



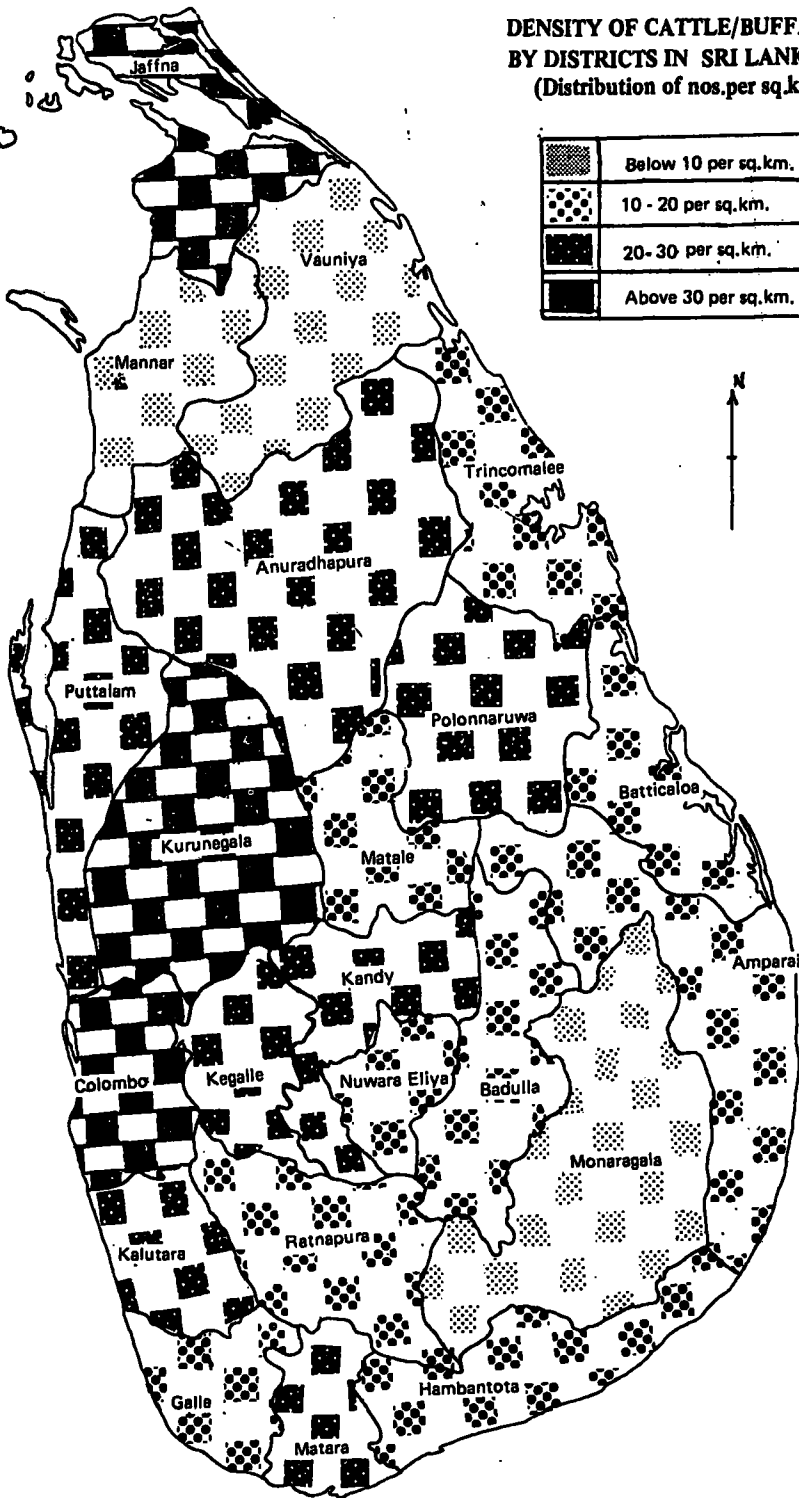


# THE DAIRY INDUSTRY

**DENSITY OF CATTLE/BUFFALOES BY DISTRICTS IN SRI LANKA**  
(Distribution of nos. per sq. km)

	Below 10 per sq. km.
	10 - 20 per sq. km.
	20 - 30 per sq. km.
	Above 30 per sq. km.



