Dairy Industry in Sri Lanka: Problems and Prospects

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As a food item in the world, milk is only second to cereals. More than cereals and any other foodstuffs, milk has the unique property of being the only one specifically prepared in nature as a food. Not only does it contain all the nutrients that we need in the correct proportions, but the nutrients are present in a form that is easily absorbed and assimilated by the body. Milk can also be converted into a range of products all of which are universally popular. It is not surprising, therefore, that milk is universally consumed on all continents by communities belonging to diverse races and religions without being subject to any of the taboos associated with many other foodstuffs.

Most of the milk consumed in the world originates from the group known as ruminants – cattle, buffalo, goat, sheep, yak, camels – whose marvelous digestive system enables them to convert coarse forages into milk and allows milk production to be undertaken even by rural farmers with limited resources.

The last few decades has seen a rapid increase in the consumption and demand for milk and meat, particularly in developing countries, so much so that it has been termed "the livestock revolution" *(see Delgado et al, 1999)*. The present milk production in the world is around 600 million metric tones per annum with most of it being produced in Europe and N America. India is the country with the highest individual milk production (ca 80 million metric tons) with the USA lying second and followed by countries such as France, UK and Germany. All these countries produce milk for their own consumption and only a few countries – principally New Zealand and Australia – produce milk for export.

As a result, only around 5% of the milk produced in the world is actually available for international trade. On the other hand, there a large number of countries, including Sri Lanka, that needs to import milk and supplement the local production in order to meet the demand in their countries.

The annual *per capita* consumption of milk in the developed world (200 kg or more) is much higher than in the developing world (average 40 kg). Milk is most popular in Europe, in those countries to which Europeans migrated – such as N America and Australia – and in South Asia. The consumption has traditionally been less in East Asia, where meat is more popular, but the demand in these countries is presently on the increase.

The present crisis in Sri Lanka

The milk consumption in Sri Lanka in the year 2007 was estimated to be around 612,000 metric tons or 32 kg per person (see Table 1). This compares to *per capita* estimates of 72 kg in India, 40 in Nepal, 180 in Pakistan and 234 in the USA showing that our consumption is one of the lowest in the world; in fact, it is even below the average value of 40 kg for all developing countries. Of the total milk consumed in Sri Lanka in the year 2007, we produced only an estimated 202,000 metric tons and the balance 410,000 metric tons were imported. Around 56% of the total milk produced in Sri Lanka was collected by processors and entered the formal milk market together with the imports. The balance 88,000 MT of milk were consumed in the household itself or sold locally. Overall, imports comprised around 67% of our national consumption and nearly 80% of the milk and milk products available for sale. Similar values were obtained in an appraisal of the dairy industry in 1999 *(Ibrahim et al)* showing that although there has been a subsequent increase in local milk collection by processors over the years, the imported milk has also increased concurrently in response to a growth in demand, thus keeping the ratio constant. These imports in 2007 had a value close to Rs 19 billion.

Table 1
Estimated Milk Production and Imports in Sri Lanka
(1000 Metric Tons per annum)

Year	Cow* Milk	Buffalo* Milk	Total* Milk	Collected** by processors	Imports*** (LME)	Total consumption
1998	147	30	177	101	370	547
1999	150	30	180	109	311	491
2000	151	30	181	93	349	530
2001	153	30	183	102	330	513
2002	153	30	183	92	411	595
2003	157	30	187	88	394	581
2004	160	31	190	99	349	540
2005	162	31	193	100	356	549
2006	165	32	197	109	443	640
2007	170	32	202	114	410	612

* *Department of Census and Statistics*
** *Compiled by the Ministry of Livestock Development*
*** *Calculated as liter milk equivalents from Customs returns: DAPH*

It can be seen from these statistics that we are importing most of the milk needed to satisfy even our modest levels of consumption. And that is not all. Whilst the demand for milk and milk products has continued to increase at around 5% over the last decade, the production has only increased by about 1.5%. A recent report (ANZDEC, 2007 – a foreign consultancy group) warns that unless these trends are arrested, we can expect the imports to continue to increase leading to an expenditure of Rs 30 billion by the year 2015.

Recent developments in the increase of food and fuel prices will only worsen this crisis situation. These increases are attributed to many factors chief among which are the use of food grains, principally maize, for fuel. Since maize (or corn) is one of the mainstays of the dairy industry, particularly in the US, this may reduce their milk production. This in turn could create shortages in those countries leading to further increases in the price of milk and its availability.

Note: All data cited in this report on milk production in other countries of the world have been taken from publications of the Food and Agricultural Organization - FAO (see Bibliography)

Components of the dairy industry in Sri Lanka

The dairy sector in Sri Lanka could be divided into milk production, milk processing and importation. The production sector comprises the dairy farmers and their service providers whilst the processing sector includes the milk collectors and processors.

