

Dairy Production, Processing and Marketing in Chencha and Kutcha Districts, Southern Ethiopia

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Abstract

This study was conducted in eighteen kebeles of Chencha and Kucha districts of Southern Ethiopia with the objectives of characterizing dairy production and marketing systems. A total of 266 households were involved as respondents and 133 respondents participated in each district and data were collected through structured questionnaires. In Chencha areas 54.14 % local cattle and 45.86% exotic cross breeds contribute to cattle composition whereas in Kucha 98.5% is local cattle and almost negligible (1.51 %) is accounted to the exotic cross breeds. The study revealed that 57.14% and 55.64% households in Chencha and Kucha areas respectively share common houses with their families for sheltering cattle meanwhile 42.64% and 44.36 % of the households in Chencha and Kucha areas respectively manage cattle in separate houses. Moreover, 87.22 % and 95.49 % (milking of dairy cows), 94.74% and 99.25% (milk processing), 72.18% and 67.67% (barn cleaning), 83.46% and 96.98% (sell of dairy products) in Chencha and Kucha areas consecutively is practiced by the women only. 69.92 % and 30.83 % of respondents in Kucha and Chencha areas respectively practice use of concentrate feed for cattle. Average milk yield per day per cow in liters recorded is 5.5, 6.8, 6.7 consecutively for 1st, 2nd, and 3rd lactations for cross breeds and 2.4, 3.0, 2.6 for 1st, 2nd, and 3rd lactations for local breeds in Chencha and 2.07, 2.6, 2.6 for 1st, 2nd, and 3rd lactations in Kucha areas for local breeds. It is fact that 70.67% and 55.64 % of children in Chencha and Kucha areas do not have access to consume cow milk daily. 84.21% and 46.62% of the respondents in Chencha and Kucha areas respectively use different naturally occurring spices to add good flavor and taste to their product during processing of milk. An average of 16.3 hours is required for curdling milk in both districts and during this period milk is stored in clay pot, finally butter is separated by continuous shaking of the container manually. 69.17% (Chencha) and 87.22% (Kucha) areas respondents do not have experience of selling fresh milk but 63.16% (Chencha) and 90.98 % (Kucha) are experienced in selling butter with an average price of 94 birr per a kg of butter.

Keywords: dairy production, marketing, respondents

INTRODUCTION

Ethiopia, with 53 million heads of genetically diverse cattle, has the largest population in Africa (CSA 2010/11). Cattle produces a total of 3.2 billion litres of milk and 0.331 million tones of meat annually (CSA 2010/11). Livestock are therefore closely linked to the economic, social and cultural lives of millions of resource-poor farmers for whom animal ownership ensures varying degrees of sustainable farming and economic stability. Ethiopia has a huge potential to be one of the key countries in dairy production for various reasons (Pratt *et al.* 2008).

Milk and milk products play a very important role in feeding the rural and urban population of Ethiopia and have a high nutrition value and is daily produced, sold for cash or readily processed. It is a cash crop in the milk-shed areas that enables families to buy other foodstuffs, contributing significantly to the household food security. Given the long tradition of using milk and milk products by the Ethiopian society, there is no doubt that increasing smallholder dairy production and productivity would bring about a conspicuous impact on improving the welfare of women, children and the nation's population at large. It also constitutes a significant proportion of the value of all livestock food products in Ethiopia (about 56%), while livestock food products constitute an important proportion of the value of total food products in the country (CSA 2008).

At present the dairy sector is expanding rapidly through intensification and expansion of smallholder milk production. To be effective, the efforts to improve the productivity of smallholder dairy production and improve its market orientation needs to be supported and informed by detailed understanding of the current and dynamic conditions of production, marketing, processing and consumption of milk and dairy products (Asfaw 2009). Though very limited researches had been carried out in different areas of the country, in Chencha and Kucha districts regarding dairy activities any research was not conducted and this created big information gap in these districts. Hence this study was conducted with the objectives of characterizing dairy production and marketing systems in Chencha and Kucha districts southern Ethiopia.

MATERIALS AND METHODS

Description of the Study Areas

Chencha District is situated between 1300 m and 3.250m above sea level. Astronomical location of Chencha

Woreda is between 37° 29' 57" East to 37° 39' 36" West and between 6° 08' 55" North and 6° 25' 30" South. Due to a high altitudinal range, the area is characterized by diverse agro-climatic distribution and vegetation cover. This District is divided into two agro-ecological zones, namely, Dega and Weyna Dega, which account for about 82 and 18% of the total area respectively. Due to its rugged topography the highland area is very vulnerable to soil eroding forces. The rainfall regime in the District is bimodal. The first round of rain occurs between March to April. The second round of rain occurs from June to August. The rainfall distribution in Chencha varies from year to year and across seasons. The annual rainfall distribution in the district varies between 900 mm to 1200mm. The minimum temperature in the District ranges from 11 to 13 degree centigrade, while the maximum temperature is in the range 18 to 23 degree centigrade. The farming system in the District is a mixed farming system where the crop sub-system and the livestock sub-system are equally important to each other.

Due to low natural fertility, low amount of available nutrients and low permeability of the clay or clay loam soils of the highland, soil fertility maintenance is the number one priority to every farmer in the highland.

Kucha district is known for hilly and undulating midland and upper lowland terrain; due to terrain and weather patterns, less than one in five households is food secure. Food crops include maize, enset, sweet potatoes, taro, teff, and yams; income sources include butter and selling firewood. Based on figures published by the Central Statistical Agency in 2005, this district has an estimated total population of 145,305, of whom 72,159 are men and 73,146 are women; 3,498 or 2.41% of its population are urban dwellers, which is less than the Zone average of 8.5%. With an estimated area of 1,384.22 square kilometers. The largest ethnic group reported in Kucha was the Gamo (98.52%); all other ethnic groups made up 1.48% of the population. The majority of the people practice mixed farming (crop and livestock production).

