

Tropentag 2018, Ghent, Belgium

17-19 September 2018

Conference on International Research on Food Security, Natural Resource Management and Rural Development, organised by Ghent University, Ghent, Belgium

Pastoral dairy development for food security and food safety in Eastern Africa: challenges and potentials

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Introduction

Pastoralism involves strategically raising animals on natural forage in order to create value out of land often regarded as marginal. It generates income and secures food and nutrition for millions of people. There are an estimated 50 million pastoralists in sub-Saharan Africa (Rass 2006). A figure commonly used for the estimate in Eastern Africa (Djibouti, Ethiopia, Eritrea, Kenya, Tanzania, Somalia, Sudan, South Sudan and Uganda) is 20 million pastoralists. However, because of the mobile nature of pastoralists, such figures are difficult to estimate (Krätli & Swift 2014).

Pastoralism is a multifunctional land-use system in which milk plays an important role – indeed, a central role in the traditional culture of the livestock keepers. Development interventions in the drylands often focus on increasing meat production. As pointed out decades ago, appropriate interventions in dairy development could improve the nutrition of pastoralist families and other local consumers of milk products in the drylands and could strengthen the role of pastoralist women as the traditional managers of milk and as innovators in dairy micro-enterprises (Waters-Bayer 1986).

Objective and methods

In order to inform European and African policymakers about the challenges and potentials of pastoral dairy development, CELEP (Coalition of European Lobbies for Eastern African Pastoralism) collected and reviewed literature and project experiences related to dairy development in Eastern Africa. It looked into the differences between what are commonly described as formal and informal milk markets, including evidence concerning food safety in these markets. It gave particular attention to the specificities of pastoral dairying compared to dairying in agrarian areas such as the highlands. The review investigated the contribution of pastoral dairying to human nutrition in the drylands and the potential contribution of pro-poor dairy development to pastoralist women's empowerment and wider food security.

Results and discussion

In Eastern Africa, as elsewhere in sub-Saharan Africa, demand for dairy products has long exceeded supply, and demand is growing with rising consumer income. Most dairy interventions in the region have focused on mixed crop-livestock farmers in highland areas, where the climate is cooler and wetter than in the lower drylands. Under the relatively favourable highland conditions, intensive animal husbandry using external inputs can be practised and there is less intra-annual fluctuation in milk yield than in the drylands. The small-scale producers operating in the formal sector in the highlands provide milk for commercial dairy processing enterprises or cooperatives. The initial tendency was to promote “modern” (Western) products such as ultra-high temperature (UHT) treated and packaged milk. The high investment and operating costs in the formal sector lead to relatively high prices for consumers (Blackmore *et al* 2015).

In contrast, the informal dairy sector generally involves low-cost and highly decentralised operations. Traders often collect milk directly from the farmers and, because the marketing costs are lower than in the formal sector, can pay the producers higher prices. They can also pay in cash and offer credit. Many milk producers therefore prefer to sell through the informal system (Hambloch *et al* 2014). In Eastern Africa, more than 80% of all milk produced by smallholders and pastoralists is sold on the informal market, up to 95% in Tanzania and 98% in Ethiopia (Bingi & Tondell 2015).

The informal dairy market includes producers, processors, transporters and sellers of milk in arable farming and pastoral areas. In recent years, some researchers and projects have worked with informal-sector dairy actors in arable farming areas. This led to recognition of how these operations contribute to meeting demand for milk products. However, little attention was given to understanding the pastoral dairy value chains and seeking ways to develop them in collaboration with local actors so as to improve local livelihoods, food security and nutrition. Such support would help meet the demand for dairy products especially in the smaller towns in the drylands. Only niche products that command high prices, such as camel milk – sold mainly to former pastoralists who have settled in towns and highly value the milk’s taste and medicinal values – can be marketed economically in large cities in non-pastoral areas.

