Socio-Economic Condition of Dairy Industry in Mahaweli H Area

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FOREWORD

The Mahaweli Development Programme is the largest integrated rural development programme in Sri Lanka. It has broadened the activities by upgrading people's lives through different income generating activities. Therefore, the Mahaweli Authority forms a separate division of livestock development and it needs to prepare proper plans for further development of the sector by understanding the present situation of the Mahaweli H area as a pilot study.

On the request of the Mahaweli Authority, HARTI undertook this research to look into the social-economic condition of the farmers and identify the strengths and weaknesses of the sector.

The study reveals that Mahaweli H area is a potential dairy farming area but at present farmers faced the problem of finding natural grasslands because the reservations and tank bunds are utilized for cultivation purposes. Therefore, addressing the above problem will lead to the future development of the sector.

Due to higher feed cost, the cost of production of milk was calculated as Rs. 47.1 per litre with family labour. Therefore, dairy farming in the Mahaweli H area is performed with marginal development and the majority are engaged in this as a secondary income source. The findings and recommendations of this study will be helpful to develop the dairy sector in Mahaweli H area.

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EXECUTIVE SUMMARY

The Livestock Division of the Mahweli Authority implemented several programmes to increase milk and milk based industries in the Mahaweli areas to increase the farmer income and they further need to develop the existing system with proper plans and programs by understanding the present situation and identifying the strengths and weaknesses of the sector. Therefore at this juncture, the Mahaweli Authority requested HARTI to undertake a socio-economic evaluation of dairy industry in order to identify its constraints, future development potentials and lessons that can be applied in preparing future dairy development programmes for further development of the dairy sector in the Mahaweli area.

Despite such efforts to develop the dairy sector in the Mahaweli area the prevailing gap of knowledge of the socio-economic condition of dairy farmers has constrained the proper planning of new dairy development programmes in Mahaweli areas. This study has been designed to fill this knowledge gap. The main objective of this study is to evaluate the dairy industry in Mahaweli System H and explore the future potential for new dairy development programme in the area. The specific objectives are to study the socio-economic background of the dairy farming communities, conduct a situation analysis of dairy farming sector to understand the present situation, SWOT analysis for identifying strengths, weaknesses, opportunities, threats and to study the economics of dairy production in the Mahaweli System H, for providing necessary recommendations to upgrade the dairy sector.

In line with the objectives of the study, the methods of data collection consisted of four major components including a comprehensive literature review, focus group discussions, key informant interviews and a questionnaire survey.

Around seventy five percent of the dairy farmers belong to the middle age group (35-60 years) and 80% of the farmers have received education up to grade 8-10. The total average family income for a month is Rs. 10,000-15,000. Thirty percent of the sample farmers fed their animals with concentrate feed and the high cost of concentrate has also affected the industry significantly. Sixty five percent of the farmers practice semi intensive management while 18% of the farmers manage animals intensively.

The main problem is lack of reservation or natural grazing lands for animals. Further, limited land availability for pasture establishment is another issue. At present, tank bunds are also utilized for cultivation. Therefore farmers were unable to find the required amount of green fodder. A strong milk marketing channel was observed and Milco is the leading collector and it collects 63% of the sample farmers' milk. Nestle' also collects 29% of farmers' milk in the study area. Except few places in Nochchiyagama and Eppawala, value addition was not observed in the study area. Jersey Sahiwal cross is the most dominant breed type (80%) in the Mahaweli H system and only 2% of the total sample represent buffalo farmers. The total average

production of cow's milk is 5.5 *l*/day. Average production of Jersey Sahiwal is 6.1 liters. Cattle shed availability at Nochchiyagama, Thalawa, Eppawala, Thambuththegama is around 50% and in Galnawa and Meegalawa 80% of the farmers owned cattle sheds specially because of the Diary Village Development Project.

Sixty two percent of the farmers utilize artificial insemination as a breeding tool and natural breeding is practiced by 38% of the farms. In Nochchiyagama, private AI technicians also facilitate AI. But in most of the cases success cannot be achived at once. The hygienic condition of milk is low because animals are not washed properly due to lack of water facilities in the farms. The total average cost of production per litre of milk was calculated as Rs. 47.11 with family labour. Excluding family labour, the total average cost of producing one litre of milk was as Rs. 23.49.

Dairy farming in the Mahaweli H areas is performed with marginal developments. Majority are engaged in this as a secondary income source. Some innovative farmers (1%) are engaged in the industry as entrepreneurs and they obtain better incomes (more than Rs. 50,000-100,000 per month).

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CHAPTER ONE

Introduction

1.1   Background

The Mahaweli Ganga Development Programme, the largest integrated rural development multi-purpose programme ever undertaken in Sri Lanka is based on water resources of Mahaweli and allied six river basins. The main objectives of this prograrmme were to increase agricultural production, hydro-power generation, creating employment opportunities, settlement of the landless poor and flood control. Under this programme the landless poor farmers were settled in different areas in the Mahaeweli region. Mahaweli area covered 39% of the total land area of Sri Lanka and covered 55% of the dry zone area.

