

Analysis of Milk Marketing in Smallholder Dairy Farming in Southern of Mozambique

Benedito Isac Tinga, Damião Wetmane Nguluve and Olga Lurdes Fafetine

Instituto de Investigação Agrária de Moçambique, Direcção de Ciências Animais-Matola, P.O. Box 1422, Maputo, Mozambique

Abstract: There are potential milk producers and buyers in the Manhiça and Xai-Xai districts, in Southern of Mozambique. The objective of this study was to characterize cow milk marketing in small-scale producers and buyers. The information was collected from the observation and interviews with participants. The results showed that the main constraints on milk production are animal feed and low genetic potential of local breed in Manhiça and Xai-Xai districts, respectively. Milk is sold by farmers as fresh in Manhiça district and handcrafted processing for yogurt, by buyers in Xai-Xai district. Available forage and by-products (maize, rice and wheat bran) can be used to improve the milk production, in both districts.

Key words: Cow, milk, Manhiça and Xai-Xai districts.

1. Introduction

Mozambique has total land area of 786.380 sq. km, there are about 36 million hectares of arable land, suitable for agriculture and 3.9 million hectares is land cultivated. The remainder of the area is under pastures for livestock.

The human population is about 28 million [1] with more than 80% of population living in the rural areas. Agriculture is their main source of livelihood. Livestock plays an important role in poverty reduction and nutritional household food security. In last years cow milk production has grown about 11%, being 63% of milk processed by milk industry and the remaining 37% sold in informal market [2].

Smallholder farmers are raising cattle for milk production and the main breeds used are indigenous, exotic and cross breeds. The daily monetary earning from the sale of milk and milk products has favorable effects on the cash flow of rural households. This study aimed to evaluate milk cattle production systems and milk and milk products marketing to identify the main constraints to promote dairy farming production.

Corresponding author: Benedito Isac Tinga, M.Sc., research field: agricultural economic.

2. Materials and Methods

The study was conducted from November 2016 to October 2017, in Manhiça (Maputo province) and Xai-Xai (Gaza province) districts, both districts located in Southern of Mozambique. The main actors involved are farmers' rearing and milking cattle, buyers and sellers of the milk and milk products. The information was collected through direct observation from farmers holding dairy cows. Twenty and five (25) buyers were individually interviewed, in Xai-Xai district to understand the milk processing technique. The data were analyzed using SPSS.

3. Results and Discussion

3.1 Production Systems

The farmers raise jersey exotic breed in Manhiça district. The farmers cut native grasses, chop and provide to animals in feeding troughs. Farmers spray the grass with the dilution of molasses and water in 1:10 proportion. A few number of farmers mix native grass with chopped sugarcane top for feeding cows. The cows are permanently housed in barn fed in the stall. Most of the cows do not meet feed requirements of the genetically improved breed, which need forages

of higher nutritive value to allow animals to best express its potential. Some farmers supplement the cows with fresh Napier grass (*Pennisetum purpureum*) and maize or rice brans, during the milking time.

In Xai-Xai district the farmers raise local breed, called Landim (indigenous) for milk production. In this site, the cows graze on communal lands and return to a barn at the end of the day. Usually, the animals are not supplemented with any feeding diet. The cow is milked with calf on foot to stimulate the milk production. After that, the calf is allowed to suckle for few hours in the pasture and then is transferred to pens where no any feed was given.

For the animal breeding, the farmers use Landim bulls for natural mating in Xai-Xai district. Artificial insemination was used in Manhiça district, supported by Land O'Lakes Project, funded by the United States Department of Agriculture (USDA) program. The project ended in 2016, since that time the farmers have not received any more support from the project to continue with the artificial insemination program. The farmers have not bull to use for natural mating and most of them report that the cows stay long period without getting pregnant, consequently have reduced the number of the calf.