Dairy farmers

In Sri Lanka, milk is almost exclusively produced on smallholdings, usually crop-livestock "mixed" farms; there are no large, intensive milk-only operations as in developed countries. Some may even be described as household farms that keep a cow or two in the backyard of households which are not otherwise engaged in agriculture. Even on large plantations, the milk is produced by the workers in a similar manner. A feature of this type of operation is that no land is used specifically for this purpose. Animals are grazed (free or tethered) on vacant lots and fallow fields or fed in stalls with cut grass, that are really no more than weeds cut from the roadside.

Service providers

The State has been the primary supplier of services to dairy farmers in Sri Lanka. It provides breeding (insemination) and information (training and extension) services to farmers and irregularly provides help to construct sheds, supplement their calves and so on. It is also responsible for control of epidemic diseases and provides a curative service through their veterinary network. Some of the para-statal organizations such as the National Livestock Development Board and MILCO (Milk Industries of Lanka, Plc.) also provide some assistance. In the main, farmers obtain their animals through an informal system involving brokers, there being no regular animal auctions as in other countries. It has been pointed out, however, that due to inherent inefficiencies in these state organizations (see FAO, 1993), farmers are often not provided with the services on time or at the desired standards.

Collection and processing of milk

In some areas of the country (notably Jaffna), farmers sell their produce directly to other households; similarly, milk is consumed or sold to neighbouring tea boutiques or to small scale producers of items such as yoghurt, curd and sweetmeats. This "informal" trade is estimated to be around 45% of production. The balance milk – around 300,000 liters per day is collected by the medium and large processors through a network of collecting points and chilling centers. Information available suggests that the installed capacity in these processing plants is more than adequate to process even double the quantities of milk that are now being collected.

These companies process the milk into a range of high quality items ranging from liquid milk products to ice cream and chocolates using modern technologies. They also use imported milk powder to meet the shortfall of fresh milk in meeting demands for products. Since local milk usually contains more fat than the upper legal standard for "full-cream" milk, they are able to prepare reconstituted milk for their processing needs by mixing this extra fat with cheap imported skimmed milk.

Finally, there are the milk food importers who import and sell milk products – primarily full cream milk powder. Many of them import the powder in bulk and repack for sale in Sri Lanka. It can be seen, therefore, that the consumer of milk or milk products in Sri Lanka gets his supply from sources ranging from his neighbour and products made from local milk to imported milk powder or butter. Some of these "channels" of milk flow in the country have been mapped and quantified *(Ibrahim et al, 1999)* but their dynamics are not fully understood.

Milk production in Sri Lanka

As mentioned above, nearly all the milk in the country is produced on crop-livestock mixed smallholdings some of which can also be described as household systems. It was estimated in 1981 (Agricultural Census, Department of Census and Statistics) that of the 1791500 smallholdings in the country at that time, 22% had either cattle, buffaloes or both. The vast majority were mixed farms and the number of holdings with only dairy animals were very few.

Milk production essentially needs dairy farmers, animals, feeds and control of disease. Epidemic diseases are generally kept under control by suitable measures, primarily annual vaccinations. Studies have shown that disease among individual animals is not a major problem among dairy cattle or buffaloes. The most important of them, mastitis, is usually a problem of management whilst occasional cases of tick fever and metabolic diseases need prompt attention. Bad housing conditions can lead to accidents that can lead to complications needing surgery. In general, however, although a curative veterinary service for dairy animals is essential, most diseases of dairy animals can be kept under control through farmer education and prophylactic vaccination and de-worming programs.

The majority of state investment over the years has gone into improving the genetics or "quality" of milking animals in the country. Towards this end, the state has maintained at great expense large farms with pure bred imported stock that are used in upgrading programs. In addition, the State has been implementing for several decades a subsidized artificial insemination program, using high quality imported semen. Nearly 100,000 inseminations are recorded every year by the Department of Animal Production and Health (DAPH) which should result in at least 15,000 female calves being born. There should in theory at least, be no problem with regard to availability of good animals. In practice, however, there is no marketplace for the calves where buyers and sellers can meet. Moreover, since there is no registration system in place, the upgraded animals have no value as breeding animals distinct from their meat value. As a result, there is a possibility that many of the excess animals - which farmers are unable to sell - end up being butchered. The AI services, infertility investigations and health services are provided through the Government Veterinary surgeons functioning under the Provincial councils.