Sampling Methods and Data Collection

In order to characterize the dairy production systems in the areas, farmers/producers were interviewed using pre-tested structured questionnaires. Multi-stage purposive and simple random sampling procedure was implemented at three stages. In the first stage, kebeles were identified and after having livestock population data (cattle) at each kebele in the two districts and ten kebeles in each district were selected purposively based on cattle population and access to infrastructure (road). In the second stage, individual households owning dairy cows of any breed and size were identified and listed in selected kebeles. In the third stage, individual dairy cow owner households were randomly selected from the list for an interview. The total number of households interviewed on the dairy production system was 266 comprising 133 households from each district. Marketing of the possible marketable dairy commodities like whole milk, butter, yoghurt (*ergo*), cheese and sour buttermilk (*arera*) will be studied as the second activity.

The data collected included information on household demography, herd composition, breed, age and sex of animals, housing of cattle, feeds and feeding methods, milking methods, lactation length, milk production, handling, processing, utilization and marketing.

Statistical Analysis

Data collected was analyzed using appropriate statistical software— Statistical Package for the Social Sciences (SPSS 2006). Survey results were analyzed using descriptive statistics. Level of significance considered was $P < 0.05$. Data related with characterization of dairy marketing system was analyzed using descriptive statistics

RESULTS AND DISCUSSION

Demographic Characteristics of the respondents

A total of 266 households were involved as respondents and 133 respondents participated in each district with an average of 14.78 respondents in each kebele. In Chencha district age of respondents range from 25 (minimum) to 100 (maximum) years and number of respondents within each age category is 51(25-40), 57(41-55), 19(56-70), 5(71-85), 1(86-100) also their corresponding percentage share respectively is (38.35%) followed by (42.86%), (14.29%), (3.75%), and (0.5%) moreover overall average age is 46.33 ± 12.87 . In Kucha district age of respondents range from 25 (minimum) to 95 (maximum) years and number of respondents within each age category is 80 (25-40), 45 (41-55), 5 (46-70), 1(71-85), and 2 (86-095) with percentage shares 60.15%, 33.83%, 3.76%, 0.75%, 1.51% respectively and overall average age is 41.11 ± 10.99 which shows that there is slight similarity between research results of kucha and Chencha districts.

Livestock holding in the study areas

In Kucha areas except in Kuto kebele in all other kebeles 131 (98.5%) of respondents do not have experience with cross breeds of cattle where as only 2 respondents (1.5%) reported that they have Jersey cross breed oxen. On the other hand in Chencha district also this study showed that 72 (54.14%) respondents have local cattle breeds only whereas 61(45.86%) respondents reported that they have Cross cattle breeds. Findings by Fikrineh et al. (2012) explains that out of the interviewed farmers across the districts only 40% had crossbred cows. In

contrast the results of this study showed that there is greater number in Chencha areas and less number of cross cows in kucha areas. The study revealed that number of local pregnant cattle owned by the respondents in the study areas of Chencha district is falling between 0 and 6. On the other hand numbers of this category of cattle in the study areas of Kucha district range from 0-5. Goats owned by the respondents in the study areas of Chencha district range from 0-7 and in kucha district their number is reported between 0 and 12 with average number 0.15 ± 0.81 and 1.64 ± 2.50 in Chencha and kucha districts respectively. In contrast to the current study finding an average number 0.23 ± 0.13 of local goats which was investigated by Asaminew and Eyassu (2009) is greater than the average number of local goats in Chencha and less than average number of local goats in kucha district. Certain numbers of horses are being owned by 23.31% the respondents in the study areas of Chencha district with average number of 0.29 whereas almost negligible (0.75%) of the interviewed households replied that they have an average number (0.01) in study areas of kucha district. From the report it is clear that in study areas of kucha district none of the respondents have mules whereas in study areas of Chencha district respondents stated that they own an average number of 0.02 ± 0.15 mules. There is variation in results of this study and that of Asaminew and Eyassu (2009) in which average number 0.24 ± 0.06 mules was provided. This study made clear that in areas of Chencha district where survey was conducted none of the respondents have donkeys, on the other side an average number (0.22 ± 0.45) of donkeys are kept by respondents in study areas of kucha district. In contrast to the results of the current study, there is variation in results found by Asaminew and Eyassu (2009) which showed an average number of donkeys was 0.36 ± 0.13 in their findings.

Purpose of raising cattle

In this study 100% and 57.89% of the respondents in Chencha and kucha districts respectively replied that the purpose of raising cattle is to use for draught power. Primary purposes for keeping cattle by dairy farmers in urban and mixed crop–livestock production systems is to produce milk for sale 89 (74.2) in Urban system and 8 (6.9) in Mixed crop–livestock system, produce milk for consumption 21 (17.5) in Urban system in Urban system 44 (37.9) in Mixed crop–livestock system (Sintayehu Yigrem et al., 2008). Among selected respondents 80 (0.34) in urban and 80 (0.28) in Peri-urban produce cattle for milk production (Gebrekidan Tesfay et al., 2012). 63.9% and 99.25% of the respondents in study areas of Chencha and kucha respectively reported that their purpose of raising cattle is for meat production. In urban 20 (0.04) and in peri-urban 7 (0.05) respondents said that they raise cattle for meat purpose (Gebrekidan et al., 2012). In this study 63.16% and 81.95% of the respondents in Chencha and kucha districts respectively replied that the purpose of raising cattle is to use for draught power. In the cereal based mixed crop–livestock production system, cattle of dual purpose predominated by local type (zebu), were mainly kept to produce milk for household consumption and male calves were grown to assist the crop production by providing draught power (Sintayehu et al., 2008). 97.74% and 51.13% of the respondents in study areas of Chencha and kucha respectively reported that their purpose of raising cattle is for income generation while 68.42% and 36.84% of the respondents respectively rear cattle for other uses such as hides, manure, etc.

