplem.							
Salt /common salt only	18 (30.0)	19 (28.4)	37 (29.1)	10 (18.2)	39 (57.4)	49 (39.8)	86 (34.4)
Calcium powder &Salt	9 (15.0)	21 (31.3)	30 (23.6)	11 (20.0)	-	11 (8.9)	41 (16.4)
Bole*/ lake soil alone	20 (33.3)	13 (19.4)	33 (26.0)	11 (20.0)	10 (14.7)	21 (17.1)	54 (21.6)
Mineral mix** & Salt	7 (11.7)	6 (9.0)	13 (10.2)	10 (18.2)	12 (17.6)	22 (17.9)	35 (14.0)
Salt &bole	2 (3.3)	8 (11.9)	2 (1.6)	1 (1.8)	-	1 (0.8)	3 (1.2)
Mineral lick*** , Salt &bole	3 (5.0)	-	3 (2.4)	1 (1.8)	-	1 (0.8)	4 (1.6)
Limestone &Salt	-	-	8 (6.3)	8 (14.5)	1 (1.5)	9 (7.3)	17 (6.8)
Partially all	1 (1.7)	-	1 (0.8)	3 (5.5)	6 (8.8)	9 (7.3)	10 (4.0)
Mineral deficiency knowledge							
Yes	40 (66.7)	35 (52.2)	75 (59.1)	32 (58.2)	23 (33.8)	55 (44.7)	130 (52)
No	20 (33.3)	32 (47.8)	52 (40.9)	23 (41.8)	45 (66.2)	68 (55.3)	120 (48)

*mineral soil collected from &around lake.**different minerals together including vitamins in the form of powder. ***salt / mineral licks often occur naturally, providing sodium, calcium, iron, phosphorus and zinc, figures in parenthesis are percentages for a given category

Table 6: Source of mineral information and types of mineral supplementation.

Variables	Adaa (n=127) n (%)			Adamazuria (n=123) n (%)			Overall total N=250
	Urban (60)	Peri-urban (67)	Total	Urban (55)	Peri-urban (68)	Total	
Seasonal Occurrence Mineral Deficiency							
Dry season	42 (70.0)	47 (70.1)	89 (70.1)	36 (65.5)	29 (42.6)	65 (52.8)	154 (61.6)
Wet season	1 (1.7)	-	1 (0.8)	1 (1.8)	2 (2.9)	3 (2.4)	4 (1.6)
Both season	4 (6.7)	1 (1.5)	5 (3.9)	2 (3.6)	-	2 (1.6)	7 (2.8)
No idea	13 (21.7)	19 (28.4)	32 (25.2)	16 (29.1)	37 (54.4)	53 (43.1)	85 (34)
Mineral deficiency							
Loss of hair coat	10 (16.7)	2 (3.0)	12 (9.4)	3 (5.5)	6 (8.8)	9 (7.3)	21 (8.4)
Licking of human urine	11 (18.3)	7 (10.4)	18 (14.2)	11 (20.0)	4 (5.9)	15 (12.2)	33 (13.2)
Lameness	2 (3.3)	4 (6.0)	6 (4.7)	3 (5.5)	3 (4.4)	6 (4.9)	12 (4.8)
Soil licking	1 (1.7)	6 (9.0)	7 (5.5)	7 (12.7)	8 (11.8)	15 (12.2)	22 (8.8)
Delayed onset of puberty	-	4 (6.0)	4 (3.1)	-	3 (4.4)	3 (2.4)	7 (2.8)
Silent heat	2 (3.3)	4 (6.0)	6 (4.7)	2 (3.6)	4 (5.9)	6 (4.9)	12 (4.8)
Irregular estrous	2 (3.3)	6 (9.0)	8 (6.3)	2 (3.6)	4 (5.9)	6 (4.9)	14 (5.6)
Failure of estrous	2 (3.3)	1 (1.5)	3 (2.4)	4 (7.3)	2 (2.9)	6 (4.9)	9 (3.6)
Long period of calving interval	2 (3.3)	3 (4.5)	5 (3.9)	3 (5.5)	4 (5.9)	7 (5.7)	12 (4.8)
Embryonic death	2 (3.3)	1 (1.5)	3 (2.4)	-	1 (1.5)	1 (0.8)	4 (1.6)
Increase incidence of dystocia	2 (3.3)	2 (3.0)	4 (3.1)	1 (1.8)	3 (4.4)	4 (3.3)	8 (3.2)

