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Fluid milk and butter production and marketing systems in Fogera District, Amhara Region, Ethiopia

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Introduction

In Ethiopia, the agricultural sector accounts for 46% of the gross domestic product (GDP) and livestock contributes 30%-35% and more than 85% of farm cash income. The sub-sector also accounts for 19% of the export earning (BEFEKADU AND BIRHANU, 2000). Although Ethiopia has the largest livestock population, productivity and production have remained low (AZAGE AND ALEMU, 1998). Per caput consumption of milk is estimated at 19 liters; this value is lower than African and world per capita averages, which are 27 kg/year and 100 kg/year. The annual national demand supply variance for fluid milk alone, calculated on the basis of per capita consumption for Sub-Saharan Africa, is estimated at 500 million kilograms. Based on this, there will be a minimum annual demand for one billion 14 million kg of milk to satisfy the projected urban population of 39 million people by the year 2020 (AZAGE AND ALEMU, 1998). Dairy products are traditional consumption items with strong demand, and the temperate climate of the Ethiopian highlands allows the crossbreeding of local cows with European dairy breeds to increase productivity (HOLLOWAY *et al.*, 2000). The Fogera cattle breed, reared round Lake Tana, is used for milk, meat and draft power by smallholder farmers. However, there is limited data on the on-farm performance of this breed and also on the milk production and marketing system in its place of origin. This study was initiated to characterize the milk production system, to study production inputs/services available, to examine milk and milk products marketing, and to identify major production constraints and provide possible interventions for more market-orientation of the system.

Materials and Methods

The study was conducted in Fogera district, South Gondar Zone of Amhara Regional State, Ethiopia. Woreta, the capital of the district, is found 625 km from Addis Ababa and 55 km from the Regional capital, Bahir Dar. The district is divided into 25 rural and 5 urban Kebeles and has a land area of 117,414 ha, out of which 9602.36 ha grazing land. Flat land accounts for 76%, mountain and hills 11% and valley bottom 13%. The district borders Lake Tanna and has an estimated water body of 23,354 ha. Altitude ranges from 1774 to 2410 masl. The mean annual rainfall is 1216.3 mm and average temperature is 19°C (IPMS, 2005).

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The human population is estimated at 236,553 and 88.3% are farmers. There are 157,128 cattle, 7,607 sheep, and 27,867 goats (CSA, 2008). Fogera cattle is the dominant breed. The farming system is classified into rice/fish/livestock and cereal/horticulture/apiculture/livestock systems. The first system, found in the Fogera Plains, is the major livestock production area. Rice, teff, maize, noug, safflower, chickpea, lentil, etc are the major crops. In the second system, the terrain varies from relatively flat bottomlands to high altitude areas and is dominated by cereals, horticultural and oil crops. Cattle, sheep, and goats are the major ruminants. Natural pasture, stubble grazing and crop residues are the major feed resources in both production systems. From these two systems, twelve peasant associations (PAs), and 40 households from each PA were randomly selected and a total of 480 farmers were used for the study. Field survey was conducted and discussion was held with farmers, extension staff, and development agents. Data were collected using a structured questionnaire on feeding and housing, hand milking, milk processing, marketing of raw milk and butter, and inputs, marketing constraints and intervention measures. Qualitative as well as quantitative data were analyzed using SPSS (2003).

Results and Discussion

Rural small-scale (mixed subsistence), peri-urban and c) urban dairy production systems were identified based on production inputs used, location and accessibility of markets. The numbers of cows in these systems are presented in Table 1. The percentage of milking cows was higher than 65% in the rural and peri-urban systems, while it was about 44% in the urban production system. This may be due poor feeding system and low fertility of cows in the urban production system. Only 12 (2.52 %) of the respondents were female-headed households.