Cattle Housing

In this study 96.24% and 55.64% of the respondents in Chencha and kucha districts respectively explained that they manage their cattle in conventional houses. 9.1%, 28.6%, and 100% of respondents said that they used Conventional houses for smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively (Emebet, 2006). This study revealed that 3.76% and 44.36% of the respondents in Chencha and kucha districts respectively replied that they use loose housing type for management of their cattle 87.9% 57.1% 0.0% of respondents said that they used loose houses for smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively (Emebet, 2006). In this study it becomes clear that 42.86% and 44.35% of targeted households in Chencha and kucha districts respectively use separate house for housing of their cattle. Urban dwellers seldom used open barn as a night shelter for cattle and the majority (85%) used a separate shelter for their animals (Sintayehu, 2008). 10% used a separate shelter for their animals (Asrat Ayza et al., 2013). This study revealed that 57.14% and 54.9% of targeted households in Chencha and kucha districts respectively use family houses as bars for cattle housing. Most households (70%) in the mixed crop–livestock system kept their cattle within their own residence compound (Sintayehu, 2008). By contrast, in the urban systems sheltering cattle with the family or cooking places (kitchen) was uncommon and was only practiced by 6% of the households (Sintayehu, 2008). Almost all of the households (80%) in rural or mixed crop/livestock system kept their cattle within family house (Asrat Ayza et al., 2013).

In this almost all respondents (100% Chencha and 99.25% kucha) do not use fenced barns as cattle shelter at all. 3.0% 9.5% 0.0% of respondents stated that they used fenced barns for smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively (Emebe, 2006). Considerable proportions (27%) of the targeted respondents used open barn/shed for sheltering dairy cattle

(Sintayeh, 2008). 10% of the respondents used open barn/shed or fences within their own compounds (Asrat Ayza et al., 2013). 1.13% and 54.89% of the livestock owners in the study areas of Chencha and kucha districts respectively use feed troughs in the barn for cattle. 37.53% and 45.11% of the livestock owners in study sites of Chencha and kucha districts consecutively use water troughs in the barn for cattle. In this study 11.28 % and 15.04 % of the respondents in Chencha and kucha districts respectively do not have experience in using either water through or feed troughs for watering or feeding of their cattle. 42.11% and 51.88% of the respondents in the study areas of Chencha and kucha districts respectively manage their cattle by separating into different groups. Out of total respondents 30.08% and 19.55% of the interviewed farmers in Chencha and kucha districts respectively replied that they use separate barns for calves and heifers. 48.12% of respondents in the study sites of Chencha district and 24.81% of them in study areas of kucha district use to group calves from birth to five months of age. 87.22% and 95.49%, 8.27% and 3%, 4.51% and 1.51% ,0% of the respondents in Chencha and kucha districts consecutively stated that milking of cows is operated by women, men, children, and hired labor respectively and the current result showed variation from that of Asaminew and Eyassu (2009) which says women,men,children, and hired labor contributed 23.67%,50.40%, , 12.5%, 13.44% respectively for milking practice of cows . But there is an agreement between the findings of this study with that of Asfaw (2009), which stated that most of the time wives are responsible for dairy farm operations such as milking cows, cleaning of milk containers, milk storing and preserving etc. Out of the total 69 farmers having milking cows, 73.9 percent (n=51) of the farmers indicated that females (Samuel, 2005). Milking of cows is mostly (97.1%) done by males (Belete *et al.*, 2010).

Share of Responsibility among Family Members

In Chencha and kucha districts women took highest position in processing of milk, 94.74% and 99.25% respectively followed by children (3% and 0.75%), men (2.26% and 0%), hired labor (0%) . There is slight agreement between the findings of this study and that of Asaminew Tassew and Eyassu Seifu (2009) in that highest share of practice of milk processing is accountable to the women (71.98%,) and also there is variation in some research findings for that in their study results it was explained that men (not applicable) and hired labor (not applicable) do not involve in processing of milk and also in their study share of responsibility for milk processing by children has greater value(28.02%). In this study on average 79.34%, 19.17%, 17.29%, and 3.39% of respondents reported that cattle herding responsibility goes to children, women, men, and hired labour respectively in both study areas. There is variation between results of this study and that of Asaminew and Eyassu (2009) in which it was stated that 31.99%,10.20%, 25.47%, 32.35% of respondents reported that cattle herding responsibility goes to children, women, men, and hired labour respectively.

83.46% and 96.98%, 9.02% and 1.51%, 7.52% and 1.51%, and 0% of respondents reported that in Chencha and kucha districts consecutively sell of dairy products are practiced by women, men, children, and hired labor respectively. There is some similarity in results of this study and that of Asaminew and Eyassu (2009) in that it was stated 73.5%, 14.34%, 12.16% of the respondents replied that sell of dairy products is practiced by women, men, and children respectively and also there is variation in that in their result hired labor is not involved for selling of dairy products. In this study it become clear that in Chencha and kucha districts consecutively 66.17%and 92.48%, 31.58% and 6.77%, 2.25%and 0.75%, and 0% sell of animals was conducted by women, men, children and hired labor respectively. Similar results were obtained by Asaminew Tassew and Eyassu Seifu (2009) in that 89.49%, 7.39%, 3.11%, 0% of respondents reported that sell of animals was accounted to women, men, children ,and hired labor respectively.