Specificities of pastoral dairying

Certain specificities of pastoral land-use and dairying systems differentiate them from systems in arable farming areas. These specificities include:

- ***Very high seasonal fluctuations in milk yield:*** As pastoralists produce animals and milk in environments with very high seasonal variation in rainfall (further exacerbated by climate change) and therefore in forage yield, the milk yield fluctuates accordingly. During the dry seasons, the milk yield may be only enough for the family, if that. During the wet seasons, a herd may produce more milk than a family can consume or than can be sold locally on sufficiently attractive terms. Women convert some of the milk into longer-lasting products such as butter, ghee, butter oil or cheese for later sale or exchange or home consumption. The pattern of milk yield in pastoral areas means that it is not suitable for large-scale dairy processing and marketing businesses operating on a year-round basis.
- ***Mobile system in sparsely populated areas:*** By definition, pastoral herds depend primarily on natural forage, in contrast to animals kept by farmers in arable systems, where forage production and livestock feeding are ecologically and economically feasible. Pastoralism is practised in drier areas where overall forage yields are lower than in the higher-rainfall farming areas. The livestock breeds that can withstand the harsh dryland conditions are not high milk yielders. This means that, in drier areas, there is a lower cow density and less milk produced per unit area of land. In order to supply even a small-scale dairy operation, milk must be drawn from a much wider radius than in a farming area with higher cow density and higher-yielding breeds. In view of also the poor road infrastructure in sparsely populated pastoral areas, even what many development projects would consider a “small-scale” milk processing unit could not collect enough milk on an economic basis for conventional dairy operations.
- ***Pastoralist women sell milk as fermented products in short value chains:*** Among pastoralists, women are in charge of milk processing, allocation and marketing. Especially in the wet seasons when milk yields are higher, the women sell milk and milk products primarily to consumers in nearby towns in the drylands, either directly to consumers or via only one or two intermediaries (CARE 2014). Almost all milk produced by pastoral herds in Eastern Africa is sold “informally” in such short value chains. Milk is seldom sold fresh but rather in fermented form, which has the advantage for human health that fermentation kills many milk pathogens (Roesel & Grace 2014).
- ***Multifunctional system:*** Milk-oriented livestock systems in the Eastern African rangelands are significantly more productive than meat-oriented ones (ILRI/ASARECA 2012). This could be seen as an argument for specialisation in dairying in pastoral areas. However, pastoralism is not specialised in one commodity. Its multifunctional nature, which includes also other outputs such as skins and hides, means that it can support a higher number of people per unit area than can either purely milk- or purely meat-oriented systems. Specialised dairy herds would be impossible under pastoral conditions, as the system would have to be intensified to the extent that it would no longer be pastoralism and would thus lose its main advantage: the ability to exploit unpredictable and ephemeral natural dryland resources to produce food and other useful products using low levels of external inputs.

Importance and potential of pastoral dairying

Support to improving dairy value chains in pastoral areas in Eastern Africa would contribute to:

- ***Pro-poor development:*** Pastoralist families with larger herds can live mainly from selling animals, but families with smaller herds need to rely more on dairy income to meet their food and other cash needs, so that they are not obliged to sell breeding stock. They can sell only the occasional surplus male or older animal. Dairying augments the income of poorer pastoralist families. Because most dairy products that are marketed informally go through a short and low-technology value chain, they are less costly than those that have moved through the longer and higher-technology value chains in the formal sector: milk collection, transportation, pasteurisation, processing, packaging and distribution, involving

still more transportation – especially to the more remote areas. The decentralised dairy system and lower prices mean that milk is more available and affordable for poorer consumers in the drylands.

- **Food security and nutrition:** The main consumers of milk from pastoral herds are the pastoralists themselves and other people of pastoralist origin – genetically capable of consuming fresh milk, because they can tolerate lactose – who live in towns and pursue other forms of livelihood in addition to or instead of keeping livestock. Milk is an excellent source of macronutrients, energy, lipids and proteins of high nutritional quality. The calcium content, vitamins and proteins in milk play a determining role in bone growth and the health of children (FAO 2013). To the extent that the pastoralists sell fermented milk products, which people of non-pastoralist origin can tolerate better than fresh milk,¹ dairy development in pastoral areas could contribute also to improving the food security, nutrition and health of the majority of Eastern Africans in these ethnic groups.
- **Pastoralist women's economic empowerment:** Although women might not own livestock, women's roles in animal keeping from watering to milking is important to their position within their families and communities (Hertkorn et al 2015). The income from dairy sales is controlled by the women, not the male household heads (CARE 2014). Some pastoralist women have been highly innovative in tapping new markets, e.g. the camel milk sellers in Somalia (Nori 2010). Supporting such informal dairy value chain development in pastoral areas in Eastern Africa would help empower pastoralist women.

