

Full Length Research

Assessment of postharvest losses of dairy products in Dawuro Zone and Konta special woreda of SNNPR

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This study was conducted in Dawuro zone and Konta special woreda of SNNPR to assess the existing dairy cattle production, milk handling, and processing practices. A total of eighty respondents were purposefully selected and interviewed for obtaining general information such as dairy cattle production, milk handling, and processing practices, traditional milk processing equipment through structured questionnaire. Dairy cattle production system, local breeds were more dominant than cross breeds in both study areas. The higher numbers of both breeds were observed in Tocha woreda than that of Konta special woreda. The dairy animal performance assessment shows that the average lactation length and milk yield of local cows were lower than that of crossbred in both study areas. Labor division among family members concerning dairying activities such as milking, milk processing, and milk marketing were dominantly done by women rather than men in both study areas. Commonly and widely used for milk handling traditional utensils in the study areas were calabash and plastic materials. Few dairy farmers were using a small clay pot for milking purpose. Milk processing methods are a predominantly traditional type, and they use traditional milk processing materials. So, farmers in both study areas are highly encouraged in for cross bred. Further work should be done in improved milk processing materials in both study areas.

Key word: milk, traditional milk handling materials, milk processing, and cross bred, locally bred.

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I. INTRODUCTION

Ethiopia has great potential for dairy development due to its large livestock population and the favorable climate for livestock. Milk and milk products contribute considerably to the household and national economy through income and employment generation. Thus, the dairy sector is one of the potential livestock sectors that contributes to poverty alleviation and improves household nutrition in the country (Mohammed et al., 2004).

The milk sector in Ethiopia is expected to continue contributing to the local and national economy due to the large potential for milk development in the country,

overall economic growth in the country, increased urbanization and improved policy environment (Getachew, and Gashaw, 2001). However, a postharvest loss is one of the major problems on the milk of the dairy sector in the country. In Ethiopia, the milk production system accounts for about 97% of the total milk production in the country where it is difficult to transport the raw milk to the market areas or the processing plants due to poor infrastructure (Staal and Shapiro 1996). Only 5% reaches the terminal market area, and the rest is processed at the farm gate into different dairy products

(Mohammed et al., 2004).

Also, there are post-harvest losses associated with poor handling and contamination, low level of technology applied in the market (Felleke, 2003). Efficient processing apart from extending the shelf-life of milk, add value to products increases income leading to better welfare of dairy producers. In the study area, collecting and processing milk and milk products are mainly carried out by traditional equipment, tools, and methods that take long hours. Therefore, this study was conducted to assess production, traditional handling techniques and causes of post-harvest losses of dairy products in selected areas of SNNPR.

II. MATERIALS & METHODS

a) Description of the study area

Dawuro zone (Tocha woreda) and Konta special woreda were the study areas. In Tocha Woreda, Medanealem and Ediget kebeles were used, and in Konta special woreda Amaya 02 and Amaya 03 kebeles were selected due to their potential dairy products. The prepared questionnaire survey was used in the study. General information such as dairy cattle production, milk handling, and traditional milk processing equipment was gathered through structured questionnaire. Eighty respondents were selected and interviewed in both areas.

b) Data analysis

The data collected were analyzed using SPSS (version 20) software. Descriptive statistics such as mean and percentages were used to summarize data as required.

III. RESULTS AND DISCUSSION

A) Household Characteristics of dairy farmers

The household size, age group and educational status in the study area are shown in Table 1. Out of the total interviewed dairy cattle producers in the Tocha woreda milk production system, 82.45% were male-headed, and the rest (17.55%) were female-headed household members while in the Konta woreda milk production system, 77.92% were male headed and 22.08% of female-headed household of different age and educational status. The study observed that dairy farming was mainly a male domain than women.