This study revealed that women, men, children, and hired labor shared for responsibility of stall feeding of cattle and this was reported by respondents with 68.42% and 45.86%, 16.54% and 29.33%, 13.53% and 24.81%, 1.51and 0% respectively in Chencha and kucha districts consecutively. In comparison to the findings of Asaminew and Eyassu (2009) 9.44%, 34.63%, 32.45%, 23.49% accounted to women, men, children, and hired labor, respectively, in their findings the values are lower than the research findings of this study. In this study it become clear that women operate highest (72.18% and 67.67%), followed by children (20.3% and 29.32%), men (7.52% and 3.01%), hired labor (0%) in Chencha and kucha districts respectively. There is agreement and in some results and variation in other results in the study conducted by Asaminew Tassew and Eyassu Seifu (2009) that stated barn cleaning operation was practiced by women (43.95%), children(24.49%), men(4.83%),and hired labor(26.76%).

Feeding and watering management of dairy cattle

69.17% and 82.7% of the respondents in Chencha and kucha areas respectively use Communal grazing as feed source for their cattle. In the study areas, cattle graze along roadsides and/or common grazing area or tethered and graze in the backyard (Asrat Ayza et al., 2013). In contrast 23.52% of the respondents reported feed resources in the study area use Communal grazing for dairy cattle (Asaminew and Eyassu, 2009). 78.95% and 73.64% of the respondents in Chencha and kucha districts respectively use private grazing as feed source for

their cattle. In contrast 12.72% of the respondents reported that they used private grazing to feed their dairy cattle (Asaminew and Eyassu, 2009). In study sites of Chencha and kucha districts respectively 69.92 and 65.41 of the interviewed livestock owners replied that they use Continuous grazing for feeding their dairy cattle. In the mixed crop–livestock system of both cereal crop based and *enset* and coffee based systems, grazing is the major feed resource. The majority (53.7%) of the households use animal feeds from their own crop farm, while 23.7% use a combination of own farm and communal grazing (Sintayehu *et al.*, 2008).

Significant numbers of households (51.13%) of study sites in Chencha district have good experience in cutting and carrying grass to feed their dairy cattle whereas insignificant numbers of respondents (10.53%) in survey areas of kucha district practice Zero grazing. During the dry season, unlike cereal crop based systems of the mid-highlands of Ethiopia, farmers feed their cattle with *enset* pseudo stem, pseudo stem and leaves of banana, parts of sugar cane and its bagasse, and leaves from different trees (Sintayehu *et al.*, 2008). Rotational grazing is less practiced in study areas of Chencha district (46, 34.59%) whereas it is practiced by greater number and proportion of respondents (70, 52.63%) in study areas of kucha district. In the study areas of Chencha and kucha 63.16 and 88.72% of respondents respectively reported that they use freely grazing land and additives to feed their cattle. 25.57% and 58.66% in the study areas of Chencha and kucha reported that they use improved forage to feed their dairy cattle. Asaminew Tassew and Eyassu Seifu, 2009 in their findings showed that 9.30% of respondents reported that they use improved forage to feed their cattle. 30.83% and 69.92% of the respondents in study areas of Chencha and kucha districts respectively use concentrates to feed their dairy cattle. The cereal crop based system, which is mainly found in the rural areas, is similar in feed resource use with most mixed crop/livestock production systems of Ethiopia (Yigrem *et al.*, 2008; Yilma and Ledin 2000; Zewdu *et al.*, 2003; Tadesse *et al.*, 2005). Crop residues are also the major feed sources in the area as is the case in most parts of the country as reported by Tolera (2009). 97.0%, 95.2%, and 100% of the respondents used concentrates (Grains, oil seed cakes, wheat bran, commercial mix, brewery spent grain and molasses) for feeding their dairy cattle in smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively (Emebet, 2006).

67.67% and 84.96% of the respondents in study areas of Chencha and kucha districts respectively use hay as dairy cattle feed. In contrast to this study Emebet (2006) showed that 78.8%, 81.0%, and 100% of the respondents used hay for feeding their dairy cattle in smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively. Hay stacking for the dry period was also practiced by 35.8% of the urban dairy producers. According to Yoseph *et al.* (2000), hay stacking is also the most common feed resource in intra-urban and peri-urban dairy farmers around the Addis Ababa milk shed (Sintayehu *et al.*, 2008). 83.46% and 87.22% of interviewed householders in study areas of Chencha and kucha district replied that they use straw to feed dairy cattle. In contrast to this study Emebet (2006) showed that 66.7%, 66.7%, and 66.7% of interviewed householders in study areas used to feed Crop residue (Sorghum and maize stover, wheat straw) for feeding their dairy cattle in smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively. Also research findings of Asaminew Tassew and Eyassu (2009) showed that 18.29% of interviewed householders in study areas reported that they used crop residues to feed dairy cattle.

69.92% and 12.03% of the targeted respondents in study areas of Chencha and Kucha districts respectively reported that they use other feeds (attela, household lefts, vegetable and fruit wastes) for their dairy cattle. In contrast 84.9%, 33.3%, and 0.0% of the targeted respondents used Non conventional feeds (Atella: local brewery and liquor residue, chat, vegetable and fruit waste, leftover food) for feeding their dairy cattle in smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively (Emebet, 2006). Other feeds provided to cattle include the pseudo-stem (well chopped), tinned and/or whole maize plant and leaves from different fruits and trees (Sintayehu *et al.*, 2008). In study areas of Chencha and kucha respectively 28.57% and 9.02% of the respondents use well water for their dairy cattle. In contrast 6.1%, 9.5%, and 33.3% of the respondents respectively stated that they used well water for their dairy cattle in smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively (Emebet, 2006). Farmers use different water resources for their cattle. Out of the total respondents, 48.8% use water from wells (Belete *et al.*, 2010).