Retention of placenta	3 (5.0)	2 (3.0)	5 (3.9)	1 (1.8)	4 (5.9)	5 (4.1)	10 (4.0)
Blind of eyes of new born	-	1 (1.5)	1 (0.8)	7 (12.7)	7 (10.3)	14 (11.4)	15 (6.0)
Emaciation	-	3 (4.5)	3 (2.4)	-	1 (1.5)	1 (.8)	4 (1.6)
Milk fever incidence	17 (28.3)	19 (28.4)	36 (28.3)	9 (16.4)	12 (17.6)	21 (17.1)	57 (22.8)
Milk quality and quantity affected	-46.7	2 (3.0)	6 (4.7)	2 (3.6)	2 (2.9)	4 (3.3)	10 (4.0)
K.Common infectious disease							
Yes	44 (73.3)	52 (77.6)	96 (75.6)	33 (60.0)	41 (60.3)	74 (60.2)	170 (68.0)
No	16 (26.7)	15 (22.0%)	31 (24.4)	22 (40.0)	27 (39.7)	49 (39.8)	80 (32.0)
Seasonal occurrence of infectious disease							
Dry season	3 (5.0)	2 (3.0)	5 (3.9)	1 (1.8)	1 (1.5)	2 (1.6)	7 (2.8)
Wet season	42 (70.0)	51 (76.1)	93 (73.2)	25 (45.5)	36 (52.9)	61 (49.6)	154 (61.6)
No idea	15 (25.0)	14 (20.9)	29 (22.8)	29 (52.7)	31 (45.6)	60 (48.8)	89 (35.6)
K=knowledge, figures in parenthesis are percentages for a given category							

Table 7: Seasonal occurrence of observed mineral deficiency and infectious disease.

Ada'a and Adama zuria, respectively (Table 6). Of those farmers that supply mineral, the frequently supplied minerals were sodium chloride (29.1%, 40.7%), and calcium powder with sodium chloride (26.0%, 17.1%) while others use undefined lake soil mineral (locally named as Bole) (Table 6).

The current study indicated that 59.1% of respondents from Ada'a and 44.7% from Adama zuria districts have knowledge about mineral deficiency diseases with their respective symptoms whereas, (40.9%, 55.3%) haven't idea about deficiency diseases in Adaa and Adama zuria, respectively (Table 7).

Discussion

In both districts male respondents mainly involved in dairy cattle production activities than female and this result was in agreements with the [9,10] in different parts of Ethiopia. In the contrary, reported that the proportion of female involved in dairy cattle production were higher number of males in Addis Ababa. This could be associated to the wealth status as most of the time male are relatively in better economic status than female-headed households. Similarly, the activity is by nature labor demanding activities.

The proportions of educated households involved in dairy cattle production activities in the current study areas were lower than that reported by [11]. In study area, farmers are forced to stop education at different school level, mostly because of different socio-economic factors like wealth difference of the farmers. The level of education of dairy farmers may have significant effect on managerial capacity, and adoption of new technologies.

Results of the current study revealed that dairy farming was a part-time activity and used to complement earnings from other business and this was in agreement with [12]. Specially in peri-urban dairy production, market for dairy products was raised as a very serious problem. In such cases, the producers were allowed to sell only a limited quantity of milk even with lower price. This condition might be limitation to dairy development in the country.

The major constraints of dairy production which identified in present study were in agreement with constraints reported by in different parts of urban dairy production in Ethiopia. Shortage of land and shortage of labor were especially emphasized by the urban dairy producers, in both districts, and these were common to many previous reports from various parts of Ethiopia [13,14]. Similar, report was reported by [15], which indicated that shortage of land was the most limiting for urban dairy production in order to produce improved forage production in different parts of the study area.

In the present study, free grazing, stall feeding and togather free grazing and stall feeding were common feeding systems observed in the study area. But relatively, zero-grazing practiced in large farms as compared to small sized farms and medium sized farms. The current study disagrees with the finding of, who reported that smallholder dairy farmers were also, practiced zero-grazing system.