Out of the total interviewed dairy cattle producers in the Tocha woreda milk production system, 19.4%, 68.1%, and 12.5% were small, medium and large family size while as 16.6%, 73% and 10.4% small, medium and large family size in Konta special woreda respectively. Comparing the education status of household heads 75%, 22.5% and 2.5% were illiterate, primary school and

diploma level in Tocha woreda while 70% and 30% were an illiterate and primary school in Konta special woreda, respectively. In two study districts, proportionately there was more diploma level in the Tocha woreda (2.5%) while in the Konta special woreda no at all. The respondents in this finding were low education level than the report by Belay (2014) who indicated 42.6% respondents at urban dairy farmers' in Jimma town. Among the respondent farmers, the majority in Tocha woreda (72.5%) and 70.7% of Konta special woreda were aging between 30 and 50 years. According to the respondents, dairy farm owners in the Tocha woreda have better education level than those who are from the Konta woreda.

b) Milk production performance of dairy cattle

The number of lactating cows, average daily milk yield and lactation length of dairy cows in Tocha and Konta woreda farms in the study area are shown in Table 2. The average number of local lactating cows owned by the respondent farmers in Tocha and Konta special woreda were 2.18 and 1.78, respectively. While the average number of crossbred lactating cows owned by the respondent farmers in Tocha and Konta special woreda were 0.40 and 0.25, respectively. This result shows that the average number of both local and cross lactating cows in Tocha woreda are higher than that of Konta special woreda.

The mean daily milk yield of local cows in Tocha woreda and Konta special woreda farms were 1.55 and 1.33 liters, respectively while the mean daily milk yield of cross bred cows in the Tocha woreda and Konta special woreda was 7.85 and 7.15 liter, respectively. The milk yield result of local cows was less than the daily milk yield reported by Bekele *et al.* (2015) who reported 2.45 liters for urban and 2.03 for peri-urban area of Dangila Town cattle, in Western Amhara Region. However, the average daily milk yield of crossbred cows was higher than the finding of Bekele *et al.* (2015) who reported 6.00 and 5.77 liters for urban and peri-urban dairy farms, respectively for Dangila Town cattle, in Western Amhara Region. The mean daily milk yield differences observed in the previous and the current study might be attributed to some factors including lack of proper supplementary feeding for the dairy cattle, poor nutritive value/forages offered to the animals and difference in animal breeds.

The average lactation length of local cows in Tocha woreda and Konta woreda farms were 7.35 and 7.16 months respectively, which is less than that reported by Bekele *et al.* (2015) who reported 8.90 and 9.16 liters for urban and peri-urban dairy farms, respectively for Dangila town cattle, in western Amhara region. The average lactation length of crossbred cows in Konta woreda and Tocha woreda farms in the study area were 9.72 and 9.68 months, respectively. This result is shorter than the average lactation period reported by Ike *et al.* (2005)

Table 1. Socio-economic characteristics of dairy farmers in study areas

| Variables | woreda | | | |
|--------------------|-------------|-------------|--------|--------|
| | Tocha(N=40) | Konta(N=40) | Total | |
| Educational status | illiterate | 75.0% | 70.0% | 72.5% |
| | primary | 22.5% | 30.0% | 26.25% |
| | diploma | 2.5% | 0.0% | 1.25% |
| Age | <30 years | 16.3% | 18.6% | 17.45% |
| | 30-50years | 72.2% | 70.7% | 71.45% |
| | >50year | 11.5% | 10.7% | 11.1% |
| Sex | Male | 82.45% | 77.92% | 80.19% |
| | Female | 17.55% | 20.08% | 18.81% |
| Family size | 1-3 | 19.4% | 16.6% | 18% |
| | 4-6 | 68.1% | 73% | 70.55% |
| | >6 | 12.5% | 10.4% | 11.45% |

Table 2. Average number, lactation length & daily milk yield of dairy cows

| variables | | woreda | | |
|---------------------------------------|----------------|--------------|--------------|-------------|
| | | Tocha (N=40) | Konta (N=40) | Total |
| Number of lactating cows | Local cows | 2.18±0.15 | 1.78±0.31 | 1.98±0.23 |
| | Cross bred cow | 0.40±0.03 | 0.25±0.10 | 0.33±0.07 |
| Lactation length in month | Local cows | 7.35± 0.76 | 7.16 ± 0.55 | 7.26 ± 0.66 |
| | Cross bred cow | 9.72 ± 0.45 | 9.68 ± 0.47 | 9.7 ± 0.46 |
| Average daily milk yield (/liter/day) | Local cows | 1.55± 0.45 | 1.33± 0.51 | 1.44± 0.48 |
| | Cross bred cow | 7.85 ± 0.28 | 7.15 ± 0.03 | 7.50 ± 0.16 |

which was 11.2 months for urban farms and 12.2 months for peri-urban farms in Awassa. This observed differences in the previous and the current study might be attributed to feeding, management and a difference in animal breeds.

