

---

# Appraisal of the Sri Lanka Dairy Sector

## Volume 1: Synthesis Report

---



Dept. of Animal Science, University of Peradeniya



International Livestock Research Institute



Ministry of Livestock Development and Estate  
Infrastructure

---

*Colombo, Sri Lanka*  
*October, 1999*

Dr. M.N.M. Ibrahim, Dr. S.J. Staal, Dr. S.L.A. Daniel and  
Dr. W. Thorpe

## Study Participants

### **Primary research team:**

Dr. M.N.M. Ibrahim (Department of Animal Science, University of Peradeniya), Dr. S.J. Staal (International Livestock Research Institute, Kenya), Dr. S.L.A. Daniel (Ministry of Livestock Development and Estate Infrastructure), Dr. W. Thorpe (International Livestock Research Institute, Kenya).

### **Resource persons:**

Production Systems: Dr. M.C.L. de Alwis (Animal Health Consultant, Kandy, Sri Lanka), Dr. (Ms) S. Premaratne (Department of Animal Science, University of Peradeniya), Dr. J.Tanner (International Livestock Research Institute, Kenya), Dr. T. Wickramaratne (Veterinary Research Institute, DAPH).

Economics and Marketing: Prof C. Bogahawatte (Department of Agricultural Economics, University of Peradeniya), Mr. B.K. Ganguly (National Dairy Development Board, India), Prof. T. Jogaratnam (Department of Agricultural Economics, University of Peradeniya)

Policy and Institutional: Dr. A.O. Kodithuwakku, (Department of Animal Production and Health), Dr. K. Pillai, (Ministry of Livestock Development and Estate Infrastructure)

### *Acknowledgements*

The authors are grateful for the support and encouragement extended by Dr. P. Ramanujam, Secretary, and the staff of the Livestock Division of the Ministry of Livestock Development and Estate Infrastructure. The support extended by Dr. S.S.E. Ranawana, Director General, Department of Animal Production and Health, and his staff, is also appreciated. The assistance of Mr. B. K. Ganguly of the National Dairy Development Board (India) in data analysis and interpretation, and that of Mr. Kapila Ranaraja and Mr. I. Yapa for assisting with the execution of household survey and data entry is gratefully acknowledged. Ms. E. Ouma and Mr. D. Njubi, ILRI, also contributed to data handling, analysis and interpretation. Mr. Khanna and Mr. H.V.G.R. Navaratne of Kiriya, Provincial Directors of the Department of Animal Production and Health, Managers of Anuradhapura district co-operative, Nawalapitiya Milk co-operative, Yatinuwara Milk co-operative and Coconut Triangle Milk Union were very helpful during the RRA survey. The GIS work was handled by Dr. R. Premalal (Department of Agricultural Engineering, University of Peradeniya) and Mr. K. Munasighe (Land use Division, Department of Agriculture).

Dept of Animal Science  
Faculty of Agriculture  
University of Peradeniya  
Peradeniya, Sri Lanka

International Livestock Research Institute  
PO Box 30709  
Nairobi, Kenya

Ministry of Livestock Development and Estate Infrastructure  
45, St. Michaels Road  
Colombo 3, Sri Lanka

## Table of Contents

### *Structure of the Report*

The complete report, **Appraisal of the Sri Lanka Dairy Sector**, consists of 2 volumes as follows:

Volume 1: Synthesis Report (this volume)

*Presents an Executive Summary, and synthesis of the study findings and recommendations, organised in three main sections: 1) Dairy Production Systems, 2) Economics and Markets, and 3) Policy and Institutions.*

Volume 2: Main Report

*Presents more detailed findings, as well as supplementary appendices, organised in the same manner as Volume 1.*

### Volume 1: Synthesis Report

<b><i>Study Participants</i></b> _____	<b><i>i</i></b>
Acknowledgements _____	i
<b><i>Table of Contents</i></b> _____	<b><i>ii</i></b>
<b><i>List of Figures</i></b> _____	<b><i>iv</i></b>
<b><i>List of Tables</i></b> _____	<b><i>iv</i></b>
<b><i>List of Abbreviations</i></b> _____	<b><i>v</i></b>
<b><i>Executive Summary</i></b> _____	<b><i>vi</i></b>
Background to the Study _____	vi
Overview of the Sri Lanka dairy sector _____	vi
Main issues in dairy production systems _____	vi
Main issues in dairy economics and marketing _____	viii
Main issues in dairy policies and institutions _____	ix
Recommendations _____	ix
<b><i>Background to the Study</i></b> _____	<b><i>1</i></b>
Objectives of the appraisal _____	1
Methodology _____	1
Summary of the structured survey _____	2
<b><i>Overview of the Sri Lanka Dairy Sector</i></b> _____	<b><i>4</i></b>
<b>Trends in Dairy Production, Imports and Demand</b> _____	<b><i>4</i></b>
Supply and demand prospects in the near future _____	5
<b><i>Dairy Production Systems</i></b> _____	<b><i>7</i></b>
<b>Main Production Zones</b> _____	<b><i>7</i></b>
<b>Summary of Zonal Production Systems &amp; Market Linkages</b> _____	<b><i>9</i></b>
Up-country: Tea Estate Dairy/Market Vegetable System _____	9
Mid-Country: Kandyan Forest Garden System _____	10
Coconut triangle and wet lowlands _____	11
Dry lowland zones _____	11
<b>Main Issues in Livestock/Dairy Production Systems</b> _____	<b><i>14</i></b>
Herd growth, productivity, and breed policy _____	14
Buffaloes for dairy production _____	14
The health status of cattle and buffaloes _____	15
Feed resources and common properties _____	15
Fodder use and the opportunity costs of labour _____	15
Access to livestock extension services and technical information – public/private goods _____	16
<b><i>Dairy Economics and Markets</i></b> _____	<b><i>17</i></b>

## Table of contents

---

<b>Economics of Dairy Production</b>	<b>17</b>
Farm-level budgets	17
<b>Milk Collection and Marketing</b>	<b>18</b>
Producer price of milk	18
Producer household milk disposal	19
Informal milk sales and collection	20
Formal milk collection	21
Other services provided by co-operatives and collection centres	22
Milk processing	22
Dairy co-operative development	23
Market channels in the Sri Lankan market for dairy products	23
<b>Milk and Dairy Product Consumption</b>	<b>25</b>
Dairy expenditure patterns	25
Liquid milk market and consumer behaviour	26
Milk powder market and consumer behaviour	26
Other milk product consumption	26
<b>Main Issues in Dairy Economics and Markets</b>	<b>27</b>
Imports	27
Informal marketing of milk	27
Preservation of milk	28
Co-operative development	28
Capturing domestic demand growth through liquid milk sales	28
<b><i>Policies and Institutional Support in the Dairy Sector</i></b>	<b>29</b>
<b>Government Institutions Supporting the Dairy Sector</b>	<b>29</b>
Ministry of Livestock Development and Estate Infrastructure	29
Department of Animal Production And Health (DAPH)	29
Provincial Departments of Animal Production and Health	30
National Livestock Development Board (NLDB)	30
Kiriya Milk Industries of Lanka Company Limited	31
Livestock Development Division of Mahaweli Authority of Sri Lanka	31
<b>Private Sector Institutions for Dairy Development.</b>	<b>32</b>
Dairy marketing institutions	32
Dairy feed manufacture	33
<b>Main Issues In Policies and Strategies for Dairy Development</b>	<b>33</b>
Animal feed	33
GST on Animal Feeds	34
Pasture and fodder for dairying	35
Trade Policies	35
Promotion of private sector activities	36
<b><i>Recommendations</i></b>	<b>37</b>
<b>Recommendations for production systems</b>	<b>37</b>
<b>Recommendations for economics and markets</b>	<b>37</b>
<b>Recommendations for policies and institutions</b>	<b>37</b>
<b><i>References</i></b>	<b>39</b>

## List of Figures

Figure 1: Conceptual framework for the Rapid Appraisal of dairy systems.....	2
Figure 2: Changes in Sri Lanka milk supply and collection, 1981 to 1997. ....	4
Figure 3: Domestic Sri Lanka milk production and dairy imports (LME's), 1987 to 1997. ....	5
Figure 4: Approximate Agro-ecological Zones by District.....	7
Figure 5: Percent pure and crossbred dairy cattle by district. ....	8
Figure 6: Overall proportions of improved and local cattle and buffaloes in Sri Lanka. Source: Farm/household survey. ....	9
Figure 7: Average informal retail/producer milk price reported in farm survey, by district.....	19
Figure 8: Households' milk disposal and market outlets. Source: Farm survey. ....	20
Figure 9: Dairy channel flow diagram for Sri Lankan dairy sector, expressed in terms of % of milk production (LME's).....	24
Figure 10: Estimated Dairy Product Market Shares, as a Proportion of the Overall Market.....	25

## List of Tables

Table 1: Cattle and buffalo systems: topography, climate and animal husbandry.....	7
Table 2: Approximate numbers of cattle and buffaloes in each agro-climatic/land-use zone.....	8
Table 3: Summary of characteristics of the main livestock production systems .....	13
Table 4: Estimated average annual budgets for typical smallholder cattle-keeping households in Sri Lanka, by zone and overall.....	18

## List of Abbreviations

AGA	Assistant Government Agent
APH	Animal production and health
AI	Artificial insemination
a.m.s.l.	above mean sea level
BOI	Board of Investment
BSE	Bovine spongiform encephalopathy
CIF	Cost of insurance and freight
CTMU	Coconut Triangle Milk Union
DAPH	Department of Animal Production and Health
DCCs	Dairy collection centres
DDF	Dairy Development Foundation
DS	Divisional secretariat
FMD	Foot and mouth disease
GDP	Gross domestic product
GIS	Geographical Information Systems
GN	Grama Niladari
GST	Good and Services Tax
HH	Household
HS	Haemorrhagic septicaemia
IDPL	International Dairy Products Limited
ILRI	International Livestock Research Institute (Kenya)
L or l	litres
LDI	Livestock development instructor
LME	Liquid milk equivalents
M	Million
MCCs	Milk chilling centres
MIDCOMUL	Mid Country Milk Union Limited
Milco	Milk Industries of Lanka Co. Ltd (Kiriya)
MLD&EI	Ministry of Livestock Development and Estate Infrastructure
MTs	Metric tonnes
NLDB	National Livestock Development Board
NLL	Nestle Lanka Limited
NDDDB	National Dairy Development Board (India)
Rs	Sri Lankan rupees
RRA	Rural Rapid Appraisal survey
SD	standard deviation
SMP	Skim milk powder
SNF	Solids non-fat
UHT	Ultra-high temperature
VRI	Veterinary Research Institute
VS	Veterinary surgeon
WMP	Whole milk powder
WTO	World Trade Organisation

## Executive Summary

### *Background to the Study*

The initiative for this study arose from a shared interest by the Ministry of Livestock Development and Estate Infrastructure and the National Dairy Development Board of India, to review progress in the Sri Lanka dairy sector with a view to identifying strategies for continued development. Due to its experience in this type of research, the International Livestock Research Institute (ILRI) was asked to assist in facilitating this review.

A stakeholder' meeting was held in Peradeniya on December 17, 1997 to further the implementation of this idea. At that meeting, a number of priority issues to be addressed through the Sector Appraisal were identified. The general objective of the Appraisal would be to review dairy development in Sri Lanka, and identify priority development and research interventions. The approach agreed upon generally followed the ILRI Conceptual Framework for Dairy Research (Rey et al., 1993), which addresses the entire consumption-to-production spectrum within dairy systems. That approach was however modified by the addition of a large structured survey of rural and urban households. A final Stakeholder Meeting was held in Peradeniya on October 5, 1998, at which preliminary results and recommendations were presented and discussed. This report reflects the inputs from the structured survey, the RRA survey, and the stakeholder meetings.

### *Overview of the Sri Lanka dairy sector*

While the per capita consumption of milk and milk products in Sri Lanka is low compared to other countries in South Asia, since 1981 it has grown by nearly 200%, from 13 kg/year to about 36 kg/year currently. Much of this increase in consumption can be attributed to strong GDP growth during the period, driving consumer demand. Milk production has apparently grown significantly, as have imports, although some national production data may not be reliable. Milk collection, however, has not grown as quickly, and so as a smaller proportion of production has fallen from 54% to 32%. This implies that most of the growth in dairy production has gone to the informal market

In terms of Liquid Milk Equivalents (LME's), imports in 1997 were estimated to represent 43% of all milk available, and some 68% of the formal, processed milk market. Although there is much concern about increased imports, it should be noted that in 1981 imports formed a similar proportion of total dairy product availability at 45%.

Based on official data, cattle and buffalo numbers (estimated at 1.64 M and 0.76 M, respectively, in 1996) have been generally declining, but overall milk production figures show an increase, from some 250 M litres (1987) to 331 M litres (1996). These figures, however, include estimates of livestock numbers and production in Northern and Eastern districts that may not be accurate. Estimates based on the districts for which more reliable data suggest that there may have been herd growth rather than decline, and decreases in productivity per animal, although the period 1992-1996 indicates growth in cattle milk productivity of 2.5% annually.

Projecting to 2010 based on these trends, and assuming a 4% rate of real GDP growth, income and population growth alone will generate an increase in aggregate demand for dairy products of slightly over 100% by 2010, from about 698,000 MT in 1997 to over 1,400,000 MT in 2010. This growth represents important opportunities for domestic producers to increase production.

### *Main issues in dairy production systems*

**Herd growth, productivity, and breed policy:** Official statistics suggest that between 1987 and 1996, there has been an overall apparent increase in domestic milk production of some 21%, while at the same time cattle and buffalo numbers fell in many areas. The most important contributor to this productivity change is likely to be the higher proportion of upgraded animals. Whereas the 1981 census found only 3% improved cattle (pure or cross bred), the Appraisal household survey estimated that some 40% of the

national cattle herd now consists of improved animals. Breed preferences were also found to differ occasionally from the breed policy guidelines. Given the relatively low disease challenge in Sri Lanka, and the success of high-grade crosses in similar low-land sub-humid tropics in other countries, more freedom for farmer breed selection could contribute to higher productivity.

**Buffaloes for dairy production:** Official data point to a shrinking national buffalo herd, while the increase in proportion of improved animals suggests, however, that many buffalo owners increasingly view them as dairy animals. Availability of improved buffalo heifers or studs was reported by farmers to be very limited, and due to herd management practices and difficulty of heat detection, use of AI among buffalo is constrained. All indications are that the shortage of improved buffaloes is greater than that of improved cattle. Current efforts to provide studs by NLDB ranches, however, appear to be limited. Given this constraint, more attention may need to be directed towards giving some priority to producing improved buffalo studs, rather than simply to producing quality buffalo semen.

**The health status of cattle and buffaloes:** Overall, the constraints to dairy production from disease challenge are demonstrated to be less severe than some other factors, such as nutrition and marketing. While many bovine diseases are prevalent, in the areas of current and potential dairy production, there are well-documented health management practises for minimising the risk of infection and productivity loss. Disease constraints to dairy productivity are therefore associated with the need to improve the delivery of veterinary services to dairy farmers and to improve the quality of those services, especially for preventive medicine.

**Feed resources and common properties:** Lack of good quality feed year round is a major constraint to profitable smallholder dairy production in Sri Lanka. This is primarily a result of pressure on land and competing opportunities for labour, which restrict the supply of fodder to many dairy herds. Potentially beneficial feed technologies have been researched by Sri Lankan institutions and others in the region. Emphasis must now be given to developing targeted projects in regions where fodder shortages are well documented, to test these promising feed technologies. Participatory approaches, thereby strengthening research-extension-farmer linkages, are required to ensure that the testing and validation of the technologies is demand/farmer driven. A related issue is the management of communal grazing areas and public land, including roadsides.

**Fodder use and the opportunity costs of labour:** Relatively high opportunity costs of labour relative to milk prices hinder more the intensive use of planted and cut and carry fodder. A rough estimate of milk price/wage ratios in Sri Lanka is approximately 1 to 13. Thus the value of one litre of milk sold at farm gate is only one thirteenth of a days wage. In India, on the other hand, where farm-gate milk prices are higher yet wages are lower, in Gujarat for example, the same ratio is approximately 1 to 4. The relative value of milk is thus much higher, as a litre of milk pays for nearly a quarter of a day's wage. Similar results are found when Sri Lankan wage/milk prices ratios are compared to other developing countries, which is linked to the relatively high per capita GDP in Sri Lanka. The result of this on farmer behaviour are significant differences in willingness to spend time gathering crop residues such as rice straw, cutting rice straw, and engaging in the marketing of fodder. These structural differences in opportunity costs of labour lead to the observed low use of rice straw, the low level of adoption of planted fodder, and the very small role of fodder markets. Altering this structural reality is unlikely to be possible through milk pricing policies or subsidies on pasture, fodder seeds, etc. Opportunities may exist, however, through raising the productivity of labour in dairy production, either through a) focusing on fodder technologies which are not labour-demanding and/or b) continued upgrading of the national herd to raise the productivity of dairy animals.

**Access to livestock extension services and technical information – public/ private goods:** Few farmers report obtaining any significant extension services in animal feeding, husbandry or breeding. This appears to be due to two factors: a) over-emphasis on animal health issues by the Veterinary Surgeons who supervise all livestock-related services, and b) few attempts by farmers' organisations to meet the needs of their members for extension services.