The nutritional needs of dairy cows are met primarily by forages such as grasses, tree fodders, legumes, hay and straw. These are usually supplemented with additional energy and protein feeds (known as concentrates) as well as some minerals in order to satisfy their nutritional requirements. In order to use the natural ability of cattle to utilize coarse forages as well as for economic reasons, the strategy followed is to obtain most of the nutrients from roughages. Since no land has ever been allocated for dairy farming, however, the main sources of roughages for dairy cattle in Sri Lanka are the grasses (or weeds) that grow on the roadside and in vacant lots. Since the quantity and quality of these roughages are variable, the farmers are compelled to use expensive concentrates and makes dairying uneconomical. In my view, this may be considered as the chief drawback to increasing milk production in the country. Most dairy farmers have traditionally used coconut oil meal

(coconut poonac), often mixed with rice bran, as concentrates; more balanced, properly formulated dairy meals are now available from the private sector and are being increasingly used by them. Good quality mineral supplements prepared by the private sector are available in the market and most farmers with good animals use them.

Constraints to increasing milk production

The manner in which milk is produced varies between the production systems in the different agro-climatic zones in Sri Lanka. We can, accordingly, identify systems in the hill country, dry zone, low country wet zone and Jaffna peninsula. The best animals – those with the greatest potential – are found in the hill country due to the milder climate. Milk production in the up-country (> 1000 m altitude) is mostly from animals of pure European breeds with a potential yield of 20 liters per day (lpd). The majority of these animals are found on tea plantations maintained by the workers for an additional income. Studies[1] have shown that their average yield is around 9 lpd, much less than their potential despite these workers on the estates being excellent dairymen. There is little doubt that the chief constraint is the lack of good quality forage and that their financial resources only allows limited supplementation. There is usually no grass available on the plantations and the workers are compelled to seek it outside. Allocation of some land from this area for grassland will lead to immediate increases in the yields and overall production of milk in this system.

Animals in the mid-country areas are usually crosses of European breeds and have a potential of at least 10 lpd. Studies have shown, however, that the actual production is only a fraction of this potential. Once again, the problem is one of obtaining sufficient forage of adequate quality for these animals.

Although more grass is generally available in vacant lots and railway embankments and so on in this area, it is of the very coarse variety known as Guinea A, unsuitable for improved European type animals. The farmers are thus compelled to use concentrates, once again reducing milk yields and increasing the cost of the operation.

Milk is produced in the low-country wet zone – Kurunegala, Gampaha, Colombo, Kalutara, Ratnapura, Galle and Matara districts - where more warm and humid conditions prevail. Good to average quality animals may be seen in these areas. The main advantage they have is the proximity to markets in these highly urbanized areas; in fact many of these farms may be considered as peri-urban. The studies of practices in these areas are limited but we know that the productivity from these areas remains low and that the reasons are similar to those described above.

The Thamankaduwa area lying to the North-East of Polonnaruwa has been the main milk producing area of Sri Lanka in historical times. These areas have natural grazing areas – known as *villus* – formed by the seasonal flooding of the lower reaches of the Mahaweli Ganga. The State has made heavy investments in this area in an attempt to revive this system and large farms were established. The milk production did not increase, however, commensurate with the expenditure. In recent times, this has become a conflict area and most of the assets of infrastructure and animals have been dissipated.

Much of the dry-zone in Sri Lanka was brought under the Mahaweli development program and unfortunately, most of the systems under the scheme, were not designed to encourage dairy farming. No land was allocated for grassland and farmers in fact were advised to drastically reduce the numbers in their large herds. The exception was System C in Girandurukotte where land was kept apart for grazing, farms were used to help in breeding, systems of milk collection and even a processing plant was established. Although this showed the potential of these systems for milk production, they have not been exploited and the milk production from these areas remains low.

In other parts of the dry zone (Purana Villages), relatively large herds of animals graze around the tanks and are rounded up into paddocks in the nights. Where milk collection networks have been established, farmers milk their animals once in the morning and sell the milk. However, the milk yields of these animals are low and often their calves have suffered. This system does not allow for any significant increase in production.

The unique system prevailing in the Jaffna peninsula has been studied and reported. It can be described as a peri-urban production system which supplies the demand for fresh milk essential to their households. The animals – usually of high genetic quality - are kept intensively, well managed and fed on straw, some greens and concentrates. Although production costs are high, the system is sustained because there is a guaranteed market for fresh milk. Parts of the Eastern Province may have similar systems but much of it remains in the pattern of the rest of the dry zone. Dairy development schemes have been launched for the Eastern Province which, with its grasslands, seems to have a great potential but have been affected badly by the ongoing conflict.

Milk from buffaloes in Sri Lanka

Around 13% of the milk produced in the world is from buffaloes and of this milk, nearly 90% is produced in Asia, mostly in South Asia, principally in India and Pakistan. In India, Pakistan and Nepal, the proportion of milk produced from buffaloes is 57%, 77% and 70% respectively; the corresponding value for Sri Lanka is 16%, less than in any other country in South Asia. In Sri Lanka, buffaloes have traditionally been used for work in connection with paddy field work. Following the introduction of tractors in the 1940s and the invention (in Sri Lanka) of the two-wheeled "hand tractor", the use of buffaloes for paddy field work has declined markedly. Together with this, the numbers of buffaloes have dramatically reduced whereas in those countries in which they are used for milk, the numbers have actually increased.