At present, livestock division of the Mahaweli Authority plays a major role in dairy industry development and the main activities include maintaining livestock farms to breed and multiply milk animals; issuing upgraded animals; providing extension, veterinary healthcare, vaccination programmes; distribution of fodder and organize farmers for milk collection. Dairy was originally an economical industry because ruminant digestive system converts course forage into milk with limited resources (Ranaweera, 2009). In addition, the dairy industry provides an additional income to the rural women and reduces the rural poverty and the nutritional poverty of the nation. The Mahaweli Authority of Sri Lanka intends to examine the socio- economic evaluation of dairy industry in the Mahaweli area for designing its future development programmes.

Livestock plays diverse roles in Sri Lankan agriculture. Primarily, it provides a crucial source of high quality protein by producing milk, meat and eggs. In addition, cattle and buffalo are a primary source of renewable and low cost draught power for a variety of agricultural operations and transport. Other subsidiary products include hides, skins and manure. Livestock also serves as a 'living bank' for many small farmers, cushioning the risks associated with crop production and providing a financial reserve during periods of economic hardships (http://www.livestock.gov.lk). The livestock sector's contribution to the GDP is about 0.8% which is low compared to countries such as Pakistan and Philippines where the livestock sector contributed 11.8% and 30%, respectively in 2013. The national cattle and buffalo population is about 16.2 million and 1.5 million respectively.

According to the livestock development division, Mahaweli H area produced the highest amount of milk compared to other systems. This system H produced Rs.10.7 million and the total milk production of Mahaweli areas increased

gradually. The total contribution to national milk production is 22.9 million liters and it is 7.1% of the total production.

Since independence, successive governments have taken different policy decisions for the development of the dairy sector; however, a remarkable change in the domestic milk production sector is yet to take place. At present, dairy farming is operating at subsistence level due to a number of constraints faced by the farmers. Those are inadequate input supply, high cost of feed, lack of support services and poor marketing conditions. Due to limited land resources in up country, intensive type of rearing is common and it has yielded better production. Some Mahaweli farmers tend to practice intensive type of dairy rearing and obtain better income from dairying (Hitihamu et al, 2009).

1.2   Relevance of the Study

According to the "*Mahinda Chinthana idiri Dakma,* it has been targeted to achieve self sufficiency in milk production by 2020. But, at present the domestic production meets 33% of the total milk requirement of the country. Livestock division of the Mahweli Authority implemented several programmes to increase milk and milk based industries in the Mahaweli areas to increase the farmer income. At this juncture the Mahaweli Authority requested HARTI to undertake a socio economic evaluation of dairy industry in order to identify its constraints, future development potentials and lessons that can be applied in preparing future dairy development programmes for further development of dairy sector in the Mahaweli area.

1.3   The Problem

Despite the above efforts to develop the dairy sector in Mahaweli area the prevailing gap in the knowledge of socio economic condition of dairy farmers has constrained proper planning of new dairy development programmes in Mahaweli areas. This study has been designed to fill this knowledge gap.

1.4   Scope of the Study

This study primarily looks at the dairy industry in Mahaweli System H particularly, assessing its effects on stakeholders (farmers, processors and other middle level players) and identifying areas for further improvement in order to the formulate plans for future dairy development programmes in Mahaweli regions.

1.5   Objectives

The main objective of this study is to evaluate the dairy industry in Mahaweli System H and explore the future potential for new dairy development programmes in the area.

The specific objectives are;

1. To study the socio-economic background of the dairy farming communities
2. To conduct a situation analysis of dairy farming sector to understand the present situation
3. Conducting a SWOT analysis for identifying strengths, weaknesses, opportunities, threats and to study the economics of dairy production in the Mahaweli System H
4. To provide necessary recommendations to upgrade the dairy sector.

1.6   Methodology

In line with the objectives for the study, the methods of data collection consisted of four major components including a comprehensive literature review, focus group discussions, key informant interviews and a questionnaire survey.

Literature Review – Various project documents, data bases and previous studies both in print and electronic versions in the area of impact studies were utilized for designing and planning of this study.

Focus Group Discussions – Group discussions supported with brainstorming session were conducted with the following key informants in order to identify the potentials and constraints at institutional and organizational level.
1. Department of Animal Production and Health – Livestock Development Officers
2. Mahaweli Authority – Six block managers and unit managers
3. Milk collecting agencies – Milco, Nestle, co-operative collecting centre representatives and etc
4. Producer level – farmer organizations / farmer cooperatives, presidents and secretaries of farmer management societies.