The importance of dairying and dairy product development has been stressed in all development proposals of Sri Lanka over the past 50 years. Since 1938 five known Dairy Development Plans have been formulated, and implemented to the extent of availability of funds, the last of these being the Medium Term Plan of 1977-1981. These proposals linked the significance of dairying to a variety of historic factors. Yet they have all agreed that dairying has an important role to play as a major foreign exchange saver for the country on the one hand; and a provider of employment and income, and nutrition generator to the rural sector on the other. Thus, targets have been set to increase the volume of production by raising the average annual yield per cow and increasing the size of the herd milked in order that the country can achieve self sufficiency in dairy products within a reasonably brief period of time. The strategies employed have ranged from the establishment of state owned cattle farms to varying sizes of private investments. The private investments suggested have extended from between small holdings with two cows to multinational involvements in rearing, milching, milk collection and processing plants with massive investments.

The evolution of dairying has its roots in the nomadic era. In Sri Lanka cattle rearing can be traced back to the early history of the island (500 B.C.) when the first settlers from North India raised

*This map, based on Agricultural Census data, shows that Kurunegala and Gampaha in the Intermediate Zone have the heaviest concentrations of cattle and buffaloes; although the majority of cattle are reared in the Dry Zone districts such as Puttalam, Anuradhapura and Polonnaruwa.*

cattle and buffaloes largely for draught and to some extent for the production of milk and ghee. Dairying in the modern context, encompasses an array of economic activities in which agricultural farming, agro-processing and farm product development, marketing and farm product management are interwoven into a single art. Thus, it is multi-purpose in its operations, multidisciplinary in approach and multi-dimensional in development. The term dairying refers to an amalgam of functions, such as production and marketing of milk and its products, which includes caring and breeding of herds, feeding, milking, milk collection and processing into dairy products. The present state of development in dairying is a function of scientific and technological advancement in which improvements in the disciplines of physiology, genetic science, microbiological and nutritional science and chemistry are involved.

#### ROLE OF DAIRYING IN SRI LANKA'S ECONOMY

Dairying constitutes a lengthy production process that commences with the growing and preparation of fodder to the sale of milk or milk products to the ultimate consumer. This long process is divided into two sub-phases. The initial phase contains the breeding and feeding of cattle upto the milking stage. Although this phase appears to be rather simplistic it is said to cover about 70 percent of work in the total process of milk production. It is during this phase that the groundwork for milk production is made in which a multiplicity of disciplines are involved and operations performed. The second phase covers the remaining 30 percent of the work, that is, collection, processing, bottling, packing and presenting, marketing and distribution. It is during this phase, that dairy economics happens to have command and an important role to play.

#### Livestock and the economy

The contribution of livestock to the gross value of agricultural production (including value of manure, hides and skins and animal draught power) is estimated at around 12 percent. Additionally, livestock makes a major contribution to the economy by utilising large areas of marginal land as well as substantial amounts of crop residues which would have little alternative use. Furthermore, livestock is an important source of supplemental income for the rural poor who have few alternative employment opportunities. For example, more than 95 percent of the cattle are kept by small farmers with a farm size of less than four hectares and/or by landless estate labourers. All livestock statistics reveal similar patterns with regard to development

trends over the past twelve years. The population of ruminants animals, ie, cattle, buffaloes, goats and sheep has shown little overall change in numbers between 1970 and 1982. In 1970 the cattle population was approximately 1.6 million, buffaloes 0.74 million, goats 0.6 million and sheep 0.27 million. The 1982 estimates reveal the population of cattle, goats and sheep has not increased by more than 1-2 percent over a period of 12 years. The number of buffaloes has increased by about 10 percent over the same period. The relatively stagnant growth figures can be explained principally by four factors: (i) low farm gate prices in relation to ever increasing production costs; (ii) unfavourable market opportunities (iii) declining availability of natural pasture and (iv) the government's regulatory policy on animal slaughter.