### *Main issues in dairy economics and marketing*

**Imports:** Although imports form an important share of the dairy market, they remain susceptible to macroeconomic factors. Based on estimates of the cost of importing, repackaging and distributing milk powder, changes in world powder prices and local exchange rates can significantly alter import competitiveness. A 10% rise in world WMP prices is estimated to raise the cost of packaged powder at the wholesale level by 8.9%. Similarly, a 10% devaluation in the Rupee/\$ exchange rate, which has indeed approximately occurred between January and Sept of 1998, would raise wholesale costs by 9.1%. As shown previously, the projected increases in domestic demand will require higher levels of per capita dairy product availability, which must come through either domestic production or through imports. With the current trend in strong GDP growth, it is possible that incomes will rise to the point where, under current labour-intensive technologies, domestic production will become un-competitive. For liquid milk sales, however, domestic production nearly always has comparative advantage, as reconstituted milk is not a good substitute. Aside from these macro-economic factors, the continued role of imports will depend on consumers' tastes regarding fresh and powdered milk.

**Informal marketing of milk:** The informal milk market plays a larger role than many have assumed. With a lower proportion of milk production now collected by the formal market (32% compared to 54% in 1981), this is an important outlet for many smallholder farms. The informal or local market supplies some 28% of the total market, and provides many viable income-generating opportunities for small entrepreneurs. Further, the informal market is critical to ensuring economic viability of dairy production for many producers, as it typically provides higher prices. The public health risks in informal market channels, however, are uncertain, and will depend on consumer practices, such as boiling of milk before consumption. The growth in the informal market suggests that formal collection systems are not serving farmers adequately, perhaps through over-rigid pricing regimes, or that supplies of liquid milk to consumers are perhaps not adequate or appropriately marketed. As in nearly any setting, fresh liquid milk sales favour domestic producers over importers, and means of increasing the market for such sales may need to be considered.

**Preservation of milk:** Although not endorsed by international standards, there is apparent widespread use of hydrogen peroxide in milk collection, much of it used at the farm or collection point level. There is strong incentive for farmers and market agents to preserve milk in situations where collection occurs only once a day. Because access to markets in some more distant areas may depend on the continued use of such bacteriological inhibitors, some consideration may need to be given to testing the more acceptable alternative, lacto-peroxidase, in areas where appropriate.

**Co-operative Development:** Co-operative development in the dairy sector has been occurring for a number of decades, including through important initiatives by the government and foreign donors. The most recent efforts that are being applied differ in some respects from those pursued in previous co-operative efforts. Among these are apparent policy not to extend services such as AI and extension, loans or services on credit. Over time, as government withdraws from provision of livestock services such as AI and livestock extension, the ability of co-operatives to offer such services may be critical for continued development.

**Capturing domestic demand growth through liquid milk sales:** As mentioned, even conservative projections indicate strong increases in demand due to continued GDP growth. This will present good opportunities for smallholder domestic dairy producers, especially if demand for liquid milk grows particularly fast, as consumption data suggests could happen. Based on the household survey, the consumption of liquid milk appears to increase with income (unlike that of milk powder), suggesting that over time, as incomes grow, demand could shift towards liquid milk. This sort of shift would strongly favour domestic producers, and efforts towards accelerating that change should be considered.

### *Main issues in dairy policies and institutions*

**Policy overview:** Facilitating the farmer and private sector activities in dairy production and marketing, and creating a competitive industry structure are key concepts in the government planning for dairy development. The promotion of the liquid milk consumption as against the heavy use of milk powders as at present among the local consumers is also a major concern in the present policy framework. The provision of public goods by the state and allowing the private sector to cater to the provision of private goods are also stated policy objectives of the present government. Because of the current economics of dairying in Sri Lanka, the state is obliged to continue to provide some services to dairy farmers.

**Animal feed & GST:** The government policy on animal feed is to promote a competitive animal feed industry in the country. Towards this end the government has allowed free trading of animal feed ingredients except maize and by-products of animal origin for the manufacturer of livestock feed, and since 1991 all feed ingredients are exempted from custom duties. Imported feed ingredients comprise nearly 70 % of the raw materials for feed manufacture. However in spite of the expansion of the animal feed milling industry in Sri Lanka, the use of manufactured concentrate feeds for dairy cattle production in the country has remained at a very negligible level. The principal reason for this cited by farmers in the study is the low profitability of dairying when concentrates are fed to their cattle. One contributing factor to this is the Goods and Services Tax (GST), charged at 12.5% on the value addition, and so cattle feed prices are now effectively increased by that percentage. The final farm-level product, milk, is however not subject to GST. Normally in the value added taxation regimes, there is the possibility of obtaining a credit for the GST paid on the inputs, such as feed in the case of dairy. Since milk is GST-exempted, this credit is not available, so that the tax on feed is borne solely by the milk producer, reducing profitability. At the same time, milk powder, whether domestic or imported, is GST exempted. Coconut ponnac is also exempted, providing incentive for farmers to use ingredients rather than compounded feed rations. It is therefore suggested that the government review its policy on GST on animal feeds.

**Pasture and fodder for dairying:** At present dairying in Sri Lanka is primarily dependent on pasture and fodder found on farm or from common property areas, with little the cultivation of pastures and fodder for purposes of dairying. Although the pasture development and extension is a function of the provincial DAPHs, there is no strong institutional arrangement to spearhead a useful programme for promotion of pasture and fodder for dairy production.

**Trade Policies:** The government of Sri Lanka has adopted the open market policy on the trading of dairy products, subject to standards set by the Sri Lanka Standards Institution. The main imported products are full cream milk powder for the formal retail market, and skim milk powder as an important raw material for the production of ice cream, yoghurt, reconstituted milk etc. Both milk powder has a 10% duty rate, and is subject to a 5.5% national security levy. In addition is the stamp duty, and at present it is equivalent to 2.5% of the CIF value of the consignment for import. The findings of the study do not tend to support a change in the present duty structure for dairy commodities, although this should be reviewed regularly by policy-makers. The deteriorating rupee-dollar parity rates have also forced the milk powder packers to raise their prices accordingly, and any increase in the duty rates on milk powder would only further increase costs to consumers. Under the upcoming implementation of WTO (SAFTA/SAPTA) agreements by the milk powder exporting countries on reduction commitments on dairy production, it is likely that the international prices of dairy commodities will increase in the international markets. The present effective rate of taxation of milk powder at nearly 19%, may therefore be sufficient to give the required protection level for the domestic dairy industry, unless market conditions change.

### *Recommendations*

The recommendations arrived at through this study are listed according to the main sections of the report, and begin on page 37.

## **Background to the Study**

The initiative for this Dairy Sector Appraisal arose from a shared interest by the Ministry of Livestock Development and Estate Infrastructure and the National Dairy Development Board of India, to review progress in the Sri Lanka dairy sector with a view to identifying strategies for continued development. Due to its experience in this type of research, the International Livestock Research Institute (ILRI) was asked to assist in facilitating this review.

A stakeholder' meeting was held in Peradeniya on December 17, 1997 to further the implementation of this idea. At that meeting, which was attended by a wide variety of participants from the public sector, research and development agencies and the private sector, a number of priority issues to be addressed through the Sector Appraisal were identified. The general objective of the Appraisal would be to review dairy development in Sri Lanka, and identify priority development and research interventions. The approach agreed upon generally followed the ILRI Conceptual Framework for Dairy Research (Rey et al., 1993), which addresses the entire consumption-to-production spectrum within dairy systems. It was decided to assign researchers to examine each of the primary set of issues: a) production systems, b) economic and structural issues, and c) policy and institutional issues. The Terms of Reference (TOR) for each topic are presented in Appendix 1. The team leader chosen to co-ordinate the Appraisal was Dr MNM Ibrahim, from the Department of Animal Sciences of the University of Peradeniya University.

### *Objectives of the appraisal*

As agreed at the initial stakeholder meeting, the overall objective was to bridge information gaps to assist and accelerate dairy development in Sri Lanka.

The specific objectives were to:

1. Highlight the nature and distribution of dairy production, processing, marketing and consumption;
2. Identify the potential for further development of the dairy sector and the primary constraints which impede the potential; and
3. Suggest areas that should be targeted for investment, policy and technological interventions and research in support of the development of the dairy sector.

The main areas targeted for the study were the zones typically used in differentiating agricultural systems in Sri Lanka: Up-country, Mid-country, Coconut Triangle, Northern Dry Zone and Southern Dry Zone.

### *Methodology*

The methodology used in this study was based on ILRI's Conceptual Framework for Dairy Research (Rey et al., 1993), further refined through Dairy Rapid Appraisals carried out by ILRI with its collaborators in Uganda and Tanzania. The approach centres on the principle that viable dairy systems are necessarily demand-driven (Figure 1). Thus the focus is on market-orientation, and the analysis begins by considering current and potential market demand, as any significant expansion or development of the dairy sector will depend on effective demand. Further, given that dairy systems are shaped by the interaction of technology, economics, and policy, an interdisciplinary approach is needed, so that is reflected in the make-up of the research teams.

Critical to generating new insights and information that are not simply a repetition of previous assessments, is a willingness to challenge prevailing notions among the development and research stakeholders in the dairy sector. This approach was taken in the Appraisal, with a view towards testing current presumptions against the available facts, as their validity may be undermined by contrary evidence, or because the dynamics of the sector have rendered them outdated.

The Appraisal was subsequently carried out during April to July 1998. It was composed of the following parts:

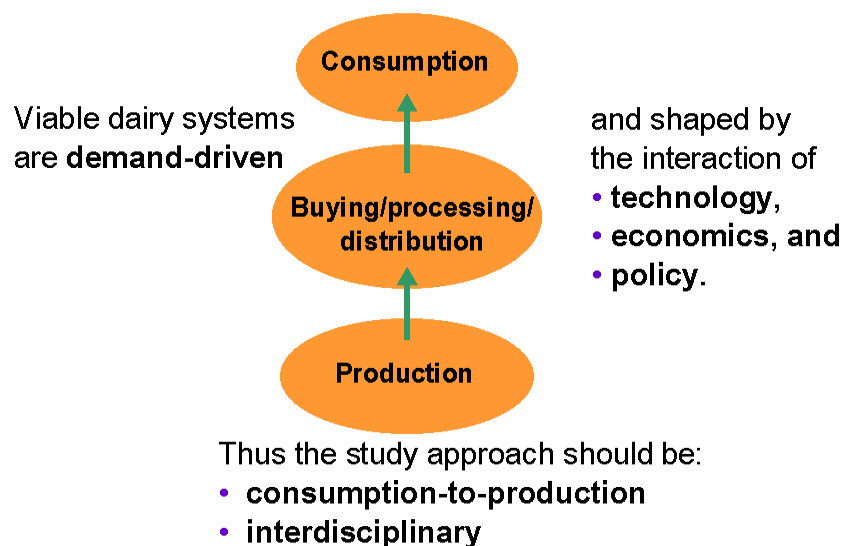
- a) a review of previous studies and secondary information on the dairy sector

- b) a structured producer/consumer survey of some 3525 households in both rural and urban areas of Sri Lanka to quantify production parameters, market linkages and dairy consumption habits,
- c) an RRA, rural rapid appraisal (“sondeo”) or interdisciplinary rapid qualitative survey – a tour by the team leaders and ILRI and NDDB scientists of the main production and consumption areas to carry out interviews with farmers, market agents, and other expert informants, in order to gather qualitative information.

A final Stakeholder Meeting was held in Peradeniya on October 5, 1998, at which preliminary results and recommendations were presented and discussed. This report reflects the inputs from the structured survey, the RRA survey, and the stakeholder meetings.

The very large structured survey was not a feature of the previous Rapid Appraisals, and necessitated considerable time and effort to conduct and analyse. For that reason, this study was not considered a Rapid Appraisal (RA) of the sort previously facilitated by ILRI, although it retains the components of the RAs with the addition of the structured survey. References in this report to RRA refer only to the sondeo rapid survey.

### Conceptual Framework



**Figure 1: Conceptual framework for the Rapid Appraisal of dairy systems**

#### *Summary of the structured survey*

A primary investigation was conducted as a part of the Appraisal, to generate estimates on dairy production and consumption parameters and fill in some major data gaps in production and consumption in Sri Lanka. This structured survey covered 3525 households in 20 districts. The sample design was as:

- (1) Given the distribution of GN Divisions in the study districts, the number of GN Divisions to be surveyed was arrived at and allocated to each district, proportionate to its estimated population (which happens to be same as the number of GN Divisions, except for Colombo district)
- (2) Sampling of GN Divisions in a given district was based on a random selection
- (3) Given a sample GN Division, the households (one in every ten) were randomly selected from the GN household list, thus both household with and without livestock were interviewed. Those with

## **Background to the study**

---

livestock were interviewed for both dairy production and consumption information, and those without were interviewed for consumption information only. The interviews were carried out by students from Peradeniya University.

## Overview of the Sri Lanka Dairy Sector

Cultivated land in Sri Lanka is estimated at about 2 million hectares, or about 30% of the total land area. Seventy five percent of this land area is estimated to be kept as small holdings, 90% of which holders are smaller than 2 ha, and 33% of which have Livestock (MLD&EI 1995). Smallholders thus dominate the agricultural sector. Agriculture provides income to 70% of Sri Lanka's population, and contributed 18.4 % of the GDP in 1996. The total farm population is estimated around 10-11 million, with an estimated 3.5 million keeping livestock, 70% of whom are rural farmers. The livestock sector contribution to the GDP is about 6% which is low compared to countries such as Pakistan and Philippines, where the livestock sector contributes 18% and 30%, respectively.

Since the country is located on the border of the equatorial belt, it's climate is characterised by low variations in temperature and rainfall, and is split between areas with uni-modal rainfall patterns (the Dry zones) and those with bimodal rainfall (the Intermediate and Wet zones). The Dry, Intermediate, and Wet zones receives mean annual rainfall of 875-1875 mm, 1880-2500 mm, and about 2505-5000 mm, respectively, and cover approximately 4.1, 0.9 and 1.5 million ha, respectively.

The national livestock population potentially contributing to dairy production includes 1.64 m. cattle, 0.76 m. buffaloes and 0.54 m. goats. In 1996 there were an estimated 697,300 milch cows and 234,800 milch buffaloes (Dept. Census and Statistics, 1997). Because large ruminant production is largely based on natural grazing, approximately 70% of cattle and 75% of buffalo are found in the Dry and Intermediate zones.

### Trends in Dairy Production, Imports and Demand

The per capita consumption of milk and milk products in Sri Lanka (about 36 kg) is low compared to other countries in South Asia like Pakistan (122.8 kg) and India (69.2 kg). Nevertheless, the level is marginally higher than the average for developing countries (32.9 kg) and close to the Medical Research Institute recommended level of 41.6 Kg.

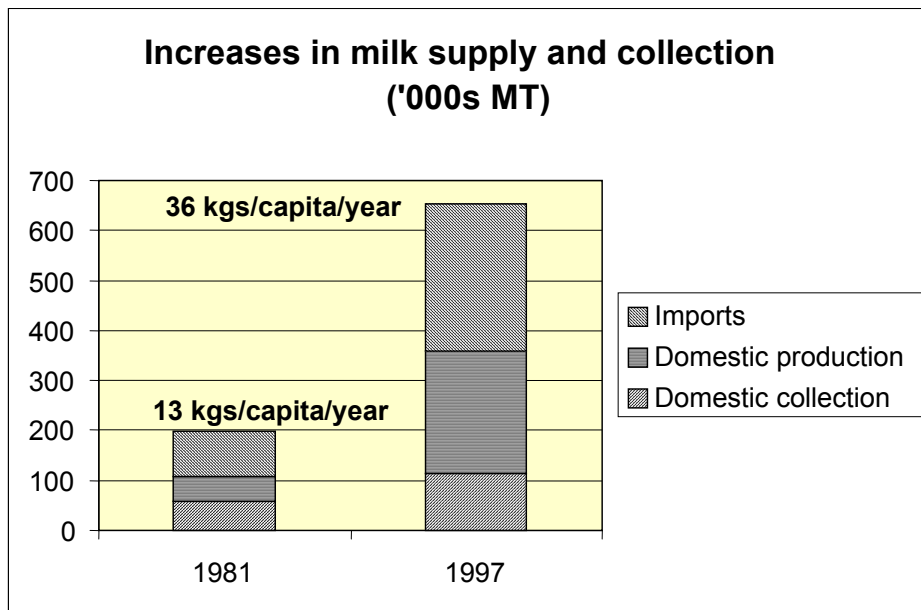


Figure 2: Changes in Sri Lanka milk supply and collection, 1981 to 1997.

Figure 2 shows changes in milk supply and collection, based on official figures from the Dept of Census and Statistics. They indicate that since 1981, per capita milk consumption has grown by nearly 200%, from 13 kg/year to about 36 kg/year currently. Much of this increase in consumption can be attributed to strong GDP growth during the period. Although the data may be unreliable (see below) milk production has apparently grown significantly, as have imports. Milk collection, however, has not grown as quickly, and so is now a smaller proportion of production – according to these figures, it has fallen from 54% to 32% of production. This implies that most of the growth in dairy production has gone to supply the informal or unregulated market, which generally offers higher prices to farmers. This may reflect inadequacies in the formal milk marketing system, including price policies, as well as limited marketing of fluid milk.