Questionnaire Survey – According to the discussions held with the relevant officials of the Mahaweli Authority it has been decided to conduct the field survey at Mahaweli System H because the Mahaweli Authority has given priority for dairy development in this area compared to other regions. Its annual contribution to the Mahaweli milk production is 10,383,000 litres which amount to 53% of the total Mahaweli milk production. System H comprises 6 blocks and the total number of registered farmers at Thabuththegama regional office is 1,459 and the distribution of dairy farmers is presented in Table 1.1. To present each block approximately 20% of the sample was initially selected for the questionnaire survey from each block and a proportionate sample of dairy farmers will be selected using the random sampling method. Information needed for the SWOT analysis will be taken from the whole data collected from questionnaire survey.

Table 1.1: Distribution of Sample

Block	Total Number of Farmers	Interviewed Farmers
Eppawala	277	60
Talawa	295	62
Thambuththtegama	336	69
Galnewa	182	40
Meegalawa	117	26
Nochchiyagama	252	54
	1459	**311**

Source: Survey data, 2014

1.7   Analytical Framework

Primarily, data was analyzed using descriptive techniques. Thus, cost and benefit analysis was undertaken to assess the profitability of farming, processing and system diversifications. Cost of production calculation and SWOT analysis were done to identify strengths, weaknesses, threats and opportunities in the dairy sector of the Mahaweli H area.

1.8   Organization of the Report

This report consists of six chapters. In the first chapter the background, objectives and methodologies are described in detail. The second chapter elaborates the present situation of the dairy industry in Sri Lanka in several dairy farming aspects. Socio-economic situation of Mahaweli H area is described in chapter three. In chapter four, characteristics of dairy farming in H area are described and in chapter five, cost of production of milk and SWOT analysis done in the area are presented. Chapter six elaborates the findings, recommendations and conclusions.

1.9   Limitations of the Study

Dairy farmers were scattered all over the area, therefore the field survey took a long duration. Other than that record keeping was very poor except for a very few farmers. Therefore, obtaining information on diary sector is somewhat difficult. Farmers are reluctant to provide income details other than expenditures. Farmers always over estimate their expenditure on dairy farming but they tend to underestimate their income information.

CHAPTER TWO

Review of Literature in Dairy Farming in Sri Lanka

2. Introduction

This chapter presents an overview of the present situation of dairy farming in Sri Lanka and the information required for this chapter was collected through a comprehensive literature survey. Moreover, information on dry zone dairy farming, milk production, natural grassland resources in Sri Lanka, feeding of dairy cattle and buffalo extension, milk marketing consumption and problems and constraints is also given in detail.

2.1 Livestock in Sri Lanka

At present, dairy industry in Sri Lanka primarily depends on natural pasture and fodder found on road side, ravines, tank banks and uncultivated public and private lands. Very few grow pasture and fodder for the purpose of feeding their animals (http://www.livestock.gov.lk).

The area of farm holdings with livestock is around 0.56 million ha, of which 99% are categorized as smallholdings. The total number of farmers involved in livestock production is estimated at 700,000, and between 30-60% of gross farm income is generated from livestock activities (http://www.livestock.gov.lk). The Department of Census and Statistics showed that there has been a gradual increase in both populations although the cattle population is higher than the buffalo population. (Annex 01 and Annex 02)

The national livestock population contributing to dairy production includes 1.1 million of cattle and 0.4 million of buffaloes in 2013. The cattle and buffaloes are reared in different agro climatic zones and 65%, 19% and 16% are found in dry, intermediate and wet zones respectively and are reared primarily by small-holder farmers.

2.2 Dairy Sector

Dairy sector is the most important of all livestock sub sectors. This is primarily because of the influence it can make on the rural economy. Sri Lanka imports around 65,000 MT (2013) of dairy commodities and dairy development is an essential activity to restrict the large volume of imported commodities and also to generate rural employment. The import bill on dairy commodities is around 15 billion rupees or approximately US $ 13 Million in 2013. The government's attention is mostly focused on the dairy sub sector; to develop this sector into a

'local industry'. The government policy on dairy development is aimed at producing 50% of country's milk requirement by the year 2015. Priority is therefore given to dairy development in public sector investment programmes offered to the private sector to engage in the dairy sector (http://www.livestock.gov.lk).

2.3   Dry Zone Dairy Farming

The dairy sector is predominantly based on smallholders rearing 2-5 cows and their followers are in most of the agro-ecological regions except the dry zone. Throughout the history, the country's largest herds of cattle and buffaloes were reported from the dry and dry intermediate zones. The dry zone covers the Eastern, North, and North-Central provinces. The Eastern Province covering Trincomalee, Batticaloa and Ampara Districts has a huge potential for developing the dairy industry. In the dry zone the herds tend to be large, though the animals are mostly of the indigenous types with poor milk yields. The population of cattle and buffalo in districts of dry zone in Sri Lanka over the past ten years is given in Annex 3 and 4 (Dept. of Census and Statistics).

