SOUTH SOUTH EXCHANGE

Sharing of Knowledge and Innovation

The case of the dairy sector in India, Uganda and Tanzania

The World Bank

SOUTH SOUTH EXPERIENCE

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Acronyms

AI	Artificial insemination
AMUL	Anand Milk Union Limited
DC	Dairy Corporation
DCS	Dairy co-operative societies
DDA	Dairy Development Authority
EAC	East African Community
EPRC	Economic Policy Research Centre
FMD	Foot and mouth disease
GDP	Gross domestic product
GoT	Government of Tanzania
HPI	Heifer Project International
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
MAAIF	Ministry of Agriculture, Animal Industry & Fisheries
MUM	Molasses-urea-mineral (blocks)
NDDB	National Dairy Development Board
SALL	SAMEER Agriculture and Livestock Ltd.
UNDATA	Uganda National Dairy Traders' Association
UNDFA	Uganda National Dairy Farmers Association
UDISA	Uganda Dairy Stakeholders Association (UDISA)
UDPA	Uganda Dairy Processors' Association (UDPA)
UHT	Ultra-high temperature

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Introduction

A South-South knowledge exchange involving India, Tanzania, and Uganda was launched in 2008 by the President of the World Bank, Mr Robert Zoellick, and the Managing Director of the World Bank, Ms. Okonio Iweala Ngozi. The sharing of experience was strongly supported by Ms. Amrita Patel, Chairman of National Dairy Development Board of India, and Mr. Shri B. M. Vyas, the Managing Director of the Gujarat Co-operative Milk Marketing Federation, Limited in Anand, India.

Uganda, Tanzania and Ethiopian delegation with Dr Verghese Kurien, the "father" of India's white revolution.

The overall objective of the South-South knowledge sharin of an improved approach to strategy, production, and cooperation in the dairy sectors of Tanzania and Uganda, with the ultimate aim of increasing local milk production and consumption. More immediate envisaged outputs were better cooperation among small milk producers; introduction of improved or adapted technology at milk collection points and processors; improved collaboration among producers and processors; streamlining of regulatory requirements; and improved capacity at the National Dairy Boards of each cooperating country.

In both Uganda and Tanzania, government and stakeholders have recognized the opportunities that the dairy sector provides. It can contribute substantially to achieving the Millennium Development Goals of reducing child and maternal mortality, while increasing income for small rural households. A crucial part of the information exchange is for participants to gain improved understanding of marketing and pricing strategies that will help them compete successfully with other beverages in the market.

The project evolved in several phases. The first was a study tour to India, focused on exchanging experiences, discussing key sector issues, reviewing the model and approach in operation, and so forth. This was completed in June 2008. The second phase was a three-day return visit and stakeholder workshops in both Uganda and Tanzania. In the final phase, the teams will link key activities with ongoing programs and World Bank-funded operations, such as linking regulatory reform activities with private sector projects to improve the business environment and developing links between small farmer associations and with agricultural advisory services.

Uganda, Tanzania and Ethiopian delegation in Gujarat India

Summary

A knowledge sharing initiative between India and Sub-Saharan Africa was launched in 2008 to collate and apply lessons from India's successful experience in developing its dairy sector to support more rapid growth of Tanzania's and Uganda's relatively slow-moving dairy industries. Participants in the exchange were exposed to a range of new strategies for increasing milk and dairy product consumption and improving marketing and production practices. The improved understanding and subsequent adoption and adaptation of these key strategies were intended to improve food security, nutrition, and incomes in the poorest communities in these two countries.

The growth of milk production in India has been spectacular—almost doubling in the fifteen years to 2007. It is now the world's largest producer, accounting for 15 percent of the total worth of some US$20 billion per annum. Twelve million farmers are involved, with nearly eighty million more employed in the dairy value chain. At the heart of the industry are village milk producers' cooperatives and collection points—also owned and run by farmers—along with processing plants owned and operated by district milk unions.

There is a buoyant regional market for milk and dairy products. Uganda and Tanzania both have good potential—as yet not fully developed—as producers. Production is growing rapidly in Uganda and the country is already estimated to be self-sufficient in milk. Most off-farm sales are processed and marketed through a large and vibrant informal sector that is able to meet a need that the formal market cannot: milk that is both cheap and readily available for which producers are paid prices that the formal sector cannot match. While this speaks well of the informal sector, it means that most of the formal sector's processing enterprises are running below capacity. In Tanzania, imported products comprise the bulk of milk sales, but production is increasing steadily. Here the informal sector plays an even bigger role than in Uganda.

There are a number of key constraints impeding the further development of the dairy value chains in Uganda and Tanzania, some of which are common to both countries—for example, the sectors' inability to cope with the seasonality of production; the lack of data for effective planning and management of the different links in the value chain; the limited capacity and coverage of dairy producer, processor, and marketing cooperatives and associations; and the poor rural feeder road network.

Summary

Constraints specific to Uganda include the lack of support services (including finance, input supply, business skills and training) critical to the efficient operation of the sector and the limited use of improved production technologies and management practices. All of these are aggravated by the general shortage of veterinary extension staff.

In Tanzania, growth is hampered by excessive regulation, resulting in high compliance costs, and by the tax regime, which acts as a strong disincentive to private sector investment. This is a major constraint for Tanzania in addition to similar constraints as in the case of Uganda.

The Indian experience identifies several key drivers that contributed to the rapid development of the dairy sector. It will be important to keep these in mind when planning the future development of the dairy value chains in the two East African countries. They include:

Minimal interference by government in the formation and governance of cooperatives (and complete integrity and transparency in their establishment and operations)
Policies and regulations that seek to reduce the cost of doing business and to provide incentives to potential investors
Efficient coordination among the various segments of the value chain
Continuous market research that results in an effective marketing system.

limited use of improved production technologies

The family members of a small household delivery milk to the village collection center after school.

Why India?

India has emerged as the world's largest producer of milk. From a milk-deficit status in the early 1960s, production has been increasing exponentially for the last two decades, growing from 56 million tons in 1991-92 to 100.9 million tons in 2007—worth approximately US$20 billion. The dairy sector is now the leading agricultural output in the country. Of total world milk production in 2007—676 million tons[1]—India alone produced 15 percent. Per capita availability of milk increased from 178 grams per day in 1991 to 246 gm/day in 2007.

India achieved this level by involving the poor as producers, distributors, and consumers. Twelve million Indian farmers (primarily small, marginal farmers and landless laborers) are engaged in milk production. The farmers are organized into 122,500 village Dairy Cooperative Societies (DCS), supplying 23 million kilograms of milk per day. According to NDDB statistics, these operate in more than 346 districts. Of the 13 million members engaged in this industry, 3.4 million are women.

The livestock sector represents approximately 27 percent of the country's agricultural GDP, with the dairy subsector accounting for approximately 70 percent of livestock output and an estimated 4 percent of agricultural GDP. In addition, it provides employment to approximately 90 million people, 83 percent of whom are women.

[1] Food Outlook – Global Market Analysis, May 2008

The importance of Milk

Milk is recognized as a vital source of good nutrition in the diets of children and adults. With nine essential nutrients, it is one of the most nutrient-rich beverages. The protein in milk contains all of the essential amino acids required by the human body. Milk is also one of the richest sources of calcium, essential for building and maintaining strong bones and important for nerve function, muscle contraction, and blood clotting. Other important minerals in found in milk include phosphorous, important for bone mineralization; potassium, needed for muscle activity and to regulate blood pressure and the body's fluid balance; and sodium, a vital component in nerves' role in stimulating muscle contraction. Milk is also a valuable source of vitamins, including vitamin A, important for regulating cell growth and in immune system integrity ; vitamins B1, B2, and B3—important for energy production; vitamin B12, essential for the growth and health of the nervous system; vitamin D, which promotes the absorption of calcium; and phosphorous, which influences bone mineralization.

Given milk's nutritional quality, there is growing evidence of the role of dairy foods in reducing risk of numerous medical disorders. There is a large body of evidence that has shown that adequate intake of milk during the early stages of life (3–13 yrs) increases bone acquisition, thereby reducing fragility fractures (osteoporosis). Calcium supplements and dairy foods have been shown to contribute to lowering the risk of hypertension and reducing blood pressure. Consumption of dairy products may also protect individuals from developing insulin resistance syndrome, a key factor for Type 2 diabetes.

How is the leading producer organized in India?

India's dairy sector is an example of pro-poor market structure. Producers are organized into Village Cooperative Societies (VCS). Collection points are also run and owned by farmers. The district milk union owns and operates the processing plant(s).

The Village Cooperative Society (VCS): The village cooperative society consists of farmer-members; 300-400 of them in the average village. Each member has a share in the cooperative and pays a small fee for each head of cattle owned. Members agree to sell the village cooperative society a percentage of the milk they produce. The village society buys milk from each member every morning and evening. The price is determined by a spot check of the quality (fat content) of the milk in each container. Payment for evening milk is made the following morning and morning milk accounted for that evening.

The staffing of the VCS: The village society regularly elects a managing committee and chairman. The committee hires several part-time employees: secretary, milk collector, fat tester, clerk, artificial inseminator, and accountant. The managing committee meets regularly with the general membership to approve all their accounts. Many societies build up reserves and declare dividends to their members.

The District Union: The village society regularly elects a managing committee and chairman. The committee hires several part-time employees: secretary, milk collector, fat tester, clerk, artificial inseminator, and accountant. The managing committee meets regularly with the general membership to approve all their accounts. Many societies build up reserves and declare dividends to their members.

The district union also sends trucks on a network of routes to collect milk from each village society twice daily. It represents all village societies and is run by a board of directors consisting of 19 members. Of these, 12 are elected from the village societies and the remaining seven include a representative of financial institutions, a nominee of the State Cooperative Department, a dairy expert, and so forth. The board makes all major policy decisions and hires a general manager to oversee day-to-day business. The district union's reserves are used for various projects, such as cattle breeding and the like.