Table 1. Proportion of milking and dry cows in the three production systems in Fogera

Production systems	N	Cows	
		Milking	Dry
Rural small-scale (Mixed subsistence)	480	764 (66.8 %)	378 (33.2%)
Peri-urban	68	129 (67.2 %)	63 (32.8 %)
Urban	217	249 (43.8%)	319 (56.2%)

Figures in brackets are percentages

The rural small scale mixed system uses 1-7 indigenous cows per household, natural pasture and crop residues as major inputs. This system is dependent on low levels of inputs and indigenous cows. In this system, milking cows are allowed to graze and there is no additional supplementary feeding. Almost all the milking is done by male while milk processing and marketing is done by only women. On average about 2.9 liters of milk is produced (off-take) per day per household. Out of this, 0.6 liters (20.7%) is used for home consumption, 1.9 liters (65.5%) for processing and 0.4 liters (13.8%) for marketing (Table 2). The peri-urban dairy production system is restricted to Aember town, located 25 km northwest of the district capital. This system uses local and crossbred animals, have access to nearby veterinary and AI services, and agro-industrial by-products. The average milk produced per day per cow from local and crossbred cows was 3.4 and 5.5 liters, respectively. Out of the total milk produced per day in the system (488.2 liters) 75 liters (15.4 %) was sold, 79 liters (16.2 %) was consumed and 334.2 liters (68.5%) was used for processing. In this system, producers face fluid milk marketing problems due to low demand and long fasting days. As a result, milk is processed into butter and local cheese (*ayib*). The feed resources are natural communal and private grazing, hay, noug and crop residues of teff, maize and finger millet. The urban dairy production, in Woreta town, involves 217 dairy producers who own 249 milking cows. Only 22% are crossbreds. These smallholders own 1-2 crossbreds and 1-7 local milking cows. Natural pasture and agro-industrial by-products such as the noug cake and wheat or rice bran are the major feeds. They also have access to AI and veterinary services. The average daily milk yield/cow from a local and crossbred cow was 2 and 8 liters, respectively. A

total of 828 liters of milk was produced daily; out of which 262 liters (31.6%) was sold, 199 liters (24%) was consumed and 368 liters (44.4%) was processed into butter and local cheese (*ayib*).

Communal grazing lands are managed in a traditional way. During the rainy season the plains get flooded and about 3,456 ha of communal grazing lands is heavily invaded with *Asracanta longifolia* weed. In addition, cattle are trekked from adjacent districts during the dry season, further limiting the availability of feed. As a result, crop residues are the major feed resources during the dry season as there is no improved fodder production. The IPMS project and the district Office of Agriculture and Rural Development staff intervened and mobilized the community to participate in the clearance and feed resources development of weed infested areas for sustainable use of natural resources. Over the last three years (2007 to 2009), a total of 423.73 ha of land has been cleared of the weed in 17 PAs. In 2009, communities in 5 PAs have developed by-laws and agreed to allocate 60.2 ha of land to be under stock exclusion for subsequent use by cut and carry system. The approach has been now scaled up and in 2010, the South Gondar Zone has decided to enclose almost 1/3 of communal grazing land based on watershed study. Results so far are encouraging and the technology has been successfully taken up by the community and is expanding. The most prevalent diseases are internal parasites (Schistosomiasis, Fascioliasis, Lungworm), trypanosomosis, and ectoparasites (mange mites and ticks). Biting flies become more abundant during the dry season and to minimize their effect, farmers keep their animals inside houses and burn dried cow dung to smoke out the flies. This causes loss of grazing time and restlessness and decreases animal productivity. Extension and veterinary services are limited and weak compared to the livestock population. Training on basic animal health care, feed resources development, grazing management, fodder conservation, feeding systems, dairy animal management, hygienic milk production and marketing are lacking.

There was no fluid milk marketed from five rural Kebeles due to traditional taboo (Table 2). The price milk varied from 1.25 to 1.50 Birr[†] per liter. There are fourteen caterers in Woreta and Aember towns who purchase milk. A total of 247.5 liters of milk was supplied per day to these caterers. Out of the total butter produced, about 25% is consumed and used for cosmetics at the household and the remaining is marketed. In the rural markets, the price of butter fluctuates depending on season, and ranged from Birr 20 per Kg in the wet to Birr 28 per Kg in the dry season. Retail prices ranged from Birr 22 to 30 per Kg depending on quality and market demand. In all the production systems, butter is traditionally made from sour milk (locally known as *ergo*). About 16.5 liters of milk is required to produce a kilogram of butter. About 66.7% of the respondents face problem of butter marketing during the long fasting season by the Orthodox Christians. Participants in the butter marketing chain are producers, rural assemblers, wholesalers, retailers and consumers. Aember town is the main butter market. The total amount of butter supplied to local markets annually was estimated at 104,193 Kg (Table 3), which translates into an estimated 1,719,184.5 liters of milk per annum.