Table 2.1: Number of Livestock Farms – 2012

District	Cattle and/or Buffalo
Jaffna	13,603
Kilinochchi	1,106
Mannar	2,933
Vavuniya	3,387
Mullativu	3,980
Batticaloa	7,915
Ampara	10,129
Trincomalee	10,178
Anuradhapura	10,128
Polonnaruwa	5,008
Total	58,049

Source: Department of Census and Statistics

2.4   Milk Production

Approximately 150 million households around the globe are engaged in milk production. In most developing countries, milk is produced by smallholders, and milk production contributes to household livelihoods, food security and nutrition. Milk

provides relatively quick returns for small-scale producers and is an important source of cash income (http://www.fao.org.agriculture).

Total national milk production of Sri Lanka in 2013 was an estimated 319.8 million litres, 6.8 percent up from the previous year (www.cbsl.gov.lk). Milk is produced in all districts, with the lowest in the conflict-affected Northern districts. The dry and dry intermediate zones produce 50 percent more milk than the wet and wet intermediate zones. Milk production zones in Sri Lanka are given in Table 2.2. (www.fao.org).

Table 2.2: Main Dairy Production Systems in Sri Lanka

Production systems	Popular Management System	Average Daily Milk Production per Cow (litres)
Hill country	Intensive	6–8
Mid country	Semi-intensive	4–5
Coconut triangle	Tethered	3–3.5
Low country dry zone	Extensive	1–1.5
Low country wet zone	Tethered	3–3.5

Source: Bandara et al, 1993

Five main milk production systems can be identified in Sri Lanka and popular management system is described as intensive, semi intensive and extensive. Average dairy milk production of the system is also listed in the Table 2.2.

Table 2.3: Cow's and Buffalo Milk Production 2003 – 2012

Year	Average Monthly Milk Production(Litres)		Total Monthly Milk Production (Liters)	Annual Milk Production (Litres)		Total Annual Milk Production (Liters)
	Cow's Milk	Buffalo Milk		Cow's Milk	Buffalo Milk	
2003	13,045,500	2,521,500	15,567,000	156,546,000	30,258,000	186,804,000
2004	13,308,000	2,550,000	15,858,000	159,696,000	30,600,000	190,296,000
2005	13,484,700	2,577,100	16,061,800	161,816,400	30,925,200	192,741,600
2006	13,748,100	2,637,180	16,385,280	164,977,200	31,646,160	196,623,360
2007	14,144,000	2,690,100	16,834,100	169,728,000	32,281,200	202,009,200
2008	14,370,200	2,970,890	17,341,091	172,442,406	35,650,685	208,093,090
2009	15,338,740	4,104,280	19,443,020	184,064,880	49,251,360	233,316,240
2010	15,993,300	4,636,200	20,629,500	191,919,600	55,634,400	247,554,000
2011	16,954,500	4,570,800	21,525,300	203,454,000	54,849,600	258,303,600
2012	19,803,300	5,134,200	24,937,500	237,639,600	61,610,400	299,250,000

Source: http://www.statistics.gov.lk/agriculture/Livestock/MilkProduction.html

According to the table the total annual milk production increased gradually from year 2003 to 2012. The average cow's and buffalo milk also increased accordingly.

2.5   Natural Grassland Resources of Sri Lanka

Sri Lanka's grasslands have been categorized in many ways, based on their origin and evolution, geographical distribution and floristic composition. According to Pemadasa (1990), natural grassland resources in the country are categorized as follows (Table 2.4).

Grasslands are likely to play an economically vital role because they have a potential as feed for livestock. However, their exploitation has been rather unsystematic due to increasing biotic interference by haphazard clearing for short-term cultivation, illegal burning, and extensive removal of herbages for fodder and over-grazing. These activities have caused considerable floristic and habitat changes and severe erosion of many types of grassland with near complete destruction of some areas (Pemadasa, 1990).

Table 2.4: Grassland Types of Sri Lanka

Main type	Main-sub type	Sub -type
Montane *(Patana)*	Dry	Humid zone dry *Patana*
		Summer zone dry *Patana*
	Intermediate	Intermediate *Patana*
	Wet	Lower wet *Patana*
		Upper wet *Patana*
Savanna		Upland savanna
		Lowland savanna
Lowland	Wet zone pastures	Inland grasslands
		Maritime grasslands
	Dry zone pastures	Damana grasslands
		Thalawa grasslands
		Villu grasslands
		Tank bed grasslands
	Intermediate zone pastures	Coconut grazing grounds
	Arid zone pastures	Dry pastures
		Humid pastures
		Mixed pastures

Source: Pemadasa (1990)

2.6   Pasture Cultivation

Pasture Cultivation, is not practiced to a great extent in Sri Lanka especially among smallholdings due to socio-economic limitations. These limitations are; unavailability of land, lack of inputs, lack of establishment and management experiences, low

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awareness of improved forage technology and poor animal production outcomes. However, among middle level holdings and large scale farms, there is a considerable trend for improved pasture and fodder cultivation and utilization. (http://www.fao.org)