28.57% and only 1.51% of the respondents in the study areas of Chencha and kucha districts respectively use river water for dairy cattle. Farmers use different water resources for their cattle. Out of the total respondents 2.3% of them use from ponds for drinking animals (Belete *et al.*, 2010). 53.38% and 87.21% of the respondents in the study areas of Chencha and kucha districts respectively use river water for dairy cattle. In contrast 0%, 0%, and 0% of the respondents respectively stated that they used river water for their dairy cattle in smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively (Emebet, 2006). Farmers use different water resources for their cattle. Out of the total respondents 47.2% of them use for watering their animals from rivers (Belete *et al.*, 2010). 36.84% and 18.80% of the respondents in the study areas of Chencha and kucha districts respectively explained that they use river water for

dairy cattle. The Households in the mixed crop–livestock system obtained 10% from spring (Sintayehu *et al.*, 2008). 14.29% and 12.03% of respondents in Chencha and kucha study areas respectively use others (tap water) water sources for drinking water for their dairy cattle. In contrast 90.9%, 90.5%, and 66.7% of the respondents respectively stated that they used tap water for their dairy cattle in smallholder urban dairy production, medium scale dairy production, large scale specialized dairy production respectively (Emebet, 2006). Farmers use different water resources for their cattle. Out of the total respondents 3% of them use from Lake Tana and 0.2% from tap water (Belete *et al.*, 2010). 8.27% and 2.26% of the respondents in study areas of Chencha and kucha districts indicated that they practice bucket feeding for local calves. In contrast findings of Asaminew and Eyassu (2009) showed that 10% of the respondents in study areas practiced bucket feeding for local calves. In study areas of Chencha district 39.09% of targeted respondents replied that they used bucket feeding for cross calves. In contrast 8.1% of targeted respondents replied that they used bucket feeding for cross calves (Asaminew and Eyassu, 2009).

In study areas of Chencha and kucha districts 76.69% and 80.45% of targeted respondents respectively stated that they used bucket feeding for cross calves. In contrast 80.7% % of targeted respondents replied that they used Suckling for cross calves (Asaminew and Eyassu, 2009). All dairy cattle producers in the mixed crop–livestock system practiced partial suckling prior to milking, and colostrums are given freely. However, in the urban production system, 31.6% of households followed early weaning while the rest 68.4% practiced partial suckling prior to milking (Sintayehu *et al.*, 2008). In study areas of Chencha district 21.8% of targeted respondents replied that they used bucket feeding for cross calves. In contrast 9.4% of targeted respondents replied that they used Suckling for cross calves (Asaminew Tassew and Eyassu Seifu, 2009).

Average weaning age for local calves reported by targeted respondents is 4.3 ± 2.5 and 6.00 ± 1.71 respectively for study areas of Chencha and Chencha districts. In contrast the overall average weaning age of local calves was 11.8 months, that is, the calves suckle their dams up to the end of the lactation period (Asaminew and Eyassu, 2009). Most of the respondents 131(98.5%) in study areas of kucha district do not have cross breed cattle therefore they lack knowledge about weaning age of these category of cattle. In contrast respondents in Chencha areas have far better understanding and experience concerning weaning age of cross cattle breeds where 32 (24.06%) out of the total respondents stated that they stop milk feeding to their cross calves in 7 months of age.

Performance of Dairy Cattle in the Study Areas

Reproductive performances

Average age at first service for local breed females in study areas of Chencha district is 3.5 years and that of kucha district is 3.7years. Average age at first service for local breed females in years for medium scale dairy production 2.28 ± 0.07 and for smallholder urban dairy production is 2.01 ± 0.09 years (Emebet Moreda, 2006). The highest percentage (48.87% and 66.17%) of the respondents in study areas of Chencha and kucha districts respectively stated that age at first service for local breed males is 4 years with an average age of 3.6 years for Chencha and 3.9 years for kucha areas respectively. This study revealed that age at first service for cross breed males in years is 3 years and this is observed by 56.39% of the respondents in the study sites of Chencha district with an average of 3.1 years. The highest percentage of respondents (41.35%) in the study areas of Chencha district indicated cross breed females reach puberty age within 2 years and the average age observed is 2.5 years. In contrast (Emebet Moreda, 2006) showed that average age at first service for cross breed in large scale specialized dairy production was 2.05 ± 0.06 years.

Age at first calving marks the beginning of a cow's reproductive life and is closely related to the generation interval. There is considerable economic importance associated with the factors that control the onset of ovarian activity in tropical cattle. In study sites of Chencha and kucha districts the results showed that age at first calving for local breed in years is 4.6 ± 0.8 and 4.4 ± 0.6 years respectively. In contrast the results of achieved by Emebet (2006) showed that the overall mean for age at first calving was 36.2 months with a range of 31.3 to 35.7 months for crosses of Friesian and Jersey sire breed with Zebu dams in the Arsi region of Ethiopia (Emebet Moreda, 2006).