Imports of mainly milk powder continue to be a significant feature of the Sri Lanka formal dairy industry. Figure 3 shows recent trends in milk production and dairy imports. Although production has tended to increase, there is no clear trend towards increasing imports.

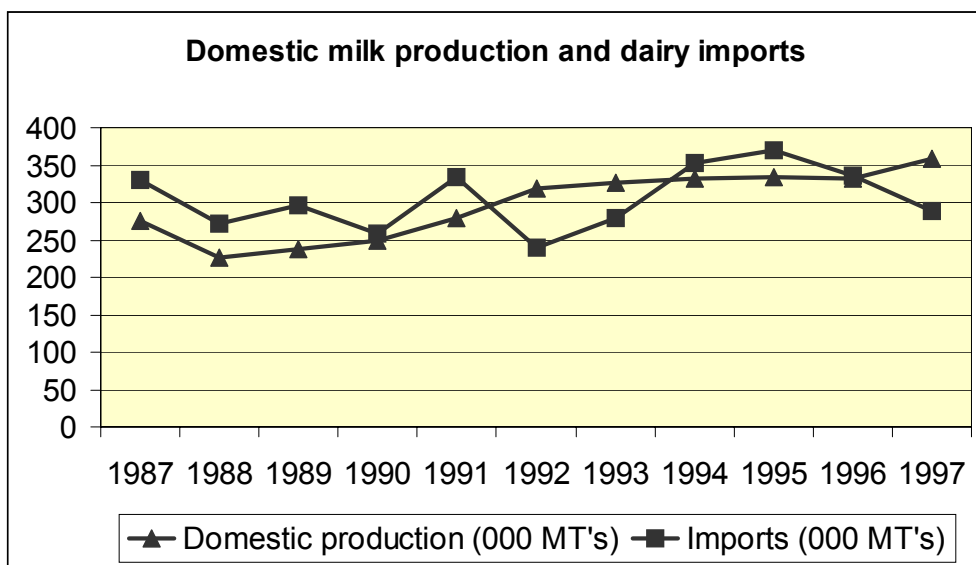


Figure 3: Domestic Sri Lanka milk production and dairy imports (LME's), 1987 to 1997.<sup>1</sup>

In terms of LME's, imports in 1997 were estimated to represent 43% of all milk available (including home consumption by milk producers), and some 68% of the formal, processed milk market. Although there is much concern about increased imports, it should be noted that in 1981 imports formed a similar proportion of total dairy product availability at 45%. Thus although imports have risen in absolute terms (from an estimated 88,000 MTs in 1981 to 290,000 MTs in 1997), as a proportion of dairy product availability, they have remained generally stable.

*Supply and demand prospects in the near future*

Changes in human population, income, and prices of milk and milk substitutes are the major determinants of demand. Although urbanisation plays an important role in generating dairy demand in many countries, Sri Lanka's urban population is apparently stable at 20% of the total. Population growth is relatively low, as it has slowed from an annual rate of 2.8% in the early 1950's to around 1.2% recently, and thus is unlikely to provide a major impetus for growth in dairy demand. Strong per capita income growth can, however, provide that increase in demand. In the past, income growth per capita was relatively low, averaging 2% per annum or less. However, economic growth has risen in recent years, averaging 4-5% annually since 1990. Further, Household Expenditure data suggest a positive expenditure

<sup>1</sup> LME conversion figures for 1995 to 1997 are based on estimates.

elasticity (1.17) of demand for milk and milk products.<sup>2</sup> This suggests that a 1% increase in household income would lead to a greater than 1% increase in expenditure on dairy products, which simply indicates that relatively more is spent on dairy products as household income goes up. Comparing rural and urban areas, rural expenditure elasticities are seen to be higher for dairy products in general (1.31 compared to 0.83). Thus, given reasonably high rates of economic growth on the order of 4% per year or more, demand can be expected to grow substantially. During 1990-95, real GDP was reported to have grown by 5.4% annually. Based on the above demand parameters and others related to population growth, projections were made for 1998-2010. At a 4% rate of real GDP growth, the elasticities suggest that income and population growth alone will generate an increase in aggregate demand for milk and dairy products of slightly over 100% by 2010, from about 698,000 MT in 1997 to over 1,400,000 MT in 2010. This represents important opportunities for domestic producers to increase production.

On the supply side, the future determinants of milk production are the number, breed and herd composition of cows and buffaloes and their productivity. Attempts to estimate these measures, however, are hampered by lack of reliable data, mainly due to civil strife in parts of the country since the early 1980s. Based on official data, cattle and buffalo numbers (estimated at 1.64 M and 0.76 M, respectively, in 1996) have been generally declining, but overall milk production figures show an increase, from some 250 mill litres (1987) to 331 mill litres (1996). These trends suggest an annual decrease in cattle and buffalo number of 1% and 2.7% respectively over the period and annual milk productivity increases per herd-animal<sup>3</sup> of 4.5% and 4.1% respectively. These figures, however, include estimates of livestock numbers and production in Northern and Eastern districts that may not be accurate. Estimates were thus also made based on the 18 districts for which apparently more reliable data are available for 1982, and 1992 through 1996.<sup>4</sup> These suggest that, in those districts, there may have been herd growth rather than decline, and decreases in productivity per animal, although the period 1992-1996 indicates growth in cattle milk productivity of 2.5% annually. There are thus conflicting trends depending on which period is covered and which data are used. Due to uncertainty as to which of these figures may be reliable, no projections on change in domestic production are presented. It may be considered likely, nevertheless, that if current trends were extrapolated, domestic production would grow either slowly or not at all by 2010. Based on the 1992-96 trends in the 18 districts with apparently reliable data, production might grow by 18% over that period.

Such supply projections, however, do not take into account price changes that may be driven by the large expected increases in domestic demand, by policy changes, or by changes in world dairy prices. All of these could affect incentives for domestic producers to increase (or decrease) supply. Regardless of factors affecting the supply side, the projected large increases in demand will present new opportunities for domestic dairy production, particularly to meet liquid milk demand, as liquid milk is essentially a non-traded commodity globally, and reconstituted milk is not a perfect substitute for fresh milk. FAO trade figures show that, in 1997, only about 1% of world dairy trade was in the form of liquid milk. The household dairy consumption trends, presented later, show a potential shift towards liquid milk and away from milk powder as household incomes rise. This trend, combined with strong projected increases in demand, will create good opportunities for smallholder dairy producers in Sri Lanka to market their production.

---

<sup>2</sup> Estimated from data gathered by Household Income & Expenditure Survey (1990-91) conducted by the Dept of Census & Statistics

<sup>3</sup> Herd-animal refers to all animals in the herd, not differentiated into cows, bulls, etc.

<sup>4</sup> The 18 districts are Colombo, Gampaha, Kalutara, Kandy, Matale, Nuwara Eliya, Galle, Matara, Hambantota, Amparai, Kurunegala, Puttalam, Anuradhapura, Polonnaruwa, Badulla, Monaragala, Ratnapura, and Kegalle.



## Dairy Production Systems

### Main Production Zones

The cattle and buffalo production systems can be classified by the breeds utilised and the husbandry practised, which in turn are closely related to the agro-ecology and climate. These can be summarised for four major agro-climatic/land-use zones: up- and mid-country; the coconut triangle; the wet lowland; and, the dry lowland. These zones are shown approximated in Figure 4 by district, and reflect the effects of both altitude and precipitation.

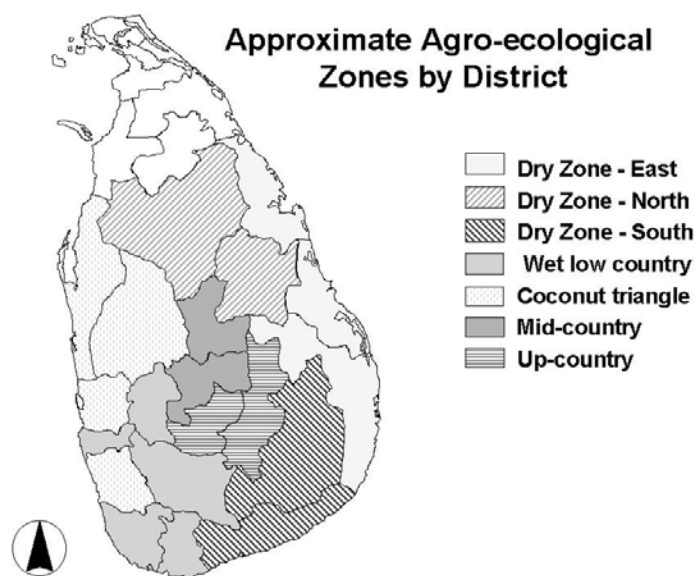


Figure 4: Approximate Agro-ecological Zones by District

Table 1: Cattle and buffalo systems: topography, climate and animal husbandry.

Zone	Elevation (m)	Rainfall (mm)	Temp. Range <sup>0</sup> C	Animal Types	Husbandry Practices
Up & Mid country	>450	>2000	10-32	Pure exotic and crosses; some Zebu crosses	Zero grazing small herds; some tethering
Coconut triangle	<450	1500-2500	21-38	Crosses of exotic breeds. Zebu types. Indigenous animals and crosses. Buffaloes	Limited grazing. Tethered under coconut palms. Medium sized herds
Wet lowlands	<450	1875-2500	24-35	As above	Limited grazing. Medium sized herds
Dry lowlands	<450	1000-1750	21-38	Indigenous cattle. Zebu cattle and their crosses. Buffaloes	Free grazing large, nomadic herds. Sedentary small herds in irrigated schemes

These agro-climatic/land-use zones contribute to milk production and collection in, and milk flows to, the five milk sheds identified in the DDF Desk Study Report (1986). The vast majority of the milk comes from smallholder herds. The common topographic and climatic features, types of animals and husbandry

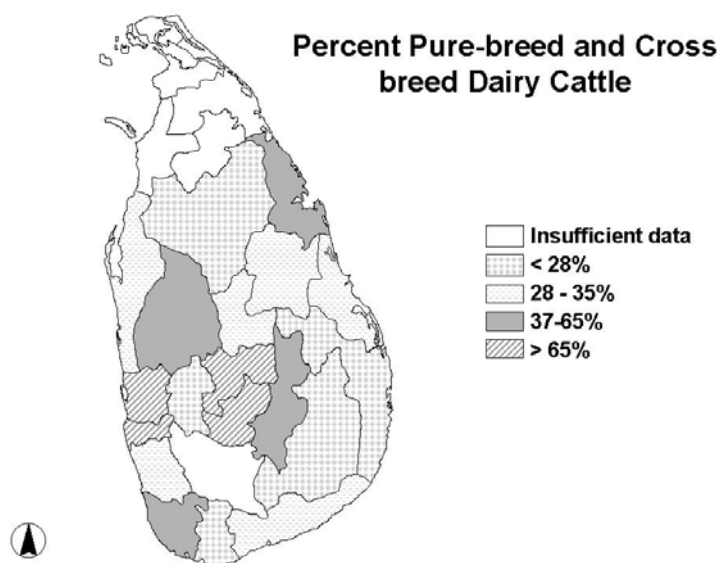
practices in the major systems are given in Table 1. The classification does not include the intensive dairying system in Jaffna, to which access is limited currently because of the military conflict.

The approximate numbers of cattle and buffaloes in each zone are shown in Table 2. As indicated, the largest number of cattle are found in the dry zones, where herd sizes are also the largest.

**Table 2: Approximate numbers of cattle and buffaloes in each agro-climatic/land-use zone**

Zone	Cattle	Buffalo
Up- & Mid-country	121,000	21,700
Coconut triangle	177,000	73,000
Wet lowlands	142,000	137,300
Dry lowlands	1,104,000	518,900

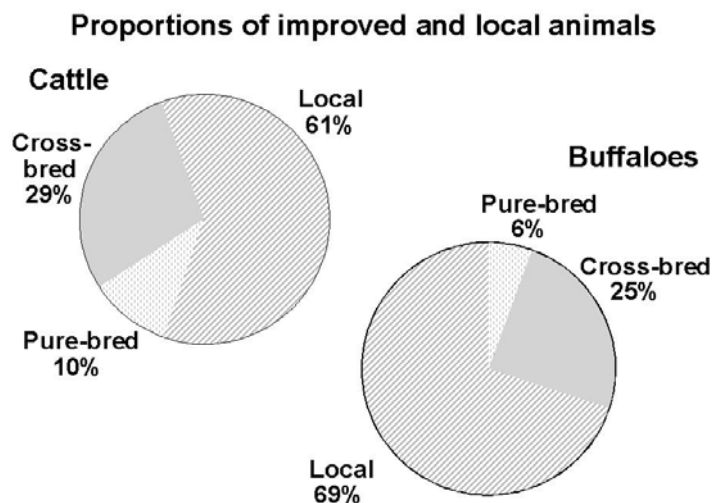
Estimated from Livestock Data, DAPH June 1997



**Figure 5: Percent pure and crossbred dairy cattle by district.**

Source: Farm/household survey

The relative distribution of cross-bred dairy cattle is reflected in Figure 5, which shows the percentage of improved animals reported in the farm household survey. The highest proportions are reported in parts of the mid- and up- country, as well as in the wet lowlands near Colombo. In the first case, this can be attributed to the temperate climate conducive to the health and performance of improved animals, while in the second case, it may be attributed to the high milk prices available through the informal market close to the urban area, under which circumstances the risks to improved animals of lowland conditions are acceptable.



**Figure 6: Overall proportions of improved and local cattle and buffaloes in Sri Lanka. Source: Farm/household survey.**

The overall proportions of improved (dairy) animals in the sampled population, 39% cattle and 31% buffalo, are shown in Figure 6. As will be discussed, these proportions are much higher than those reported by the livestock census in 1982, indicating that significant upgrading of the herd has apparently been occurring.

### Summary of Zonal Production Systems & Market Linkages

The following descriptions are based on information from a combination of sources: the rapid appraisal, secondary sources, and the structured farm/household survey.

#### *Up-country: Tea Estate Dairy/Market Vegetable System*

The up-country or hill country zone lies above 1200 meters a.m.s.l. It is characterised by tea plantations and dairy production from cattle kept in two systems, the estate- and village-based systems (the system can also be found in mid-country tea lands). The zone has few buffalo. The mean herd size observed in the survey was 3.4 (SD 2.7) with, on average, 1.0 lactating cows. In the estate-based system, many of the employees in the tea estates rear dairy cattle, some European breeds, Ayrshire, Friesian and Jersey, but mainly their crosses. Many herds are kept in enclosed sheds next to worker bungalows. There is extensive use of AI. In the survey, average milk yields for dairy crossbreeds were reported at 10.3 litres/cow/day, about twice the mean yield in the coconut triangle (4.6 l). In the village-based system, the majority of smallholders are crop-livestock farmers, growing vegetables and paddy. Manure is a major product from their cattle, with milk often a secondary source of income.

Feed resources are generally constraining, with producers dependent on cutting from small plots of steeply sloped (sometimes planted) pasture above the tea land, in gullies or valleys, or on scavenging *Gliricidia*, *Erythrina*, etc from tea plantations. There is significant seasonality of fodder supplies and concentrate prices and very little or no grazing. In the survey nearly 60% of cattle-keeping households reported using concentrate feeds. Unlike in other areas, animal loaning is not common and farmers generally buy their initial stock. Credit for animal purchases may thus be a constraint. Few incidences of animal health problems are reported, although some estate workers do not have good access to health services. Extension services are minimal.

Milk marketing systems are well developed, and are assisted by the concentration of estate workers into villages, with usually twice a day milk collection. Multiple milk collection and processing organisations operate in the area. Testing of fat and SNF is generally carried out. Milk retention is relatively high, due to Tamil cultural preferences for fresh milk. Manure is an important output of the system, and is marketed through private entrepreneurs who collect directly from farms, and sell to market vegetable farmers in the Nuwara-Eliya area.

There is very little room for expansion of production in these areas due to feed and land constraints. Improvement in access to credit may alleviate some constraints to animal purchases, allowing full utilisation of existing feed resources. Further co-operative development may allow better access of farmers to livestock services. Allocation of unused tea lands for fodder production would increase offtake. There is very little access to extension services.

### *Mid-Country: Kandyan Forest Garden System*

As expected, the structured farm/household survey showed that the mid-country zone has the highest proportion of dairy cattle (mainly Jersey/Ayrshire and Friesian crosses) in Sri Lanka, nearly 75%, and the highest proportion of purebreds (25%). AI use is widespread and appears to be increasing. The zone is characterised by medium-intensity dairy production, but also has some Zebu cattle and local buffaloes. The survey confirmed that herd sizes were small but variable, with mean 3.1 (SD 3.0), and on average 0.9 lactating cows. Detailed studies (EEC Project Report, 1996) found that average milk yields were about 6 litres/cow/day or around 1,500 litres/cow/lactation. Farms combine a homestead tree garden system with rice production in the low lying land, generally cultivated by buffalo. Land sizes average 4 acres, encouraging the adoption of more intensive feeding practices. There is an increasing dependence on fodder from off-farm and on concentrate purchases, which are influenced by the level of household income. The farm/household survey reported 55% of cattle-keeping households using concentrate feeds.