2.7   Constraints Identified in Improvement of National Grasslands

Management of grasslands for sustainable development remains a major challenge for researchers, policymakers and development agencies. The livestock sub-sector together with the larger agricultural sector now face considerable limitations which are listed below:
- Inadequacy of grassland management policies coupled with other functional policies such as economic, socio-economic, land use and wildlife management
- Inadequate funding and many other complex issues in the national research system
- Difficulty in management of research due to dispersion of agricultural research under several ministries of the government
- Poor infrastructure in many grassland associated areas. e.g. market outlets and veterinary facilities
- Inherent low productivity of grasslands due to seasonal variation of rainfall, poor nutritional status of soils, weed invasion, unpalatability and low quality of forages
- Lack of current research information on productivity, soil properties, existing forage species and their nutritional quality and, persistence of improved forage species under particular grassland ecosystem
- Unavailability of functional sources of planting materials for improved forages for local conditions
- Main focus of current livestock policy towards agro climatic issues but not towards the actual background of the grassland ecosystem
- Lack of collective agreement, poor-cooperation and disorganization of the pastoralists
- Poor involvement of governmental and private organizations in participatory approach. (http://www.fao.org)

2.8   Feeding Dairy Cattle and Buffalo

The primary objectives in feeding the dairy cow or buffalo are: to allow maintenance and growth to mature body weight; to provide nutrients for the production of a calf after every 12 to 15 months, and to promote optimum quantity and quality of milk.
In a normal practice on farms, the ration of a dairy cow or buffalo consists of two parts, namely: maintenance and production. The maintenance part of the ration depends upon the body weight while production is dependent upon the level and composition of the milk.

Diets based on crop residues deficient in protein, energy, minerals and vitamins which restrict intake and digestibility, can be improved by providing supplementary nutrients, including:

- Leguminous and non-leguminous green forages
- Concentrates

2.9   Feeding Dairy Cows

The low average milk production of *Bos indicus* cattle and buffalo is mainly because they have been bred for draught purposes, disease resistance, tolerance to tropical climates and poor nutrition. Multipurpose animals produce 500-1000 litres of milk in one lactation with a peak of 3-5 kilograms per day. High producing crossbreeds produce between 2400-4000 litres of milk per day. Therefore, in feeding the dairy cow or buffalo, farmers should consider at one extreme a zebu cow weighing 250 kg, producing one to two kilograms of milk per day and consuming wheat or rice straw and a little grazing. At the other extreme, a cross bred cow or Murrah buffalo weighing 500 kg is producing about 20 to 30 kg of milk per day, at six per cent fat in the case of buffalo, and receiving about 20 to 25 kg green fodder and 8 to 12 kg of concentrate (http://www.ilri.org).

Calorimetric studies have revealed that during lactation, heat production in an animal of 453 kg body weight is increased by over 2000 kcal per day. For high producing animals to meet energy requirements, higher levels of intake are required, which depress digestibility. As a result ME available to the animals for conversion into milk becomes less than the calculated value. Taking all these factors into consideration the NRC recommends an increase of three percent feed for each 10 kg of milk produced above 20 kg/day.

If a crossbred cow weighing 400 kg and producing 10 kg of milk per day with five per cent butter fat is fed 70 kg of berseem or green cowpea equivalent to 15 per cent dry matter the critical requirements of protein and energy are met. The digestible crude protein level is higher than the requirement and the TDN requirement for 10 kg of milk production is met with berseem. High quality feeds such as berseem feeding can be used as basal roughage with no concentrate needed to be fed for up to eight liters of milk production. Similarly lucerne and cowpea can be fed solely for up to eight kilograms of milk production. The cheapest feed for milk production is good quality fodder. Problems of bloating can be managed by introducing feeds gradually; it is advisable to feed about 2 to 2.5 kg of good quality hay with legumes.

For a wheat straw and concentrate mixture addition of Vitamin A and phosphorus is needed and can be supplied through a synthetic source of Vitamin A and 100 g of sterilized bone meal for phosphorus. (http://www.ilri.org)

2.10   Government Policies and Programmes for Dairy Breeding

The government will make necessary legal documents to safeguard long term interest of the dairy industry by ensuring strict reservation of state livestock farm for the purpose of breeding cattle buffalo and goat (National Programme 2005-2010). Joint ventures between the government and other parties interested to fulfill this objective would be more effective than allowing the government organization to only maintain these farms. The high demand for quality breeding stock in the country could have been met easily if these farms were managed properly. Already, the Ministry of Livestock Development has been approached with several project proposals for joint ventures with National Livestock Development Board (NLDB).

In addition, a special animal breeding programme was proposed to overcome the scarcity of quality breeding animals (National Programme 2005-2010). It was initiated in view of production of 3000 upgraded heifer calves annually through AI. However, the sustainability of this programme depends on the continuous availability of funds from the government.