c) Traditional milk processing materials

The different containers used for milk milking and processing materials are shown in Table 3. Milk milking and processing materials in study areas were all traditional equipment. Milk processing is based on naturally fermented/sour milk. The sour milk is processed into butter using traditional materials such as plastic container (33.7%), calabash (67.3%), clay pot (0%) in Tocha woreda and plastic container (38.2%), calabash (61.8%), and clay pot (0%) in Konta special woreda. This study shows that both woredas calabash is used dominantly for milk processing. The use of calabash obtained in the present study is different from earlier studies conducted by Sintayehu *et al.* (2008) and Bekele *et al.* (2015) who indicated that 96.5% and 100% of the dairy farmers used clay pot for milk processing /churning, respectively in southern and western Ethiopia. The respondents showed that the traditional milk processing materials and methods used in this study are time-consuming and inefficient in terms of fat recovery.

Small clay pot, calabash and plastic materials are traditional milking materials used in the study areas. It shows that majority of respondents in Tocha (41.3%) and in Konta special woreda (38.5%) used calabash for milking, which is followed by plastic materials in Tocha woreda (28.37%) and Konta special woreda (34.71%). A small clay pot is more common in Konta special woreda than Tocha woreda. The majority of respondents in Tocha (53%) and in Konta special woredas (61%) responded that traditional milk milking and processing containers are easily broken.

d) Dairy processing activities in the family

Labour division among family members concerning dairying activities such as milking, milk processing and milk marketing in the Tocha and Konta special woredas are shown in the table 4. In Tocha woreda, 88.7% of milking activity is done by women, and the rest 11.3% of the milking activity is done by both genders while in the Konta special woreda 94.4% of milking is done by women and the rest 5.6% of milking activity is done by both.

In Tocha woreda, 92.34% of milk processing is done by women, and the rest 7.34% of the milk processing is done by both genders while in the Konta special woreda 94.89% of milk processing is done by women and the rest 5.11% of milk processing is done by both. In Tocha woreda, 93.34% of milk marketing is done by women and the rest 6.66% of the milk marketing is done by both

genders while in the Konta special woreda 96.63% of milk marketing is done by women and the rest 3.37% of milk marketing is done by both. Milking, milk processing and milk marketing of dairy products activity in both Tocha and Konta special woredas of the study area were mainly done by women. In the current study, women take the major responsibility in dairying activity because this may be men work outside home activity other than dairying activity. This finding is consistent with the finding of Bekele *et al.* (2015) who reported that dairying gives more opportunities for females to be closely involved in the daily management than other family members.

e) Traditional materials used for washing and smoking of milk containers

The plants that are used for washing and smoking milk containers are shown in Table 5. All the respondents practice washing the milk utensils used for milking, storing and processing of milk. The most common local plants materials used for washing milk vessels were "kosorotia", "hiranhuwa", "gunichecha", "zimbanuwa", and "xalotiya" depending on their availability. Most of the respondents use "kosorotia" in both Tocha and Konta special woredas (37.5% and 40.55%), respectively. The remaining respondents use "hiranhuwa" in Tocha and Konta special woredas (13.32% and 19.7%) respectively. "Gunichecha", "zimbanuwa", and "xalotiya" are common local plants used for smoking and washing milk containers in the study area. Respondents mentioned that, the purpose of smoking is to facilitate fermentation and to bring good taste or aroma to the dairy product.

IV. CONCLUSION AND RECOMMENDATIONS

The existing dairy production, milk handling and processing practices in Tocha and Konta special woredas were assessed. Dairy cattle production system, local breeds were more dominant than cross breeds in both study areas. The higher numbers of local and cross breeds were observed in Tocha woreda than that of Konta special woreda. The dairy animal performance assessment shows that the average lactation length and milk yield of local cows were lower than that of crossbred in both study areas. Labor division among family members concerning dairying activities such as milking, milk processing, and milk marketing were dominantly done by women rather than in both study areas. Commonly and widely used utensils for milking and milk handling in study areas were calabash and plastic materials. Few dairy farmers were using a small clay pot for milking purpose. Milk processing methods are predominantly traditional type. The most common plants used for washing and smoking milk vessels were "kosorotia", "hiranhuwa", "gunichecha", "zimbanuwa", and "xalotiya" depending on their availability. In this finding, it