India

The district union, Anand Milk Union, Limited (AMUL), provides its members veterinary care, artificial insemination designed to improve the quality of the cattle stock, and nutritious feed concentrates. AMUL must stay solvent in order to operate; the group's philosophy is that farmers are more committed to success when they have to pay for their inputs and services.

For example, mobile veterinary clinics visit regularly in each of the 850 AMUL villages. Members pay about US$2 per visit and nonmembers pay US$3.50. Emergency services are also available around the clock. In addition, one member of each village society is taught veterinary first-aid and his or her work is checked each week by AMUL veterinarians. The medicines these first-aid workers use are replaced free of charge each week by the mobile clinics. Finally, the district union pays up to 75 percent of the cost of setting up the first veterinary first-aid center in any member village.

AMUL owns processing plants that convert milk into nonperishable products, powdered milk, and other milk products. As a result, farmers can increase their milk production and be sure of a stable demand and price all year round. The factories now process not only milk, but also butter oil (ghee), baby food, cheese, and so on. These products are marketed by AMUL throughout India.

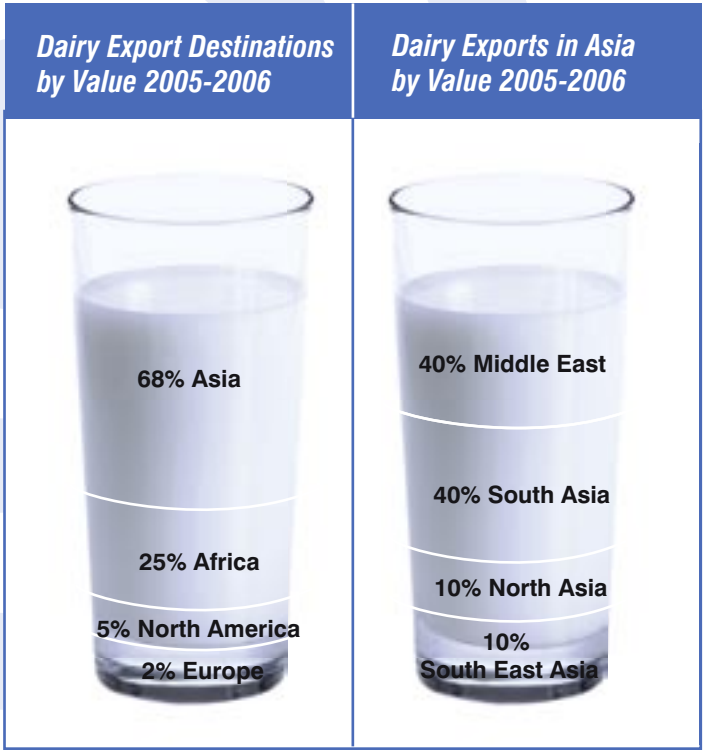
The diary sector has transformed itself from a net importer to a significant exporter of milk

India was traditionally an importer of dairy products; it stopped importing in 1993. Since 2001, the country has consistently been a net exporter of milk and dairy products, with exports increasing rapidly since 2003.

Approximately 20 percent of production is consumed onfarm, with a further 25 percent sold as raw milk to rural consumers. Twenty percent is sold as raw milk to urban consumers, while 20 percent is processed by the informal sector. The balance (15 percent) is transformed into pasteurized milk and milk products through registered and regulated processing plants and marketed through cooperatives, dairies, and vendors. Automatic milk collection units and bulk milk collectors have been installed in rural centers. This has improved average milk quality and reduced losses along the marketing chain.

In 2005[2], dry skimmed milk and cheese accounted for 43 percent and 28 percent, respectively, of total dairy exports. The remainder consisted of dried whole milk, ghee and butter oil and infant formula. Most exports are destined for neighboring countries, Africa, and the Middle East. Bangladesh is the largest market for Indian dairy products, along with Algeria and the UAE; it accounts for almost one-third of the total.

[2] Agricultural and Processed Food Products Export Development Authority's website (http://www.apeda.com)



Source: ADEPA online database (www.apeda.com)

The Anand Milk Union Limited is the principal role model and the heart of the success story

AMUL was established as a dairy cooperative in India's Gujarat state in 1946. AMUL is the brand name managed by an apex cooperative organization, the Gujarat Cooperative Milk Marketing Federation, Ltd., which today is jointly owned by some 2.6 million milk producers in Gujarat.

AMUL is the largest food brand in India and the world's largest pouched milk brand, with an annual turnover of US$1,050 million (2006–07)[3]. AMUL's members supply it with an average of approximately 10 million liters of milk per day. The brand's total milk procurement by the member unions during the year 2006–07 averaged 6.7 million kilograms per day, representing growth of 4.5 percent over the previous year's figure. It produces a range of dairy products, including butter, powdered milk, ghee, cheese, and cream, and exports to the Middle East, Asia, China, Africa, and Australia, among others.

There are several other enterprises—private, cooperative, multinational, and public—working in the dairy subsector. AMUL's turnover, with annual dairy sales of US US$510 million, is more than double that of Nestle, its nearest competitor.

The AMUL model focuses on empowering farmers by: ensuring market access to rural produce; incentive pricing; promoting employment, with emphasis on women's employment; ensuring nutrition for the masses (particularly for children); and strengthening education and political democracy in villages. The replicability and scalabilty of this model are reflected in the current status of the Indian dairy industry: by adopting the AMUL model, the sector has successfully organised 12 million farmers into cooperatives, giving them control of production, processing, and marketing of their own output.

A major player in the dairy sector:
AMUL is the largest cooperative society in the Indian dairy sector[4] While there are government, multinational, cooperative, public, and private sector players involved in this sector, AMUL alone dominates the share of daily sales and production.

[3] AMUL Website (http://www.AMUL.com)
[4] Source: Rabobank " India: The World's Biggest Milk Producer," May 2005

The National Dairy Development Board a center of excellence in dairy sector development

Legislation establishing the National Dairy Development Board (NDDB) was approved in 1965. The board drew up a program for the development of the sector across the country—Operation Flood—implementation of which began in 1970 and ended in 1996. It sought to raise rural incomes by increasing milk production throughout the year and making affordable milk available to all consumers. India's status as the world's largest milk producer was a direct result. At the heart of the program were village milk producers' cooperatives, which procured milk and made inputs (such as feed) and various services (such as artificial insemination) available to their members.

NDDB's[5] subsidiaries include Mother Dairy, which markets approximately 2.8 million liters of milk daily in the markets of Delhi, Mumbai, Hyderabad, and other cities. Mother Dairy milk has a market share of 66 percent in the branded sector in Delhi, where it sells 2.3 million liters daily and undertakes marketing operations through some 14,000 retail outlets and 845 exclusive outlets.

Direct milk sale at a village collection center.

[5] National_Dairy_Development_Board (http://www.nddb.org)

The case of Uganda

Background

Uganda has a total area of 241,551 kilometers^2, 17 percent of which is lakes and wetlands. The population, currently estimated at 30 million, is increasing at an annual rate of 3.2 percent, with 85 percent living in rural areas. The average per capita income was estimated to be US$370 in 2007. The economy has grown by an annual average rate of 7.2 percent over the past decade.

A Ugandan milk herd

Agriculture is the mainstay of the economy, contributing slightly less than one-quarter of gross domestic product (GDP), employing more than 77 percent of the economically active population, and generating 85 percent of export earnings and the bulk of the raw materials used by the mainly agriculture-based industrial sector.

Uganda has a comparative advantage in dairying

Uganda has good potential for livestock production in general, and dairying in particular, thanks to its abundant land area, fertile soil, favorable temperatures, and high annual rainfall. The total cattle herd is estimated to be 5 million[6], of which 5 percent[7] (some 240,000 head) are improved dairy animals. Population growth rates of local and dairy cattle are estimated at 3 percent and 6 percent per year, respectively (Staal and Kanguongo 2003).

[6] Another source (DDA, 2008) puts this figure at closer to 8 million head, rising gradually from 4.7 million in 1986), with the proportion of improved dairy breeds being approximately 8% (see Footnote 3). The highlights the data inadequacies raised in Footnote 9.

[7] It is interesting that the situation has hardly changed from the mid-1990s, when it was estimated that improved dairy cattle made up between 3.4% and 4% of the national herd (ILRI, 1996).

Current milk production trends are promising

Total milk production per year is estimated at 1.3 billion liters, of which 40 percent is consumed on the farm and 40 percent is marketed through informal channels. The remaining 20 percent enters the formal market. The contribution of the country's four regions to total milk production is: central (34 percent); eastern (7 percent); northern (8 percent); and western (51 percent). Milk production from local breeds averages 2 liters of milk per head per day with a lactation period of 200 days—considerably below the performance of the improved breeds, which can produce as much as 990 liters per head per year.

Milk production is strongly influenced by the seasonal distribution of rainfall and the resulting fluctuation in the quantity and quality of pasture. As the rainfall is pattern bi-modal over much of the country, with two distinct dry seasons, output levels fluctuate significantly[8].

The subsector comprises a limited number of commercial dairy farms with large herds of exotic dairy cows (Holstein-Friesian, in particular). The bulk of production, however, comes from farms that are not specialized dairy units but mixed, that is, crop and livestock combined, with milk just one of several products being marketed, and with some milk is consumed onfarm. A significant proportion of milk production also comes from zero-grazing units that have been established by farmers with only small land holdings, mostly living close to a market. Typically, these farmers, a significant proportion of whom are women, keep between one and three dairy cows in a stall on a zero-grazing regime. As land is usually insufficient to keep a bull, these farmers make regular use of AI services.