#### SRI LANKA'S IMPORTS OF MILK PRODUCTS-VALUE (Rs.'000)

	VALUE OF TOTAL IMPORTS	
	1982	1984
Fresh Milk-Milk and Cream	1,614	1,752
Milk Powder-Skimmed, Full Cream Dried & Cream	426,227	535,830
Condensed Milk	8,617	7,027
Milk & cream in forms other than powder	1,913	1,836
Butter, Ghee, Cheese and Curd	43,166	109,961
TOTAL	481,537	656,406

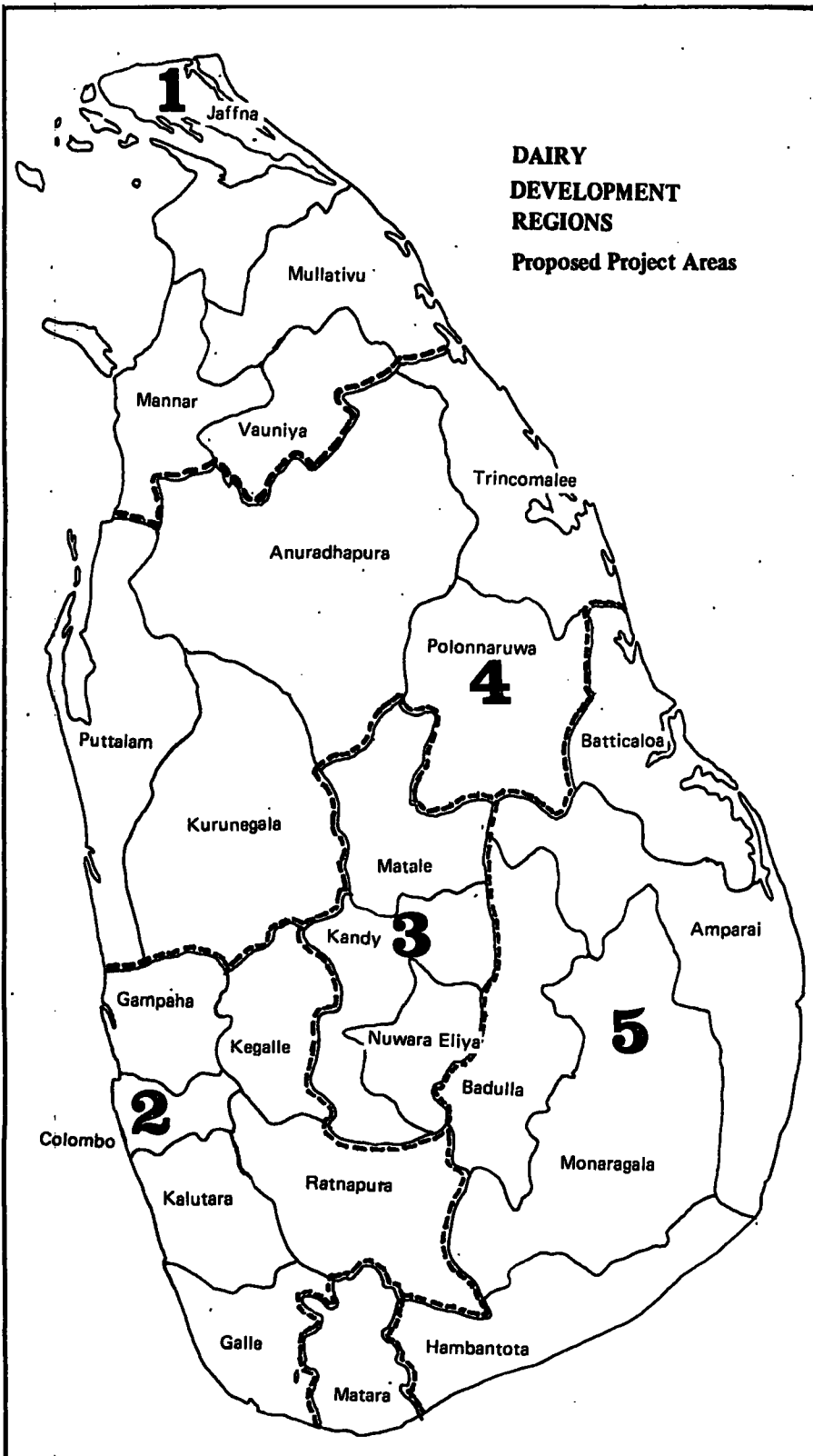
The economy of Sri Lanka is endowed with a land extent of about 65,500 sq.kms. or 16.2 million acres of which about one fourth of it is under cultivation. By 1981, the tree crops sector covered about 50 percent of