NLDB producing 6000 upgraded heifer calves and promoting private sector breeding farm producing 10000 heifer calves annually are the other important objectives of this programme.

2.11   Extension

Farmers were given technical training to convert existing traditional dairy management practices with new concepts and technologies to enhance their dairy production which is designed to help farmers improve their income. They are linked to the veterinaries of the Department of Animal Production and Health.

In 2012, the Government through the 'Divi Neguma' program of the Economic Development Ministry allocated Rs. 1,117 million to promote livestock and fisheries sectors of the country, according to the Rural Economic Development Division of the Ministry (www.sundayobserver.lk).

The five-year development plan under the Eastern Provincial Council envisages an annual growth rate of 10 percent in the livestock sector. To achieve this target, three main thrust areas are identified - i.e., enhancing production and productivity of livestock, promoting farmer empowerment and skills development and improving livestock marketing and value addition. The development program includes increasing the supply of breeding stock such as cross bred heifer calves (cattle) and goats, day old broiler and layer chicks as well as promoting backyard poultry-keeping (www.sundayobserver.lk).

It also has prioritized the need to increase availability of animal feed, improving veterinary services, promoting collective action among livestock farmers,

strengthening entrepreneurial skills of stakeholders, improving livestock marketing and promoting, processing and value addition of livestock products (www.sundayobserver.lk).

The labor intensive nature of many livestock operations, under local conditions, can therefore be effectively harnessed for rural employment creation, livelihood improvement and poverty alleviation initiatives. Government plans to facilitate the transformation of the present subsistence level of dairy production into a viable commercially oriented activity. Developing the livestock sector is a necessary condition for ensuring the food security in the country (http://www.sundayobserver.lk).

2.12   Milk Marketing

Milk is an essential commodity in daily consumption. These days when almost all items are sold in ready-made form in packets, milk is no exception. It can be purchased at any time from a grocery shop. It is also good from the health point of view as it is purified and the cholesterol content is removed from it. Marketing of milk in Sri Lanka is complex and varied. There are individual farmers who sell directly to processors, consumers, hotels, cafeterias and canteens. Co-operatives are organized primarily for the purpose of collecting and selling milk to either hotels or processors. 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 centers operated by co-ops or the main dairy processors. Most farmers are not members of cooperatives or farmer societies. Unlike milk powder, the consumption of fresh milk appears to have increased with income, suggesting that as incomes increase over time, demand could shift towards liquid milk (www.fao.org).

Domestic producers have a comparative advantage in the liquid milk market as reconstituted milk does not seem to be a good substitute. Awareness to increase market for such sales needs to be considered.

2.13   Milk Consumption

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.

2.14 Problems and Constraints

- The constraints to sustainable livestock production by the resource poor farmers in developing countries are fully applicable to the current situation that prevails in Sri Lanka. Those are:
- Procurement of animals: Poor farmers find it difficult to access capital and credit facilities to purchase the required breeding stock.
- Management: Farmers are unable to obtain animal health and production services, such as veterinary, breeding and advisory services in a timely and effective manner.
- Marketing: Small farmers do not have access to reliable and steady markets for their products.
- Studies conducted under a SAREC/NARESA Buffalo Development Project a decade ago showed that there are constraints faced by cattle and buffalo farmers in many regions of Sri Lanka.
- Low farmgate price of milk is determined by government policy and the monopolistic practices of milk collection systems.
- Lack of producer participation in collection and marketing, thereby resulting in monopolies and malpractices by the collectors and exploitation of the farmers
- Powerful advertising campaigns by importers of milk products in order to sway consumer preference away from local milk products
- Lack of milk collecting facilities in certain areas, and inadequacies even in some areas where they exist, with only morning milk being collected
- Shortage of suitable breeding stock in the country.
- The state sector livestock farms of the National Livestock Development Board (NLDB) are mandated to supply superior breeding stock to farmers, but they are able to meet only about 20% of the demand.
- Lack of organized livestock markets for farmers to sell and buy animals
- Limitations of the artificial insemination (AI) programme, with only 10-15% of breedable cows being served by AI, and only 2-5% of calvings are attributable to AI
- Lack of natural breeding (stud) services in areas where AI services are not available
- Lack of knowledge on methods of low-cost feed supplementation
- Absence of an appropriate long term government policy and sustained support to improve local milk production and progressively reducing imports. This is due to inadequate government support for livestock extension services in management, health, breeding and product technology.
- High cost of veterinary services and drugs
- Lack of follow-up programmes by the Ministry and the DAPH to continue the livestock development programmes that were initiated and assisted by international grants and loans

- Lack of credit, tax rebates, insurance schemes and other incentives to encourage small to medium scale private enterprises in dairy production. A study commissioned by the Animal Production and Health Commission for Asia and the Pacific (APHCA) of the FAO on improved market access and smallholder dairy farmer participation for sustainable dairy development identified the main constraints to dairy development in Sri Lanka in five main areas as: stock availability; animal health management; land availability; farmer knowledge and skills; and extension system limitations. Recent findings of the Ministry of Livestock Development through its studies and consultations with stakeholders in the dairy sector have shown that many of the above constraints are still present.