The market in Uganda is poised for strong growth

The consumption of milk[9] has increased steadily since the turn of the century although the per capita amount has hardly increased. Annual consumption levels, which average approximately 40 to 50 liters per capita, are below those of neighboring countries and well below the internationally recommended (FAO/WHO) level of 200 liters. There are significant regional differences in per capita consumption levels, ranging from 91.3 liters per annum in the central region to 15.6 liters in the northern region (K2Consult (U) Ltd. 2001).

[8] During the dry season in 2009, deliveries of raw milk to the principal dairy in Kampala fell by some 75% for a period of approximately two months, for example (and this was in spite of a doubling of the producer price).

[9] Representing that proportion of production that is not consumed on-farm/fed to calves.

The case of Uganda

Source: Elepu, 2008

Annual milk consumption in Uganda. 2001 to 2007 in million litres

Approximately 90 percent of marketed milk is channeled through the large and vibrant informal market (Keyser 2009); this is why unprocessed raw milk[10] is the most commonly consumed type. The next most common type is processed and packaged (both pasteurized and UHT), followed by boiled unpackaged milk.

The informal market comprises both direct sales by producers to consumers in the neighborhood of their farms and sales to traders, vendors, associations who transport the milk to local or urban markets. The latter are estimated to account for 60 percent of farm sales, though this proportion varies significantly among regions (ILRI 1996 and EPRC 2009).

[10] Although almost all milk is boiled before being consumed – Keyser (2009) estimates that only 40% of the milk marketed by the informal sector is, in fact, sold completely raw without any processing/chilling.

The high demand for unprocessed milk arises because informal traders are able to meet a need that the formal market does not: ensuring that milk is both readily available and cheap—meeting the needs (in terms of both convenience and price) of many low-income households[11], while also paying prices to producers that the formal market cannot match[12]. For example, in 2002, unprocessed milk was being sold at a discount of 33 percent against processed milk[13], while farmers were receiving a price premium of 12 percent (King 2002). The quality of the unprocessed milk, however, can be poor, as it is sometimes adulterated with water or chemical preservatives.

Exported produccts have increased in the recent past

The formal market for milk is concentrated in the Entebbe-Kampala-Jinja conurbation. It is showing a healthy rate of growth: a recent study showed an 11 percent annual rate of increase in the sales of processed milk (pasteurized, UHT, yogurt, ice cream, and so on) between 2003 and 2006.

Exports:

The export of both UHT milk (from the two plants in Mbarara and Kampala) and milk powder has increased significantly in the recent past: from less than 0.20 million liters in 2006 to more than 1.40 million liters the following year. The bulk of the powder is produced by SAMEER Agriculture and Livestock, Ltd. (SALL), which took over the assets of the Dairy Corporation and boosted its processing capacity by installing a 200,000 liter powdered milk plant at its Kampala premises in 2008 and began to export the product. Nevertheless, annual exports of UHT to neighboring countries, which averaged 0.55 million liters between 2000 and 2007, amounted to less than 2 percent of total processed milk and less than 1 percent of total UHT manufacturing capacity. Clearly, there is potential for a significant expansion in exports.

[11] Although in the early 1990s, 61% of the households, at the lower end of the income spectrum, were responsible for only 20% of marketed milk consumption – with most of this being raw milk (ILRI, 1996).

[12] It is important to understand that the development of the informal sector began in earnest during the period of civil disturbances between 1977 and 1986, when the DC was unable to service its suppliers and it suffered fromwidespread looting (Keyser, 2009).

[13] Keyser (2009) estimates the discount to be even higher – between 55% and 60%.

An estimated 2 percent of production is exported to regional markets (Elepu 2008)[14]. In addition, there is a significant, yet unquantified, informal cross border trade in raw milk. The principal markets are Rwanda (where 2.6 million liters were imported from Uganda in 1995, for example) and Kenya (where milk deficits appear likely to continue for some time). Democratic Republic of Congo, Sudan, and Tanzania also feature in the export statistics.

Quality test at milk collection centre

Imports:

Dairy imports, comprising mainly skimmed milk, butter, and infant formula, have declined in recent years, from 6,000 tons in 2003 to only 1,000 tons per annum today; they are likely to continue to decline as local production of milk powder and UHT milk expands. Indeed, some observers have estimated that the country is now at or near self-sufficiency in milk production.

Outlook:

There is consensus that although the country is now at or near milk self-sufficiency, there remains a large latent demand milk that could be realized through increased efforts in the areas of marketing and distribution—changing the existing balance of activities, which is very much focused on stimulating production. These efforts could include: (i) adopting a school milk program; (ii) expanding exports to Kenya, which has a huge unmet demand for milk and milk products; (iii) establishing a milk powder plant and fully liberalizing milk collection in the southwestern milkshed.

In addition, it is estimated that considerable potential exists to expand milk exports and dairy products in the region and beyond, to Sudan, Burundi, Rwanda, DRC, and the rest of the COMESA region, for example (DDA 2008). The reduction (and complete abolition by 2010) of tariffs on trade among the member states of the East African Community (EAC) will provide a further incentive to such an expansion, although nontariff barriers, such as quality standards and sanitary and phytosanitary measures, may well negate any moves in this direction.

[14] Although the figures presented in his paper would put the amount at less than 1 per cent.

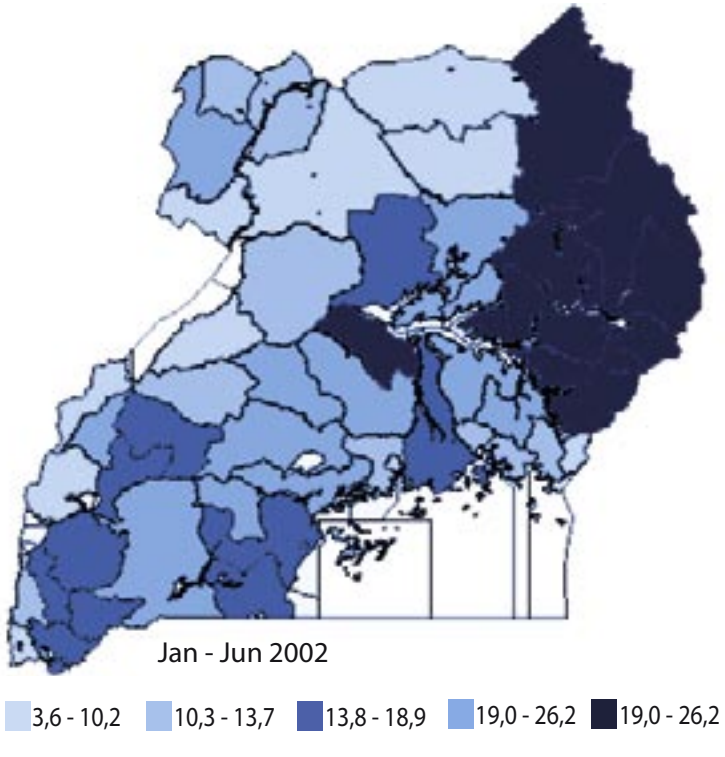
Dairy farm types in Uganda

Farming methods can be classified as three types: extensive, semi-intensive, and intensive. The extensive system characterizes the seminomadic pastoralists in the northern regions and is based on small East African shorthorn Zebu cattle. The semi-intensive (agropastoralist) system is characteristic of the southwestern part of the country and is based mainly on the larger-bodied Ankole Longhorn type of cattle. This system also involves varying proportions of crossbred dairy cattle.

Intensive milk production is a system that requires high levels of capital investment (exotic/grade dairy cattle, housing, and equipment) and high levels of management (zero- and paddock-grazing, supplementary feeding, and veterinary care). Geographically, it is characteristic of the area between the two other systems, especially near the major urban centers around Lake Victoria (Staal and Kaguongo 2003).

The main constraint to the intensive system is competition from food and cash crop production, which has created a shortage of land for fodder production. The extensive system provides more land for livestock but it is marginal and pest-infested. It is the semi-intensive, mixed crop and livestock system that has the greatest potential for increased milk production, through improved management of the Ankole cattle and crossbreeding. In fact, recent surveys have revealed more widespread upgrading of local cattle than had previously been reported (Staal and Kaguongo 2003).

Uganda's Cattle Corridor
Percentage of agricultural households rearing local cattle



Source: Balikowa (2008)

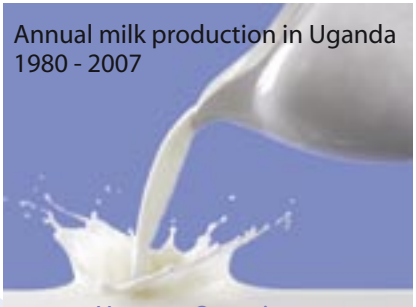
The case of Uganda

Annual milk production

Annual output is currently estimated to be more than 1.50 billion liters (table 3), of which approximately one-third is consumed on-farm and the balance marketed (DDA 2008).

The logistics of milk collection

Most farmers producing milk commercially transport the surplus raw product to the nearest collection center, either directly (mainly by bicycle) or by making use of vendors, who also sell unprocessed milk directly to consumers. The centers are estimated to account for less than 10 percent of marketed milk, with the balance being channeled through the informal market. Almost no processing is carried out on-farm.



Annual milk production in Uganda 1980 - 2007

Year	Quantity in million of litres
1980	436
1985	416
1990	481
1995	551[16]
2000	700
2001	900
2002	1,000
2003	1,100
2004	1,200
2005	1,300
2006	1,400
2007	1,500

Source:
Twinamasiko, 2001, DDA, 2006 and EPRC, 2009.