Conclusion and Outlook

The fluid milk market is very limited in Fogera district. However, large quantity of butter is produced and supplied to local markets, indicating the potential for development of the sector. Shortages of feed and improved breeds, high disease prevalence, poor extension, AI and veterinary services, lack of working capital, poor infrastructure and marketing are critical problems. Opportunities for improvement of milk production and marketing exist in the district. Technologies and knowledge on improved butter production and marketing systems would enhance the benefits to smallholder dairy farmers if major urban centers such as Bahir Dar city and its surroundings and the export market open up new opportunities. To enhance dairy

[†] 1 USD = 11.20 Birr

development, establishing community based grazing land management, improving crop residues utilization, enhancing fodder production and conservation, strengthening extension and veterinary services, genetic improvement, capacity building in improved dairy cattle management and production, developing infrastructure and strengthening collective milk marketing. Strengthening of farmers' cooperatives and the private sector in input supply such drugs, AI, health service deliveries and marketing promotion activities could also play a significant role.

Table 2. Mean (\pm SE) daily milk production and utilization per household in Fogera district

Kebele	Milk produced	Milk consumed	Milk processed	Milk sold
Rural				
• Kuahir Michael	1.10 \pm 0.10	0.29 \pm 0.02 (26.4)	0.66 \pm 0.11 (60.0)	0.15 \pm 0.09 (13.6)
• Shaga	2.30 \pm 0.40	0.22 \pm 0.06 (9.6)	1.60 \pm 0.35 (69.6)	0.41 \pm 0.15 (17.8)
• Kuahir Abo	3.60 \pm 0.30	1.03 \pm 0.09(28.6)	2.60 \pm 0.19 (72.2)	0
• Shina	2.10 \pm 0.27	0.37 \pm 0.03(17.6)	1.75 \pm 0.25 (83.3)	0
• Kidist Hana	1.50 \pm 0.12	0.26 \pm 0.02 (17.3)	1.25 \pm 0.11 (83.3)	0
• Addis betechrstian	2.90 \pm 0.29	0.73 \pm 0.09 (25.2)	2.23 \pm 0.22 (76.9)	0
• Wojiarbamba	4.50 \pm 0.35	0.95 \pm 0.12 (21.1)	3.43 \pm 0.28 (76.2)	0.15 \pm 0.11 (3.3)
• Wagera	3.40 \pm 0.28	0.85 \pm 0.08 (25.0)	2.60 \pm 0.25 (76.5)	0
• Menguzer	1.60 \pm 0.12	0.50 \pm 0.03 (31.3)	1.02 \pm 0.09 ((63.8)	0.06 \pm 0.03 (3.8)
• Abuatihua	2.00 \pm 0.26	0.20 \pm 0.05(10.0)	1.46 \pm 0.18 (73.0)	0.36 \pm 0.20 (18.0)
Urban - Woreta Zuria	4.70 \pm 1.26	0.49 \pm 0.09 (10.4)	1.99 \pm 0.30 (42.30)	2.23 \pm 1.20 (47.5)
Peri-urban - Alembere	3.40 \pm 0.41	0.83 \pm 0.10 (24.4)	1.53 \pm 0.24 (45.0)	1.07 \pm 0.30 (31.5)
Average	2.79 \pm 0.13	0.56 \pm 0.02(20.0)	1.85 \pm 0.07 (66.3)	0.37 \pm 0.11 (13.3)

Numbers in brackets indicate percentages of produce.

Table 3. Amount of butter supplied to different markets in Fogera district

Market	Amount of butter supplied (Kg)		
	Dry season	Wet season	Total
Rural markets*	27,692	39,233	66,925
Alembere town	4,320	15,040	19,360
Woreta town	5,686	12,222	17,908
Total	37,698	66,495	104,193

*Rural markets include: Wotemb, Woji, Kinti, Maksegnit, Hodgebeya, Nabega and Meneguzer

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