Table 1  
Distribution of Land Use-Tree Crops  
and other Perennial Crops

Land Use	Acres ('000)	Percent
Tea	604	13.5
Rubber	550	12.3
Coconut	1,100	24.5
Total tree Crops	(2,254)	(50.3)
Paddy	1,650	36.8
Other Crops	(2,232)	(49.7)
Total field crops	4,486	100.0

cultivated area while the share of paddy had been about 37 percent. (See Table 1 and Diagrams).

The presence of diverse agro-climatic conditions encourages a wide range of agricultural pursuits. The total population of the country is estimated to be around 15 million of which about 80 percent live in rural areas and are directly or indirectly dependent on agriculture. This distribution pattern of cultivable land vis-a-vis population imposes a serious physical constraint on extensive forms of dairying and dairy development, as is often being practiced in some parts of the western world. Thus, the feasibility of dairying and related programmes depends on the suitability of the model followed, and selection and use of technology and skills that could be adjusted according to the basic physical constraints. Even now the heavy pressure on land, which has given rise to a series of tenurial and distributional problems, poses questions



The proposed project would cover the entire country and for project purposes Sri Lanka would be divided into five milksheds. They are:

1. **JAFFNA** - Including Jaffna, Mullativu, Mannar and Vauniya.
2. **COLOMBO** - Including Colombo, Kalutara, Kegalle, Ratnapura, Galle and Gampaha.
3. **KANDY** - Including Kandy, Matale, Nuwara Eliya.
4. **POLONNARUWA** - Including Polonnaruwa, Anuradhapura, Puttalam, Kurunegala and Trincomalee.
5. **MONARAGALA** - Including Monaragala, Badulla, Amparai and Hambantota.

## FOREIGN LOANS AND GRANTS FOR SRILANKA'S DAIRY SECTOR

The dairy sector of this country has been a regular recipient of international assistance from many sources and in a variety of forms such as direct technical assistance, grants, food aid commodity aid and concessionary loans for development of the industry.

The table below indicates some of the main sources of external assistance channelled to the dairy sector during the five year period 1980 - 1984, and the aid pledged in 1985. Of this aid, project aid and commodity aid constitute a major portion; while Finland, Switzerland, Netherlands and the IDA have been the main sources of the aid.

The quantum of foreign assistance increased sharply in 1985, with a Rs. 1 billion concessionary loan negotiated with the World Bank, which would be channelled to develop the Milk Producer Co-operative System islandwide under a new dairy setup - abolishing the National Milk Board and replacing it with an institutional structure which will be privately owned, primarily by dairy farmers.

A complete restructuring and modernisation of the dairy industry is envisaged under this project (second IBRD Development Project) involving the construction of new processing plants and chilling facilities and the encouragement of private sector ownership.

Funding Country/ Agency	1980 Rs. Mn.	1981 Rs. Mn.	1982 Rs. Mn.	1983 Rs. Mn.	1984 Rs. Mn.	1985 Rs. Mn.
1. ADB					13.0	10.9
2. Finland			44.9	11.6	10.1	
3. Switzerland		6.8	0.6	15.0	5.7	
4. IDA	14.5	13.5	8.9	0.3		
5. Sweden		0.3	1.1	0.1	1.9	
6. Australia				19.6		
7. Netherlands					104.6	
8. USA					50.0	
9. World Bank (IBRD)						1,043.1
<b>Total</b>	<b>14.5</b>	<b>20.6</b>	<b>55.4</b>	<b>46.5</b>	<b>133.4</b>	<b>1,054.0</b>

on the selection of technology, and the viability of their operation.

