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RESEARCH PAPER

Milk Production, Processing and Marketing Practices in Sebeta Hawas District, Shagar City, Ethiopia

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Abstract

The study was conducted to assess milk production, processing and marketing systems in Sebeta Hawas district of Oromia, Ethiopia. A total of 139 randomly selected smallholder farmers were involved in the study from five purposefully selected kebeles of the district. Both primary and secondary data were used for the study. The data collected were analyzed using Statistical Package for Social Science (SPSS) version 24 and a z-test was employed to test the difference between rural and urban dairy production systems. Pasture was the major feed source (54.7%) of dairy animals in the district followed by crop residues (25.9%). The majority (69.1%) of the dairy farmers use free grazing while only about 26% practice stall feeding in the district. More than 2/3 (68.3%) of the dairy farmers in rural areas do not produce improved forage for their dairy cattle due to shortage of land (38.3%), shortage of forage seeds and fertilizer (36.2%) and lack of awareness (22.3%) whereas more than half (57.9%) of the dairy producers in urban areas produce improved forage for their dairy cows. Almost all (99.3%) of the milk produced in the study area was traditionally processed using hand churning. Informal marketing was the sole means of dairy products (milk, cheese and butter) marketing. Feed shortage, animal diseases, poor accessibility of AI and poor dairy marketing systems were the major milk production constraints in the study district. Thus, developing improved forage in the areas, introducing milk processing technologies, linking milk producers to formal milk marketing systems, strengthening access to veterinary services and vaccination, improving access to AI services and improving the whole extension systems were recommended to improve milk production, processing and marketing in the study district.

Keywords: Milk production, consumption, processing, marketing

Introduction

Livestock keeping is an ancient tradition in rural areas of Ethiopia. With a cattle population of more than 70 million head (CSA, 2021), Ethiopia stands first in Africa and 6th in the World. The size and diversity of livestock resources have become vital to the sustenance of rural life and the largely agrarian economy of the country. Cattle are the predominant element of livestock wealth in Ethiopia both in the agricultural highlands and pastoral and agro-pastoral lowlands, and hence the proportional contribution to the national economy is considered to be high (Yayeh et al., 2017; Getabalew *et al*., 2020).

Ethiopia holds large potential for dairy development due to its large livestock population (CSA, 2021), its favorable climate, emerging market opportunities, and the improved policy environment for the involvement of private sectors (Mebrate et al., 2019). Dairy production is an important component of livestock farming in Ethiopia (ILRI, 2015) and is used as an enterprise and economically viable and greatly contributes to poverty reduction, food security, increased family nutrition and income and job

opportunity creation (Niraji et al., 2014). It plays a vital role in economic development, especially in developing countries as both driving economic growth and profiting from it. It is a valuable device to increase income, employment, food and foreign exchange earnings as well as better nutrition as an engine of growth. The share of animal products in the total food budget increases faster than that of cereals due to the relatively high-income elasticity of demand for animal products (Dayanandan, 2011; Tadesse et al., 2020).

With a cattle population of 25.5 million, Oromia stands first in Ethiopia (CSA, 2021); the Sebeta Hawas District area contributes 151,900 cattle and it is among the highest potential areas for dairy cattle in Oromia special zone surrounding Finfinnee (SHDLFRDO, 2020). Even though milk production is an essential part of the livelihood of the rural and urban communities in the present study areas, there is no documented data on milk processing, handling, utilization and marketing systems. Developing appropriate interventions to assist smallholder dairy households and identifying those that should be targeted requires a clear understanding of the dairy production systems, and the prevailing traditional practices of milk production, processing and marketing systems. Therefore, the study was aimed at describing the milk production, processing and marketing system in Sebeta Hawas District of Oromia Regional State, Ethiopia.

Materials and methods

Description of Study Areas

Sebeta Hawas district is located on the main road of Addis Ababa - Jimma at a distance of 28 km away from Addis Ababa. It has 36 rural and 4 urban administrative sub-divisions or kebeles. The total area of the district is 73,078.048 hectares. Out of this total area, 86.7% and 5.2% are used for cultivation and grazing land, respectively. Cattle are the most important livestock species in the area. From the total number of female cattle populations of the district (61060), 60,693 are local breeds and 367 are crossbreeds, of which milking cows account for 13,777. The district has two agroecologies- midland (88%) and lowland (12%) (SHDLFRDO, 2020). Mixed crop-livestock production (90%) is the main agricultural practice in the study area.