Feed resources are not a severe constraint overall, although they can be seasonally. This is confirmed by observed low use of existing fodder resources and crop residues such as rice straw, and the general absence of fodder markets. Cattle are often grazed/tethered on paddy land/bunds. As mentioned earlier, significant and widespread use of concentrates, mainly poonac (copra cake) and rice bran was observed. Manure is generally used on paddy cultivation or other crops, or is often sold. In some areas, manure/nutrients are not well captured, and occasionally not used.

The “ande” system of cattle loaning is a major positive contributor to the upgrading and expansion of the herd. Some export through the private sector of heifers to the coconut triangle and dry zones is reported, so this area appears to be a replacement supply source.

Milk marketing systems offer multiple milk collection options in many if not most areas. Individual testing of milk for fat and SNF is now widespread, although often based on 15 day averages rather than daily tests, and testing at the bulk level in the Nestle collection system. A number of dairy co-operatives are well-established and are providing services such as concentrate feed on credit, and in some cases AI and extension, as well as loans. Kiriya/Milco primary co-operatives are also being established rapidly. The proportion on milk offtake is relatively high. Variable once and twice a day milk collection were reported, with some use of hydrogen peroxide in areas where only morning milk is collected.

At current prices of milk and concentrate, there is little incentive for more intensive feeding. Relatively high opportunity costs of labour result mostly from the wide variety of agricultural activities present, but also from alternative employment provided by small urban areas.

In this zone, the most immediate constraint to increased milk production may be the inefficient feeding systems of dairy cattle. Access to livestock extension advice is poor, and is a constraint to greater productivity. With the increased use of AI that appears to be occurring, over time breed constraints may

be alleviated. Access to AI and health services is generally good but variable, constrained in some areas by terrain, depending on local infrastructure and distances.

### *Coconut triangle and wet lowlands*

In this area, which forms most of the periurban dairy system around Colombo, there is wide variation in level of integration of crop and livestock and in level of intensification. In much of the area the system is relatively extensive, with landholdings reported at about 4 acres/household. Cattle and buffalo form an integral part of the farming systems, helping in weed control and providing manure in the coconut lands. Buffaloes are used principally for draft purposes in paddy cultivation. In both zones cattle and buffalo graze or are tethered on the fallow paddy fields, as well as on the natural pastures under the coconut plantations and in non-cultivated areas, including common properties. This is supplemented with grass cut from roadsides. Coconut poonac and some bran are often fed as local availability is high. There was no observed use of compounded feeds. Rice straw is generally not used, although it may occasionally be in dry seasons. Manure is used in situ, on crops, or sold.

There is considerable variety of genotype of cattle, including Zebu, cross-breed, local and Indian buffaloes. Of the farm/households surveyed nearly 20% had purebred dairy and 25% crossbred dairy cattle, and the remainder (56%) local breeds. The proportion of improved (dairy) buffaloes was slightly lower. Jersey and Sahiwal/Sindhi appear to be preferred cattle breeds for crosses. Although the numbers of cross - bred dairy cattle are significant, they appear to be a minority, especially in the north. AI is being used and appears to be on the increase. The survey results showed cattle herds averaging 4.8 animals (SD 5.3) with nearly two cows, of which a mean of 1.2 were lactating. Buffalo herds were generally smaller, a mean of 1.4 animals (SD 5.5), of which 0.5 were cows. Amongst the majority of small herds there were some large commercial dairy farms. As mentioned, the mean daily milk yield reported in the survey in the coconut triangle for dairy cattle crossbreds was 4.6 l. Milk yields for dairy buffalo were well above the national average reported in the survey for purebreds (5.6 l.) and for crosses (4.8 l), but not for indigenous types, suggesting that dairy types received some preferential feeding in this zone.

Milk marketing is variable in reliability but generally adequate in availability. All the major collectors are present, and there is good market infrastructure. There is variability of once or twice daily milk collection. The buffalo milk is generally converted to curd for which there is high demand locally. In some areas, co-operatives are strong, whereas near towns and Colombo local markets for milk and products are important, which is reflected in higher producer milk prices.

The potential for fodder production is not being fully exploited, in spite of current availability of pasture subsidies. Labour constraints again are likely to play a role in this, due to proximity of urban areas.

### *Dry lowland zones*

This large zone encompasses a considerable variety of settings, from sub-humid forest to dry scrub to large irrigated rice growing areas. The zone is typified by use of indigenous breeds. These cattle and buffalo form an important capital asset for the peasant farmers, and where there is the possibility to sell milk, it is becoming an important source of income. The farm/household survey reported 70-74% indigenous cattle and 21-30% dairy crossbred cattle in the east, north and south parts of the dry zone, with very few purebred dairy cattle. Upgrading of buffalo was more extensive with more than 50% of herds in the east having improved types.

In the North and the South, the system focuses on low-technical efficiency, low-cost and labour-efficient extensive beef-dairy production. This is accomplished by herds which in the survey averaged 12.8 cattle (SD 19.2) and 3.5 buffaloes (SD 8.9) in the north and 17.6 cattle (SD 48.3) and 9.4 buffalo (SD 27.3) in the south. On average cows made up 40% of the cattle herds and 50% of the buffalo herds. These herds graze for most of the year on paddy lands, bunds and scrub jungle. During good cropping seasons, the animals may be moved some distance to scrub jungle. There is almost no use of concentrates (in the survey fewer than 1 in 10 households reported using concentrate feeds) and little use of crop residues,

although buffaloes are fed rice straw. In the rainy season, milk collection may fall as animals are moved off paddy lands. There are few cross-bred dairy cattle, although some have been introduced and there is some experimental use of AI, as well as use of cross-bred studs. Most cross-bred dairy cattle are found in irrigated areas, with some imports from mid and up country, suggesting that demand for upgrading is not being met through official channels. AI is severely constrained by open herd management practices, so that upgrading is occurring through use of studs. Animal loaning is an important mechanism for herd development and expansion. There is very poor access to extension services.

The average production of milk offtake the indigenous breeds is less than 1 litre/cow/day, with 2-5 times more from dairy cross - breeds. The primary product is beef animals, mostly males up to 2 years of age, which are sold once or twice a year to traders. Milk is sold when available, and some of the standard collection structures apply, although distance is a limiting factor, as is low milk densities. There appears to be opportunities for an expanded role of private milk collector intermediaries, due to these constraints. Milk prices are relatively high, due to high fat and SNF, providing good incentive for increased offtake. In some areas curd marketing is well organised, through both private intermediaries and co-operatives and serves even the Colombo market a considerable distance away. Milk spoilage is relatively high even with apparently common use of hydrogen peroxide.

There is some potential for increased offtake if market systems and price incentives are improved. The most direct means to increase would be upgrading of local animals, with focus on buffaloes, and in that case a focus on the use of studs to overcome the practical constraints to AI. This potential would increase if land constraints grow and farmers perceive a need for more productive animals in smaller herds. Feed constraints may, however, prove to be severe.

## Dairy production systems

Table 3: Summary of characteristics of the main livestock production systems

	Dry zone East	Dry zone North	Dry zone South	Low wet	country	Coconut triangle	Mid country	Upcountry	Overall
Average cattle herd/household	7.2	12.8	11.7	4.9	4.8	3.1	3.4	5.5	
% Households with buffalo	31	32	21	16	19	11	4	18	
% Improved cattle of herd	30	26	30	39	44	72	58	39	
% Improved buffaloes of herd	51	83	14	26	37	2	10	30	
Average milk yield/cow/day (x-bred cattle)	3.9	2.9	2.3	3.9	4.0	5.2	8.4	4.8	
Average milk yield/cow/day (x-bred buffalo)	1.5	2.7	2.0	3.0	3.1	<i>na</i>	<i>na</i>	2.1	
% Farmers grazing/tethering	97	95	98	83	93	77	76	86	
% Farmers cutting fodder	4	6	0	15	49	23	23	26	
% Farmers feeding concentrates	31	8	9	32	42	54	59	37	
Average kgs concentrate/day for milking cows	0.9	0.3	0.2	0.6	0.8	1.0	1.3	0.8	
Average milk price, collection centre (morning)	12.6	11.9	11.4	11.5	12.2	10.6	10.7	11.6	
Average milk price, retail to neighbours	14.2	13.8	15.9	14.7	17.2	11.8	9.9	15.2	
% Farmers members of co-operatives	46	38	9	14	18	47	20	23	

Source: Farm/household survey, 1998

## Main Issues in Dairy Production Systems

### *Herd growth, productivity, and breed policy*

Growth in the numbers and proportion of improved animals in the national cattle and buffalo herd have apparently contributed to both an increase in per herd animal productivity and in overall production levels. Intensification of production, in the form of more intensive feeding and higher proportions of adult female animals, is also likely to have contributed to this. Between 1987 and 1996, this has contributed to an overall apparent increase in production of some 21% in domestic milk production, based on official statistics. This occurred even though cattle numbers were reported to have fallen in many areas. The most important contributor to this productivity change is likely to be the higher proportion of upgraded animals. Whereas the 1981 census found only 3% improved cattle (pure or cross bred), the household survey estimated that some 40% of the national cattle herd now consists of improved animals.

Although questions are sometimes raised as to the effectiveness of AI services generally, such services have apparently, over the long run, contributed significantly to this change. Private bull service using cross-bred bulls, as well as private marketing of improved heifers from relative surplus areas, have also been factors. In some areas, nevertheless, it was observed that farmers continue to have difficulty in obtaining improved animals. In the coconut triangle area, in particular, farmers reported this as one of their primary constraints. In many of the Sinhalese-speaking areas, the *ande* system of cattle-loaning is an important source of initial stock for young farmers. In Tamil-speaking farms, however, where this practice is not common, credit constraints may impede entry into smallholder dairying by young farmers.

Breed preferences were also found to differ occasionally from the breed policy guidelines. In some dry areas, particularly in irrigation schemes where water and crop residues were available, some farmer reported preferences for Friesian or Ayrshire crosses, but were constrained by officials due to breeding policies. Given the relatively low disease challenge in Sri Lanka, and the success of high-grade crosses in similar low-land sub-humid tropics in other countries, more freedom for farmer breed selection could contribute to higher productivity.

### *Buffaloes for dairy production*

Official data point to shrinking national herd of buffalo, attributed to substitution by mechanised traction. The increase in improved animals suggests, however, that many buffalo owners increasingly view them as dairy animals. This provides buffalo owners with alternative use for their animals. The figures show productivity levels only slightly lower than those among cattle. Availability of improved buffalo heifers or studs was reported by farmers to be very limited, and due to herd management practices and heat detection, use of AI among buffalo is constrained. The shortage of replacement improved animals is confirmed by the very high prices being paid for improved buffalo cows of Rs 25,000 or higher. Whereas heifer cattle sell at approximately the gross value of one lactation, heifer buffaloes sell at a considerably higher price level. All indications are that the shortage of improved buffaloes is greater than that of improved cattle.

Because of reproductive constraints, it is generally accepted that buffalo studs appear to be the most effective means to upgrade. Current efforts to provide studs by NLDB ranches, however, appear to be very limited. Further, instances have been reported of buffaloes from such ranches being sold to butchers rather than farmers. Given this constraint, the joint NDDDB-NLDB ranch in Polonnaruwa, located in a buffalo zone, should consider giving some priority to producing improved buffalo studs, rather than simply to producing quality buffalo semen.



### *The health status of cattle and buffaloes*

The health status of cattle and buffaloes in Sri Lanka is largely dependent on the breeds and husbandry practices, which in turn are closely related to the different climatic and topographical features, and agricultural practices. While many bovine diseases are prevalent, and some endemic, in the areas of current and potential dairy production, there are well-documented health management practises, both curative and prophylactic, for minimising the risk of infection from these diseases and the productivity losses associated with infection. Disease constraints to dairy productivity are therefore associated with the need to improve the delivery of veterinary services to dairy farmers and to improve the quality of those services, especially for preventive medicine. Clearly these are policy and institutional rather than technical issues. A recommended approach to the strengthening of veterinary services is to associate their delivery more directly with organisations (farmers' groups; co-operatives; private milk processors; etc) collecting and marketing milk as a transitional stage to private sector delivery.

### *Feed resources and common properties*

Lack of good quality feed year round is a major constraint to profitable smallholder dairy production. This is primarily a result of pressure on land and competing opportunities for labour, which restrict the supply of fodder to many dairy herds. In turn, limited access to good quality fodder reduces the cost-effectiveness of feeding concentrates. Potentially beneficial feed technologies have been researched by Sri Lankan institutions and others in the region. Emphasis must now be given to developing targeted projects in regions where fodder shortages are well documented, to test these promising feed technologies. Participatory approaches, thereby strengthening research-extension-farmer linkages, are required to ensure that the testing and validation of the technologies is demand/farmer driven.

A related issue is the management of communal grazing areas and public land, including roadsides. Community-based schemes need to be developed to improve the management of these resources, which frequently are key to efficient dairy production by smallholders, particularly during the cropping seasons.

Improving the nutritional value of milling by-products: Milling residues are a vital resource for increased dairy production, yet current milling practises reduce the value of, e.g., rice bran. A targeted project should be implemented to demonstrate the benefits to grain producers, millers and dairy producers of milling methods that improve the availability of good quality milling by-products.

### *Fodder use and the opportunity costs of labour*

Relatively high opportunity costs of labour relative to milk prices hinder more the intensive use of planted and cut and carry fodder. They also greatly restrict incentives for fodder markets, which are limited to larger urban areas. This constraint is apparent across regions by virtue of farmers reporting of low milk prices as a primary constraint. A rough estimate of milk price/wage ratios in Sri Lanka, where rural manual unskilled labour earns some 150 Rs/day and milk prices in the formal market average some 11.5 Rs/litre, is thus approximate 1 to 13 (about 0.08). Thus the value of one litre of milk sold at farm gate is only one thirteenth of a days wage. In India, on the other hand, where farm-gate (co-operative) milk prices are higher at about 9 rupees (equivalent to about 14 Sri Lankan Rs at current rates), a rural manual wage rate, in Gujarat for example, is approximately 35 Rs/day (some 54 SL Rs)<sup>5</sup>. In that case, the ratio is about 1 to 4. The relative value of milk is thus much higher, as a litre of milk pays for nearly a quarter of a day's wage.<sup>6</sup> Similar results are found when Sri Lankan wage/milk prices ratios are compared to other developing countries, which is linked to the relatively high per capita GDP in Sri Lanka. Sri Lanka is categorised by the World Bank as a Lower Middle Income nation, with per capita GNP of some \$800, more than double that of India with \$370 (World Development Indicators 1999, World Bank). These

---

<sup>5</sup> B.K. Ganguly, personal communication.

<sup>6</sup> Although these are rough estimates and vary widely by location, they give an indication of structural differences in relative opportunity costs of labour.

realities are reflected clearly in rural casual wage rates in Sri Lanka, which are much higher than in lower income countries.

The result of this on farmer behaviour are significant differences in willingness to spend time gathering crop residues such as rice straw, cutting rice straw, and engaging in the marketing of fodder. These structural differences in opportunity costs of labour lead to the observed low use of rice straw, the low level of adoption of planted fodder, and the very small role of fodder markets. It is mainly in situations where practical opportunities for alternative employment are low (e.g. up-country tea estate workers) or where local, informal milk prices are high (urban and periurban areas), that significant intensification of fodder use and marketing can be found. Everywhere else, farmers choose to optimise returns to labour by operating at relatively low levels of both fodder use and milk output, but which require low labour input. In contrast, in India where opportunity costs are low, there is in many areas intensive use of crop residues and fodder market or exchange, particularly among landless dairy producers. The effect of labour values on dairy cattle feeding has been recently confirmed in another more detailed study in Sri Lanka led by Wageningen University that shows clearly that poorer households employ more labour-intensive feeding practices. Further, they show that a significant number of households engage in off-farm casual employment, and that off-farm employment contributes to 47% of all household income on average, which confirms the validity of using rural casual wage rates as indicators of labour opportunity costs (Leegwater et al., 1999)

Altering this structural reality is unlikely to be possible through milk pricing policies or subsidies on pasture, fodder seeds, etc. Opportunities may exist, however, through raising the productivity of labour in dairy production, either through a) focusing on fodder technologies which are not labour-demanding and/or b) continued upgrading of the national herd to raise the productivity of dairy animals.

### *Access to livestock extension services and technical information – public/private goods*

Few farmers report obtaining any significant extension services in animal feeding, husbandry or breeding. This appears to be due to two factors: a) over-emphasis on animal health issues by the Veterinary Surgeons who supervise all livestock-related services, and b) few attempts by farmers' organisations to meet the needs of their members for extension services. In light of this, and the proven record of dairy co-operatives to provide such services elsewhere, the policy among the newly established Kiriya/Milco primary co-operatives of not providing such services should be reconsidered.

All the above constraints emphasise the urgent need to improve the provision of technical information to current and potential dairy producers, particularly to the vast majority who are smallholders. This may be best achieved in a sustainable way through linking these research and extension services to the providers of dairy input and output markets, e.g., dairy co-operatives, farmers' groups, private dairy processors, etc. Targeting the provision of technical information as a private, rather than as a public, good has the potential to overcome the current poor delivery of improved production technologies, especially to resource-poor farmers.