The data available on dairy and livestock are scanty and discrete. According to the latest available estimates, the total cattle population is about 1.7 million of which roughly about 17 percent are exotic or crossbreds, which is supplemented by about 0.9 million buffaloes. The contribution of this sector to the G.D.P. is less than 2 percent and comprises about 8 percent of the total agricultural output of the country. Furthermore, the estimated herd of milking animals amounts to about 552,000 of which approximately 75 percent comprises cattle. The pattern of distribution of this herd among various parts of the country shows an obvious concentration in the dry zone of the country, where almost

70 percent of the dairy population is located.

Available data on milk production is far from adequate and figures from different sources are conflicting and lead to wide variations between the different estimates made, based on consumption surveys and potential yield of the total herd. The consumption surveys show estimated production to be around 400,000 millilitres per day (Mlpd); while the expected yield of the potential milk animals runs as high as 700,000 Mlpd. Like most of the developing countries, the bulk of this production is retained to meet household consumption needs, and another portion spills off to local markets through middle men. The National Milk Board which is the formal milk processing agency purchases

the balance available for the market. The N.M.B. now converted to MILCO a public company with an effective plant capacity 450,000 Mlpd. and with four plants located in different parts of the country is processing this milk basically to produce pasturized milk, sterilized milk, powdered milk and other milk products, like cheese, butter and ice cream. Its plant capacity is supplemented by the newly established dairy product processing plant set up by an international company with a capacity of 300,000 Mlpd. This plant is almost entirely dependent on imported inputs, as the major part of its raw material comprises recombined imported milk powder and butter oil.

The dry zone produces about 40 percent of the total milk produced which is incompatible with its potential capacity, as almost 70 percent of the country's cattle population is located in this zone. The contribution of the wet zone (up-country) accounts for 25 percent of the production while the balance comes from the intermediate zone.

Ironically, the wet zone (up country) with its 25 percent of the country's share of production contributes to 48 percent of the total milk collection of the National Milk Board. On the one hand it depicts the syphoning process of milk from the producers who form part of the sector which needs milk very much due to its poor nutritional levels; while on the other hand it indicates the distortions of the institutional coverage extended to the milk producers. The dry zone with almost 70 percent of the cattle distribution and about 40 percent of the milk produced in the country has as its share only 35 percent of collection of the National Milk Board. Another point worth noting is the discrepancy between the NMB prices and those offered in the local markets in the dry zone which perhaps has deprived the dry zone milk producer from enjoying the favourable price structure offered by the NMB.

Table 2

Average Quantities of Milk and Milk Products Consumed per Person  
for one Month by Income Group (Rs.)

Item	0-200	201-600	601-1,000	1001-2,000	2001-3000	3001-5,000	5001-10,000	Over 10,000	Over all Average
Milk (MLT)	172.5	319.35	377.15	662.8	1045.7	1372.9	1566.7	2824.1	675.0
Fresh Milk Cow	124.85	226.15	271.55	517.25	816.9	1072.9	1279.9	2273.6	521.8
Fresh Milk Goat	-	16.9	5.85	10.95	5.1	13.2	7.3	-	8.0
Infant Milk	3.25	29.35	48.2	51.05	58.5	60.9	88.5	93.8	51.2
Other Powdered Milk	28.85	25.85	31.7	64.45	106.2	143.7	129.1	214.3	63.2
Condensed Milk	-	1.3	0.45	0.8	6.2	6.3	5.3	20.1	2.0
Curd/Yoghurt	1.65	9.35	14.05	12.4	25.3	59.0	50.2	200.9	19.7
Infant Cereal Food	-	1.65	1.35	0.95	1.6	2.2	-	2.7	1.4
Other Milk	1.5	7.7	4.0	4.95	25.9	14.7	6.4	18.7	8.6
Milk Products	6.35	1.1	1.75	4.55	15.8	43.9	53.4	167.7	10.1
Butter	6.35	1.1	0.4	2.5	11.0	36.3	39.3	92.9	6.7
Cheese	-	-	-	-	0.4	0.8	2.8	0.6	0.2
Moru	-	-	-	-	0.2	-	-	-	-
Ice Cream	-	-	0.5	0.4	0.9	1.4	5.7	51.7	1.1
Other	-	-	0.85	1.65	3.3	5.4	5.6	22.5	2.1

Source: *Consumer Finances and Socio Economic Survey, 1981/82*

Table 2 above gives the pattern of consumption of milk, by different income groups in the country. It shows that the consumption pattern of milk is highly responsive to the income levels of people. It may also be noted that the consumption pattern of milk products is more strongly receptive to income standards.