The collection centers:

In the 1990s, almost all of the 60 collection centers in the country— located primarily in the southwestern milk shed area—belonged to the Dairy Corporation (DC). Following the liberalization of the subsector and the transfer of the DC to SALL, the network of collection centers expanded. As a result, there are currently between 90 and 100 centers, spread throughout the southwestern, western, central, and eastern regions; 70 are owned by SALL. Each center comprises a 2,000 to 5,000-liter capacity milk cooler and a generator. Approximately 50,000 farmers are now marketing their milk through these facilities. At the collection centers, milk is sold by the operators both to local consumers directly and to retailers—in raw form in almost all instances. The centers also distribute the milk to small processors who produce pasteurized milk and yogurt.

Insulated tanker vehicles are used to transport chilled milk from the collection centers to the processing plants and raw milk outlets in the urban centers. There are currently 35 tankers owned by private milk traders and a further 24 owned by cooperatives.

[15] Another source gives a figure of 430 million litres (ILRI, 1996); see Footnote 7.

Processing:

In 2001, seven dairy companies were pasteurizing, packing, and selling milk, mainly in urban areas in central and southwestern areas; two processors were producing only cheese. By 2008, the number had grown to 12 private milk processing enterprises. Most are located in the central and southwest milk sheds and are operating at far below 30 to 50 percent capacity (NARO 2001), far below their potential combined output of 343,000 liters per day (IFPRI n.d.).

Processing milk company in Uganda

As might be expected, milk processing and the production of dairy products have followed a trend similar to that of raw milk production (Elepu 2008). Pasteurized milk accounts for approximately 60 percent of the total volume of processed product, with the balance made up of yogurt, ice cream, sour butter, ghee, and cheese.

The dairy industry has been particularly successful in recent years, being able to supply the local market (raw milk and the processing industry) for much of the year, with the exception of the generally dry months of March and August. Indeed, milk production has consistently exceeded consumption during rainy periods which has encouraged the development of a small milk processing industry (butter, yogurt, cheese, and ice cream, in particular). It has also, however, resulted in farmers' milk sometimes being refused by milk collection centers in the more remote areas that are unable to find a market. During these times of glut, farmers are forced to pour milk away. In addition, significant losses of milk have been recorded elsewhere along the value chain (EPRC 2009): 5.8 percent at the farm level, 11 percent during transport, and 10 percent during processing[16] (DDA 2008[17] and CTA 2009).

[16] Another estimate puts the total even higher – at 37% (IFPRI, n.d.).

[17] However, how these estimates were arrived at is not clear. Other conflicting figures in the literature throw considerable doubt on most data used in documents on the dairy sector – for example, in one study (Twinamasiko, 2001) production was estimated to be 0.587 million litres; in another (ILRI et al, 1996) it is estimated to be 0.42 million – a difference of almost 30%. Indeed, as with all data on the country's agricultural sector, questions can be asked about their accuracy (see MAAIF, 2006, for example).

The case of Uganda

The structure and activities is shown in the Ugandan dairy value chain. Over 800,000 households keep cattle. There are about 60 milk cooling centers (with a total capacity of 550,000 liters per day), 90 percent of which are located in the western and central regions. There are 25 bulk milk traders, who own 35 insulated milk tankers (total capacity 189,000 liters) who deliver raw milk to the informal market. Another 24 tankers (capacity 253,700 liters) deliver milk from cooperative cooling centers to 12 milk processing plants and minidairies (capacity 297,300 liters per day). In addition to formal processors, there are many microprocessors, but their combined capacity is small. There are 3 UHT plants (Kampala, Mbarara, and Kisoro) and one milk powder plant (Kampala). As in the case of Tanga Dairies Cooperative Union (TDCU) in Tanzania, there are several farmer cooperative unions (for example, Amate Gaitu of Mbarara) that sell milk to private processors.

Ugandan household with her cattle

Uganda Dairy Industry Value Chain

Uganda Dairy Industry Value Chain

Milk production

Structure

1. Exotic and crossbreds (intensive) 1.3 mil. cattle by 100.000 households
2. Local cattle (ext. & s. intense); 5,7 mil. cattle by 800.000 households

Activities

1. Intensive cut and carry (zero grazing) system. Use of AI/exotic bulls. Tick control
2. Semi-intensive grazing and crop residues tick control.
3. Extensive grazing; tick & Tsetse control

Bulking & Cooling

Structure

1. Many bulking centres without cooling equipment
2. About 60 cooling centres – 90% in Central & Western regions. Handle about 10% of marketed milk

Activities

1. Quality control
2. Cooling

Processing & Packaging

Structure

1. Many micro-scale processors. Handle insignificant volumes of milk
2. Operational dairy plants including 3 for UHT and 1 milk powder plant

Activities

1. Quality control
2. Pasteurization (batch; continuous flow)
3. Production of products
4. Packaging

Transport & Distribution

Structure

1. 100,000 itinerant traders now use metal milk cans instead of plastic
2. less than 50 milk traders with about 60 insulated milk tankers. Total capacity over 400,000 litres

Activities

1. Transport of raw milk by large number of informal operators on foot and bicycles.
2. transport of raw milk and processed products using vehicle.

Retailing

Structure

1. A large number of mobile hawkers (by foot, bikes, bus, vehicle) especially within 20 km of major towns. They supply bulking centres, kiosks, consumers with raw milk.
2. Hundreds of milk kiosks, shops and a number of super markets vending hot milk and processed products

Activities

1. Delivery of raw milk to bulking centres, kiosks and households.
2. selling of fresh and cultured milk, shops and supermarkets, may sell imported UHT/powder milk and other dairy products.

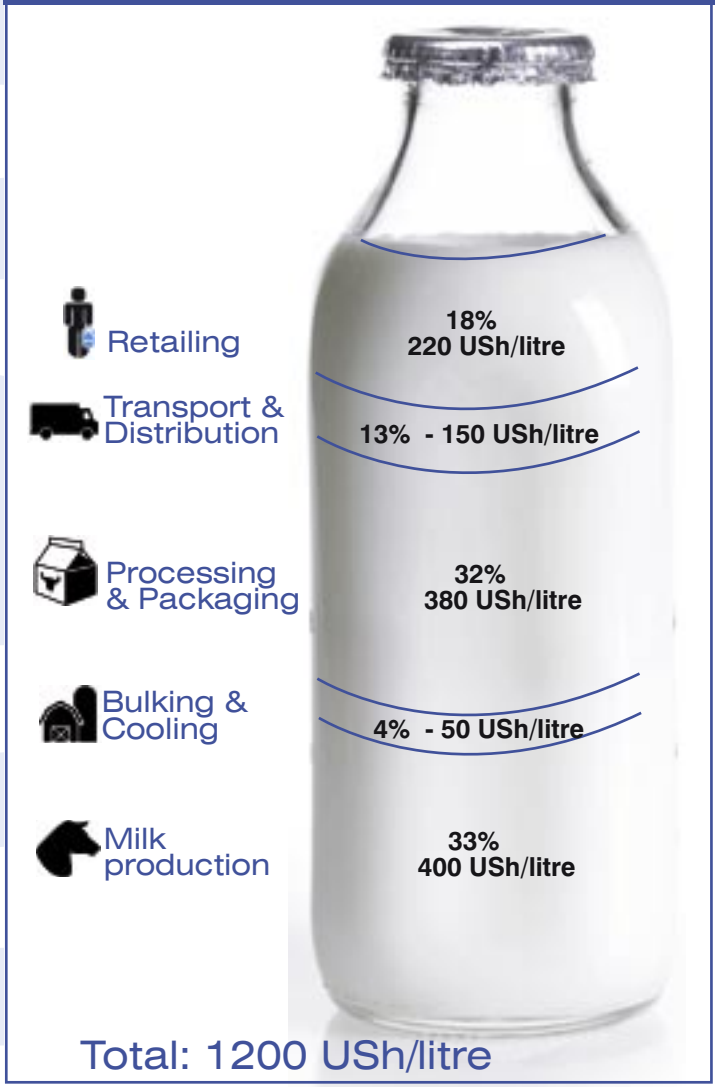
The case of Uganda

Prices

Milk prices vary by location and season. The southwestern milk shed generally has the lowest producer prices. Prices are higher in the dry season(s) when production falls. It is also surmised (although no time-series local data are available to substantiate this) that outbreaks of diseases such as foot and mouth, which lead to restrictions on the movement of livestock, result in price spikes in the affected areas and beyond. Nevertheless, it is clear that with production being closely tied to rainfall, producer milk prices fluctuate significantly (with figures of between UShs 80 and Ushs 400 per litre in a single year, being quoted in the literature).

The income elasticity of demand for milk is greater than one, meaning that with the projected continued growth of the economy and the associated increase in personal incomes, the demand for milk can be expected to expand rapidly. Indeed, some projections have shown demand outstripping production by 2010. This would provide new opportunities for the industry (IFPRI n.d.)

Share of revenue in the Uganda fresh milk value-chain



After a shaky start, the industry now has a strong institutional base

The Uganda National Dairy Farmers Association (UNDFA), established in 2001, is the umbrella body for dairy farmers, while the Uganda Dairy Processors' Association (UDPA) is the apex body for dairy processors, large and small. Dairy traders are organised into the Uganda National Dairy Traders' Association (UNDATA).

The industry itself has formed the Uganda Dairy Stakeholders Association (UDISA) to represent its constituent organizations and their members in dealings with the government and other parties. At the lower levels, dairy farmers are members of a number of associations and registered cooperatives that supply them with bulking, transportation, and marketing services included advisory services. There are more than 100 associations for milk traders and processors and dairy cattle breeders. However, many of these organizations have suffered from similar problems to those of the Dairy Corporation (DC) (discussed below) and no longer handle large volumes of milk.

The DC was established under the Dairy Industry Act of 1967 to both develop and regulate the subsector. It soon became the largest milk processor in Uganda. It invested heavily both in the smallholder milk collection infrastructure concentrated in the south-western milk-shed, and in dairies in Kampala and Mbale that produced processed milk and a number of other dairy products. For more than 25 years, the DC was the monopoly body responsible for collecting, processing, and marketing milk in the formal sector.