## Dairy Economics and Markets

Milk collection and marketing in Sri Lanka is carried out through complex system with a wide variety of actors. The formal, or processed dairy market consists of small primary dairy co-ops, larger local co-ops, district-level dairy co-ops, dairy co-operative unions, and networks of collection points and milk chilling centres operated by co-ops or the main dairy processors. Small local processors of modern dairy products also play a role. Contributing to the informal market are small private milk collectors, small local processors of traditional dairy products, and small retailers, as well as dairy producers themselves, who sell directly to hotels and restaurants, or to consumers. This section will discuss first farm-level economics of dairy production, market channels, and finally dairy consumption.

### Economics of Dairy Production

#### *Farm-level budgets*

The revenues and costs of cattle keeping and production, including dairy production, were estimated from the results of the household survey. These estimates are shown in Table 4. Revenues include sales of milk and animals and the value of milk consumed by the household. Costs include fixed equipment and variable costs such as feed and input services. The costs of family labour and land were not available from the survey and so are not included. This should be kept in mind when evaluating returns, which are thus considered returns to land and labour. Not all zones are shown, as the results were not judged to be reliable in some areas due to lack of producer response to questions.

The results show that overall, cattle-keeping households earn returns to land and labour per household of nearly SR 28,000 per year, or more than SR 2,000 per month. Per metric ton of milk overall returns to land and labour are over SR 10,000, or over SR 10 per litre of milk (a litre of milk is approximately 1 kg). Comparing zones, the highest returns were reported in the Low (Wet) Country, which includes Colombo. The high returns there were due to high prices of milk available through local sales to individuals and institutions, underlining the importance of informal dairy markets in maintaining producer profitability. The lowest returns per household were reported in the mid-country and coconut triangle, where feed costs were reportedly high and revenues relatively low. The largest cost components are for cattle, fixed equipment, and feeds. Reported expenditures on veterinary drugs and services are generally quite low.

In the large majority of household cases, dairy and cattle production are only one component of the household farm and employment strategy, in which case returns to land and labour should be viewed from the point of view of returns per litre of milk. At over SR 10 per litre of milk, the returns can be considered as relatively good, considering that milk prices in most collection centres are in the range of SR 11-12. The reason that returns are nearly as high as those prices is the much higher value of the milk sold to local/informal markets, and the value of sale of animals. Again, it should be kept in mind that these returns must also cover the cost of land and family labour. Nevertheless, these results suggest that in most cases dairying is an economically viable enterprise, and that the informal market is critical to profitability. These results also point to the strong comparative advantage of domestic producers for the liquid milk market (the target of most of the informal milk market).

**Table 4: Estimated average annual budgets for typical smallholder cattle-keeping households in Sri Lanka, by zone and overall.**

	Coconut Triangle	Dry East	Low Country	Mid Country	Up Country	Overall
Herd size	5.1	9.5	7.3	3.1	3.2	5.3
MT's milk/year	2.1	3.2	3.8	1.9	3.1	2.6
<b>Annual Revenues</b>						
Milk home consumed	4,435	4,090	8,752	4,677	4,392	5,643
Milk sale –collect centres	3,888	26,050	25,439	9,059	7,298	10,620
Milk sale- other	25,427	13,147	29,894	7,508	20,534	21,433
Sale of cattle	3,980	7,590	4,520	2,170	2,440	4,070
<b>Total Annual Revenues</b>	<b>37,730</b>	<b>50,876</b>	<b>68,605</b>	<b>23,414</b>	<b>34,664</b>	<b>41,766</b>
<b>Annual Costs</b>						
Fixed equipment and livestock	4,631	10,401	5,810	4,215	4,040	5,165
Feed/minerals	12,090	2,855	3,254	6,264	2,885	7,562
Vet drugs/ vaccines	175	1,310	390	100	-	282
Breeding services	408	171	5	30	539	278
Veterinary services	82	14	67	-	-	48
Hired Labour	569	-	-	1	55	254
Other	456	14	144	40	-	228
<b>Total Annual Costs</b>	<b>18,410</b>	<b>14,766</b>	<b>9,671</b>	<b>10,650</b>	<b>7,520</b>	<b>13,818</b>
Annual returns to family labour and land per HH	19,320	36,111	58,934	12,764	27,144	27,948
Annual returns to family labour and land per MT of milk	9,286	11,217	15,510	6,777	8,853	10,892
Annual returns to family labour and land per cow	8,782	7,081	21,048	9,819	16,965	12,151

*Source: Household survey*

### Milk Collection and Marketing

The formal milk collection system in Sri Lanka revolves around collecting small quantities of milk from large number of small holdings scattered over relatively long distances. Producers who are not able to sell directly to consumers or retail outlets must rely on either private (informal) milk collectors, co-operative milk collection, or formal milk collection centres linked to formal dairy processors. Distance from major urban markets may or may not affect market access, depending on milk production density. The formal milk sector consists of public or private enterprises such as MILCO (now Kiriya), Nestles group, Nestles Lanka and small processors. The “informal” or raw milk market consists of sales directly to individual consumers and private milk collectors who then sell milk either to collection centre or to customers and institutions.<sup>7</sup>

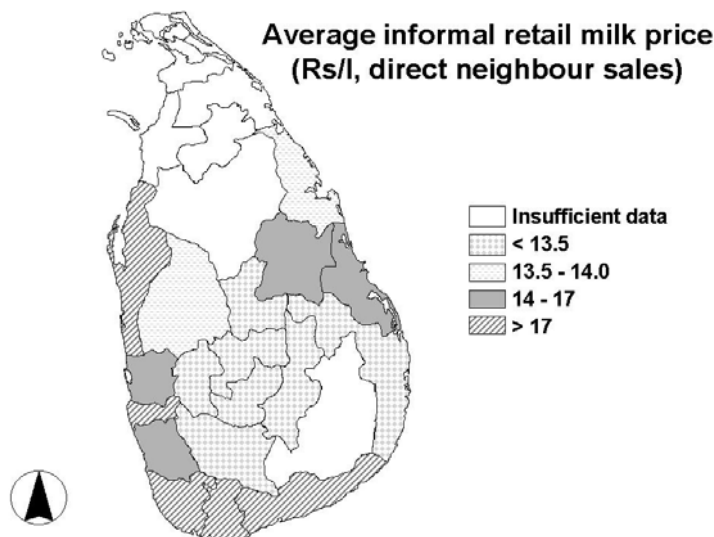
#### *Producer price of milk*

The present practice observed in most of the formal dairy industry is to set the producer price of milk based on the fat and SNF content of milk. The average nominal price for farm milk (4.3% fat, 8.4% SNF) was set at Rs 10.54/litre in 1994, but now appears to vary by milk collector and is instead set by the market.

<sup>7</sup> The term “informal market” is used here to describe raw milk or indigenous process dairy product markets, which may or may not be officially sanctioned at some level.

The survey results indicate that the average producer price varies from Rs 10.9 to Rs 15.2, depending on the agency to which it is sold. The best price is received from “other households” (Rs 15.2) and “hotels” (Rs 14.7), with substantially lower prices from “collection centres” (Rs 11.6-12.7), “private traders” (Rs 10.8) and “others” (Rs 10.9).

Those parts of the informal market where the producer can sell directly to consumers or institutions offer the highest prices, and contribute importantly to farmer profitability. Figure 7 below compares informal retail milk prices across the country. The results show the highest prices occur in the milk deficit areas at the coast.



**Figure 7: Average informal retail/producer milk price reported in farm survey, by district**

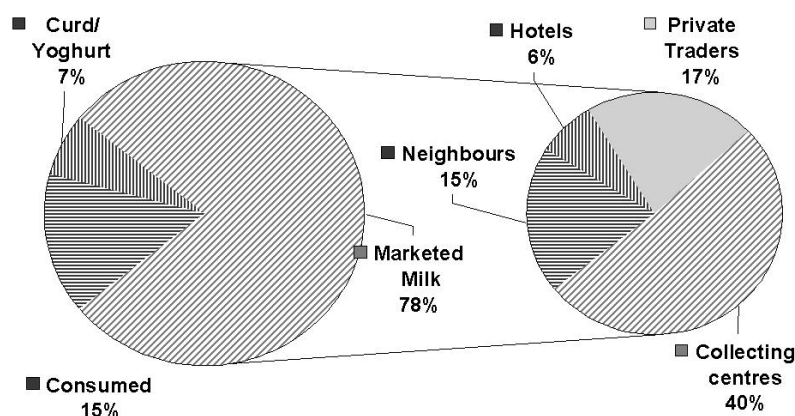
Consumer and producer milk prices were obtained from various secondary sources, and adjusted for inflation to yield real prices (base=1990). In real terms, while the producer price has moved in a narrow band in recent years, the real consumer price has in fact declined during 1994-97, a period which saw continued increases in powder imports as demand rises with income growth (see details in Economics and Markets report). This suggests that producer prices are less affected than consumer prices by levels of powder imports. One reason for this might be that domestic milk production goes partially into the liquid milk market, for which reconstituted powder is not a good substitute. Regardless, the results suggest that even under increasing powder imports, producer prices are robust.

#### *Producer household milk disposal*

The household survey asked each producing household to report the amount of milk sold to each market outlet, and the price received. Of an average of 7.2 litres of milk produced per day by each cattle- and or buffalo-keeping household, only about 15% (about 1 litre per day), was reported consumed by the producing household (Figure 8). Most of the rest (78% of that produced) is sold in liquid form, with 6% being produced into curd. A small amount, less than 1%, is reported made into yoghurt by the producing household. Some 85% of the household production is thus apparently sold, mostly in liquid form, reflecting a high degree of commercialisation of dairying and its role in offering regular income to the producing household. As also shown in the figure, most cattle milk is sold to collection centres (46%) with most of the rest split between other households (20%) and private collectors (22%).

There is some variation in milk outlet importance in different areas. Hotels are an important outlet in the wet zone, likely a reflection of higher human population densities and thus closer proximity to urban area.

## Household milk disposal and market outlets



**Figure 8: Households' milk disposal and market outlets. Source: Farm survey.**

In the dry zone, private collectors are important, reflecting the longer distances to collection centres and the role that private collectors play in transporting milk to the centres.

The majority of the households reported selling milk through the collection centres use MILCO, comprising some 66% of the total milk volume reported by the surveyed farmers to be sold to MCCs. Second in importance were co-operative collection centres, which in turn sell to either Milco, Nestle or some other outlet, including direct marketing of raw milk informally. Less than 2% of the households sampled used more than one collection centre. Regarding milk testing, 59% of households said they were tested regularly, 24% said periodically, and 17% said their milk was never tested. Testing is done either daily of individual farmers milk or of bulked milk, 15 day average testing or average 7 or 15 day testing of bulked milk. Even where daily or individual testing is not practised, however, farm-gate prices clearly reflect general fat and SNF levels in all systems visited, so that prices in the dry zones were significantly higher than those in the other areas, in spite of the higher transportation costs. These provide excellent incentive to increase offtake particularly in extensive production areas where high-fat genotype animals predominate.

### *Informal milk sales and collection*

An important and convenient outlet for milk sales for many producers is direct sales to neighbours, shop and restaurants. Although this may entail some higher transaction costs in the form of time spent searching for buyers, the farmers are able to exert some control over price, delivery and payment terms through informal agreements and establish regular customers. Producer households in the survey reported disposing of 15% of milk in this way.

These local fresh (raw) milk markets also a useful role in areas where such markets are available, particularly in periurban areas or near towns (sometimes referred to as "town milk"). These are served directly farmers, by private collectors and by some co-operatives delivering milk to hotels and restaurants, to small processors, and door to door. Although accurate figures on this market do not exist, informed respondents suggested that this market might be relatively important in some areas. In Anuradhapura, for example, it was estimated that 1,000 Lt/day was marketed in this way. In one area outside of Kandy, a small co-op marketed 500 Lt/day in their locality, which did not include urban areas.

Private (small-scale) milk collectors are a group of private sector entrepreneurs (also called middlemen) who collect milk from small producers and deliver it to milk markets (boutiques, hotels, home delivery to consumers, major processors, chilling centres or milk collecting centres). Operating by bicycle,

motorcycle, or small lorry, they play an important role in many systems, even where dairy co-operatives are strong. They provide an apparently efficient means of bulking and delivering milk to collecting or chilling centres, although they generally appear to offer a lower farm-gate price than available through farmer-delivered collection systems. In return, however, they offer services such as farm-gate collection, delivery and sales of concentrate feeds, and interest-free advances and loans to farmer clients. They range in size from those handling 7-8 litres/day (bicycle operators) to 2000 litres/day (vehicle operators). The RRA investigation indicated that these private collectors can operate with limited capital, and they often extend non-price benefits to producers. One case study indicated an estimated 13% gross return to labour per litre of milk in this type of small-scale milk collection, handling some 160 L of milk per day. This activity yielded a monthly return to labour of about Rs 8,000 per month, at the same time as providing employment to one full-time worker. Such middlemen often provide other services to farmers, such as small loans.

### *Formal milk collection*

The organisation of milk procurement routes usually follows milk production density, and this is apparent in Sri Lanka as well. Nuwara-Eliya has the highest production per sq. km (66 litres), followed by Colombo (36 litres) and Batticaloa (34 litres). North Western province (Coconut triangle) has the highest reported share of milk collection as well as highest share cattle and buffalo population. Though the share in number of cattle and buffalo is comparatively low in Central province, it contributes significantly to the total milk collection, due to higher yields as a result of more favourable climatic conditions and higher grades of dairy animals. Based on 1996 figures, the Northern Dry zone had the highest share of the milk collection (46%), while the Wet zone accounted for some 25% of the total collection. A considerable amount of seasonality is observed in milk collection, due to seasonality in rainfall and temperature. Over the year, the collection index varies from 86 (Nov) to 118 (July) – an increase of about 37%.

Dairy Collection Centres (DCCs): these are the primary formal collection points, with a sufficient number of milk producers to ensure a minimum milk collection of about 100 litres/day. These are operated by farmers themselves, by processors or by larger dairy co-operatives. The main function of a DCC is receiving milk from producers/collectors and forwarding the milk to the chilling centre or processor. Most DCCs test for fat and SNF in milk, as reported above.

Most milk is usually collected on a “morning only” basis, although in areas where the production density levels are higher, milk is collected in the evening as well. Otherwise, evening milk is often sold by farmers to the informal markets or simply consumed. In some areas, hydrogen peroxide is added to evening milk to preserve it for morning collection. This practice has led to some controversy, and the additive is not generally considered as acceptable in milk, unlike the lacto-peroxidase system of milk preservation. Although all formal processors insist that they now discourage the practice, hydrogen peroxide was observed in use on occasion during the RRA. The practice is likely to continue unless replaced with lacto-peroxidase or until milk collection systems are able to better meet the needs of the farmers.

Of the registered 265 dairy collection co-operatives, 4 are large district-level primary co-operatives, 30 are at levels of AGA divisions or electorates, 231 are smaller primary dairy collection co-operatives at the village level. Some of these primary dairy collection co-operatives have formed secondary milk producer co-operatives societies/unions, including: Coconut Triangle Milk Union (CTMU), Mid Country Milk Union Limited (MIDCOMUL), Moneragala Milk Union, Binthenna Milk Union, and the Badulla Milk Union. Some of these do not operate in reality since most co-operatives sell directly to processors, and co-operatives report their unwillingness to pay union fees.

Kiriya, a joint venture between the Government of Sri Lanka and the National Dairy Development Board of India, is currently organising small primary dairy collection co-operatives for sale of milk to Milco. Although not yet apparent, larger unions of these small co-operatives are expected to be developed by Kiriya in the future.

Milk Chilling Centres (MCCs): These are secondary collection points. At present about 80 chilling centres are owned and operated by Milco, while the other large processors Nestles, IDPL and NLL, also have a substantial network of 38 chilling centres, with 376 collecting points. Additionally, some 331 large scale farms supply milk directly to the chilling centres. The small ones are often troubled by power breakdowns, and many have old equipment. Milk collection costs are apparently high in areas with low production density. Average collection cost for efficient large-scale operators is around Rs 2.50-2.70/litre. The competition for farmer milk is leading to tensions in some areas, particularly where private collectors are being displaced by new Kiriya primary societies, and where Nestle and Milco are both collecting, and both competing for supplies from the same dairy co-operatives and private collectors. There appears to be little loyalty by suppliers to any particular milk buyer. Suppliers expressed willingness to shift to other buyers if price conditions changed.

During the RRA investigation, some estimates were made of margins available to dairy co-operatives. In one case study, shown below, an important component of economic viability was direct local raw milk sales that obtained considerably higher prices.