Data and methods of Data collection

Both primary and secondary data were used for the study. Primary data was collected through a survey using pre-tested semi-structured questionnaires, while the secondary data was collected from relevant documents viz., district and zonal reports and literature. All the primary data collected were triangulated by focus group discussions and key informant interviews with district livestock heads and experts in livestock and animal health.

Sampling and selection of study households

Purposive and random sampling techniques were employed to identify kebeles and household respondents. Five kebeles (three from rural and two from urban) were purposively selected based on dairy cattle population and accessibility. Initially, study populations were defined as households that had at least one milking dairy cow both in the urban and rural kebeles, whereafter, dairy cow-owning households were randomly selected for an interview from the list.

The sample size was determined using the formula given by Yemane (1967) for homogenous experimental material with a 92 percent confidence level because the farmers are all smallholders and more or less the breed they keep and management practices are similar.

$$n = \frac{N}{1 + N(e)^2}$$

Where,

n = designates the sample size

N = designates total number of Agricultural households (AHH)

e = designates maximum variability or margin of error =8% (0.08)

1 = designates the probability of the event occurring

Thus, $$n = \frac{N}{1+N(e)2} = \frac{1256}{1+1256(0..08)} \cong 139$$

Accordingly, a total of 139 dairy producers were used for an interview.

Data analysis

All collected data were analyzed using SPSS version 24 Software. Descriptive statistics like frequency tables and averages were used to summarize the data. T-test analysis was employed to compare rural and urban dairy production systems.

Results and discussions

Feed resources and feeding practices of dairy cattle

The major sources of feed for cattle in the study area are shown in Table 1. Natural grazing, crop residues, hay, improved forage, agro-industrial byproducts, and non-conventional feedstuffs (*Atella*) were the major feed resources in the study area. Feed resources for dairy cattle showed a significant association ($P<0.01$) with the production system (rural and urban) of the study area.

In the rural area, the most commonly used feed resources for dairy cattle were grazing land (59.2%) followed by only crop residue (teff, wheat plus crop) (29.2%) and a mixture of crop residues, grazing and industrial by-products (11.7%). While in urban areas a mixture of crop residues, free grass grazing and industrial by-products (68.4%), grazing (26.3%), crop residue (25%) and industrial by-products (5.3%) (Table 1) were the commonly used feed sources for dairy cattle. The feeding system of dairy cattle was significantly associated with the production systems of the study area ($p<0.01$).

Mostly known feeding systems practiced were free grazing (75.8%) and (26.3 %) in rural and urban areas, respectively and grazing and stall feeding practiced (73.7%) in urban and 18% (Table 1) in rural areas. The present result was not in line with the result reported by Kassa and Dekamo (2016).

Table 1. Feed resources and feeding practices of dairy cattle in the study area

Description	Production systems		Total	Test	
	Rural	Urban		X^2	p-value
	N (%)	N (%)	N (%)		
Most commonly used feed resources for cows				**42.295****	**0.000**
Only crop residue of teff, wheat crop	35(29.2)	-	35(25.2)		
Industrial byproducts	-	1(5.3)	1(0.7)		
Grazing Land	71(59.2)	5(26.3)	76(54.7)		
Crop residues, grazing, and industrial by-products	14(11.7)	13(68.4)	27(19.4)		
Feeding practice of cattle for local and cross breed				**26.335****	**0.000**
Free grazing	91(75.8)	5(26.3)	96(69.1)		
Stall feeding	6(5.0)	-	6(4.3)		
Grazing + stall feeding	22(18.3)	14(73.7)	36(25.9)		
Other	1(0.8)	-	1(0.7)		

N= Number of respondents

Production of improved feed for dairy cattle

The practices of growing and feeding improved feeds for dairy cattle in the study area are depicted in Table 2. The current result indicated that there was a significant association between growing of improved feed within the production system ($p<0.05$). The majority (68.3%) of respondents did not practice the production of improved feed for their dairy cattle in rural areas due to insufficient land (38.3%), shortage of input like seed and fertilizer (36.2%), lack of knowledge (22.3%) and insufficient labor (3.2%) (Table 2).