36.09% of targeted respondents in the study sites of Chencha explained that age with which cross breed cattle give first birth is 3 years with an average age of 3.1years. In the work done in the central high lands and in Addis Ababa milk shed, the overall means for age at first calving was found to be 40.6 months (Yoseph *et al.*, 2003) and 20.1 and 29.0 months (Yoseph, 1999), respectively. Kiwuwa *et al.* (1983) reported mean age at first calving of 33.8. 41.35% and 68.42 of targeted respondents in the study sites of Chencha observed that their local breed cattle conceive using Single service/insemination. In contrast Emebet Moreda, 2006 found that 47.8% (27.4%, 68.2%) in Smallholder urban dairy production and 41.3% (29.1%, 53.4%) in Medium scale dairy production respondents stated that their cattle became conceived with Single service or insemination.

57.14% and 30.83% of respondents in study areas of Chencha and kucha respectively reported that cattle become conceived after repeated service. Significant number 40 (30.08%) of the interviewed households

in Chencha district observed that their dairy cows become conceived after single mating but in kucha district respondents stated that they do not have any idea about rate of conception in cross breed cows since these animals do not yet belong to them in their areas. Considerable number 46 (34.59%) of the interviewed households in Chencha district observed that their dairy cows become conceived after repeated mating but in kucha district respondents stated that they do not have any idea about rate of conception in cross breed cows since these animals do not yet belong to them in their areas. 5 (3.76%) and 3(2.26%) of interviewed households explained that they make breeding record whereas majority of the respondents 128 (96.24%) and (130 (97.74%) in the study areas of Chencha and kucha districts respectively do not make record regarding breeding.

Production Performance

An average milk yield for 1st lactation for local cows in Chencha and kucha districts reported is 1.77 ± 0.85 and 1.7406 ± 0.88 respectively. This study revealed slightly less milk yield than findings of Asaminew and Eyassu (2009) which stated milk yield recorded for 1st lactation for local cows was 2.0 ± 1.33 . For local animals high average daily milk yield of 3.3 and 2.8 liters were reported from Ambo and Naqamte, respectively (Jiregna *et al.*, 2013). An average milk yield for 2nd lactation for local cows in Chencha and kucha districts reported is 2.10 ± 0.97 and 2.24 ± 1.09 respectively. This study revealed greater milk yield than findings of Asaminew and Eyassu (2009) which stated milk yield recorded for 2nd lactation for local cows was 1.2 ± 0.44 . An average milk yield for 3rd lactation for local cows in Chencha and kucha districts reported is 1.64 ± 0.89 and 1.87 ± 0.81 respectively. This study revealed slightly greater milk yield than findings of Asaminew and Eyassu (2009) which stated milk yield recorded for 3rd lactation for local cows was 0.6 ± 0.30 .

An average milk yield for 1st lactation for cross breed cows in Chencha district reported is 5.26 ± 2.19 . The result investigated in this study showed less milk yield than findings of Asaminew Tassew and Eyassu Seifu (2009) which stated milk yield recorded for 1st lactation for cross breed cows was 7.3 ± 2.12 . An average milk yield for 2nd lactation for cross breed cows in Chencha district reported is 5.19 ± 1.95 . The result investigated in this study showed less milk yield than findings of Asaminew and Eyassu (2009) which stated milk yield recorded for 2nd lactation for cross breed cows was 5.5 ± 1.93 . An average milk yield for 3rd lactation for cross breed cows in Chencha district reported is 4.79 ± 1.85 . The result investigated in this study showed greater milk yield than findings of Asaminew and Eyassu (2009) which stated milk yield recorded for 3rd lactation for cross breed cows was 3.5 ± 1.35 . In this study an average lactation length recorded in months for local breed in Chencha and kucha districts is 7.42 ± 1.89 and 9.23 ± 2.27 respectively. This finding is slightly less than findings of Asaminew and Eyassu (2009) which stated that an average lactation length recorded in months for local breed was 9.8 ± 2.26 . Also it had been indicated by Jiregna Dessalegn *et al.*, (2013) that an average lactation length recorded in months for local breed was 8.8 (0.8).

In this study an average lactation length recorded in months for cross breed in Chencha and district is 10.2481 ± 1.74 . This finding is greater than findings of Asaminew and Eyassu (2009) which stated that an average lactation length recorded in months for cross breed was 10.1 ± 1.73 . Moreover it had been indicated by Jiregna *et al.* (2013) that an average lactation length recorded in months for local breed was 10.7 (1.4). 30.08% and 69.92% of the respondents in Chencha district stated that they milk their local cows two times and three times per day respectively whereas in kucha district 18.8%, 79.7%, 0.75%, 0.75% of the respondents explained that milking frequency in local cows is two times, three times, once, and four times per day respectively with average number of milking 2.69 ± 0.46 and 2.80 ± 0.43 in Chencha and kucha districts consecutively. This study showed some similarities and also some variations in findings by Asaminew and Eyassu (2009) in that it had been provided that milking frequency of local cows was stated by 86.7% of respondents in the morning and the evening and by 13.3% respondents in the evening only. On the other side the study results of Sintayehu *et al.* (2008) indicated that out of the interviewed dairy cattle producers, 96.3% of households milked their cows twice a day. Very few farmers milk their cows thrice (3.3%) and once (0.4%) a day. In Chencha district 84.21%, 12.03%, and 3.76% of respondents explained that cross breed cows milking frequency is three times, four times, and two times per day respectively with average milking frequency of 3.08 ± 0.39 . This study revealed that 97.74% of respondents in Chencha district and 98.49% respondents in kucha district do not make production records. About 79 and 94% of the urban and mixed crop–livestock producers, respectively, did not have any record keeping schemes. Only 21.2 and 6% of the urban and mixed 30 crop–livestock producers, respectively, were found recording some reproduction parameters using informal sheets.