In general neither milk nor milk products are over consumed, except by the higher income categories. According to the estimates of the MRI and paediatricians the Sri Lankan per capita milk requirement (all products converted) is estimated to be 5.5 ozs. of standard liquid milk. This distribution should however, be weighted in favour of the different age and social groups. For instance, a baby under one year of age would require on an average about 26.3 ozs. of liquid milk a day.

The demand and consumption of milk exceeds domestic production by about 50 percent; which has to be met by importing the balance requirements from the major milk producing countries. The total import of dairy products is around 12,000 tons annually, providing the liquid milk equivalent of about 400,000 Mlpd. The total value of milk imports which was around Rs. 481 million in 1982 had gone

up to Rs. 656 million in 1984. (See Table 4).

In terms of value, full cream and half cream milk powder constitute 80 percent of the milk imported while the major exporting countries have been the Netherlands, New Zealand and Australia. Other milk products include condensed milk, and a relatively negligible proportion of (in terms of the value of total milk imports), butter, cheese, curd and ghee. The tariff structure on imported milk arranged in ascending order starts from a low duty of 5 percent on infant milk and whole milk to about 100 percent on other dairy products like cheese and butter.

The significance of dairying, together with the relatively stagnant growth rate and constraints confronting this sector were well summed up by an introductory statement of a "Livestock Sector Strategy Report" prepared in August 1984. (See box) Attempts at developing the dairy industry, with assistance from several donor agencies and countries have been intensified in recent years. One such agency is the World Bank's soft-arm affiliate the IDA. An International Development Association (IDA) Mission in 1982/83 evaluated the reactions of the dairy sector

to a variety of policy incentives and adjustments made by the authorities and put up a new set of proposals which were identified as a major shift in the strategy adopted hitherto. On the basis of these proposals the country was divided into five major distinctive milk production systems namely, the estate system; the mid-country small-holder system; the dry zone system; in order to achieve an incremental milk production target of 106,000 Mlpd by the seventh year of its operation. In the earlier project being implemented with IDA assistance in the 1970s, the Project area was confined to the Mid-country Wet Zone and the Coconut Triangle; but the IDA's reformulated project decided to undertake some aspects of dairy development in each of the agro-climatic zones around a 'milk shed' with a view to giving a fillip to the total national programme in the long term. The programmes targets are expected to be achieved by increasing the number of milk animals, changing the composition of the domestic herd, by increasing the share of cross-bred varieties and increasing the daily average yield per animal. These objectives are to be achieved through setting up of about 1,920 village level milk producing farmer societies.

DISTRIBUTION OF LIVESTOCK BY MAIN CLIMATIC ZONES, 1982

Species	Dry Zone	Intermediate Zone	Wet Zone	Total
Cattle	995	355	338	1,688
Buffaloes	458	239	182	879
Goats	326	80	106	512
Sheep	22	5	1	28
Pigs	16	15	44	75
Poultry	2,079	1,125	3,038	6,242

Source: Sri Lanka Livestock Statistics 1983

Livestock keeping largely hinges on the agro-ecological conditions prevalent in the farmer's socio-cultural and religious environment. This table which depicts the livestock distribution by the main agroclimatic zones shows that the majority of cattle and buffaloes are reared in the Dry Zone.