Table 2. Production of improved feed for dairy cattle in the study areas

	Production systems		Total	Test	
	Rural	Urban		X^2	p-value
	N (%)	N (%)	N (%)		
Do you grow improved feed for dairy				4.944*	0.026
Yes	38(31.7)	11(57.9)	49(35.3)		
No	82(68.3)	8(42.1)	90(64.7)		
If yes, what are they?				13.923**	0.003
Fodder trees	4(10.5)	-	4(13.3)		
Improved grasses	7(18.4)	-	7(23.3)		
vetch &oats	27(71)	7(63.6)	15(50.0)		
All	-	4(36.4)	4(13.3)		
If no what are the major reasons?				1.627NS	0.653
Insufficient land	31(37.8)	4(55.6)	36(38.3)		
Insufficient labor	3(3.5)	-	3(3.2)		
Shortage of input (seed, fertilizer)	32(39.6)	2(22.2)	34(36.2)		
Lack of knowledge	17(20.7)	2(22.2)	21(22.3)		

N= Number of respondents

Preservation and processing practices of crop residues

About 89% of the respondents were storing crop residues by stocking outside (Table 3). This causes damage to crop residues due to excessive sun and rain. In comparison to rural families (9.2%), urban families (21.1%) stored their crop residues stocked under the shed. More than half (53.3%) of the crop residues were fed in the form of chopped in rural areas while 68.4% of the crop residues were fed in the form of treated in urban areas. As the result showed there was a significant association between crop residue feeding form and production system ($p<0.05$).

Both rural and urban families (66.2%) implemented the practice of treating crop residues to improve its utilization. The result showed that there was a significant association between treating crop residues and production systems ($p<0.05$). Among respondents treating crop residues 75.7% and 72.2 % of respondents said crop residues treated by mixing crop residues with *Atella*, molasses and other feeds in rural and urban, respectively and 24.3% and 27.7% was practiced treating crop residue by urea treatment in rural and urban, respectively. The result showed that there is no significant relation between the treatment method and production system ($p>0.05$). The present result was in line with the findings of Zewudie (2010) who reported about 75% of the dairy farmers in Debre Birhan and more than 65% in Sebeta offered whole straw mixed with other feeds like water, salt and local brewery by-product '*atella'*.

Table 3. Preservation and processing practices of crop residues

	Production systems		Total	Test	
	Rural	Urban		X^2	p-value
How do you store crop residues?	N (%)	N (%)	N (%)	2.407^{ns}	0.121
Stocked outside	109(90.8)	15(78.9)	124(89.2)		
Stocked under shed	11(9.2)	4(21.1)	15(10.8)		
In what form do you feed crop residues?				26.773^{*}	0.000
Whole	28(23.3)	-	28(20.1)		
Chopped	64(53.3)	4(21.1)	68(48.9)		
Treated	20(16.7)	13(68.4)	33(23.7)		
Mixed with other feed	8(6.7)	2(10.5)	10(7.2)		
Do you have practice in treating crop residues to improve utilization?				8.016	0.005
Yes	74(61.7)	18(94.7)	92(66.2)		
No	46(38.3)	1(5.3)	47(33.8)		
If yes, which crop residue do you usually treat and what type of treatment do you use?				0.951	0.813
Urea treatment	18(24.3)	5(27.7)	23(25)		
Mix crop residues with *'Atella'*, molasses and other feeds	56(75.3)	13(72.2)	69(75)		

Feeding agro-industrial by-products

Agro-industrial by-products were not given to milking cows in rural areas as replied by 68.3% while in urban areas oppositely agro-industrial by-products were given to milking cows as mentioned by 78.9% of respondents as shown in Table 4. This might be due to urban area families' access to agro-industrial by-products. Agro-industrial by-products, such as brewery (from Meta Beer factory), oil seed cake and wheat bran were more common animal feed in this study area. Commonly agro-industrial by-products are not highly accessible in both rural and urban areas of the study area. The main cause for the non-accessibility of agro-industrial by-products in the study area might be due to the high price of agro-industrial by-products as mentioned by 71% of respondents in rural and 76.9% of respondents in urban areas. This current result was greater than the results of (2.2%, and 46.7%) reported by Ayelaw (2017) in the South Wollo zone. This might be due to the fact that the current study area is near (short distance) to agro-industries.