3.2 Milk Production

All farmers have not any facility to milk the cows, so the milking process is done manually in the kraal or paddock and once a day. Only a few farmers do the mastitis test. The cow is milked, after that the milk is

collected in the small plastic gallons and is sold without pasteurization process. In Manhiça district there is a milk collection plant but does not work yet. Buyers, in Xai-Xai, consider that the milk collected is of low hygienic quality and they are willing to pay the higher price if the milk quality is improved.

3.3 Market Potential

Manhiça farmers produce milk and sell it directly at home to consumers, while in Xai-Xai milk is sold to buyers and transported in gallons by foot, motorbike or by bicycle. Xai-Xai is the only site where milk is processed home as yoghurt and then sold in local market. Table 1 shows the quantities of fresh milk processed as yoghurt per week.

The yoghurt processing is made at home by boiling fresh milk, and then natural yoghurt is added as yeast. In that process, about 18% of fresh milk is lost, in each liter of yoghurt produced.

The milk was sold between 30 meticaís for liter (MT/L) and 50 MT/L, in Manhiça district. The same product was sold between 25 MT/L and 40 MT/L, in Xai-Xai district (Table 2). No price difference was found during the period study in Manhiça district, probably due to weak milk commercialization in this place for lack of buyers, important actors in the value chain. Higher price occurred in Xai-Xai district for the dry season, probably due to decreased milk production in that season, corroborating with Holmann [3] observed that the price paid to producers by buyers depends on the supply of milk which is abundant during

Table 1 The milk and yoghurt acquired for a week in Xai-Xai district.

Type of milk	Production		
	Minimum (kg/week)	Maximum (kg/week)	Mean (Std deviation) (kg/week)
Fresh	10.0	360.0	105.5 (120.6)
Yoghurt	8.0	324.0	86.4 (104.7)

Table 2 The price (meticaís for liter (MT/L)) of fresh milk paid to farmers and yoghurt sold in Xai-Xai district.

Type of milk	Production		
	Minimum (MT/L)	Maximum (MT/L)	Mean (Std deviation) (MT/L)
Fresh	25.0	40.0	30.5 (4.38)
Yoghurt	60.0	60.0	60.0 (0.0)

the rainy season and scarce in the dry season. According to the same author, the milk production seasonality is the main cause of milk price fluctuation. This indicates the importance of supplying additional feeds after grazing, as a nutritional supplement of cows during the dry season. Milk processors produce yoghurt mainly during the rainy season, the period that found more feed for cattle and more milk produced in Xai-Xai district.

3.4 Technological Implications

The results have two main types of technology implication: the animal feeding and genetic improvement. In Manhiça district, regarding the animal feeding, the results suggest that a program to promote the forage legume shrub (*Leucaena leucocephala* and/or *Moringa* spp.) and Napier grass as supplements of dairy cattle would have a much higher impact. This technology would reduce the needs to purchase balanced feed to supplement the cow, thus increasing the level of milk production and subsequent producer's cash flow. Associated to the previous technologies, there will be a promotion of the use of agricultural by-products as supplemental feed and training for the farmers with milk processing for yoghurt and cheese. The lack of Jersey bulls in the herd for breeding can be solved by using artificial insemination or providing bulls to the same selected groups of farmers.

The main technology implication of improving the yield of milk of Landim breed in Xai-Xai district can be achieved by promotion of genetic improvement of cattle by crossbreeding using Jersey bull or artificial insemination with Jersey semen, as genetic improvement strategy to incorporate Jersey genes into

the local gene to improve milk production. Nhantumbo [4] found in average 22 L cow milk/month in local breed.

4. Conclusions

The farmers are the main cow milk sellers. The buyers are other actors involved in the commercialization of cow milk, only in Xai-Xai district and in Manhiça district. The milk is sold as fresh for consumers and processed as yoghurt in Manhiça and Xai-Xai districts, respectively. The main constraints are animal feed and low genetic potential of local breed for milk production in Manhiça and Xai-Xai districts, respectively.

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