Table 3. Traditional milk milking and processing materials used in the study area

| Woreda | | | | |
|---------------------------------------|------------------------------------|------------------------|-------------|--------|
| Variables | | Tocha(N=40) | Konta(N=40) | Total |
| Traditional milking materials | Clay pot(small) | 5.33% | 13.21% | 9.27% |
| | Calabash ('qil') | 41.3% | 38.5% | 39.9% |
| | Plastic materials | 28.37% | 34.71% | 31.54% |
| | 'qil"&plastic material | 25% | 17% | 21% |
| Traditional milk processing materials | Clay pot(large) | 0 | 0 | 0 |
| | Calabash ('qil') | 67.3% | 61.8% | 64.55% |
| | Plastic materials | 33.7% | 38.2% | 35.95% |
| | Problems in traditional equipments | Difficult for cleaning | 35.3% | 28.8% |
| | Easily broken | 53% | 61% | 57% |
| | Difficult for handling | 11.7 | 10.2% | 10.95% |

Table 4. Gender participation in milking and post-harvest activities

| Woreda | | | | |
|-----------------|--------|-------------|-------------|--------|
| Variables | | Tocha(N=40) | Konta(N=40) | Total |
| milking | Male | 0 | 0 | 0 |
| | Female | 88.7% | 94.4% | 91.55% |
| | Both | 11.3% | 5.6% | 8.45% |
| Milk processing | Male | 0 | 0 | 0 |
| | Female | 92.34% | 94.89% | 93.62% |
| | Both | 7.34% | 5.11% | 6.38% |
| Milk marketing | Male | 0 | 0 | 0 |
| | Female | 93.34% | 96.63% | 94.99% |
| | Both | 6.66% | 3.37% | 5.01% |

Table 5. Traditional materials used for cleaning and smoking of milk utensils in the study area

| Woreda | | | |
|---------------------|-------------|-------------|--------|
| Local name | Tocha(N=40) | Konta(N=40) | Total |
| Kosorotia | 37.5% | 40.55% | 39.03% |
| Hiranhuwa | 13.32% | 19.7% | 16.51% |
| Gunichecha | 17% | 12.6% | 14.8% |
| Zimbanuwa | 8.33% | 10.25% | 9.29% |
| Xalotiya | 6% | 3.8% | 4.9% |
| Kosorot&hiranuwa | 11.5% | 9.6% | 10.55% |
| Kosorot &gunichecha | 6.35% | 3.5% | 4.93% |

is recommended that crossbred dairy cows should be encouraged for farmers who are only focused on locally bred dairy cows and further work should be done in milk processing equipment.

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VI. REFERENCES

1. Bekele A., Fekadu B., and Mitiku E., (2015): Handling, processing and marketing of cow milk in urban and peri-urban area of Dangila Town, Western Amhara Region, Ethiopia. *Global Journal of Food Science and Technology*, ISSN: 2408-5472 Vol. 3 (3)
2. Belay D., and G.P.J. Janssens, (2014): Smallholder milk processing and marketing characteristics at urban dairy farms in Jimma town of Oromia regional state, Ethiopia. *Global veterinarian* 13 (3): 285-292.
3. Felleke G., (2003). A review of the small-scale dairy sector in Ethiopia, in milk and dairy products, postharvest losses and food safety in sub-Saharan Africa and the near East. FAO (Food and Agricultural Organization) Prevention of food losses programme.
4. Getachew F., and G. Gashaw, (2001). The Ethiopia dairy development, a draft policy document, MOA/FAO, Addis Ababa, Ethiopia
5. Ike, A, A Mane-Bielfeldt, Girma A and Anne V Z (2005). Comparison of urban and peri-urban dairying in Awassa, Ethiopia. Paper presented "Rural Poverty Reduction through Research or Development and Transformation in Deutscher Tropentag, October 5-7, 2004 in Berlin.
6. Mohamed A.M., Simeon E., and Yemesrach A., (2004). Dairy development in Ethiopia. EPTD discussion paper No. 123. International Food Policy Research Institute, Washington, DC20006 U.S.A.
7. Staal, S.J. and Shapiro, B.I. (1996): The economic impact of public policy on smallholder peri-urban dairy production in and around Addis Ababa. ESAP (Ethiopian Society of Animal Production), Addis Ababa, Ethiopia ESAP Publication No. 2, Pp 64.
8. Sintayehu, Y., B. Fekadu, T. Azage and G.W. Berhanu., (2008). Dairy production, processing and marketing systems of Shashemene, Dilla area, South Ethiopia. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 9, ILRI (International Livestock Research Institute), Nairobi, Kenya, pp: 62.