Table 4. Feeding agro-industrial by-product

	Production systems		Total	Test	
	Rural N (%)	Urban N (%)	N (%)	X^2	p-value
Do you give agro-industrial byproducts to your milking cows?				15.543**	0.000
Yes	38(31.7)	15(78.9)	53(38.1)		
No	82(68.3)	4(21.1)	86(61.9)		
Are agro-industrial by-products accessible in your area?				0.370NS	0.543
Yes	30(25.0)	6(31.6)	36(25.9)		
No	90(75.0)	13(68.4)	103(74.1)		
If not, what is the reason?				28.016**	0.000
High price	64(71.1)	10(76.9)	23(20.9)		
Shortage on market	20(22.6)	1(7.7)	21(19.1)		
Lack of awareness	6(6.6)	2(15.4)	66(60.0)		

Water sources and watering system

The source of water for cows is mostly ponds (60%) followed by nearby river water (38.3%) for rural areas and pipeline water (68.4%) followed by ponds (21.1%) for urban areas as indicated in Table 5. In contrast to the present result, Getachew et al., (2012) reported river water as a major source of water for dairy cows in Urban (85.9%) and mixed crop-livestock (79.5%) systems of Debre Zeit areas. The present result showed that there was a significant association between the source of water supply and the production system ($p<0.05$). In rural areas, means of transportation of water to cow or cow to water are nearly equal with 55.9% transporting water to animals and 44.1% bringing cows to where water is found while in urban areas, water is mostly transported to where cows are reared. Either water transportation to cows or cows to the area of the water source has no impact on the production system ($p>0.005$). Average dairy cow travel has a direct correlation with the production system ($p<0.05$). The watering frequency of dairy animals varies by season (wet and dry), and from one production system to another. Water was provided once per day (47.5%), once per two days (26.6 %), free access (10%) in rural areas and twice per day (63.2), and free access in 31.6 % (Table 5) in urban areas. According to the focus group discussion, there was a scarcity of drinking water in the areas during the dry season.

Table 5. Water sources and watering systems in the study areas

	Production systems		Total	Test	
	Rural	Urban		X^2	p-value
What are the sources of water for your cow?	N (%)	N (%)	N (%)	75.957	0.000
Pipeline water	2(1.7)	13(68.4)	15(10.8)		
Nearby river water	46(38.3)	2(10.5)	48(34.5)		
Ponds	72(60.0)	4(21.1)	76(54.7)		
If you use water sources from river, pond or well, do you usually transport the water or bring the animals to the rivers, pond, or well?				0.647	0.421
Transport water to the animal	66(55.9)	4(66.6)	70(56.8)		
Bring the animals to the river or pond	52(44.1)	2(28.6)	54(43.2)		
If you take your dairy cattle for water what is the average distance to the watering point?				9.750	0.021
<1km	14(26.8)	2(100.0)	16(29.6)		
1-4km	20(38.4)	-	20(37)		
4-10km	18(34.6)	-	18(33)		
How frequently do you provide water for your cattle?				30.112	0.000
Free access	13(10)	6(31.6)	27(19.4)		
Once per day	57(47.5)	1(5.3)	58(41.7)		
Twice per day	18(15.0)	12(63.2)	30(21.6)		
Once per two days	32(26.6)	-	24		

Traditional milk processing practice

According to the present study, almost all dairy cattle owners (99.3%) process milk traditionally by hand (Table 6). The present result is in agreement with the findings of Zelalem (1999), Lemma (2004) and Alganesh (2002) who reported that almost all the respondents in the central highlands, east Shewa zone and east Wollega zone, respectively process milk into butter and cheese. The source of milk for processing was significantly associated with the production system ($p<0.01$). In rural areas of Sebeta Hawas, the majority of dairy cattle producers use milk from local cattle breeds for processing (71.4%) and only a few of them use milk of crossbreed (10.9%) and from both cross and local cattle breeds (17.6%). Whereas the urban dairy cattle owners (66.7%) in the district process milk of both local and cross breeds. In the study area, churning by hand was the only method used for processing milk into varieties of products.