<i>Market Margins: Small co-operative near Kandy</i>					
<i>This independent co-operative conducts about 1400 lt./day of milk collection, about half of which is sold locally through private vendor and the other half sold to Milco. They pay approximately Rs 10.25 morning price, Rs 10.75 afternoon price to farmers who deliver the milk. The local sale price is Rs 14, while the Milco price received by the co-operative is about Rs 11.25 morning, and Rs 11.75 afternoon. The estimates indicate that the co-operative can generate a much higher margin on local sales, some 15% of sale price, than is available on sales to Milco (2%). When the total volume of milk is incorporated, these result in about 83% of the returns to the co-operative activity coming from local sales. As in the case of smallholder farmers, local market allow dairy activity to be viable</i>					
Milco sale margins	Rs/L.	% of sale price	Local sale margins	Rs/L.	% of sale price
Farm-gate price	10.46	91%	Farm-gate price	10.25	73%
Transport and overhead	0.80	7%	Transport, overhead and commission	1.65	12%
Sale price	11.46	100%	Sale price	14.00	100%
Gross margin	0.20	2%	Gross margin	2.10	15%

*Other services provided by co-operatives and collection centres*

Other services besides milk collection are widely reported available from milk collection centres. These include loans for purchases of cattle, feed on credit, and AI, also usually on credit. Nearly half (41%) of farmers supplying Milco centres reported receiving either cattle loans or feed on credit. Similarly, some 27% of co-operative members reported receiving these services. Further, informal market agents such as private milk collectors also often offer cash loans and feed on credit. During the RRA, these services were reported by farmers as important components of the services they expected to receive along with milk collection. This linkage of services is typical of dairy co-operatives in other countries as well, although not among Anand-model co-operatives in India, and is generally considered one of the bases of the comparative advantage that co-operatives hold over some other market agents. The newly-developed Kiriya co-operatives currently do not offer these services, and some farmers indicated that this made them less attractive.

*Milk processing*

In Sri Lanka, the milk processing industry is comprised of (a) liquid milk processing of locally produced milk and (b) repackaging plants using imported milk powder while some processors use a combination of local milk and imported milk powder to produce yoghurt and ice-cream. The main actors are Milco, with a throughput of some 160,000 litres/day (1995), Nestle Lanka, producing annually 5000-6000 MT WMP with local milk, Ceylon Cold Stores, with a collection of milk around 5000 litres/day, Lanka Milk Food and Swiss Cheese Company, each handling 10,000 litres/day, as well as Nel Farms, Mini Dairies, the



Coconut Triangle Milk Union, Mahaweli, and the National Livestock Development Board. In addition to milk powder production, many are also import bulk WMP and repackage it in retail packs. Lanka Milk Foods handles around 35% of the WMP market. New Zealand Milk Products handles around 40% of WMP market. Most of these firms include ice cream manufacture in their operations. Because of relatively low tariff on imported dairy products (10-15%), and low packaging/distribution costs and retail margins, consumers enjoy relatively low cost milk. The cost of locally produced WMP in 1995 was equivalent to US\$ 35-41 cents/litre.

Small private processing was found to play a small but useful role in increasing the marketing of dairy products. Products include curd, which was also produced by farmers themselves, and modern products such as ice cream, sweetened yoghurt, etc. The value added (and subsequently the returns to labour) of such processing was seen to be high. Some adulteration with water, etc was reported in such activities. In spite of apparently low retail prices, local entrepreneurs can engage in small-scale dairy processing quite successfully. One case study made during the RRA permits some examination of the margins available to a small-scale processor of simple dairy products such as yoghurt. This entrepreneur makes yoghurt, curd and popsicle tubes, which he distributes locally by motorcycle to retail outlets. The milk used, some 260 L/week, is bought from the local dairy co-operative at a price of Rs 14/L. Including capital and variable costs such as packaging a fuel, but not including the premises or his labour, he can generate a gross margin of some 40%, or over Rs 21,000 per month.

### *Dairy co-operative development*

Dairy co-operatives play a relatively important role in Sri Lankan smallholder dairying, with, 23% of farmers surveyed reporting being members of milk co-operatives, although it is estimated that only 7% of milk production is handled by them. A number of types of co-operatives can be observed, which differ in the manner in which they were established, their scale and range of operation, the services they offered, and the level of genuine farmer participation and/or control.

At the smallest scale, newly established Kiriya primary societies are present mainly in the mid and up-country. These have 15 to 30 members each, and function only as milk collection centres, with individual daily milk sampling on which pricing is based. Each primary society takes in from 50 to 500 litres of milk a day, which is collected twice a day by a Milco/Kiriya truck. Some of these offered concentrate feeds, which are repaid through deductions from milk payments. Until these primary societies are able to combine into unions or federations, it is unlikely that they will be able to provide any other services, although in some cases it was reported that the secretary-employee was unofficially providing small cash advances to members.

Well-established co-operatives of 300 to 1,500 members occur in a number of areas, including the mid country and the northern dry zone, handling anywhere from 1,000 to 7,000 litres of milk per day. These were established previously under government project initiatives in the 1970s and 80s. They generally operate by sending their own or leased vehicles to fixed collection points to which farmers brought milk, either once or twice a day. Often they simply bulk milk that is then collected by Nestle or Milco vehicles, and in some case they chill the milk as well. The collection vehicles generally distribute feeds as well, provided to members on credit. Other services found to be offered by co-operatives were the provision of loans, AI, and in some cases they hired full-time extension agents to provide farmers with livestock extension services. The Main Report provides details on which services farmers report receiving.

### *Market channels in the Sri Lankan market for dairy products*

Based on a number of information sources, including those reported above, a dairy market channel flow diagram was constructed for the Sri Lankan dairy sector (Figure 9) The RRA Survey indicates that milk producers retain about 15% of their production for family consumption, the remaining is sold locally or to the collection centres, mainly to Milco/Kiriya and Nestle. Thus, 52% of the marketed milk is eventually formally processed, before reaching the consumer in liquid or other product form. Significantly, however, approximately 34% of the marketed milk is not formally processed, and is

marketed either raw or as indigenous products such as locally-produced curd. While this informal or unregulated market is small in comparison to most developing nations, such as in India where it is estimated to comprise 85% of milk production (Dairy India, 1997), it remains significant.

Total dairy imports in 1997, on liquid milk equivalent basis, were estimated to represent 43% of all milk available (including producer home consumption), and were an addition to the milk available of 85% of domestic milk production. Imports represent 69% of the formal, processed milk market<sup>8</sup> and 50% of the overall market. Figure 10 below shows market share in terms the overall market, all marketed milk and dairy products available, not including home consumption. In those terms, local or informal share of the market is clearly significant as the largest single domestic share of the market.

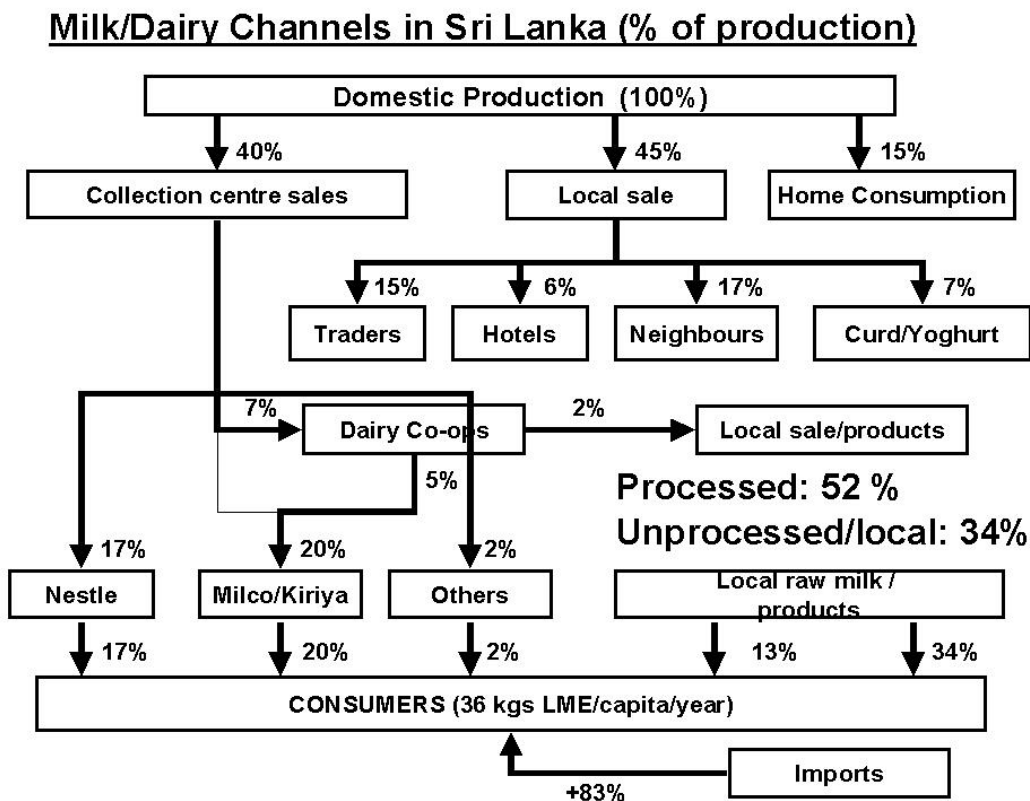
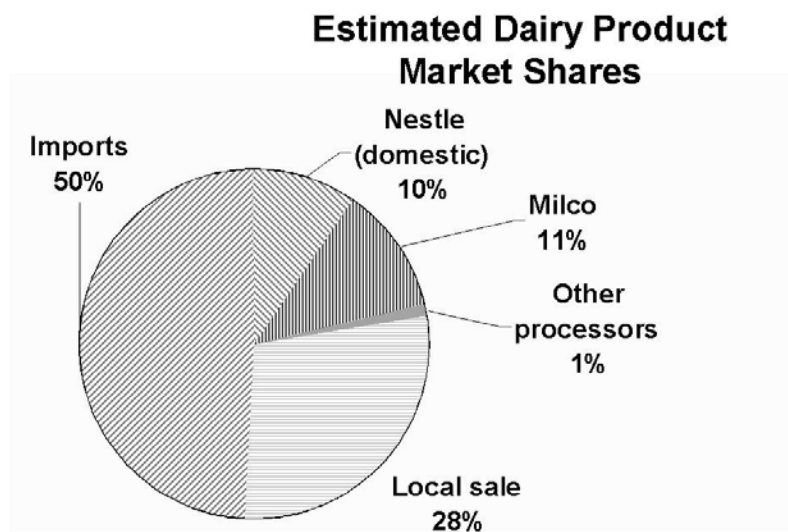


Figure 9: Dairy channel flow diagram for Sri Lankan dairy sector, expressed in terms of % of milk production (LME's).

<sup>8</sup> The formal, processed milk market is also referred to at times as the organised or regulated market



**Figure 10: Estimated Dairy Product Market Shares, as a Proportion of the Overall Market.**

### Milk and Dairy Product Consumption

The household survey also addressed milk and dairy product consumption in the household. Since the survey covered both dairy producing and non-producing households, these responses are available for a wide range of household type, and can be used to accurately gauge consumption patterns.

The sample households had an average family size of 4.54 persons and an average income of Rs 6047 per month (Rs 1332 per capita) which is comparable to the official estimate of Rs 5019 (1993) at 5% annual growth. Some 53% of the households in the sample were milk producers, which is considerably higher than the generally accepted proportion of cattle-keeping households in the country, which is some 15-20%. The sample must thus be considered biased towards milk producers, which may be attributable to a tendency by enumerators to select dairy producers. Overall, 58% of the households in the sample districts buy some liquid milk and/or milk products, 48% and 70% in case of producers and non-producers, respectively.

#### *Dairy expenditure patterns*

Income quartiles were used to classify the households. An average household spends about Rs 262 (4.3% of the household income) on liquid milk and milk products, about 20% of which is spent on liquid milk, with another 62% on milk powder and the remainder on other milk products. As one moves from lower to higher income quartiles expenditure on liquid milk and milk products rises sharply (from 140 to 494 Rs/month for lowest to higher income quartile, respectively), but not as a percentage of household income, which instead falls from 5.6 to 4.2%. Q4 households account for nearly half the market for dairy products. The survey showed clearly that a very limited market exists for specialised dairy products like condensed milk and cheese.

One notable result is that, while expenditure on milk powder as a percentage of income declines at higher quartiles, expenditure on liquid milk more than doubles, from 0.5% to 1.1% of income. In economic terms, this suggests that consumers perceive milk powder as an inferior good, in that its consumption declines with income. On the other hand, liquid milk is shown to be a superior good. This result

indicates that as per capita income rise in Sri Lanka, demand is likely to shift increasingly to liquid milk (assuming preferences remain the same).

### *Liquid milk market and consumer behaviour*

Across the districts, some 12% of the households buy liquid milk though the frequency is much higher in districts like Colombo (52%) and Badulla (41%). An average buyer household buys some 0.5 litres of milk a day at an average price of Rs 29.3 a litre (all types of milk and all forms of packaging included). In absolute terms, Colombo market ranks first with an estimated market size of nearly 140,000 litres a day, followed by Badulla (22,000 litres) and Puttalam (14,300 litres).

Over 50% of the purchased liquid milk is used for making tea/coffee, 43% is converted into milk products or used as cooking ingredient<sup>9</sup>, 5% is directly consumed by adults, leaving some 2% for the children below 7 years of age. As for the reasons of never buying liquid milk, 41% stated that they were milk producer themselves, 35% preferred milk powders while 15% stated non-availability as a major reason (more so in districts like Batticaloa, Hambantota, Kandy, Gampaha, Kurunegala and Puttalam). As for other reasons, over 15% of the respondents in Kandy and Polonnaruwa rated the presently available quality of liquid milk as “poor”, while over 15% in Colombo, Kandy and Hambantota stated that they could not afford to buy liquid milk for considerations of income. The relatively high ranking of non-availability of liquid milk and reported poor quality may be indicators that markets for liquid milk are not currently meeting demand, and could be significantly expanded.

For the buying households, the per capita consumption of liquid milk works out to be 106 gms/day or 39 kgs/year (0.5 litre/day/household). However, households in the highest income quartile form the bulk of the consumer market. One-third of the households in this category buy liquid milk and they account for 69% of the market in quantity and 70% in value. As noted, with increases in income, the frequency of households buying liquid milk increases, as does quantity bought and expenditure. Thus, a potential target group for liquid milk marketers is the 4th Quartile households. Along with marketing strategies to increase availability and convenience, such as smaller retail units (e.g. 250 ml's), marketing may induce more lower quartile households to the liquid milk market.

### *Milk powder market and consumer behaviour*

An estimated 69% of the households in the sample districts reported buying milk powders, with the highest percentage levels in Colombo (95%). An average buyer family buys about 1.12 kg of milk powder a month (a high 30% variation is observed in the average quantity bought) at an average price of Rs 211/kg. Anchor brand accounts for 48% of the market volume, followed by Lakspray's 14% and Highland's 9%. Unlike liquid milk, little inter-district variations are observed in the milk powder price. This observation is consistent with price data published in official reports and reflects greater price uniformity in the formal market.

Respondents did not report significant complaints about the quality of milk powders they buy – 90% rated the available products as either “very good” or “good”. As expected, the frequency of households buying milk powders increases as one moves from lower to higher income and so does the average quantity bought. Unlike liquid milk, the proportion of income spent declines, however, as incomes increase.

### *Other milk product consumption*

Every third sample household reported buying some other milk product. Curd, yoghurt and flavoured milk powders were most common products, followed by butter and, to lesser extent, cheese. Flavoured

---

<sup>9</sup> The relatively frequent reported use of milk as a cooking ingredient is thought to indicate some misunderstanding by respondents, since milk in cooking is not considered widespread. Respondents may have meant by this that they use milk in tea/coffee.

Milk powder was purchased by 9% of the households, the average quantity bought being a little over 0.5 kg a month at an average price of Rs 242/kg. Some 12% of the sample families were buying curd (usually in earthen pots), reporting an average quantity of 1.7 kg a month at an average price of Rs 82/kg. Similarly, 12% of the households reported buying yoghurt, an average quantity of 1 kg per month at an average price of Rs 88/kg.

### Main Issues in Dairy Economics and Markets

#### *Imports*

There is increased availability of dairy products, from 13 kgs/capita/yr. in 1981 to about 36 kgs/capita/yr. now, due to proportional growth in both domestic production and imports. Although imports form an important share of the dairy market, they remain susceptible to macroeconomic factors. Based on estimates of the cost of importing, repackaging and distributing milk powder, changes in world powder prices and local exchange rates can significantly alter import competitiveness.

Cost category	Share of wholesale price
World Whole Milk Powder FOB	75%
Freight, clearance	1%
2.5% stamp, 10% duty, 4.5% security levy	12%
Repackaging and distribution cost margin	13%
RS/400 gram package wholesale price	100%
Sensitivity to 10% exchange rate change	8.0%
Sensitivity to 10% WMP price change	7.8%

Dairy industry sources

A 10% rise in world WMP prices is estimated to raise the cost of packaged powder at the wholesale level by 8.9 %. Similarly, a 10% devaluation in the Rupee/\$ exchange rate, which approximately occurred between January and September of 1998, would raise wholesale costs by 9.1%.

As shown previously, the projected increases in domestic demand will require higher levels of per capita dairy product availability, which must come through either domestic production or through imports. The most important factor determining the competitiveness of domestic dairy production over time will be the opportunity cost of labour. This is determined by alternative employment opportunities, by the prices of farm outputs and inputs, and by the farm technologies available. With the current trend in strong GDP growth, it is possible that incomes will rise to the point where, under current labour-intensive technologies, domestic production will become un-competitive. For liquid milk sales, however, domestic production nearly always has comparative advantage, as reconstituted milk is not a good substitute. Aside from these macro factors, the continued role of imports will depend on consumers' tastes regarding fresh and powdered milk.

