SESSION 3 : DAIRY LAND, SUSTAINABLE LAND?

Presided by Bernard Faye

The dairy sector in the Ethiopian Highlands: The place of traditional fermented milk products

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In Ethiopia, around 97-98% of the annual milk production is accounted by the traditional milk production system, which is dominated by indigenous breeds. Most of the milk produced in the country is accordingly processed on-farm using traditional technologies that are generally not well understood. The very few enterprises currently operating in and around the capital depend on the traditional sector for the majority of their milk supply. These underscore the importance of understanding the traditional sector to render improvement interventions possible.

The importance of milk in the diet of Ethiopians differs according to the farming system and the socio-cultural set-ups. In the highlands that cover about 40% of the country (~499,000 km^2) and are home for about 90% of the total human and 70% of the livestock population, the rural people are sedentary farmers raising both livestock and crops. Milk is used for rearing calves and children, and the surplus is soured for *Ergo* (Ethiopian naturally fermented milk) from which other fermented milk products may manufactured.

Milk production systems in Ethiopia can be broadly categorized into urban, peri-urban and rural. Both urban and peri-urban systems are located around Addis Ababa and regional towns and take the advantage of the urban markets. The rural dairy production system is part of the subsistence farming system and includes pastoralists, agro-pastoralists, and mixed crop-livestock producers mainly in the highlands.

Ethiopian traditional fermented milk products include: *Ergo* (naturally fermented milk); traditional butter, *Arera* (defatted sour milk); *Ayib* (Ethiopian cottage cheese) and *Aguat* (why). Milk container vessels used for milk souring and/or churning in different parts of the country include: clay pot, calabash, woven grass or plant fiber vessels and hollowed wood vessels. These containers are covered using a piece of skin, hide, plastic or plant leaves during storage/souring and/or churning.

Ergo is produced from raw milk of cattle in all parts of Ethiopia by smallholder farmers. The relatively low pH of *Ergo*, ranging from 4.3 to 4.5 retards the growth of pathogens and spoilage bacteria enabling its further storage. *Ergo* is the major fermented dairy product that is popular and consumed in all parts of the country and by every member of the family. It is particularly used as a nutritional support to sick people, children and to pregnant and lactating mothers. *Ergo* is consumed, either spiced or natural, as a side dish with different traditional foods such as *Genfo* (kind of cereal based porridge), *Qinchea* (traditional dish prepared from broken wheat and barley) and *Dabbo* (traditional bread). *Ergo* is the basis of further processing into more shelf stable products such as butter and *Ayib*.

Smallholder butter-making in Ethiopia is based on sour milk mainly due to high ambient temperature, small quantities of daily milk production, and longer keeping quality of sour milk. About 21 liters of whole milk is needed to produce a kilogram of butter (83% total solids) with average churning time of 187 minutes. In Ethiopia three types of butter can be distinguished namely *Lega*, *Mekakelegna* and *Besal*, which refer to fresh, semi-rancid and rancid, respectively, based on the degree of lypolysis that had undergone due to a number of factors such as age of the product. With the objective of extending its shelf-life, butter is cooked at around 100°C until the moisture content is almost completely evaporated. In the process, spices such as garlic and ginger are added to improve its flavor. The resultant product is called *nitir kibie* (for melted and clarified butter or ghee) that can be stored for quite a long time at ambient temperature. Butter has additional functions besides its nutritional value. Women put butter on top of their head, which is assumed to have dual functions as hairdressing and to cure headaches. Ghee is added is a variety of Ethiopian traditional dishes: in *Kitifo* (minced beef served raw or half cooked)

and a variety of cereal, pulse and meat based sauces. Ghee is also consumed with coffee and tea especially when important guests are received and during major holidays, or is eaten as a supplement to the dry-season diet.

Ayib, a cottage type soft cheese common in many parts of Ethiopia, is made by heating *Arera* in a clay pot or a similar material on a low fire to about 40-50oC. On average 6 liters of defatted sour milk is needed to make a kilogram of *Ayib* with 2.29% fat, 1.23% ash, 20.42% total solid and 79.58% moisture on smallholder farms in the central highlands of Ethiopia. *Ayib* can be consumed as side dish in its natural form or may be spiced with *kochikocha* (a condiment prepared from Caps. annuum, salt and other herbs and spices). *Ayib* particularly accompanies *Doro wot* – spicy chicken sauce, made in most households during major holidays. In some cases, especially during holidays, traditional ghee (*nitir kibe*) may also be added. Aguat (Amharic for whey) is the liquid that remains after most of the fat and the protein in the milk is removed during the *Ayib*-making process.

There are two marketing systems in the central highlands of Ethiopia: the formal system in which the milk is collected at the roadside (milk collection and chilling centers) and taken to large-scale processing plants; and the informal system where smallholder producers sell their surplus supplies to their neighbors or in the local market, either as liquid milk or in the form of *Ergo*, butter and/or *Ayib*. Traditional milk products generally sell at a lower price than factory processed products mainly due to their low production costs and local availability therefore may be attractive for urban communities. Currently, there are a number of dairy cooperatives that are involved in collecting milk, and processing and marketing of milk and milk products.

Ethiopian traditional fermented milk products represent an important part in the life of the community from nutritional, economic as well as social perspective. However, low milk production; low selling prices; weak marketing system; inadequate dairy infrastructure; and products of substandard quality are among the major constraint affecting the Ethiopian dairy sector. Traditional fermented products are appreciated for their outstanding gastronomic qualities that include flavor and aroma as compared to industrial products. Such desirable characteristics of Ethiopian traditional fermented foods in general and dairy products in particular need to be the focus of future research endeavor. This helps entering into the international commercial scenario with a product of reliable quality from sensorial, nutritional and consumer health point of view. Future research should be designed in a well coordinated manner that includes milk production, processing, preservation and marketing in order to lift the subsistence type of production to commercial level.

This research was realized with Bernard Faye, CIRAD, Campus International de Baillarguet, Montpellier, France.

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