Table 6. Milk processing practice in the study area

	Production systems		Total	Test	
	Rural	Urban		X^2	p-
Do you process milk?				0.159	0.690
Yes	119(99.2)	19(100.0)	138(99.3)		
No	1(0.8)	-	1(0.7)		
If yes, do you process milk from?				15.472	0.000
Crossbreed	13(10.9)	-	13(9.9)		
Local breed	85(71.4)	11(57.8)	96(69.9)		
Both	21(17.6)	8(42.1)	29(22.1)		
Why do you need to process milk?				0.323	0.570
Shortage of raw milk market	70(50.7)	1(5.3)	8(8.5)		
To gain cheese and butter	68(49.2)	18(94.7)	86(91.5)		
What method do you use for milk processing?					
Churning by hand	119(100.0)	19(100.0)	138(100.0)		

Dairy product marketing

During the survey period, dairy farmers in the study area practiced an informal dairy products marketing system. Milk, cheese, and butter were the major dairy products sold to consumers, retailers, and traders in the study area. In the rural areas, the majority (60.5%) of the respondents indicated that there is no nearby market for milk selling. In contrast to rural areas, the majority (68.4%) of urban dairy producers have nearby markets for selling their milk (Table 7). The target markets for urban milk producers are mostly urban cafeterias and individual consumers. Due to the shortage of raw milk market, about ¾ of the respondents in rural milk producers preferred to sell processed milk. In conformity to the present result, Zewdie (2010) reported that butter was the main product sold (56%) followed by both butter and Ayib (42.4%) in the central highlands of Ethiopia. According to the same author, 92.9 % of urban milk producers preferred to sell raw milk due to the high demand for raw milk. During FGD, milk and butter prices fluctuate in the dry and wet seasons, in holidays and festivals, and in non-fasting periods.

Table 7. Dairy product marketing system in the study areas

	Production systems		Total	Test	
	Rural	Urban		X^2	p-value
Do you have a nearby market for milk?				5.578*	0.018
Yes	47(39.5)	13(68.4)	60(43.5)		
No	73(60.5)	6(31.6)	78(56.5)	4.655*	0.031
If yes, who is your target market?					
Individual consumer	17(36.2)	8(61.5)	21(36.2)		
Urban /Cafeterias	32(71.1)	5(38.5)	37(63.8)	34.674**	0.000
Prefer to sale					
Raw milk	22(19.0)	13(92.9)	35(26.9)		
Processed milk (butter and ayib)	89(74.7)	1(7.1)	90(69.2)		
Do not sell	9(7.5)	-	5(3.8)	64.00	0.000
Why?					
because of the lack of raw milk market	58(69.1)	-	38(59.4)		
due to the high price of processed milk	37(30.9)	-	17(26.6)		
high demand for raw milk	25(20.8)	9(100.0)	9(14.1)		

The income gained from the sale of milk products is used to purchase farm inputs like feed, fertilizer and improved crop varieties, food and non-food items like education materials for their children as well as house construction and for expansion of their farm. This finding was in line with the findings of Asaminew (2007) in the Mecha and Bahir Dar Zuria district and Kassa and Dekamo (2016) in the Bona Zuria district of Sidama Zone, Southern Ethiopia.

Dairy marketing constraints in the study areas

Dairy marketing constraints in the study area were shown in Table 8. Dairy marketing constraints in the study area mainly occur during fasting time. About 70 % and 78.6% of the rural and urban respondents reported that there was less demand for milk and milk products during fasting time while the remaining respondents reported that there was a problem of milk product marketing throughout the year. The study revealed that dairy products are marketed informally via different channels and are mainly hampered by many constraints. Low amount of milk produced, low price of milk, distance to marketplaces and lack of market information were the major constraints of milk marketing in the study areas. The present result is in agreement with the findings of Amanuel *et al*., (2018) who reported a low amount of milk produced, distance to the market and high cost of transport in the Gimbi district of west Wollega Zone.

Table 8. Problems associated with dairy product marketing

	Production systems		Total	Test	
	Rural	Urban		X^2	p-
Is there any period that you have the problem of marketing your milk and				19.454	0.000
Yes	30(25.0)	14(73.68	44(31.6		
No	90(75.0)	5(26.32)	95(68.3		
If yes, which month				0.354	0.552
Fasting month	21(70.0)	11(78.6)	32(72.7		
In all months of the year	9(30.0)	3(21.4)	12(27.3		

Constraints of dairy production in terms of feed

Unavailability (49.6%) and high cost of feed (43.9%) were the major feed-related problems in the study areas (Table 9). The high cost of feed (73.7%) was majorly an issue in urban areas compared to rural areas as urban dairy farmers mostly depend on purchased feed. There is a need to develop improved forage and improve the productivity of grazing land in order to overcome the scarcity of feed in the rural areas. Improved forage development and productivity of rural grazing land could also contribute to reducing the high cost of feed in urban dairy production systems as the rural dairy farmers sell their surplus production to urban areas. The present result is in conformity with the findings of Debir (2016) and Tolera et al., (2012) who reported feed shortage as the major constraint of livestock production in Sidama Zone and Burji woreda of SNNPR, Ethiopia.