#### *Informal marketing of milk*

The informal milk market plays a larger role than many have assumed. With a lower proportion of milk production is now collected by the formal market (32% now compared to 54% in 1981), this is an important outlet for many smallholder farms. The informal or local market supplies some 28% of the total market, and provides many viable income-generating opportunities for small entrepreneurs. Further, the informal market is critical to ensuring economic viability of dairy production for many producers, as it typically provides higher prices. Formal collection centre price averages 11.6 Rs/l, while the informal market price average is 15.2 Rs/l. The public health risks in informal market channels, however, are uncertain, and will depend on consumer practices, such as boiling of milk before consumption.

The growth in the informal market suggests that formal collection systems are not serving farmers adequately, perhaps through over-rigid pricing regimes, or that supplies of liquid milk to consumers are

perhaps not adequate or appropriately marketed. Consumers reported that fresh liquid milk was frequently not available. As in nearly any setting, fresh liquid milk sales favour domestic producers over importers, and means of increasing the market for such sales may need to be considered.

### *Preservation of milk*

There is apparent widespread use of hydrogen peroxide in milk collection, much of it used at the farm or collection point level. There is strong incentive for farmers and market agents to preserve milk in situations where collection occurs only once a day. The use of hydrogen peroxide is not endorsed by the Codex Alimentaire. However, the accepted alternative, lacto-peroxidase, was not observed in the market. Because access to markets in some more distant areas may depend on the continued use of such bacteriological inhibitors, some consideration should be given to testing the use of lacto-peroxidase in areas where appropriate.

### *Co-operative development*

Co-operative development in the dairy sector has been occurring for a number of decades, including through important initiatives by the government and foreign donors. The most recent effort is through the Kiriya joint venture between the Sri Lankan government and National Dairy Development Board (NDDB) of India. The policies that are being applied differ in some respects from those pursued in previous co-operative efforts. Among these are a) maintaining separation between primary village-level co-operatives, which are also of a very small size b) apparent policy not to extend services such as AI and extension, loans or services on credit. Interviews with members of these primary co-operatives reveals quite clearly that they generally view them simply as milk sales outlets, from which they could and would withdraw if, for example, higher prices were offered by other outlets. Farmer loyalty may grow over time. Further, farmers complain that they receive no other services besides milk collection from these primary co-operatives, whereas even small private milk collectors often provide loans and feed on credit. Over time, as government withdraws from provision of livestock services such as AI and livestock extension, the ability of co-operatives to offer such services may be critical for continued development. Provision of short-term credit by co-operatives may also be a needed service, as it is provided by other milk collection outlets and is viewed by farmers as a standard service.

### *Capturing domestic demand growth through liquid milk sales*

Even conservative projections indicate strong increases in demand due to continued GDP growth. Under the assumption of 4% GDP growth (compared to 5.4% 1990-1996), demand could grow by over 100% by 2010. This will present good opportunities for smallholder domestic dairy producers, especially if demand for liquid milk grows particularly fast, as consumption data suggests could happen.

Based on the household survey, the consumption of liquid milk appears to increase with income (unlike that of milk powder), suggesting that over time, as incomes grow, demand could shift towards liquid milk. This sort of shift would strongly favour domestic producers, and efforts towards accelerating that change should be considered.

## Policies and Institutional Support in the Dairy Sector

The institutional support for the dairy industry is provided both by state institutions as well as by the private sector. The state sector is mainly engaged in providing the public goods, and the private sector institutions provide the input supplies, and marketing facilities.

### Government Institutions Supporting the Dairy Sector

#### *Ministry of Livestock Development and Estate Infrastructure*

The government support to the dairy sector is primarily under the Ministry of Livestock Development and Estate Infrastructure. In addition, this Ministry is also responsible for the development of socio-economic welfare of the workers in the plantation sector. The subject of Livestock Development was made a separate portfolio in 1978, and since then the function of livestock development including that of dairy development has remained a separate portfolio. In 1978 the Ministry responsible for livestock development had the added responsibility of rural development also, and in June 1997 when the present Ministry was established the livestock development responsibilities and that of estate infrastructure development were combined together and named as the Ministry of Livestock Development & Estate Infrastructure.

The Mission Statement of the Ministry is stated as **'Initiate appropriate measures to ensure sustainable growth in the livestock sector'**, and the development goals of the livestock sector are spelt out by the Ministry as;

- Promotion of dairying and other livestock species and livestock sector activities for additional employment and incomes, and as instruments for rural development.
- Increase the self reliance on domestic milk production.

The key concepts of livestock development are to promote the private sector to play a greater role in the activities of livestock production, processing, marketing and supply of inputs including veterinary services and extension advice to the farmers, and, for the state to engage in activities of livestock and dairy development which are at present not attractive for the involvement of the private sector.

In pursuing its development goals in the livestock sector, MLD&EI the medium term objectives to improve the dairy sector are a) to increase the number of breedable cows in the country through new approaches and delivery systems, b) to spearhead a programme for small farmer group formation for access to milk collection and other inputs/services, and c) to increase the role of domestic buffalo in the milk production

To implement the Ministry policies, there are the Department of Animal Production and Health (DAPH) and the National Livestock Development Board (NLDB), as well as eight Provincial Departments of Animal Production and Health in the eight provincial councils of the country. In addition to the MLD&EI, the Ministries of Agricultural and Lands, Mahaweli Development, and Internal and International Trade, Commerce and Food are also engaged in some activities which has a role in the development of the dairy sector in Sri Lanka.

#### *Department of Animal Production And Health (DAPH)*

The department of Animal Production And Health was established in 1978 as a separate organisation with the establishment of a separate portfolio for livestock development. Prior to this change the DAPH was functioning under the Department of Agriculture (DOA) as a Division of Animal Production and Health.

The mission statement of the DAPH is ‘to provide leadership on technical aspect of development to the livestock sector from a national prospective’. The objectives of the department are stated as:

- Monitor the status of the livestock sector monthly in order to identify emerging issues.
- Plan and execute research programmes according to the needs of the livestock industry.
- Provide technical products and specialised services according to the needs of the livestock sector.
- Implement the provisions of the statutes pertaining to livestock sector.
- Promote the build-up of technical capacity of sectoral staff.
- Disseminate technical information concerned agencies, provincial DAPH and individuals.
- Develop the genetic resources of livestock.
- Monitor and control animal disease of economic and zoonotic importance.
- Provide professional expertise on issues related to the livestock sector.

To carry out the above functions the department is organised into 6 divisions, namely the Human Resources Development Division, Animal Health Division, Veterinary Research Division, Livestock Resource Development Division, Livestock Planning and Economics Division, General Administration Division. The department is headed by a Director, and each of the above mentioned 6 divisions are headed by a Deputy Director. In addition to these 6 divisions, there are special entities for the following functions directly under the Director DAPH. They are the Implementation of Laws and Regulations Unit, which deals with registration of drugs and pharmaceuticals, registration of animal feeds, control of import of live animals and livestock products, and the unit for animal quarantine functions.

The Human Resource Development division is responsible for manpower development, including training of trainees, conducting of departmental examinations for DAPH staff, extension co-ordination and mass media activities related to livestock production. It also conducts diploma level education for advance level qualified youth at two of its training schools at Welisara and at Anuradhapura. The Animal Health Division is responsible for disease surveillance and control of animal diseases in the country. The Veterinary Research Division is engaged in carrying out animal health and production research to meet the needs of the livestock sector. It is also engaged in the production of certain vaccines for animal diseases. The Livestock Resources Development division is responsible for animal breeding and semen production in the country, while the Economics and Planning Division of the department is responsible for planning and monitoring of DAPH development activities. The General Administration Division of the DAPH looks after the financial and administration functions of the department and that of the Sri Lanka Animal Production and Health Service which includes even the veterinary surgeons and agriculture graduates serving under the provincial DAPH.

### *Provincial Departments of Animal Production and Health*

The provincial departments of APH come under the administration of the different provincial councils of the country, and are directly under the Provincial Ministries of Agriculture. They are headed by a provincial director, who is a Class 1 officer of the Sri Lanka Animal Production & Health Service.

The provincial DAPHs are responsible for carrying out the devolved functions of livestock development in the country, and these include animal breeding, animal health control, animal husbandry extension, pasture and fodder production, and farmer training. The provincial DAPH have a net work of veterinary ranges in their provinces to carry out the above functions. And the veterinary ranges are headed by a veterinary graduate and 3 or 4 diploma trained livestock development instructors. The technical back-stopping for the provincial DAPH is provided by the Central DAPH at Peradeniya, including the supply of semen for animal breeding, and vaccines and other biologicals for animal disease control.

### *National Livestock Development Board (NLDB)*

The National Livestock Development Board was established as a state agricultural corporation on 4th May 1973 with original purpose of promoting and improving the efficiency of the meat trade through animal purchase, slaughtering of animals, processing of slaughtered animals, transportation of meat to



retail outlets and utilisation of by-products of slaughter for animal feeds. However, the NLDB could not venture into any of these functions, and in 1975 a different set of functions were assigned to NLDB. Since then the NLDB has been focusing on the maintenance of livestock farms as nucleus farms for the production and multiplication of livestock and poultry to be issued to the farmers, and to carryout them as commercial operations.

At the time the NLDB was established, several coconut estates that were acquired by the government under the land reform law of 1972 were handed over to NLDB for purposes of holding animals it procures for meat. When the functions of the NLDB were changed in 1975 these coconut estates were converted as dairy cattle farms. In 1991 the government took a decision to hand over the livestock farms belonging to the DAPH to NLDB, and as a result of these changes the number of farms of the NLDB increased and it now maintains a total to 30 livestock farms incorporating nearly 17,000 hectares of land, thus making the agency with the largest land resource for livestock farming.

### *Kiriya Milk Industries of Lanka Company Limited*

Kiriya Milk Industries of Lanka Ltd. is a joint venture between the National Dairy Development Board (NDDB) of India, which promotes dairy co-operative development, and the government of Sri Lanka on a 51% to 49% share basis, for the purpose of milk processing and marketing in Sri Lanka. It is the successor to the formerly state owned milk factory the Milk Industries of Lanka Ltd.. (MILCO). In keeping with the government policy of divesting state owned commercial entities to the private sector, the MILCO was made into a joint company in September 1997 in partnership with the National Dairy Development Board of India. A factor that influenced the government of Sri Lanka to enter into a joint venture project with NDDB is the latter's perceived contribution to helping make India the largest milk producer in the world, also based on smallholder production. In spite of this perception, the co-operative share of the Indian dairy market is less than 10% (Dairy India, 1997).

The main function of Kiriya is to provide a market for the liquid milk produced by the dairy farmers of Sri Lanka. Kiriya at present manages 3 milk plants and some 90 milk chilling centres spread throughout the country. The 3 plants are the Colombo liquid milk plant, the Digana dairy and Ambewela spray drying milk plant. Kiriya at present processes fresh milk into products such as pasteurised milk, sterilised milk, full cream milk powder which are the major products and to other products such as yoghurt, ice cream, cheese etc. which are minor products comparing the volume but are important contributors to the MILCO revenues. Kiriya has plans to set up a 300,000 a litres a day new milk factory, and also a 30 ton a day capacity cattle feed plant. At present the total milk handling capacity of Kiriya is 220,000 l/day, of which some 50% is used, and the present cattle feed plant of Kiriya makes around 5 tons of cattle feed a day.

The key concept of the Kiriya operation is to mobilise farmers into small groups as dairy co-operatives at village level, and to collect the milk from these farmer managed dairy co-operatives with testing of milk of every farmer member every time he supplies and pay for the milk according to it's quality. Few other services are provided.

### *Livestock Development Division of Mahaweli Authority of Sri Lanka*

The Mahaweli Development Program was an agricultural development programme started in 1970 with the diversion of waters of the Mahaweli river to the dry zone parts of the country. The project was mainly an irrigation and a farmer settlement project. The project is handled by the Mahaweli Authority of Sri Lanka, under the Ministry of Mahaweli development.

In order to provide the draught cattle requirements of the Mahaweli settlers another development component was added to the original project and was given the responsibility of maintaining large farms for cattle breeding. This activity is handled by the livestock development division of the Mahaweli Authority. At the beginning when it was first started in the late 1970s its activities were restricted to the production of draught cattle and buffaloes. However in the mid 1980s it expanded its livestock

programme to cover dairy cattle breeding, as well as milk collection and processing. As a result of these changes the livestock programme was renamed as the draught animal and dairy development programme.

The basic livestock unit being promoted by draft animal and dairy development program was two cows and followers, and the philosophy was to develop a dual purpose draft and milk animal, "the Mahaweli cow", based on crossing Sahiwal and Jersey. In Mahaweli areas farmers own buffaloes and/or neat cattle, although about 70 - 80 percent would use cattle/buffalo for cultivation. Mahaweli owns some 10 farms, 2 of which each being in the system H, system C and Uda Walawe. 3 farms are in system A and 1 farm is located in system B. At present livestock in Mahaweli plays a major role in the dairy industry. It involves in production of milk as well as milk products. According to the Mahaweli Authority it's collection of milk from Mahaweli area is around 1.2 million litres of milk annually.

The main functions of the livestock development division of Mahaweli Authority of Sri Lanka can be summarised as follows:

- Maintaining livestock farms to breed and multiply a milch animal suitable for the Mahaweli areas.
- Issuing upgraded animals for farmers in the Mahaweli areas
- Providing extension, veterinary health care, immunisation against endemic diseases, distribution of pasture and fodder cuttings for developing the feed resources in the area
- Organising farmers for collective milk marketing and in producing simple dairy products
- Managing a joint venture company called the Mahaweli Livestock Enterprises Limited for the production of Pigs, Poultry and Poultry meat.

### **Private Sector Institutions for Dairy Development.**

Among the private sector agencies supporting the dairy development in Sri Lanka, the milk processors are an important group. Besides providing milk collection and marketing services, some participate directly in dairy production development. There are two multinationals in the milk processing industry in Sri Lanka and a few local companies also engaged in milk procurement and processing. The main private sector institutions are summarised below; for more details, see the Main Report.

#### *Dairy marketing institutions*

*Nestles Lanka Limited (NLL):* Nestle's has been manufacturing dairy products in Sri Lanka since 1980, starting with condensed milk at Polonnaruwa, a few years later going into full cream powder manufacture at Kurunegala. The plant, commissioned in 1983, is producing some 5,000 - 6,000 Mt of whole milk powder annually, about 50% of its total capacity. Also in 1983, the government agreed to allocate to Nestle' milk collection in 3 districts, viz. Anuradhapura, Kurunegala and Puttalam. Milk was collected through chilling centres of Milk Industries of Lanka Company Limited, a joint venture company between the then National Milk Board and Nestle'. A large development program was carried out by the Nestles to increase milk production in these districts, including pasture establishment, issuing of stud bulls, bull calves, supplying interest free loans for the farmers, etc. In 1989 Nestle' entered into an agreement with the Ministry of Livestock, for the collection of milk in the Kandy district also. By 1992, however, the formal segregation of areas for milk collection was deregulated and Nestles and MILCO were free to collect milk in all districts in Sri Lanka. The Ministry has viewed this as a good policy to increase the competition of milk procurement in the country and thereby to guarantee a good farm-gate price for milk. Nestle' started farmers associations in many parts of the country for milk collection, and some of these were breakaway groups of the former dairy co-operatives organised by the DAPH and the NLDB. Nestle' was the first company to start computerisation of milk procurement system at village level, and farmer associations were given computer printout of individual farmer details of milk receipts, quality, value, deductions etc. on a fortnightly basis. The Kurunegala milk plant produces a wide range of dairy products such as Nespray, Nestomalt, Milo etc. and according to Company sources, the full cream milk powder production is not a very attractive activity because of the imported milk powders in the local market.

The Coconut Triangle Milk Union is collecting about 13,000 to 15,000 litres of milk and process only 3,000 litres daily. The rest of the milk is being sold to the Nestles Lanka Limited. In addition, there are three milk processing companies which have secured the BOI approval to purchase local milk and produce Ultra Heat Treated (UHT) milk and pasteurised milk. Those are the Lanka Dairies (Pvt) Limited which markets the popular " Daily " Milk which is a subsidiary of Lanka Milk Foods and Stassens group, Dairy Lanka (Pvt) Limited, subsidiary of New Zealand Milk Products; which is a member of the Anchor group and the Tropicfruit which produces UHT milk under the brand name " Rich Life ".

The total processing capacity owned by private sector is about 450,000 l/day, but utilisation is only about 30-40%.

Also there are several large scale operations in importation and packaging of milk powder. The bulk of this milk powder is imported and repacked by Lanka Milk Foods Limited and the New Zealand Milk Products TMOL (Pvt) Limited. In addition, Maliban Milk Products Private Limited, Danish Dairy Products Lanka Private Limited, Millers Limited, Delmage Forthy and Company Limited, Dutch Dairy Products Private Limited is also actively engaged in importation and packaging of dried milk powder.

### *Dairy feed manufacture*

Theoretically, concentrate cattle feed also forms an important input for milk production, but in the present context the use of concentrates in milk production in Sri Lanka is very negligible. Although there are several large scale feed mills manufacturing livestock feed in Sri Lanka, the percentage of cattle feed produce by them is less than 1% of their total feed out put.

## **Main Issues In Policies and Strategies for Dairy Development**

The policy framework for dairy development is designed and implemented in accordance with the declared macro-economic policies of the government. Accordingly the major thrust of the policy initiatives for dairy development are directed towards expanding the domestic dairy production for increased employment and incomes and towards increasing the self reliance in domestic milk sources.