With the policy and institutional changes in the milk subsector that began in the early 1990s, a number of private entrepreneurs, cooperatives, and associations began processing and marketing milk and dairy products, competing directly with DC. This further aggravated its already severe financial situation and continuous subsidies were required from the government. It also suffered from many technical inefficiencies—high levels of milk wastage in its operations, for example. Nevertheless, even after the entry into the market of a number of competitors, DC still accounted for 64 percent of milk sales in 2001 (NARO 2001) and in 2005, 13,000 farmers were regularly selling milk to the corporation through 60 collection centers, most of which were located in the southwest. Indeed, the company currently helps its suppliers obtain credit and provides training on the technical aspects of milk production.

The case of Uganda

The DDA was established as a semiautonomous agency of the Ministry of Agriculture, Animal Industry & Fisheries (MAAIF) under the revised Dairy Industry Act and became operational in 2000, with a mandate to regulate, coordinate, and harmonize the liberalized sector in order to achieve and maintain self-sufficiency in milk production and dairy products[18]. A number of statutes have since been promulgated under the act to facilitate its regulatory functions and, since then, it has been particularly active in enforcing milk hygiene standards and quality control. It now requires all milk traders to be licensed as meeting minimum public health and milk quality standards (657 traders were licensed in 2005/06, for example[19]) and provides training in these areas.

As a result, there has been a significant improvement in the quality and safety of milk and milk products. This has in turn improved access to high-value markets, both locally and abroad. This important work notwithstanding, most of the milk that is marketed (80 percent) is still traded outside the purview of the DDA.

There are a number of international NGOs (such as Land O'Lakes, Heifer Project International (HPI), Technoserve, and Send-a-Cow) working through groups to provide dairy animals to DDA members. For many years, the subsector has also received considerable support from a number of development partners, including the ADB, DFID, GTZ, UNDP/FAO, USAID, and the World Bank. Most recently, both Danida and France have provided significant levels of support.

[18] Under the 1967 Act, a Dairy Board was to have been established, with similar functions. However, it was never set up.

[19] Approximately 15 million litres of raw milk were being sold each year in Kampala without licence in the mid 1990s,for example (ILRI, 1996).

The principal constraints in the case of Uganda

The principal constraints to the development of the dairy industry, in the areas of production, processing and marketing, are:

Limited incentives to enter the formal market value-chain:

There is still little incentive for most smallholders to supply the formal, as opposed to the informal, market. Efforts need to be focused on ways to both encourage producers to supply more milk to the formal dairy value chain, and to "formalize" informal sector operations and operators. Recent efforts by the DDA have focused on doing this by, for example, proactively engaging with the informal sector— rather than harassing and trying to eradicate it—in the areas of training and certification in order to ensure quality and safeguard public health.

Limited use of improved new production technologies and management practices:

The principal cause of the limited productivity gains made by the national herd has been the low rate of adoption of improved management practices and new technologies. For example, the use of AI services is restricted to between 2 percent and 15 percent of farmers because of high cost, restricted access, and doubts about AI's efficacy. Government policy has also resulted in the import of semen being significantly below demand (by an estimated one-third). At the same time, there is a strong and continuous demand for dairy breeding stock. All this suggests that, given the favorable agroclimatic conditions in much of the country, there may be enormous potential for boosting milk production by upgrading the national dairy herd.

Lack of financial services:

There is a need to provide credit and other financial services— to dairy producers for the purchase of inputs and improved breeding stock; to those involved in marketing, to meet their working capital requirements; and to processors, to facilitate their procurement of equipment and machinery. Credit is currently limited and costly.

Shortage of other essential services:

There is a shortage of inputs supply and of business and training/advisory services. Additionally, the limited uptake of improved technologies and techniques is aggravated by a general shortage of veterinary extension staff.

The case of Uganda

Lack of processing capacity:

A high proportion of annual production is lost by the failure to convert surplus milk produced during the rainy seasons into longer-lasting, high-value products (Keyser 2009). This results in loss of producers' income and of export revenues to the economy. It also costs farmers as it creates an unpredictable income flow over the year.

Inadequate infrastructure:

The condition of the physical infrastructure required for raw milk marketing and subsequent processing—rural feeder/access roads, cooling facilities, electricity network, and the like—is poor, particularly in the northern and eastern milk sheds.

Weak co-operative structure:

Despite of their long history in the subsector, most of the producers' groups, associations, and cooperatives are weak and have failed to realize their potential to improve milk and dairy products processing and marketing. They have also failed to provide a unified voice to lobby effectively on behalf of the subsector.

Data:

Information and data on the number of dairy cattle and other key segments in the value chain are, for the most part, subjective and highly contradictory. This complicates planning the future growth of the industry and deters new investors from involvement in the subsector.

The case of Tanzania

Background

Masai Farmer in Tanzania

Tanzania has an area of approximately 886,000 kilometers, of which 6 percent is arable and more than one-third made up of permanent pastures. The remainder is mainly forests and woodland, often infested with tsetse flies and home to a wide range of wildlife. Only half of the estimated 50 million hectares that are suitable for grazing are currently being used.

The 2009 population is estimated to be 40 million, with approximately 80 percent of the households rural. Rural population density averages approximately 35 per square kilometer. Some 25 percent of the agricultural householders are classified as livestock keepers, although most also practice arable husbandry. Five percent of livestock keepers have dairy cattle.

By 2010, the national cattle herd will comprise a projected 19 million Zebu cattle and 0.5 million dairy (cross/grade) animals, increasing by 1.7 percent and 6 percent per annum, respectively. The number of small stock, 80 percent of which are goats, is projected to be only slightly less than the cattle herd. Approximately 70 percent of the cattle are located in 9 of the country's 20 regions, in the Central Lake Victoria "Cattle Corridor," which accounts for approximately half of the total milk output. Almost no livestock are found in 7 of the country's 20 regions because of tsetse flies.

The cattle used for milk production include mixed Indo-African cattle, which are suitable for both milk and meat and are found over much of the central part of the country; imported dairy breeds, found mainly in the Arusha-Kilimanjaro area (the home of two-thirds of the national dairy herd); and crossbreed dairy cattle produced by the government's AI program. There are also a number of small dairy farms close to the principal urban centers of Arusha, Dar es Salaam, Iringa, Mbeya, and Tanga.

From a low base, milk production has steadily increased

Almost 80 percent of milk production, amounting to approximately 1 million tons per day, is currently produced by the local Zebu cattle, which are husbanded semi-intensively in the humid to semiarid agroclimatic zones by approximately 90 percent of the country's cattle-keeping households The animals produce little more than 1 liter per day (200-day lactation period). The other 20 percent of total milk production is produced by dairy cattle, which account for some 95 percent of the volume of marketed milk. One-third of the total production is estimated to be consumed on-farm by the family or fed to calves.

Production is estimated to be increasing steadily at an annual rate of 2.6 percent. However, this is less than the rate of increase in demand. Indeed, demand has exceeded supply for at least the past 30 years and ILRI projections show that the deficit, currently more than 90 million liters per annum, or some 9 percent of production, will widen unless there is a rapid increase in the number and productivity of dairy cattle (figure 15). The current production gap is covered by imports.

Self-sufficiency in milk production is unlikely to be realized from an expansion of the present dairy herd, given the high opportunity cost of land in the main production areas and the relatively high cost of production because of the need to purchase fodder and feed. There is some potential for more intensive production ("dairy ranching") from the local Zebu herd in the cotton-tobacco-cashew nut production zone. This, however, would involve crossbreeding through an expansion of AI services, the use of supplementary feeds, improvements in animal health services and infrastructure, and a more efficient milk collection network. Production in this zone would, moreover, be subject to seasonal fluctuations of up to 50 percent between the seasons due to the shortage of available pastures.

Past government involvement in the sector

Until the liberalization of the economy as a whole in the mid-1980s, the government was heavily involved in milk production, processing, and marketing. Much of the support from the development partners was, for this reason, directed to government and parastatal dairy farms and processing plants, rather than smallholder development. Many of these publically funded schemes collapsed during the 1990's, leaving only a few parastatal dairy farms operating. The government also regulated the market through price setting and other interventions.

The informal market dominates

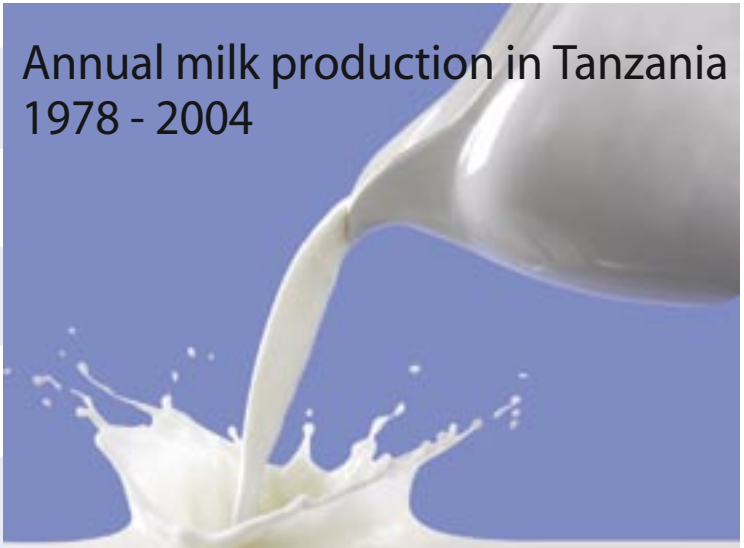
An estimated 90 percent of milk consumption is currently supplied by the informal market. The product is affordable, competitive, and provided directly by hawkers (33 percent of the total) or sold directly from farms (60 percent); the balance is made up of sales by cooperatives and by processors. The hawkers purchase the milk directly in loose, nonpasteurized form and deliver it to households on a regular basis. Formal sector processors, for the most part, have to compete with the informal sector in obtaining their milk from farmers and selling their products to consumers. As a result, the majority of formal processors have failed because of:

(i) Competition from the informal sector and the low margins realized from producing the pasteurized product (utilities and transport, in particular)

(ii) Costs of complying with hygiene and other regulations

(iii) The impact of value-added tax levied on processed products.