Table 9. Feed and feeding constraints of dairy production in the study areas

	Production systems		Total	Test	
	Rural	Urban		X^2	P-value
What are your major problems with dairy cattle feed and feeding?				8.290	0.082
Availability	64(53.3)	5(26.3)	69(49.6)		
Cost	47(39.2)	14(73.7)	61(43.9)		
Quality	2(1.7)	-	2(1.4)		
Technical knowledge about fodder production, handling and feeding	6(5.0)	-	6(4.3)		
Others	1(0.8)	-	1(0.7)		

Cattle disease

Almost all the respondents in both the production systems reported Anthrax, Bloating *'Bokoksa',* and Blackleg *'Arebajele*' diseases as the major cattle diseases in the study areas (Table 10). The majority of the respondents in the study areas reported the presence of veterinary centers/services and vaccination schedules. These services were provided by the government and private sectors.

Table 10. Cattle diseases

	Production systems		Total	Test	
	Rural	Urban		X^2	p-value
Major dairy cattle disease					
Anthrax, 'Bokoksa', 'Arebajele'	120(100.0)	19(100.0)	139(100.0)		
Is there an animal health center?				4.364*	0.037
Yes	97(80.8)	19(100.0)	116(83.5)		
No	23(19.2)	-	23(16.5)		
Do you have vaccination accessibility?				0.037NS	0.847
Yes	97(80.8)	15(78.9)	112(80.6)		
No	23(19.2)	4(21.1)	27(19.4)		

Constraint of Artificial insemination

As indicated in Table 11, the lack of AI technicians was the main problem both in urban and rural areas followed by cow infertility and size. About 13.3% of the rural dairy farmers had no access to artificial insemination (AI) services which could affect the genetic improvement of our local animals in rural areas. In addition to this, about 9.35% of the respondents in the study areas had no awareness about the importance and services of AI which again has negative connotations on genetic improvement. From these results, it was suggested that access to AI services and awareness creation on the importance of AI need to be emphasized in order to improve the genetic and milk production potential of our indigenous animals. The result shows that there was no significant association between the constraints of artificial insemination and production systems ($p>0.05$).

Table 11. Artificial Insemination related constraints in the study areas

	Production systems		Total	Test	
	Rural N (%)	Urban N (%)	N (%)	X^2	p-value
What are the problems related to AI?				5.739ns	0.219
Lack of AI technician	45(37.5)	11(57.90)	56(40.30)		
Infertility of cow	30(25.0)	5(26.32)	35(25.18)		
Unavailability of AI service	16(13.3)	-	16(11.51)		
Lack of awareness	10(8.3)	3(15.78)	13(9.35)		
Small size of cattle	19(15.9)	-	19(13.66)		

Conclusions and Recommendations

Dairy production in the study district was not market-oriented. The pasture was the major feed source of dairy animals in the district

followed by crop residues. The majority of the dairy farmers use free grazing while only a few practice stall feeding in the district. Almost all the dairy producers process milk traditionally and hand churning was the only method used for processing milk into dairy products. Informal marketing was the sole means of dairy product marketing. Feed shortage, animal diseases, poor accessibility of AI and poor dairy marketing systems were the major milk production constraints in the study district.

Based on the above conclusions, the following recommendations are forwarded:

- There is a need to develop improved forage in order to overcome the scarcity of feed in rural areas.
- Milk processing technologies be introduced in these areas in order to improve the efficiency of milk processing (to improve product yield, quality and processing time)
- Milk producers in the areas be linked to a formal milk marketing system
- Access to veterinary services and vaccination be strengthened to control disease problems in the areas.
- Access to AI services and awareness creation on the importance of AI need to be emphasized in order to improve the milk production of the study areas.
- In nutshell, the extension systems be improved in order to develop dairy production in the study areas

Conflict of interests

The authors have declared no conflict of interest.