According to the report of [16], 76% of urban dairy farmers in southern Ethiopia used purchased feeds and this result higher than the current finding. The primary reason for the predominant use of purchased feeds was due to scarcity of land for on farm forge cultivation. The types of feed and feed resources reported in this study were also in agreement with the previous studies of [17,18] which indicated that dairy activities are highly constrained by feed shortage.

The majority of respondents provided sodium chloride for their dairy cows as main mineral source, similar to this study, reported that in Dandi district, west shewa zone supplements their livestock with common salt. Similarly, in Eastern zone of Tigray the provision of salt was also a recognized practice that they provide salt during the wet season for their animals [19]. The current study revealed that natural soil (Bole) is used for their animals, the result in line with work of [20], reported that farmers use undefined soil based salt lick (bole) as mineral sources for supplementation. The amount provided dairy animals that are given this mineral need further exploration for proper ration formulation.

During the dry season when the available forage is low in quantity, quality and as well as in mineral contents, this usually consequences in loss of live weight, low birth weights, lowered resistance to disease and reduced animal performance. Likewise, the current study agree with the result of [21], indicated that during dry season, forages were low in most mineral [22]. Moreover, if forage supply is sufficient, and can be directly related to mineral deficiencies elicited by low mineral concentration in soils concomitant to forage [23]. Therefore, based on the physiological condition and seasonal variation, animals need effective mineral supplementation [24]. Likewise, tropical countries, mineral imbalances in soils and forages have for long been held responsible for low production and reproductive impairment of the dairy animals [25].

According to the current study result, dairy owners, including poor body conditions, milk fever, slow live weight gain, and low fertility, recognized various mineral deficiencies symptoms tentatively. In agreement with the work of [26] maintenance of calcium homeostasis throughout transition is imperative for uterine health. Similarly, supplementation of anionic salts can reduce the incidence of clinical

hypocalcaemia (milk fever). Moreover [27-30] observed that cows with dystocia, stillbirth and retention of placenta had a greater decrease in calcium postpartum than cows without these risk factors. It is also true that low concentration of phosphorus in livestock feeds, supplementation of this mineral is needed because Phosphorous deficiency results in reduced growth, decreased appetite, impaired reproduction and fragile bone [31,32].

Conclusions and Recommendation

An assessment of feed and mineral resources was carried out in Ada'a and Adama zuria east shewa zone, Oromia Regional to identify the types and sources of feeds, constraints in dairy feeds, and awareness in mineral supplementation. in terms of educational the majority dairy owners have lower level of education this may have significant effect on managerial capacity and adoption of new technologies. Dairy farming activities are considered to a par time activities due to profitability issues, due to shortage of land, which in turn leads to shortage of cultivation of improved forage and hence feed and labor shortage are commonly in the urban dairy farming system, in both districts, this condition might affect dairy development. In case of mineral supplementation, sodium chloride and bole soil are commonly used minerals but the amount provided dairy animals that are given this mineral need further exploration for proper ration formulation.

Moreover, the results showed that feed and mineral difference and feeding practice variability based on their availability and cost of feeds and minerals in the study area. Therefore, Alternative feed production and mineral sources awareness such as development of improved forages, proficient feed application technologies and natural pastureland improvement measures should be taken. The contribution of improved forage in dairy feed was very low due to lack of awareness and shortage of improved forage seeds in the area. To alleviate this problem, awareness creation and model nursery sites should be established for demonstration in potential area of the districts, so that dissemination and utilization of these feeds are very important.

During dry season, in the study area used crop residues and hay for their dairy feeding but the mineral and nutritive value of such feeds in most cases were low, to compensate the nutritive value and mineral deficiency of crop residues, improved forages with better yield where irrigation facilities are available and mineral supplementation should be alternative feed sources for dairy specially in the areas. Due to unaffordable costs of commercial dairy feeds including concentrates, minerals and vitamins, provision of common salt and locally available natural soil/bole as mineral source should be encouraged.

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Conflict of Interest

The authors affirm that there is no conflict of interests in the work described.

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