Milk processing and utilization

The majority 94 (70.68%) of the respondents in the study areas of Chencha stated that they use clay pot whereas the majority 114 (85.71%) of the interviewed households in the study areas of kucha district mentioned that they use kil for storage of milk to extract butter. One of the major factors affecting the quality of dairy products is related to milking utensils. The type and quality of milking utensils used as well as methods and frequency of cleaning milking utensils affect the quality of milk and its products (Sintayehu Yigrem *et al.*, 2008). The

majority 123 (92.48%) and 129 (97%) of the respondents in the study areas of Chencha and kucha districts respectively stated that they use clay pot for storage of milk to extract butter. The majority (92%) of urban producers used plastic milk utensils and about 43.3% of the rural producers used clay pot and plastics, while few (12.5%) farmers used locally made grass utensils (Sintayehu Yigrem et al., 2008). Out of the total interviewed households 122 (91.73 and 130 (97.74%) of the respondents in the study areas of Chencha and kucha districts respectively stated that they use clay pot to produce ergo. In this study 57.14% and 42.86 % in the study areas of Chencha district use clay pot and plastic containers and 97% and 3% of the respondents in the study areas of kucha district use clay pot and Kil respectively as equipment used for separation of butter. The majority (96.5%) of dairy producers used traditional churning material made from clay pot while the rest used wooden, 'Kell' and metal (Sintayehu et al., 2008). In this study 65 (48.87%) of the interviewed households in Chencha areas explained that they use clay pot meanwhile the majority 131(98.45%) of respondents in the study areas of kucha districts stated that they use kil to carry milk to local market. All 133 (100%) and the majority 132 (99.25%) of the respondents in the study areas of Chencha and kucha districts respectively stated that they use enset leaf (koba) to carry butter to local market. And average period of time required for curdling milk is 6.2 and 20.11 hours in the study areas of Chencha and kucha districts respectively. There is similarity between the current research findings 100% in Chencha and 30.08% of respondents in kucha districts use storing of milk in clay pot whereas 69.92% of respondents use storing in clay pot and cooling in kucha district for fermentation of milk. The former works that state dairy processing in Ethiopia is generally based on *ergo* (fermented milk in Ethiopia) formation without any defined starter culture, with natural starter culture. Raw milk is either kept at ambient temperature or kept in a warm place to ferment prior to processing. A study conducted in Borena area of Ethiopia showed out of the total milk produced, 69% was used as fresh milk, 24% was stored and soured to make butter, 6% was used for short-term sour milk and 1% was used as long-term sour milk (Sintayehu et al., 2008). Other studies conducted around Addis Ababa (Azage and Alemu 1998), and Mekele (Nigussie 2006) indicated that 73 and 79% of the fresh milk produced by urban dairy farmers, respectively, was marketed (Sintayehu Yigrem et al., 2008).

100% and 40.6% of targeted households in study areas of Chencha and kucha districts stated the way they use to extract butter is by shaking whereas 59.4% of respondents in study areas of kucha district explained that they use cooling for extraction of butter. All (266) selected respondents in the study areas of both Chencha and kucha districts stated that boiling is the only way with which they extract cheese. Out of the total 133 interviewed households the majority 112 (84.21%) and significant 62 (46.62%) of the respondents in the study areas of Chencha and kucha districts stated that they use spices for milk processing. Out of the total 133 interviewed households the majority 72 (54.13%) and 40 (30.08%) of the respondents in the study areas of Chencha use spices for odor (smell) and for taste (flavor) respectively whereas 62 (46.62%) of respondents in the study areas of kucha district stated that they use spices for odor (smell) only.

Tenadam, Abish, and Nechazmud are plant species stated by 59 (44.36%), 43 (32.33%), and 10 (7.52%) respondents respectively in the study areas of Chencha district meanwhile Abish, Nechbahirzaf, Tejsar, Shinkurt, Tosign, and Besobila are plant species stated by 12 (9.02%), 6(4.51%), 3 (2.26%), 2 (1.51%), 2 (1.51%), and 2 (1.51%) respondents respectively in the study areas of kucha district. Out of the total respondents significant number 99 (74.44%) and 63 (47.37%) in study areas of Chencha and kucha districts do not get milk every day. 25 (18.8%) and 69 (51.88%) of the interviewed households also replied that they have access to milk only once in a week and others 9 (6.67%) and 1 (0.75%) of them in the same areas of Chencha and kucha districts respectively said that they get milk only once in two weeks. 94 (70.67%) and 74 (55.64%) of respondents in the study sites of Chencha and kucha districts stated that their children have no access to drink milk every day. This shows that there is remarkable deficiency since milk is indispensable requirement that must be provided every day in recommended quantity in order children to grow healthy. In the study areas of Chencha the average quantity of milk consumed in liters by adults and children is 0.5263 whereas that of kucha districts is 0.5338. Significant number 49 (36.84%) and 61(45.86%) of the interviewed households in surveyed areas of Chencha and kucha districts respectively replied that they consume milk without boiling. This shows that it is high time to aware the community about zoonotic diseases since some diseases are transmitted through consumption of raw milk.

Marketing of Milk and Milk Products

30.83% and 12.78% of households in the study areas of Chencha and kucha districts respectively explained that they sell fresh milk. In contrast the study on the status of the peri-urban dairying showed that about 70, 69, 60, 52 and 43 % of the respondents sell fresh milk in Ambo, Jimma, Naqamte, Gimbi and Dambi Dollo towns respectively (Jiregna et al., 2013).