CHAPTER THREE

Socio-economic Background of the Farmers

3.1   Introduction

This chapter describes the social-economic characteristics such as education, main occupation, income type and management. The sample population comprises 311 farmers and in that 15% are female farmers and 85% are male farmers.

3.2   Age Distribution of Farmers

Table 3.1: Distribution According to Age by Sex

Age Limit (Age)	Female		Male		Total	
	No	%	No	%	No	%
Less than 20	1	2.1	3	1.1	4	1.28
21-35	6	12.8	44	16.7	50	16.2
36-45	23	48.9	68	28.8	91	29.2
46-60	15	31.9	125	47.3	140	45.1
More than 60	2	4.3	24	7.1	26	8.3
Total	47	100	264	100	311	100

Source: Survey Data, 2013

As shown in the table 3.1, majority of the female farmers belong to the 36-45 age group (49%) and age of the majority is 46-60 years (45%). The total youth contribution to the dairy farming is 17%. But the majority belong to 36-60 age group irrespective of the sex. This indicates that youth participation in dairy farming is less.

According to the survey, it is clear that entry of newcomers to the sector is somewhat constrained, because, the community does not regard the livestock farming as a recognized industry.

3.3   Education Level of Farmers

As illustrated in the figure 3.1, 34% of the farmers have received education up to the level of GCE/O/L. The farmers who have studied up to grade eight were 29% of the sample and 24% of the farmers had received education up to grade five. The number of farmers who have not received formal education was 8% of the sample and 4.3% of the farmers received education up to GCE (A/L). One degree holder is also engaged in dairy farming in the study area.
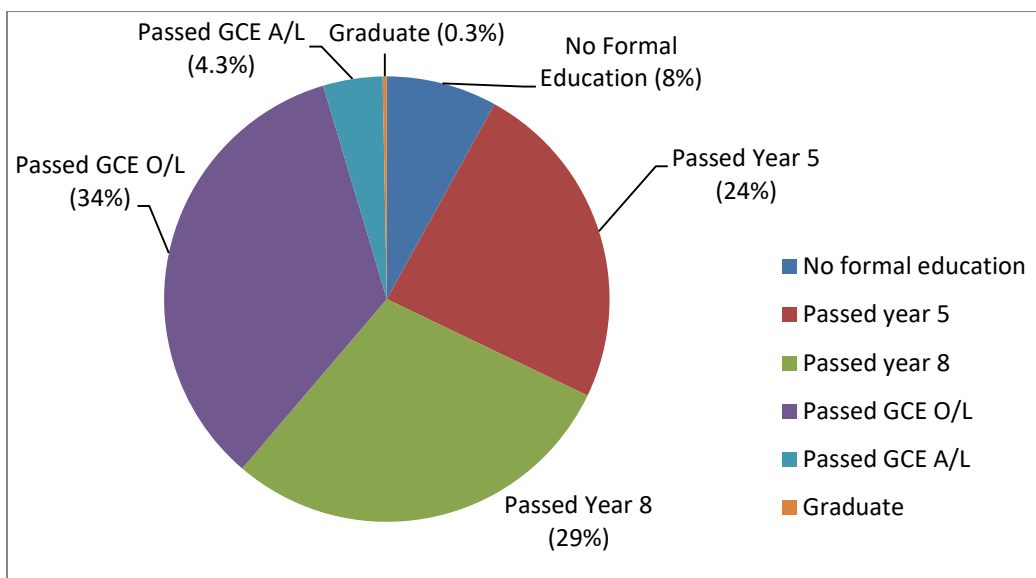
Source: Survey Data, 2013

Figure 3.1: Education Background of the Dairy Farmers (percentage)

Dairy farmers in the Mahaweli H systems showed lesser levels of education qualifications. This indicates that as the level of education increases the interest to involve in dairy farming as income generating activity, except few large scale operators, declines among the respondents.

Table 3.2: Main Occupation of the Dairy Farmers

	Nochchiyagama	Eppawala	Thabuththegama	Talawa	Meegalawa	Galnewa	Total No	Total %
Dairy farming	31	52	26	25	20.8	28.6	98	31.5
Other livestock	2	0	0	0	0	0	1	0.3
Agricultural farming	60	35	68.5	50	75	65.7	177	57
Agricultural labour work	2	0	2.7	0	4.2	2.9	5	1.6
Non agricultural labour work	0	7	0	5	0	0	7	2.3
Government jobs	2	35	0	10	0	2.9	10	3.2
Private sector jobs	0	0	0	3.3	0	0	2	0.6
Self employment	4	35	2.7	6.7	0	0	11	3.6
Total	100	100	100	100	100	100	311	100

Source: Survey Data, 2013

The table describes block level main occupation of the sample farmers. Accordingly, dairy farming as main occupation is practiced by 32% but the block of Eppawala the situation is different and 52% of the farmers practiced dairy farming as their main occupation because the Mahaweli Authority has implemented several projects to develop the dairy sector by providing subsidies. Other than that, 57% of total

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farmers practiced agricultural work as their main occupation. This situation is higher in the Meegalawa (75%) and Thabuththegama (68.5%). Furthermore agricultural labours, non agricultural labourers, government employees and self employees are also engaged in dairy farming as a secondary employment.