Major constraints in pastoral dairying – and pastoralism

Many pastoralist women already process and sell milk products at least on a seasonal basis, but they face numerous constraints, including poor transport infrastructure and lack of context-appropriate facilities for preserving and marketing more of the seasonally surplus milk. The capital-intensive requirements for formal milk processing and marketing hinder pastoralist women from entering this domain, as they lack capital and credit for local investment.

Moreover, pastoralists in Eastern Africa face constraints that threaten their entire land-use system. Their insecurity of access to natural resources such as land and water reduces their flexibility and mobility in using the seasonally dispersed grazing resources in the drylands. Throughout Africa, pastoralists continue to be politically and socially marginalised. Although the African Union (2010) developed an African policy framework on pastoralism that was endorsed by African Head of States, implementation has been very slow. There is still little explicit recognition of and support to pastoralism in Eastern Africa.

Pastoralists continue to have difficulties to access public services, most of which are not adapted to a mobile way of life, e.g. human and animal healthcare, formal education and provision of clean water, which would contribute to pastoralists' wellbeing and to better hygiene and food safety in the products they sell. In the shorter value chains for pastoral dairy produce, there is less opportunity for contamination of milk than in the longer formal value chains, but the risks could be further reduced if the milk handlers could learn more about how to deal with them (Roesel & Grace 2014).

Conclusions and outlook

Promoting pastoral dairy development in a multifunctional system could bring a higher income to a larger number of pastoralist families than focusing on sale of livestock and meat. Greater support to marketing milk from pastoral herds would augment family income – especially for poorer families – by taking advantage of the seasonal availability of surplus milk, if processed in appropriate forms. This would include traditional fermented milk products and possibly new products that are acceptable for consumer taste and lactose intolerance, can be stored for a long time and can be transported easily. This would also give poorer consumers access to nutritious and affordable milk products.

Based on these findings, CELEP formulated recommendations regarding European policies and development interventions in this sector in Eastern Africa. The partner organisations of CELEP in Eastern Africa are developing corresponding recommendations for policymakers in their respective countries and the region. Some of the recommendations to European policymakers² are:

- **Recognise specificities of pastoralism and support dairying accordingly:** The specificities of pastoral dairying call for a different approach to dairy development in the drylands than in agrarian areas such as the highlands. Interventions to support dairying should be implemented in ways that fit the specific context of the pastoralists.

¹ Up to 90% of people in arable farming communities in East Africa have a high level of lactose intolerance. Because fermentation converts lactose into lactic acid, they can better tolerate fermented milk products (Tishkoff SA *et al.* 2007).

² For more details about these and other recommendations, see CELEP (2018).

- **Promote investment in services and infrastructure suited to pastoral areas:** Investments should be made to improve the road and market network in the drylands and to offer public services adapted for pastoralists, including mobile animal and human healthcare and education for children and adults. This could take advantage of the widespread use of mobile phones among pastoralists (Waters-Bayer & Bayer 2016). Information and communication technology (ICT) could be used to support pastoral dairying, e.g. for information about markets, prices and transport opportunities. Pastoralist women and their dairy associations need credit, training and organisational support to be able to invest in and operate decentralised micro-scale equipment and facilities for handling milk, including cooling equipment possibly using solar power.
- **Recognise role of women in pastoral dairying:** Promoting development of dairy value chains in the drylands should start with recognising the role of women related to milk, their context-appropriate milk products and their own initiatives in milk processing and marketing. Access to milk from the herd is part of a pastoralist woman's identity, and milk handling and income are completely under the woman's control. Most "development" projects to collect and process milk deal with men, and rob women of their power within the pastoralist society and economy. More research into how the existing dairy value chains in the drylands benefit pastoralists and consumers would help identify entry points for collaborating with pastoralist women and other local milk sellers and consumers.
- **Facilitate development of context-appropriate milk standards:** Current milk handling and safety regulations in Eastern Africa are derived from models in industrialised countries and are not appropriate for local small-scale dairying operations. Instead of trying to enforce unattainable standards that would push actors in the informal sector out of business or even into illegality, it is necessary to develop standards that reflect the situation and needs of small-scale producers and the mass of consumers. To improve hygiene and health, it is much more effective and inclusive to train milk handlers in maintaining milk quality and food safety (Roesel & Grace 2014). If only the formal "modern" dairy system would be allowed, the poorer consumers would be deprived of nutritious dairy products and the poorer producers could not benefit from additional income from the milk.

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