Buffaloes have several advantages over cattle for milk production under our conditions and indeed accounts for the success of India and Pakistan. They are able to effectively utilize large amounts of coarse forages when compared to improved dairy cattle. This ability is due to a larger and stronger rumen, non-selective feeding habits, well-developed salivary glands as well an ability to absorb and excrete large amounts of water. In other words, they will be able to convert the very coarse forages (biomass) available in the mid-country and low-country wet zone areas to milk. Buffaloes are also able to live and thrive on low-lying water logged areas. They have other advantages such as producing richer milk and being more resistant to diseases. The only disadvantage is that they are sluggish breeders and Artificial Insemination is more difficult, although many of these problems have been overcome in India and Pakistan.

A small study of peri-urban buffalo dairy farms located to the South-East of Colombo[2] showed that they were lucrative. The farmers fed the animals on the vacant lots and low-lying areas and abandoned paddy fields, with very low feed costs, and converted the milk to curd for which there is a good market. Clearly there is a great potential for producing milk from buffaloes which has not been exploited in Sri Lanka.

Prospects for increasing milk production

The current Government target of 50% self-sufficiency in milk by the year 2015 (from the present 20% or so), is generally regarded as unattainable. Recent events in world food and fuel prices have given an added urgency to the need to increase local milk production in the short term. A more modest "working" target to double the local milk production has now been announced. This anticipates an increase in the daily collection from the present 300,000 to around 650,000 liters per day which is aimed at reducing imports rather than increasing the *per capita* consumption.

A recent study (ANZDEC, 2007) has highlighted the difficulties in increasing milk production from the household-type production systems with one to three cows. They point out that the financial return for their labour is less than 50% of the casual wage rate. As a result, householders will exit dairy production if employment is available, or conversely, those that remain in dairy farming are the surplus labour. Similar smallholder systems in other countries such as India and Kenya are viable since they are 50 to 70% more productive per cow and have far lower costs due to lower wage rates and the availability of cheaper feed. They conclude that milk production can be increased in Sri Lanka through larger-scale commercial dairy farms (which are more productive and efficient) and have proposed a model in which Small householder farms can be attached to these Commercial enterprises thereby increasing their efficiency of production. Similar "out-grower" systems which have proved successful are common in the poultry sector in Sri Lanka.

If such commercial enterprises are approved, the Government will need to release suitable land for this purpose. At present, no land is allocated specifically for dairy farming in Sri Lanka. It is self-evident that it is not possible to produce milk or to increase the production, particularly with improved cattle, on weeds that grow on the wayside.

It was pointed out earlier that buffaloes are more efficient in utilizing the available coarse forages(weeds) found in most parts of the country. As mentioned earlier, nearly 60% of the milk in India – the largest producer in the world – now originates from buffalo and they are able to use all their crop residues for milk production. The lesson for Sri Lanka is that they should promote buffalo dairying in those areas that land cannot be allocated for grassland. The present policy of the State which is to improve the dairy cattle using high quality imported semen needs to change to one that gives greater emphasis to milk production from buffaloes.

Most of the services to dairy farmers are now provided by state or para-statal organizations. A report to the Ministry of Livestock by a team from FAO (2003) highlighted the many shortcomings in these organizations and the services they provide. Lack of timely services to dairy farmers has contributed to the relative inefficiencies and their low productivity. In this respect, the performance of the poultry industry which is completely in private hands stands in stark contrast. Recognizing the need to involve the private sector in providing services to farmers, the Ministry of Livestock Development recently held a Workshop to identify some of the areas in which they could be profitably involved The conclusions from this workshop should be actively followed up to improve the services to farmers.

Conclusions

Recent decades have seen a rapid increase in the demand for milk and meat throughout the world, particularly in developing countries and the demand has been met by increased production. The consumption of milk in Sri Lanka is low and is even below that in most developing countries. Despite considerable investments by the Government over the last 4 decades or more, the production of milk has shown little increase and we are presently importing 80% of the milk needed for even this very modest level of consumption. Recent price increases and shortages of food in the world may eventually lead to milk becoming a luxury item in our diets.

The present smallholder and householder systems of production do not appear to be able to deliver the goods and new models need to be explored. The Government will need to set apart land for dairy farming and to increase the participation of the private sector in both production and servicing. At the same time, the use of buffaloes for milk production should be increased in line with the example seen in neighbouring India, Nepal and Pakistan.

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Footnotes:

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