Table 3 Average Expenditure on Milk and Milk Products per person for one month by income groups (Rs)

Income Group	Milk	Milk Products	On Milk and Milk Products	On All Food Items
0 - 200	2.4 (1.75)	0.20 (.14)	1.46(1.06)	136.95(100)
201 - 600	2.58(1.89)	0.13(.09)	2.72(1.99)	136.01(100)
601 - 1000	3.06(2.05)	0.05(0.03)	3.11(2.08)	149.09(100)
1001 - 2000	5.75(3.12)	.16(0.08)	5.91(3.21)	183.77(100)
2001 - 3000	9.60(4.33)	.88(0.39)	10.48(4.73)	221.53(100)
Over 3000	14.28(5.45)	2.05(0.78)	16.33(6.24)	261.61(100)

Source: Consumer Finances and Socio Economic Survey, 1981/82

The overall impact of such an ambitious programme if continued unabated, could be favourably felt in the fields of supplementary employment and income generation, redistribution of income, foreign exchange savings, improvements in nutritional status, and changes in total welfare and living standards. Whether these effects can be achieved would depend on many factors and if these aspects are not properly looked into, the present programme also would eventually end up without having made any significant change in the existing position.

Table 3 above indicated that the average expenditure on milk and milk products per person, is only 3.6 percent of their total expenditure on all food items. This had been alarmingly low in the case of lower income groups.

The average consumption figures either by sector or otherwise do not indicate a realistic picture, so that the average per capita consumption of 76 millilitres per day (Mlpd) and the average rural per capita consumption of 480

Mlpd can be used only as a barometer to get an idea about the pattern of milk consumption.

In general, the consumption of milk and milk products in Sri Lanka is said to be well below the levels prevalent in other South Asian countries. Hence the income elasticity for the demand of milk and milk products is estimated to be about 0.6-0.8 at mean consumption level.

Several Dairy Development Plans have been formulated and implemented over the last few decades, one of the more recent being the Medium Term Five Year Plan 1972-1977. This Plan attempted to develop the Dairy Industry in the Mid-Country and the Coconut Triangle, and IDA assistance was provided for this purpose. But, in spite of genuine efforts made by the project's technical Staff this Plan came up against many serious constraints and could not fulfill the targets it had set out to achieve. Finally, the Project was revised for the period 1975-1977. But in spite of the revision, due to future constraints the progress of the Revised Project was also impeded and by 1979 of the total IDA credit

of US Dollars 9 million for the Project only US Dollars 4.6 mn had been expended or committed. An indepth examination of these constraints revealed the familiar pattern of how the country's dairy development Plans have gone awry and why despite the vast potentialities livestock, (and milk production particularly) is not still not at the "developed" stage it should have reached. There have been achievements but progress on this Plan was far from satisfactory.

In this particular instance there was a low level of private sector participation particularly from operators of larger farms (16ha-20ha) due to the uncertainties of land ownership and land tenure. What is important here is that the plans could not foresee the underlying reasons for the low-response of private individuals, or the public sector for that matter, to the changes envisaged in the Plan.

Inconsistency in price trends of producers of milk vis-a-vis cost of animal feeds gave rise to discouraging terms of trade. For instance, while the farm gate price of milk remained unchanged the price of poonac (coconut cake) which was Rs. 400 per ton in 1975 increased to an unprecedented level of Rs. 2,400 per ton in 1977. This discouraged farmers from expanding their dairy herds and in many instances resulted in closures of dairies; accelerating the dwindling of the productive herd, while further reducing milk production.

Shortages and temporary failures in feed supply has been another obstacle. Notwithstanding the high prices, the total supply of feed available in the country was adequate to meet only one-third of the demand created by the new Plan. For instance, to implement this Five Year Plan (1972-77) the entire animal industry needed 176,000 tons of feed per annum, but in actual practice what was available in the country had only been 63,000 ton per annum in 1974. Inadequacy of the institutional infrastructure was another problem. The milk collection was

handled solely by the Multi-purpose Co-operative Societies which were not sufficiently geared to absorb changes envisaged in the Plan. Non availability of suitable stocks, and cattle in sufficient numbers to meet the demand when existing operators or new operators showed interest, was another constraint.

High mortality ranging from 25-40 percent among calves in the hill and mid-country zones where temperate breeds were maintained was also a problem. Mortality among calves is largely due to starvation between birth and four months by depriving them of milk, due to farmers extracting maximum milk from the cows to compensate for the high price of cattle feed and shortage of high quality herbage feed.

Inadequate supporting services such as "Artificial Insemination" (AI) services, veterinary assistance and supply of drugs. This led to an emergence of an informal sector capable of providing the same services at a high cost, which was not affordable to average dairy producers.