Facilitating the private sector activities in the production processing and provision of inputs for dairying and creating a competitive industry structure for all related activities for dairying are key concepts in the government planning process of dairy development. The promotion of the liquid milk consumption as against the heavy use of milk powders as at present among the local consumers is also a major concern in the present policy framework. The provision of public goods by the state and allowing the private sector to cater to the provision of private goods are also stated policy objectives of the present government. However, in the case of dairying there still exists many services which are strictly of the nature of private goods, but because of the current economics of dairying in Sri Lanka, the state is obliged to continue to provide such services to the dairy farmers.

Encouraging farmer participation in the milk assembly and marketing; provision of inputs for dairying; providing effective extension delivery; educating the farmers on methods of reducing the cost of production of milk; reducing the age at calving and calving intervals; are regarded as some of the important strategies among the many different development strategies adopted for dairy improvement in Sri Lanka.

The present policies of the government on the various components of the dairy industry and suggestions for improvement of same based on the findings of the Rapid Appraisal of the Dairy Sector are produced below:

### *Animal feed*

The government policy on animal feed is to promote a competitive animal feed industry in the country. Towards this end the government has allowed free trading of animal feed ingredients except maize and by-products of animal origin for the manufacturer of livestock feed. Both the latter ingredients require an import permit from the Controller of Imports and Exports before any one places an order for such imports into the country.

The maize is under license to promote local production of maize, and products of animal origin for feed are restricted to control the entry of BSE into the country.

Imported feed ingredients comprise nearly 70 % of the raw materials for feed manufacture, since only a very few raw materials are available locally. Before 1991 only foreign investors registered with the Foreign Investment Advisory Committee of the Ministry of Finance were permitted to import their feed ingredients free of custom duties for the manufacture of livestock feed. However since October 1991 this anomaly in the feed industry structure is rectified, and all feed ingredients are exempted from custom duties. This action by the government therefore has brought uniformity in taxation of the feed industry, and has made the policy on the importation of feed ingredients transparent to every importer.

This latter move by the government has encouraged the competitiveness of the animal feed industry, and since then many new firms have started to manufacture animal feed in the country. However in spite of the expansion of the animal feed milling industry in Sri Lanka, the use of concentrate feeds for dairy cattle production in the country has remained at a very negligible level. The principal reason attributed for this by the farmers in the study is the low profitability of dairying when concentrates are fed to their cattle.

Although there is no duty on the import of animal feed ingredients to the country, there exists a 10% duty on the import of finished animal feeds. The intention of this policy is to develop a local feed industry with the possible advantage of providing a market for local feed ingredients such as coconut poonac, rice polish, shell powder etc. Furthermore, the manufacturer also will have to get a certificate to confirm that the finished feed has not used any animal sources from areas where BSE disease is reported.

### *GST on Animal Feeds*

The government in April 1998 introduced a new taxation called the Goods and Services Tax (GST) which is charged at 12.5% on the value addition on a manufacturing process or in providing some kind of a service. This new taxation appears to have serious implications on the use of concentrate feeds for dairying, because the cattle feed prices are now effectively increased by 12.5% .

Before the GST was introduced the tax on cattle feed was only the business turn over tax (BT) which was charged at 1% of the feed cost. The GST has now replaced the BT, and although in many cases it has resulted in a reduction in sale prices of commodities, as the average rate of BT for many consumer items was 18 or 20 %, the situation is different in the case of animal feeds. The new GST therefore is an added cost on the milk production amounting to nearly 12.5% of the feed costs.

Normally in the value added taxation regimes, there is the possibility of obtaining a credit on the GST payable on the finished product, equivalent to the amount of GST paid on the inputs used by the manufacturing process. But unfortunately in the case of dairy farming the final product of the production process, that is milk is GST exempted and therefore the farmers do not have a mechanism to get relief of the GST they have already paid on the concentrates and other inputs used for milk production. One may argue that the small dairy farmers operate at very low production levels and hence their total turnover do not qualify them to register for GST calculations, and any benefit of input credit on final GST is only a theoretical concept. But the reality of the present policy of GST on feeds however is that it has resulted in raising the animal feed prices, and therefore the cost of production of domestic milk.

The higher cost of production of milk also has another implication. The liquid milk and milk powder being both GST exempted, is applicable both for domestic milk as well as for imports. It is not difficult therefore to understand that the present cost advantage of imported milk and milk powders to local milk or milk powders have been increased as a result of the policy of GST on animal feed.

Furthermore it is strange to note that coconut poonac is GST exempted where as many other feed ingredients and cattle feed are subjected to GST. Poonac is only one of the many feed ingredients, and not a balanced cattle feed. The GST exemption on poonac therefore is not an incentive for promoting dairy development. However if the intention of the government in exempting poonac from GST is promotion of dairy development in the country, then the most desirable action would be to remove GST from animal feed. The governments concern to expand the tax base through the introduction of GST is understandable. However by the present policy of adding GST to cattle feed and exempting the final product milk from GST to benefit the consumer only shows the insensitivity of government policy on dairy production.

It is therefore suggested that the government review its policy on GST on animal feeds so that the dairy farmers are given the advantage of such a policy, while at the same time without burdening the consumers of dairy products. The removal of GST on feed is likely to increase the use of concentrate feed for dairying, and hence will have a positive effect on the local milk production. This would also mean that there will be a surplus of milk which can be converted to products such as curd, yoghurt, ice cream, fresh cream etc. which are GST chargeable. The increased revenue from such products will largely compensate the revenue loss on the abolition of GST on animal feed, and the government should therefore be hesitant to decide on the policy of GST on animal feed.

### *Pasture and fodder for dairying*

At present dairying in Sri Lanka is primarily dependent on pasture and fodder found on road sides, tank bunds, ravines, and other common property areas. Hardly any farmer practices the cultivation of pastures and fodder for purposes of dairying. There are many reasons for this farmer behaviour, and the lack of knowledge and skills about the possibilities of growing and using pastures and fodder is a major factor.

The pasture development and extension is a function of the provincial DAPHs. However there is no strong institutional arrangement either at the provincial level or at the national level to spearhead a useful programme for promotion of pasture and fodder for dairy production.

It is however interesting to note that the recently started livestock breeding project by the Ministry of Livestock Development and Estate Infrastructure with technical assistance from the National Dairy Development Board of India, has a major component of the project on the promotion of pasture and pasture utilisation. The present weakness of the institutional arrangement for pasture development may become a hindrance for the above project objectives, and it is therefore recommended that the necessary institutional changes at the central DAPH, and the provincial DAPH and the Livestock Breeding Project are put in place early, so that a meaningful remedy can be made to the present problems on the expansion of the pasture base for dairy production.

### *Trade Policies*

The government of Sri Lanka has adopted the open market policy on the trading of dairy products. As such all dairy products are under open general license system, and the only requirement the importers of dairy products have to comply with are the standards set by the Sri Lanka Standards Institution. Full cream milk powder and the skim milk powder are the 2 important dairy products imported from outside sources, and which have an implication on the domestic dairy industry. Full cream milk powder is the main dairy product in the formal milk market of Sri Lanka, and skim milk powder is an important raw material for the production of items such as ice cream, yoghurt, reconstituted milk etc. Both these commodities therefore have a direct bearing on the market prices of domestic fresh milk which is a substitute for milk powder or as a raw material for the production of above mentioned other dairy products.

Milk powder has a 10% duty rate, and a 5.5% national security levy. In addition importers also incur a cost when opening letters of credit for such imports. This is the stamp duty on the letters of credit, and at

present it is equivalent to 2.5% of the CIF value of the consignment for import. The findings of the study do not tend to support a change of the present duty structure for these dairy commodities. Further, the deteriorating rupee-dollar parity rates also has forced the milk powder packers to raise their prices accordingly, and any increase in the duty rates on milk powder may not be a feasible solution. After the implementation of WTO (SAFTA/SAPTA) agreements by the milk powder exporting countries on reduction commitments on dairy production, it is likely that the international prices of dairy commodities will increase in the international markets. The present effective rate of taxation of milk powder nearly 19%, may therefore be sufficient to give the required protection level for the domestic dairy industry, although the issue may require regular policy review.

It is understood that the government is planning to make it compulsory for the sellers of milk powders to print on the packaging of such products the date of manufacture of the powder, so that the import of very old stocks of milk powder at give- away prices from international markets are discouraged from entering the domestic market and influencing the domestic milk prices .

### *Promotion of private sector activities*

In line with the government policy of promoting free market for dairy processing and marketing, the government in the past has offered several concessions and fiscal incentives to the private sector to enter into dairy processing.

## **Recommendations**

### **Recommendations for production systems**

1. Further research into and the promotion of improved fodder and feed technologies, given the observed low utilisation of fodder resources and low demand for compound feed. Similarly, research should address the role of common property feed resources, including those in the estate sector, and identify ways of better management of those resources.
2. More focus of government breeding farm efforts should be on providing improved buffalo studs, and not solely or even primarily on semen for buffalo AI.
3. Farmer-participatory research and extension for validation and promotion of appropriate technologies should be expanded. This would identify means of raising productivity that are suitable for existing production systems and traditional practices.
4. Investigate quality of rice bran, and find ways of improving the availability and quality of compounded feeds, which are currently little used in the dairy sector.

### **Recommendations for economics and markets**

5. Promote liquid milk consumption through generic campaign aimed at consumers, but also by encouraging market agents to better exploit currently un-tapped demand for liquid milk, as revealed in the consumer survey. Increased liquid milk consumption will have strong positive effects on opportunities for domestic milk production, given the clear comparative advantage domestic producers hold for supplying fresh milk demand.
6. Research is needed into informal and traditional milk and dairy markets to identify effective and appropriate market mechanisms, technologies, avenues for formalisation and quality control, and to identify public health risks.
7. Because some areas are characterised by low milk production densities and long distance from milk processing facilities, research is needed into alternative strategies for milk preservation, and to identify the target areas for their appropriate use

### **Recommendations for policies and institutions**

8. Explore alternative systems for monitoring and updating national and regional livestock statistics.
9. Promote the alternative provision of livestock services, including through private and co-operative institutions. Dairy co-operative development efforts should carefully consider all dairy farmer service needs, including animal health, AI, extension, credit, and inputs. Currently, not all services and inputs are adequately provided in all areas, and private dairy institutions and co-operatives could play an important role, as they do in other countries.
10. Rectify the issue of GST tax on compounded feeds, which currently imposes discriminatory taxation on dairy producers.
11. Maintain the status quo on tax and trade policies for imported dairy products. This position should be reviewed regularly, and revised if considered necessary to support domestic production

## Recommendations

---

under changing market conditions. Trade policies should be complemented by efforts to promote demand for fresh milk, which will favour domestic producers.

12. Strengthen institutional support for developing feed and fodder resources. With the continued upgrading of the national herd, the constraint posed by feed and fodder resources will grow more severe. Co-ordinating central and provincial animal production and health departments to give priority attention to feeding and fodder extension may be one option.
13. Consider measures for those dairy processors using equipment obtained with Board of Investment concessions, to compel them to collect more fresh milk and reduce dependence on imported dairy products.
14. DAPH should promote closer linkages between researchers, including VRI and universities, with VS staff, farmer organisations and NGO's to improve participatory research and extension efforts in support of dairy development. Such participatory activities will better provide appropriate technologies and strategies, and their dissemination for dairy producers.



## References

- Abeygunawardena, H., Rathnayake, D., Jayathilake, W. MA.P. 1997. Characteristics of Cattle Farming Systems in Sri Lanka. *J. of Nat. Sci. Coun. of Sri Lanka* 25(1): 25 – 38.
- Abdulai, A., D. K. Jain, and A.K. Sharma. 1996. Household Food Demand Analysis in India. Forthcoming, *Journal of Agricultural Economics*.
- Agricultural Statistics of Sri Lanka. 1995. Department of Census and Statistics, Ministry of Finance and Planning, Sri Lanka.
- Anon 1997. Cow Boys in Milk Mess, Sunday Times, 2<sup>nd</sup> November.
- Asian Development Bank, Ministry of Livestock Development and Rural Industries. 1996. Sri Lanka Second Livestock Development Project, Final Report, Sri Lanka.
- Birner, R. 1995. Cattle and Buffalo Farming Systems in the Dry Zone of Hambantota District. *Grass Roots* 4:2- 8.
- Bogahawatte C. 1991. Changes in farm gate price of milk on production and consumption of milk in Sri Lanka. *Sri Lankan J. of Agricultural Sci.*, 28 : 34 - 42
- Bogahawatte, C. 1994. Cost of Dairy Production of Agroecological Zones in Sri Lanka: Implications for Milk Pricing Policy, Consultancy Report, Ministry of Livestock Production and Rural Industries, November, Sri Lanka.
- Central Bank of Sri Lanka. 1986-1987. Consumer Finance and Socio Economic Survey, Sri Lanka.
- Central Bank of Sri Lanka. 1996. Annual Report.
- Coconut Development Authority. 1990-92. Annual Report, Sri Lanka.
- Dairy Development II Project.. 1986. Revised Briefing Paper, Farming Sys., Dairy Development Foundation, Sri Lanka: pp. 1 – 15.
- Dairy Industry in Sri Lanka. 1997. Status, Limitations and Suggestions for Revival. Reported by Presidential Sub Committee on Animal Production and Health Sector, University of Peradeniya: pp 1 – 32.
- Dept of Animal Production and Health. 1990-93. Annual Reports, Sri Lanka.
- Dept of Census and Statistics Census. 1982. General Report, Sri Lanka.
- Dept of Census and Statistics Census. 1975-1994. Annual Reports, Sri Lanka.
- Dept Import and Export Control. 1980-92. Annual Reports, Sri Lanka.
- de Jong, R. 1996. Dairy Stock Development and Milk Production with Small Holders. Doctoral Thesis, Wageningen Agricultural University, The Netherlands, pp : 111 - 190.
- de Moor. 1989. The Role of Women in Dairy Husbandry in the Project area of NLDB/SHDDP, SHDDP, Kandy. In Livestock Sector Policy Review, Draft Final Report, Asian Development Bank and the Ministry of Livestock Development and Rural Industries.

## References

---

- Economic and Social Statistics of Sri Lanka. 1996. Central Bank of Sri Lanka.
- Economic Review. 1996. Peoples Bank of Sri Lanka: 22(6 & 7), 2 – 24.
- FAO. 1995. Short Term Trade Outlook of Milk and Milk Products.
- FAO. 1990-95. Commodity Trade Bulletins.
- Food Balance Sheet. 1991 – 1995. Dept. Census and Statistics, Ministry of Finance and Planning: p - 11.
- Herath, HMS. 1998. "Women In Extension and Development In Livestock Farming And Veterinary Services in Sri Lanka", (pp 18-21), Scientific Proceedings, Volume-I (Invited and Short Papers), Second Pan Commonwealth Veterinary Conference on Animal Health and Production In Rural Areas: The Essential Role of Women At All Levels, 22-27th February, 1998, Bangalore, India.
- Leegwater, P.H., G Zemelink, S. E Ranawana, and M.N.M. Ibrahim. 1999. Socio-economic aspects of smallholder dairy farming in the mid-country forest garden areas of Sri Lanka, IAC, Wageningen.
- Livestock Sector Policy Review. 1992. Draft Final Report, Asian Development Bank and Ministry of Livestock Development and Rural Industries.
- Mahaweli Authority of Sri Lanka. 1995. Annual Report
- Mendis, S.K. Women in the Dairy Industry in Sri Lanka. Center for Women's Research, Colombo. In Livestock Sector Policy Review, Draft Final Report, Asian Development Bank and the Ministry of Livestock Development and Rural Industries.
- Milk Industries of Lanka Co Ltd. 1984-94. Annual Reports, Sri Lanka.
- Ministry of Livestock Development & Milk Development. 1975-1992. Annual Report, Sri Lanka.
- National Livestock Development Board. 1985-92. Annual Reports, Sri Lanka.
- Progress of Activities and Future Development Plans. 1997. Ministry of Livestock Development and Estate Infra Structure: 1 - 14.
- Rajaguru, A.S.B. 1986. Livestock Development Policy Plan for Sri Lanka. Report of the Society for Researchers on Native Livestock 11: 37 - 64.
- Sri Lanka Customs. 1980-92. Annual Reports, Sri Lanka.
- Sri Lanka Livestock Statistics. 1986/87. Ministry of Rural Industries Development, Colombo.
- Sri Lanka Livestock Statistics. 1991/92 Department of Census and Statistics, Colombo
- Sri Lanka Second Livestock Development Project. 1995. Asian Development Bank and Ministry of Livestock Development and Rural Industries, Colombo.
- Sri Lanka Socio Economic Data. 1998. Statistics Department, Central Bank of Sri Lanka, Colombo.
- Sri Lanka Veterinary Association. 1995. Strategies for Revitalizing the Dairy Industry in Sri Lanka,; pp 1 - 48.
- Wimalasuriya, R.K. 1992. A Baseline Survey of the Rainfed Farming Systems in the Dry Zone of Sri Lanka with Special Emphasis on Ruminant Livestock and Chena Cultivation. Final Report of a

## References

---

Collaborative Research Project Between the VRI and Agriculture Research Station, Maha Illuppallama Undertaken in 1991.

World Bank. Sri Lanka Poverty Assessment, South Asia Region, World Bank.