Respondents reported that an average price for 1 liter of fresh milk is 3.52 and 1.31 birr in study sites of Chencha and kucha districts respectively. In contrast price average of fresh milk for 1 liter of milk was 2.50 and 2.80 for Addis Alem dairy cooperative and Abay Zuria dairy cooperative respectively (Asaminew and

Eyassu, 2009). The largest number and proportion 84 (63.16%) and 121(90.98%) of the interviewed households in study sites of Chencha and kucha districts respectively have experience in selling butter. Respondents in kucha areas are more experienced than those of Chencha areas when their experience towards this activity is compared. Maximum prices 130 and 125 and minimum prices 60 and 50 Ethiopian birr per kg of butter were reported by 4.51% and 0.75% and 0.75% and 0.75 interviewed households in study areas of Chencha and kucha districts respectively. Almost negligible number 1(0.75%) of respondents stated that they have awareness on selling cheese meanwhile significant number 82 (61.65%) of the interviewed households replied that they generate income through cheese selling. Maximum price (35 birr) and minimum price (12 birr) with an average price of 22 birr for 1 kg of cheese was recorded in study areas of kucha district whereas the price of 1 kg of cheese in the survey areas of Chencha district observed by 1(0.75%) of respondents is 20 birr.

Only 6 (4.51%) out of 133 respondents in kucha areas answered yes on the question do you sell ergo and the remaining 127 (95.48%) said they do not sell this milk product. In contrast all 133 respondents in the study areas of Chencha district do not sell ergo as means of income generating activity. Maximum price (10 birr) and the minimum price (2birr) with average price of 6 birr for 1 glass of ergo is reported by 6 (4.51%) of respondents in study areas of kucha district. Significant number 66 (49.62%) and 95 (71.43%) of the interviewed households in study areas of Chencha and kucha districts explained they usually use local (village) markets to sell their milk and milk products. Out of total interviewed households 70 (52.63%) and 89 (66.92%) of respondents in study areas of Chencha and kucha districts explained they usually use market in district town to sell their milk and milk products. Out of total selected and interviewed households significant number and proportion 107 (80.45%) and 75 (56.39%) of respondents in the study sites of Chencha and kucha districts respectively stated that there is all-weather road accessibility to the market areas. Nevertheless 25 (19.55%) and 58 (43.61%) of the respondents in Chencha and kucha districts consecutively stated that still they have difficulties of road accessibility even to markets of their vicinity villages.

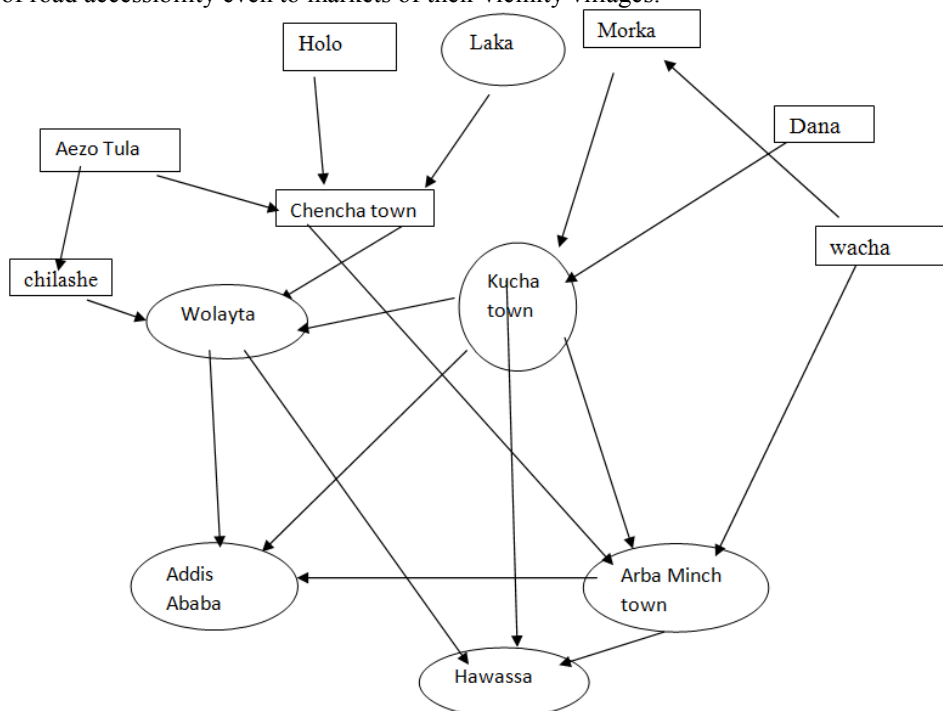


Fig. 1. Illustration of the marketing routes of dairy products (butter) in the study areas

CONCLUSIONS AND RECOMMENDATIONS

Study on dairy production, marketing and challenges and opportunities in Chencha and kucha districts was conducted with an aim to understand the status and identify constraints hindering development of dairy sector in these areas. It could be concluded from the study that dairy production is at its infant stage and on contrary there is a high demand for dairy and dairy products in all the surveyed areas.

In general, the dairy production system in Chencha and kucha areas is among the vast potential livestock production systems, with high opportunities for economic development in Gamo-Goffa Zone and in the whole country as well. Nevertheless, different challenges are constraining the development of the system, these includes inadequate feeding both in quality and quantity, shortage of A.I.service, poor veterinary services, poor housing and poor general management practices, unavailability of improved genotypes and poor genetic make-up of indigenous animals which actually reflected in low milk production and dairy products marketing are

mentioned worth.

- Availability of feed is low both in quality and quantity hence strong extension work on use of concentrate feed, grazing land management, and development of improved forage is important.
- Separate houses of dairy cows should be properly practiced using appropriate designs and locally available construction materials.
- Livestock owners should be familiar with hygienic procedures of milking and milk processing as well as equipments used.

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