Those processing units still in business are operating at an average of only 50 percent of their installed capacity.



Annual milk production in Tanzania 1978 - 2004

Year	Quantity in million of litres
1978	1,185,145
1984	1,214,857
1989	1,321,272
1994	1,458,708
1999	1,615,414
2004	1,795,516

Source: NDDB

The case of Tanzania

Annual milk consumption in Tanzania

Annual milk consumption in Tanzania. 1978 to 2004 in million litres

1978	1984	1989	1994	1999	2004
547,999	573,925	623,915	697,782	784,593	889,036

Milk production
A dairy farmer in Kilombero District milking two improved cows

The business model for most dairy farmers in Tanzania is based on the ownership of two cows.

Assets: 2 cows

Technology (for milk hygiene):
Two (2) aluminum milk cans (15 litre capacity) @ Tsh. 40,000[21]
One (1) milking bucket (10 litre capacity) @ Tsh. 20,000
One (1) strip cup (1 litre capacity) @ Tsh. 5,000

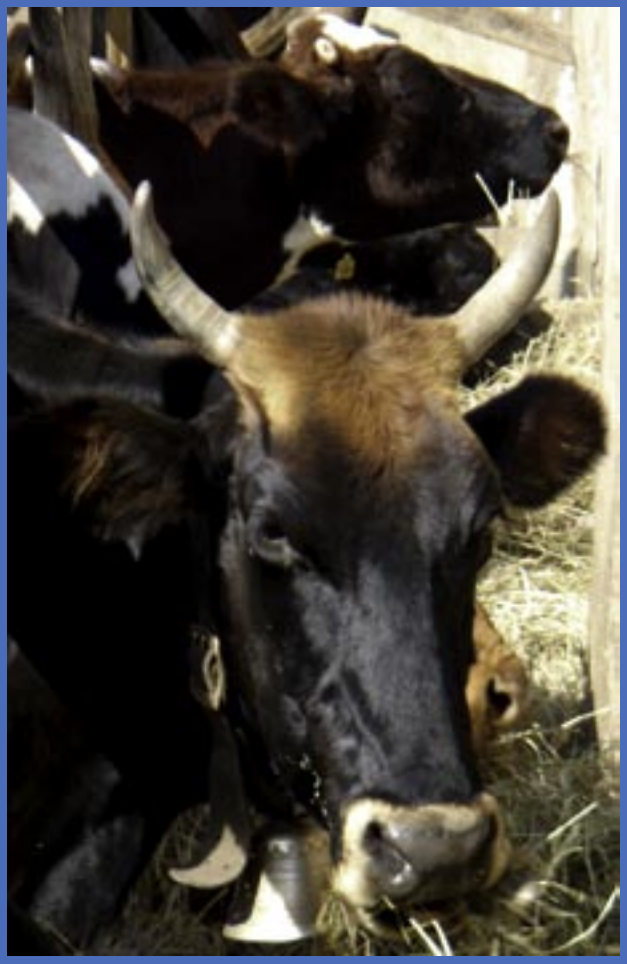
Monthly:

Income		**Expenditure**	
Milk production	480 litres	Fodder	30,000 Tsh
Milk for calves (1)	60 litres	Maize bran (10 tins ~ 200 liters)	10,000 Tsh
Milk for household	60 litres	Sunflower cake (3 kgs)	3,000 Tsh
		Minerals (4 kgs)	5,000 Tsh
		Other	
		Veterinary drugs & services	31,500 Tsh.
		Labour	25,000 Tsh.
Milk sales @ 600 Tsh.	**360 litres 216,000 Tsh**	**Total Expenditure**	**104,500 Tsh**

Monthly Nett Income (cash) 111,500 Tsh

[20] Tsh. 1,300=USD 1,00

The case of Tanzania



There are significant monthly fluctuations in milk production (and sales), depending on the quantity and quality of available fodder (usually natural pastures). Controlled data (from a large farm in Morogoro) give the following factors for converting monthly sales to annual sales taking the seasonal fluctuation into account. Factors for January through December, respectively are: 9.8; 11.7; 8.9; 9.4; 10.8; 10.7; 12.1; 16.0; 17.9; 19.5; 15.9; 10.8. Taking the conversion factor for September (17.9), the annual gross margin can be estimated as 216,000 x 17.9 – 104,500 x 12 = 2,612,400 Tsh. (US$ 2,010) Gross margin per cow per year is approximately US$ 1,000. This is high compared to the national average of nearly US$ 300 per cow, mainly because the farmer has a niche market for his milk (urban consumers and milk shops). If she were to sell his milk to a collection centre, she would receive about half of the current price and her margin per cow would approach the national average.

Fluctuations in monthly milk production can be significantly reduced by supplementing the feed given to the cows with molasses-urea-mineral (MUM) blocks. In India, this technology was introduced to dairy farmers by the NDDB in the 1980's. In addition to causing a significant increase in milk yield, fertility and live-weight also improved. The cost-benefit ratio (based on milk alone) ranged from 1:2 to 1:4. A dairy farmer group in Kilombero has started production and use of MUM blocks. Initial results are encouraging. However, the mixing of the ingredients and pressing of the blocks which is currently done manually could probably be improved by using more appropriate technology from India.

Raw milk trading by hawkers

Hawkers buy raw milk from farmers and resell it to collection centers, processing plants, milk shops, or directly to consumers. During the glut (rainy) season, they tend to sell relatively more milk to the first two categories, but when milk becomes scarce, more is sold to consumers because a higher price is offered. Most hawkers in the central corridor use bicycles to transport milk, over a radius of up to 20 kilometers. During the dry season, cattle may migrate to distant grazing areas beyond bicycle range. This has led to an increasing number of hawkers using motorcycles—which also can carry a greater volume of milk.

All of these factors affect the hawkers' gross margins. Milk is usually transported in 20 liter plastic containers that are difficult to sterilize and therefore reduce the quality of the milk. Metal (aluminum or stainless steel) milk cans, although recommended, are more expensive and probably more difficult to transport by bicycle. India is the biggest (and cheapest) supplier of containers: a 20 liter aluminum milk can retails for about T Sh 50,000. Three of these can go on one bicycle for a total of 60 liters per trip. The total investment in technology, including the bicycle, is on the order of T Sh 300,000.

This is equivalent to a monthly income of about T Sh 50,000, which is less than the minimum wage. However, one has to bear in mind that this is a part-time job (no more than half of a working day) and that in rural areas there are few cash-based employment opportunities.

Annual Income	
Milk sales; 13,500 liters (9,000 x 280 + 4,500 x 350)	**4,095,000 Tsh**
Annual Expenditure	
Milk purchases (9,000 x 230 + 4,500 x 300)	3,420,000 Tsh
Losses (1%)	34,200 Tsh
Bicycle repairs	50,000 Tsh
Total Expenditure	**3,504,200 Tsh**
Annual Gross Margin:	**590,800 Tsh**

The case of Tanzania

Milk collection/bulking

In the Central Corridor, the ideal (and average) initial capacity for a milk cooling tank is 1,000 liters. This means that during the peak production period, it will handle about 1,300 liters a day, but only 700 liters per day in the lean season. Excess milk has to be removed from the collection center by more frequent visits by the milk tanker. A 1000 liter cooling tank ex-India costs about T Sh 12 million, c.i.f. Dar es Salaam. Where there is no electricity, the cooling tank can be driven by a 10 KW wind turbine costing about T Sh 50 million. Milk testing equipment includes a lactometer/refractometer, test tubes and racks, measuring cylinder, pipettes, and beakers. Assuming that the building housing the tank is rented, the total investment to establish a milk collection center, without electricity, is approximately T Sh 65 million.