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References

Alganesh, T. 2002. Traditional milk and milk products handling practices and raw milk quality in Eastern Wollega. M.Sc. Thesis, Alemaya University, Ethiopia.

Amanuel, B., Ulfina, G. and Lemma, F. 2018. Dairy Products Marketing Systems and its Constraints in Gimbi District, West Wollega Zone, Oromia, Ethiopia. J. Vet. Sci. Technol. 9 (5), 1-5.

Asaminew, T. 2007. Production, handling, traditional processing practices and quality of milk in Bahir Dar milk shed Area, Ethiopia. MSc. Thesis, Alemaya University, Ethiopia.

Ayalew, M. 2017. Milk production, handling, processing and marketing in three dairy production systems of south wollo zone, Amhara Regional State, Ethiopia.

CSA. 2021. Agricultural Sample Survey, Volume II: Report on Livestock and Livestock Characteristics, Statistical Bulletin 587, Addis Ababa, Ethiopia.

Dayanandan, R. 2011. Production and marketing efficiency of dairy farms in highland of Ethiopia- an economic analysis. International Journal of Enterprise Computing and Business Systems, 1(2), 1-34.

Debir Legessa. 2016. Assessment of reproductive performance of local and crossbred dairy cattle in Sidama Zone, Southern Ethiopia. Journal of Natural Science Research, 6(9), 16-22.

Getachew, F., Medhin, W., and Getnet, H. 2012. Dairy Policy Inventory of Ethiopia. Post-Harvest Losses and Food Safety in Sub-Saharan Africa and the Near East, FAO Action Programme for the Prevention of Food Losses, FAO/MOA -Ethiopia.

Getabalew, M., Alemneh, T., Zewdie, D. 2020. The milk processing: Status, challenges and opportunities in

Ethiopia. Int. J. Vet. Sci. Res. 6(1), 52-57.

ILRI. 2015. Ethiopia livestock master plan. Ethiopia livestock master plan. International Livestock Research Institute, Ethiopia.

Kassa, T. and Dekamo, F. 2016. Dairy Production and Marketing Systems in Kaffa and Sheka Zones, Southern Ethiopia. Journal of Marketing and Consumer Research, 4(2), 1-6.

Lemma, F. 2004. Assessment of butter quality and butter making efficiency of new churns compared to smallholders' butter making techniques in east Shoa zone of Oromia, Ethiopia, MSc Thesis, Haramaya University, Ethiopia.

Mebrate, G., Tewodros, A., Dawit, A. 2019. Dairy Production in Ethiopia - Existing Scenario and Constraints. Biomed. J. Sci. and Tech. Res. 16(5), 12304 -12309.

Niraji, K., Kbrom, T., Desalew, T., Awot, T. 2014. Productive Performance of Crossbred Dairy Cows and constraints faced by dairy farmers in Mekelle, Ethiopia. Journal of Agriculture and Veterinary Science, 7(1), 62-66.

SHDLFRDO.2020. Sebeta Hawas District Livestock and Fisheries Resources Development Office, 2020.

Tadesse, A., Galmessa, U., & Bekuma, A. 2020. Milk Handling, Processing Practices and Quality Evaluation. Global Journal of Animal Scientific Research, 8(1), 56-74.

Tolera, A., Yami, A., and Alemu, D. 2012. Livestock feed resources in Ethiopia: Challenges, Opportunities and the need for transformation. Ethiopia Animal Feed Industry Association, Addis Ababa, Ethiopia.

Yemane, T. 1967. Statistics, an Introductory Analysis (2nd ed., Vol. 1). New York, USA: Harper and Row.

Yayeh, Z., Kassa, A., Dagnew, E. 2017. Milk Production, Marketing and Processing Practices of Dairy Cattle in Debremarkos Woreda of East Gojjam Zone, Amhara Regional State. J. Nutr. Food Sci. 7 (4), 1-6. Doi: 10.4172/2155-9600.1000607

Zelalem, Y. 1999. Smallholder Milk Production Systems and Processing Techniques in the Central Highlands of Ethiopia. MSc Thesis. Swedish University of Agricultural Sciences. Uppsala, Sweden. 132 p.

Zewdie, W. 2010. Livestock production systems in relation with feed availability in the Highlands and Central Rift valley of Ethiopia. MSc Thesis, Haramaya University, Ethiopia.