Insufficiency of high quality herbage feed for the productive cattle arising out of high pressure on land, particularly in the hill and mid-country.

A more detailed discussion of these constraints has been pursued in the latter section of this Special Report. The significance of these constraints is that, over and over again the same constraints or a combination of similar constraints have impeded past endeavours to streamline the dairy industry of this country. That there are "vast potentialities for livestock production in general, and milk production in particular in Sri Lanka, in the different agro climatic zones in the island, provided the available resources are judiciously harnessed" has been a common refrain of experts and specialists both within and outside the country. But if the constraints identified are not properly considered and due priority not afforded to the Livestock Sector it is inevitable that the same old pattern would be followed.

## Milk Nutrition

Milk is considered a complete food. In the Mammalian world, milk is the exclusive food of young ones until their digestional system is sufficiently matured to digest other food substitutes. The growth pattern of human babies differs from that of the young ones of other mammalian counterparts, as the period between their birth and

maturity is much longer, during which period milk in different forms and sources provides much of the essential nutritive elements during this period.

Milk is superior to the other food forms, as it provides essential minerals and vitamins in a balanced ratio and in an easily assimilable form.

**Table 1**  
**Composition of a Selected Group of Milk Products**

Product	Water	Fat	Protein	Lactose	Ash	Calcium
Fresh milk	87.0	3.9	3.5	4.9	0.7	118
Dry Cream	0.7	65.0	13.4	17.9	3.0	—
Butter	16.0	80.6	0.6	0.4	2.4	20
Butter oil	0.2	99.5	0.3	—	—	121
Skimmed milk	90.5	0.1	3.6	5.1	0.7	121
Yoghurt	89.0	1.7	3.4	5.2	0.7	120
Plain Condensed skimmed milk	66.0	0.4	12.5	18.4	2.5	—
Sweetened condensed milk	26.5	8.1	8.1	11.4	1.6	262
Ice cream	63.2	10.6	4.5	6.6	0.5	146
Dry skimmed milk	3.0	0.8	35.9	52.3	8.0	1308
Dry malted milk	2.6	8.3	14.7	20.0	3.6	288
Cheese	37.0	32.2	25.0	2.1	3.7	750

According to the table above much of the fresh milk and other milk products contain water, followed by different combinations of fats, protein, lactose, ash and calcium. Fat content is assumed to be relatively high in those products like butter (86%) and butter oil (99%), cheese (32%), dry cream milk (65%), while protein content is high in dry cream (13.4%), plain condensed skimmed milk (12.7%), dry skimmed milk (35.9%), cheese (25.9%). Calcium is amply available in dry skimmed milk with most of the vital vitamins and minerals. Table 2 provides us an idea about the vitamin availability of a few of these milk products.

Milk is absolutely vital in the early years of the growth of the brain and nurturing mental power. Milk starvation and under-nutrition in the early stages of life is therefore said to cause mental retardation for life.

Breast feeding no doubt is the best form of food for babies in their early growth stages. However, breast feeding is not feasible throughout the growth stages. Milk and milk products supplement part of this food gap in the second, third and fourth growth stages extending up to physiological adulthood. In addition to this group, lactating mothers, invalids and old age groups form the milk sensitive groups in the population.

**Table 2**  
**Vitamin Content of Some Milk Products**

Product	A Caro- tene (IU/ 100g)	B <sub>1</sub> Thio- mine (Mg./ Kg)	B <sub>2</sub> Ribo- flavin (Mg./ Kg)	B <sub>3</sub> Nico- tinic acid (Mg./Kg)	B <sub>5</sub> Pyri- doxine (Mg./Kg)	Panto- thenic (Mg./ Kg)	Bio (Mg./ Kg)	B <sub>12</sub>
Milk	156	0.44	1.75	0.94	0.64	3.46	0.31	.0043
Butter	3108	0.03	0.18	0.5	0.4	2.3	—	—
Skim Milk	9	0.4	1.7	0.86	0.45	3.6	0.16	.0038
Ice Cream	523	0.48	2.3	1.1	—	—	—	—
Cheddar Cheese	1196	0.30	5.0	0.49	0.75	2.7	0.20	.013