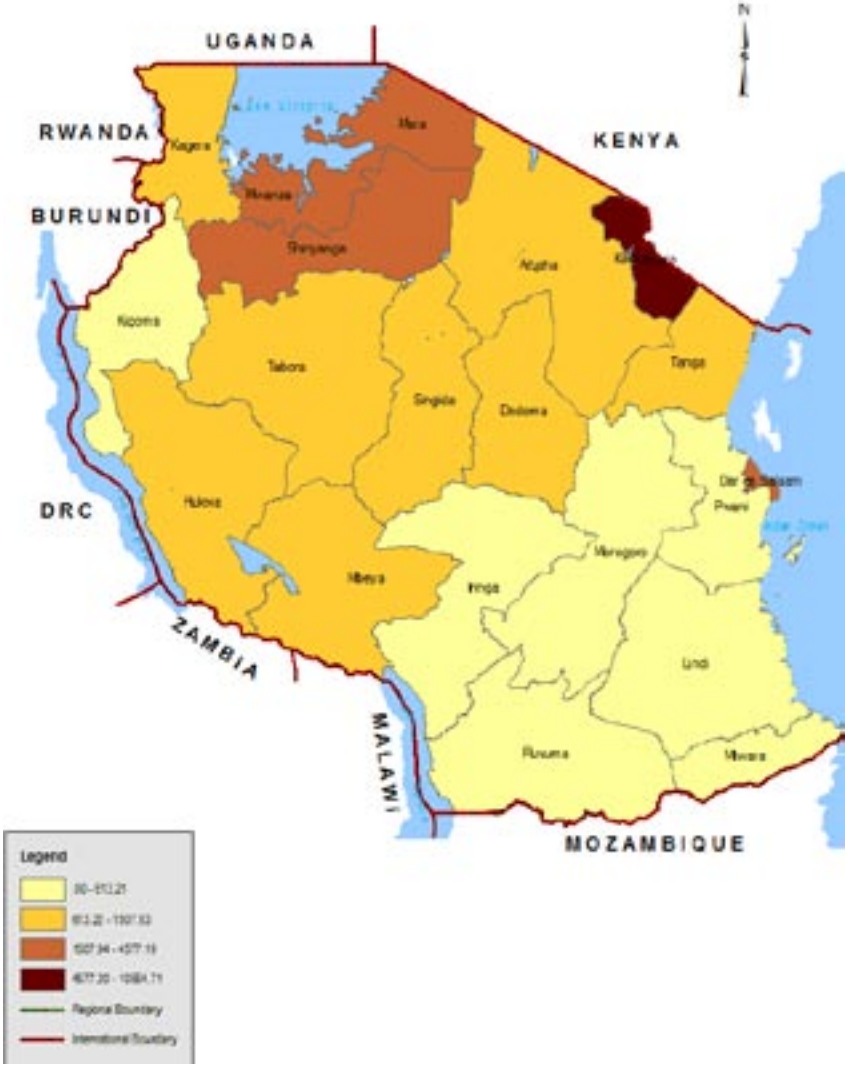
As an enterprise, the milk collection center is basically a device for bulking the milk for a milk processor. The value added (extended freshness through cooling) is difficult to pass on directly to the consumer, who would rather buy raw milk from a farmer or hawker at a lower price. This is one of the reasons why milk collection centers located close to urban centers get less milk, or may be forced to close, during the dry season when milk is scarce. This case study is based on a collection center owned by a milk processor. Although it is supplied with electricity from the national grid, the owner is often forced to use a standby generator because of frequent power cuts. This adds to the already high energy bill and, therefore, the owner is planning to change to wind power.

Annual Expenditure

Loan repayment (over 5 years at 20% interest)	21,735,000 Tsh
Rent	650,000 Tsh
Depreciation	6,500,000 Tsh
Water	60,000 Tsh
Salaries	2,288,000 Tsh
Consumables	120,000 Tsh
Total Expenditure	**31,353,000 Tsh**

The total volume of milk collected over the year is 345,500 liters. Therefore the value added by cooling the milk, using wind power, is approximately 90 T Sh per liter.

Milk Offtake kg/km²



Value chain

The dairy value chain has five main steps: milk production at farm level; bulking and cooling; processing and distribution; and retailing. The structure and activities at each step are outlined in the Tanzania Dairy Industry Value Chain. The main constraints in the Tanzanian value chain include poor access to services by farmers (advisory, technical, inputs, financial); low capacity of farmer organizations; severe seasonal fluctuation in milk production and supply; and poor infrastructure and high costs of doing business, especially for registered (formal) milk processors. Seasonal glut and deficit periods are the major cause of low or unfavorable capacity utilization for cooling centers and formal milk processors. This is exacerbated by the practices of the informal sector, which practically shuts down during glut periods (because of low demand for raw milk) and yet outcompetes formal processors during deficit periods by offering higher prices to farmers.

Tanzania Dairy Industry Value Chain

Milk production

Structure

1. Exotic and crossbreds (intensive) 599,000 head of cattle by 100.000 households
2. Zebu cattle (extensive) 9 mil. head of cattle by 100.000 households.

Activities

1. Intensive cut and carry (zero grazing) system. Use of AI/exotic bulls. Tick control

Bulking & Cooling

Structure

1. Over 200 bulking centers owned by farmer groups
2. Less then 50 cooling centres owned by cooperatives, associations and private compares handle less than 5% of marketed milk

Activities

1. Quality control
2. Cooling
3, Input services (feeds, drugs, AI)

Processing & Packaging

Structure

1. Over 100 small-scale processors (mostly unregistered) owned by farmer groups and individuals
2. Less than 30 registered plants of which most of which are not operational or operating below capacity handle less then 2§ of marketed milk.

Activities

1. Quality control
2. Pasteurization (butch/batch; continuous flow)
3. Production of products
4. Packaging

Transport & Distribution

Structure

1. Over 100,000 unregistered hawkers, small traders and farmers transport more than 90% of the milk by foot and bicycles.
2. A few specialised/ non-specialised vehicles owned by cooperatives and private companies.

Activities

1. Transport of raw milk by large number of informal operators on foot and bicycles.
2. transport of raw milk and processed products using vehicle.

Retailing

Structure

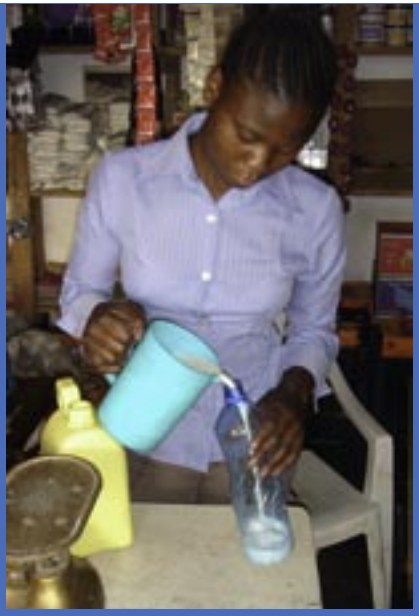
1. A large number of mobile hawkers (by foot, bikes, bus, vehicle) especially within 20 km of major towns. They supply bulking centres, kiosks, consumers with raw milk.
2. Hundreds of milk kiosks, shops and a number of super markets vending hot milk and processed products

Activities

1. Delivery of raw milk to bulking centres, kiosks and households.
2. selling of fresh and cultured milk, shops and supermarkets, may sell imported UHT/powder milk and other dairy products.

Specific values along the chain vary from milk-shed to milk-shed and between different dairy products. For this reason, a case study can be more instructive; one is presented below.

A milk kiosk in Dar es Salaam: A case study



The Bahati milk kiosk (BMK) is a small milk shop located at a busy street corner in downtown Dar es Salaam. The owner is a single mother with two young children. She started BMK two years ago as a backyard enterprise to supplement her cash income. Each day she would buy about 20 liters of raw milk from a hawker, who in turn bought about 40 liters from suburban farmers (about 10 kilometers away) and ferried them in on a bicycle. The initial investment in the BMK comprised of a charcoal stove, a casserole, several thermos flasks, plastic mugs, a small table, and two benches for customers (worth about T Sh 48,000). She raised the money by participating in a rotating credit and savings association (ROSCA) group. BMK products were mainly hot milk and milk with coffee. Within a year, BMK became a popular destination for young people in the evening and sales soared. Soon the owner had several hawkers delivering about 70 liters a day to her. One day she was served with a notice from the local government to get a business license or close BMK.

The process of formalizing BMK was lengthy, bureaucratic, and costly.

1. ***Inspection of the premises by health inspectors (3 days of followup plus taxi fare for the inspectors—about T Sh 20,000)***
2. ***Putting up wall tiles, a wash basin, water heater and plumbing (28 days of supervision plus Tsh 400,000 for materials and labour).***
3. ***Batch pasteurizer (biomass fuel, Tsh 300,000).***
4. ***Utensil cabinet with glass front (Tsh 35,000).***
5. ***Deep freezer (Tsh 600,000).***
6. ***2 plastic tables and 8 plastic chairs (Tsh 360,000).***
7. ***Profit and loss account for submission to TRA to determine provisional tax (Tsh 50,000 accountant fee).***
8. ***Obtaining a Taxpayer Identification Number from TRA with a provisional tax of Tsh 300,000 ayear.***
9. ***Obtain a license from the local government (Tsh 30,000).***

The batch pasteurizer and deep freezer were loaned from a hire-purchase organization for women entrepreneurs with 30 percent interest rate per year. The collateral were a cash deposit of equivalent to 15 percent of the loan, two referees, and the equipment itself. Loan repayment was in monthly installments. It took nearly half a year to get all the necessary permits. Since BMK was operating illegally during this period, it attracted rent-seeking from enforcers of about T Sh 180,000. However, when the "new" BMK was formally launched, it attracted more customers and was processing 200 liters a day after one year. At this point, the owner started to process and pack both fresh and cultured milk, employing six people. Although the investment constituted a major hurdle, it was quite reasonable compared to turnover. The other positive aspect of BMK's small size is the high rate of capacity utilization (approximately 100 percent); as a result BMK had a good profit margin in 2007 as shown below:

Sales		
73,000 litres of milk	Tsh	97,000,000
Purchases		
73,000 litres of milk	Tsh	43,800,000
75,000 pouches	Tsh	1,500,000
52 sacks of charcoal	Tsh	1,400,000
Utilities	Tsh	360,000
Other costs		
Salaries	Tsh	5,760,000
Payroll costs	Tsh	576,000
Loan repayment	Tsh	1,170,000
Compliance costs	Tsh	1,000,000
Miscellaneous	Tsh	500,000
Net profit	Tsh	40,934,000
Income tax 30% net profit	Tsh	12,280,200

The case of Tanzania

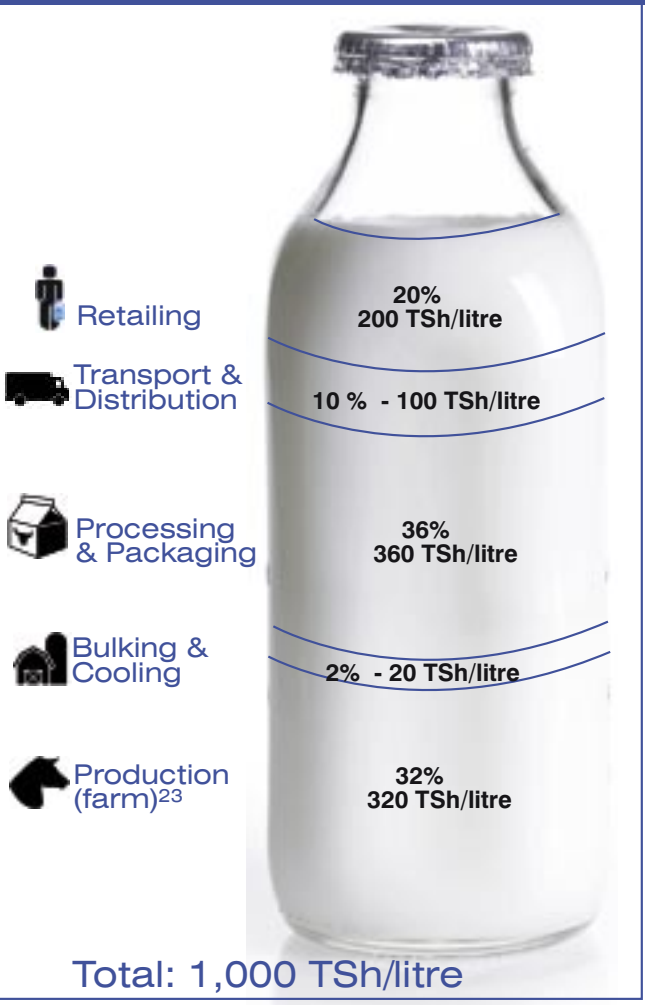
Prices

During the current year, raw milk has been sold at the farmgate at a price of between TSh 200 and TSh 400 per liter. It is then sold to the consumer for between TSh 400 and TSh 600 per liter, in raw form, or TSh 800 to TSh 1,200 per liter as pasteurized and packaged milk. These prices are more than double those at the equivalent stages in the marketing chains of other East African countries.

Margins are earned at different stages in the fresh milk value chain, with the largest accruing at the processing and packaging (including marketing) stage, while a similar proportion of the final cost is attributed to the initial production of the commodity on the farm. By comparison, margins are clearly negligible for the bulking and cooling and retailing links in the value chain.

Source:
Survey data 2008 (Tanga Region);Mchau.

Share of revenue for the TDCU fresh milk value-chain[22]



[21] 1USD = 1,200 Tsh.

[22] Farmers estimate production costs to be between 50% and 70% of the producer price.

The policy, regulatory and institutional frameworks have a chequered history

Two changes in the policy and regulatory environment have heavily affected the dairy industry. These are the nationalization of large-scale dairy farms and milk processing plants in the 1960s–70s and the subsequent liberalization and privatization of parastatal dairy companies in 1990s. Under government management, the performance of large-scale dairy farms and processing plants declined and most went out of business.

Liberalization meant that the private sector now plays a dominant role in the subsector. However, its operations are hamstrung by a wide range of overlapping regulations that unnecessarily increase the cost of doing business. At the same time, delays in reforming the industry (from the early-1990s to the present time) have increased the cost of doing business and slowed down the recovery of the processing sub sector. Compounding these problems are the more than 17 government agencies regulating the dairy industry, with overlapping mandates (especially with respect to registration, inspection, and licensing). For example, a building permit required to build a processing unit requires the approval of three separate public sector agencies. The process is expensive and can take up to one month, while the inspection of the completed premises requires visits from five separate agencies, also a costly and time-consuming process. Inspection of the machinery installation by 4 responsible agencies is also necessary and can take up to 27 days to complete.

The principal constraints in the case of Tanzania

The current excessive regulation of the sector increases compliance costs and constrains expansion.

As noted, there are currently some 17 regulatory agencies, with mandates that often overlap considerably. The resulting multiplicity of administrative compliance procedures, licenses, and fees have resulted in the current high cost of doing business in the dairy industry. As a result, more than 50 percent of the privately owned dairy processing plants that opened following liberalization of the sector in the early 1990's have closed.

The tax regime acts as a strong disincentive to private sector investment in milk production, processing, and marketing, where competition from the informal sector is strong.

VAT is levied on processed milk that passes through the formal value chain, putting it at an immediate competitive disadvantage compared to the informal sector.

The gap between supply and demand is growing.

Production is highly seasonal in most years; output under the current system of production is heavily dependent upon rainfall, meaning that the bulk of milk is produced during the rains, when transporting the commodity is difficult. This leads to substantial financial losses (between 20 percent and 50 percent) from unsold milk, and loss of processors' customers in the dry season because of an insufficient supply of milk.

The poor rural road infrastructure and the limited coverage of the public utilities network

(water, electricity, and so on), as well as their high cost, are hampering the commercialization of milk, in particular in the Cattle Corridor.

Recent bad experiences mean that many farmers have little confidence in cooperatives and other forms of "organized agriculture" to help them increase the commercialization of their dairy enterprises.

Yet cooperatives are, in theory, an effective way for many rural dairy producers to obtain input, advisory, and veterinary services.

How solutions from the Indian Dairy Industry might be applied in Tanzania

The following indicates how improved practices and technologies from India could be used to address a number of the principal constraints to the further development of the dairy industry in Tanzania.

Constraints Tanzania	*Improved technology/practices from India*
1. Lack of systematically collected and analyzed information on milk production, collection, processing, and marketing in the formal and informal segments of the dairy industry	Information and communication system that has been developed by NDDB and applied along the formal dairy value chain of India. This could be adapted to Tanzanian conditions in collaboration with Tanzania Dairy Board, Tanzania Milk Processors Association, and Tanzania Milk Producers Association
2. Poor milk hygiene at farm, hawker, and collection levels	Milk cans (15 liter), milking buckets (10 liter), funnels, strainers, and strip cups at farmer level Milk cans (20-40 liter) at hawker level Insulated milk tankers for bulk transportation
3. Limited use of locally available feed resources (especially rice straw, rice bran, molasses, and bagasse) for dry season supplementation of milk cow feed	Cooling tanks and milk quality control equipment (especially lactometers and butterfat testing) at milk collection centers. These may be sourced through NDDB in collaboration with TDB/TAMPA SACCOS Molasses-urea-mineral block technology appropriate for rural conditions
4. Inadequate equipment for AI technicians and insufficient supply of dairy cattle semen	Kits for insemiznators Storage tanks for semen (5-20 liter) Semen motility test equipment suitable for field conditions

General lessons learned from India

No interference by government in the formation and governance of cooperatives is a key element of success.

The capture of cooperative structures for political purposes by politicians or the "takeover" of cooperatives by appointing government officials and public servants to their boards lead to their their ineffectiveness and collapse. The AMUL cooperative is the leading example of an organization with strong producer ownership and control. Board and management are responsible to the producers as owners of the organization and not to any third party. The Indian government has also developed a new companies act allowing the formation of producer-owned companies.

Policies and regulations must aim to reduce the cost of doing business and also create incentives for local investors.

The most striking example is India's zero taxation of inputs for the processing of milk. The policy allows the processed milk to reach the end consumer market at competitive prices. In addition, permits and regulations are simplified and streamlined. This is in marked contrast to the case in Tanzania, for example, where operations along the value chain are hamstrung by the wide range of overlapping regulations that unnecessarily increase the cost of doing business in the subsector.

The gap between supply and demand is growing.

Production is highly seasonal in most years; output under the current system of production is heavily dependent upon rainfall, meaning that the bulk of milk is produced during the rains, when transporting the commodity is difficult. This leads to substantial financial losses (between 20 percent and 50 percent) from unsold milk, and loss of processors' customers in the dry season because of an insufficient supply of milk.

Efficient coordination within the supply chain increases competitiveness.

In India, there is strong coordination among producers, veterinary service providers, collection points, processors, and so on. This enables each segment of the value chain to maintain a substantial margin based on increased productivity. As a result of effective coordination, information is shared at all levels in a timely manner and service providers are able to provide the correct services at the correct time. For example, farmers receive feedback in six hours on bacteria levels in their milk. Veterinary services can then be provided immediately to address any production problems.

All services are paid for and fully embedded in the supply chain and not provided by the public sector.

All members are provided with veterinary care, artificial insemination services, nutritious feed concentrates, and so forth, designed to improve the quality of the cattle stock. The philosophy is that farmers take better care of things if they have to pay for inputs and services. Since all participants in the value chain share the same goal—milk that is competitive in the consumer market—and are connected through the producer ownership structure, the true cost is reflected in the service price and no excess markups charged.

Effective marketing based on continuous market research is essential in ensuring that demand for milk outstrips supply.

AMUL has successfully maintained a leading position in the branded consumer market. As a result of their successful marketing, their products are preferred over those of other multinationals, guaranteeing demand for milk from local producers. Successful marketing, based on quality and competitive price, is the basis for a long-term contractual relationship between producers and processors. Long-term price agreements eliminate price risk faced by farmers and supply risk faced by processors. As a result, planning investments and expansion in both segments can be more predictable.

Fluctuations in monthly milk production can be significantly reduced by supplementing the feed given to the cows with molasses-urea-mineral (MUM) blocks.

In India, this new supplementary feeding technology was introduced to dairy farmers by the NDDB in the 1980s. As a result, there was a significant increase in milk yield, fertility, and live weight. The cost-benefit ratio (based on milk alone) ranged from 1:2 to 1:4. As weather patterns continue to change and rainfall decreases in East Africa, this technology will be more important to farmers there. The mixing of ingredients and production of supplement blocks is currently done on a small scale in Tanzania; more appropriate technology from India could help increase the scale of production.

Integrity and transparency are the bases on which successful cooperatives are established and producer owned companies competitively managed.

A clear mission objective ("highest price to producers and volume of milk sold") keeps staff at all levels fully committed and focused.

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