Mahaweli H area as a settlement area most of the farmers settle there for cultivation purposes. At present, the third generation of Mahaweli settlers are involved in farming activities in the area. Therefore, land acts as a limiting factor in choosing cultivation as their main occupation. Since, one third of the farmers are engaged in dairy activities as their main income generating activity.

3.4   Income Distribution of the Farmers

Table 3.3: Total Monthly Income by Farm Families

Income range	Number	%
10000	23	7.3
10001 - 20000	101	32.4
20001 - 30000	98	31.5
30001 – 40000	41	13.1
40001 – 50000	25	8
More than 50000	23	7.3
Total	**311**	**100**

Source: Survey Data, 2013

The Table 3.3 indicates the distribution of total monthly farm family income. Accordingly, majority of the farm families received a Rs.10,000-30,000 monthly income and it is 64% of the total sample. Farmers obtaining Rs.30,000-50,000 monthly income represent 21% of the total sample and more than Rs.50,000 monthly income receivers are 7% of the total sample. The survey disclosed that 7% of the farmers are depending on a monthly income of Rs. 10,000. This indicates that some Mahaweli farmers live on a marginal income.

In Mahaweli H area, two thirds of the dairy farmers received less than a Rs. 30,000/= total monthly income and this indicates that most of the dairy farmers are middle level income receivers.

3.5   Method of Management

Dairy Management Systems
Depending on the availability of the resources, the cattle and buffalo farming can be broadly categorized into three management systems: intensive; semi-intensive; and extensive management.

Intensive Management System

Mainly the pure or crossbreds of European type animals are kept indoors and provided with cut grass. They are supplemented by concentrated feeds and mineral mixtures. The majority of farmers depend on formulated concentrates available in the market, while a few farmers provide self-mixed concentrated feeds to their animals. The most common self-mixed mixture is the rice barn and coconut *poonac*. Common salt and di-calcium phosphate are the most common mineral sources used by farmers. By- products from mills such as broken rice, dhal, omi, beer pulp are also used depending on the availability. The average production level of an intensively managed herd is 15 lit/cow/day. The most common breeding method for cattle is AI while the buffalo and goat are their artificially or naturally bred.

Semi- intensive Management System

Animals are sent out for grazing or tethered during day time. For tethered animals, changing the tying position 2-3 times is the normal practice and the animals are usually given water in a bucket. In the evening, animals are brought back and the concentrated and mineral mixtures are given. Some animals are provided with cut grass or tree fodder during night. Most of the animals are provided with sheds during night. Very often the animals are milked twice. The average milk production is 8-10 lit/cow/day. Calves are also sent with mothers if they are not milked in the afternoon. The majority of them are crosses of Temperate (Frisian/Jersey or Ayrshire) and Zebu (Sahiwal) types.

Extensive Management System

This is a low input management system. Normally, they are large herds. The animals are released to crown land, tank beds or scrublands for grazing them again in the evening. Very often animals are not fed with concentrates. They are not provided with shelter at night. Sometimes the animals are milked once a day or not milked at all. The average milk production is 2-3 lit/cow/day. Most of them are either Lankan or Zebu types.

Table 3.4: Type of Management in the Study Area

Division	Intensive (%)	Semi Intensive (%)	Extensive (%)
Nochchiyama	4.9	70.5	24.6
Eppawala	-	94.8	5.2
Thabuthegama	4.1	93.2	2.7
Thalawa	0	98.2	1.7
Meegalawa	20.8	79.2	-
Galnawa	0	91.4	8.6
Total	**3.8**	**88.7**	**7.7**

Source: Survey Data, 2013

The Table 3.4 describes the method of cattle management in six divisions of Mahaweli H area. Accordingly semi intensive type of management dominates and represents 89% of the sample and 7.7% of farmers practiced extensive type of management. Intensive farming is practised by 3.5% of the sample population. The data shows that in Meegalawa 98% farmers practice semi intensive type of farming. Other than that, in Eppawala, Thambuththegama and Galnewa more than 90% of the farmers are involved in semi intensive farming practices and very few farmers from Thambuththegama practice intensive type of farming and few farmers are involved in extensive type of management. Due to unavailability of natural grasslands in Mahaweli H area the extensive farming was less, compared to other practices.

3.6   Land Ownership and Availability
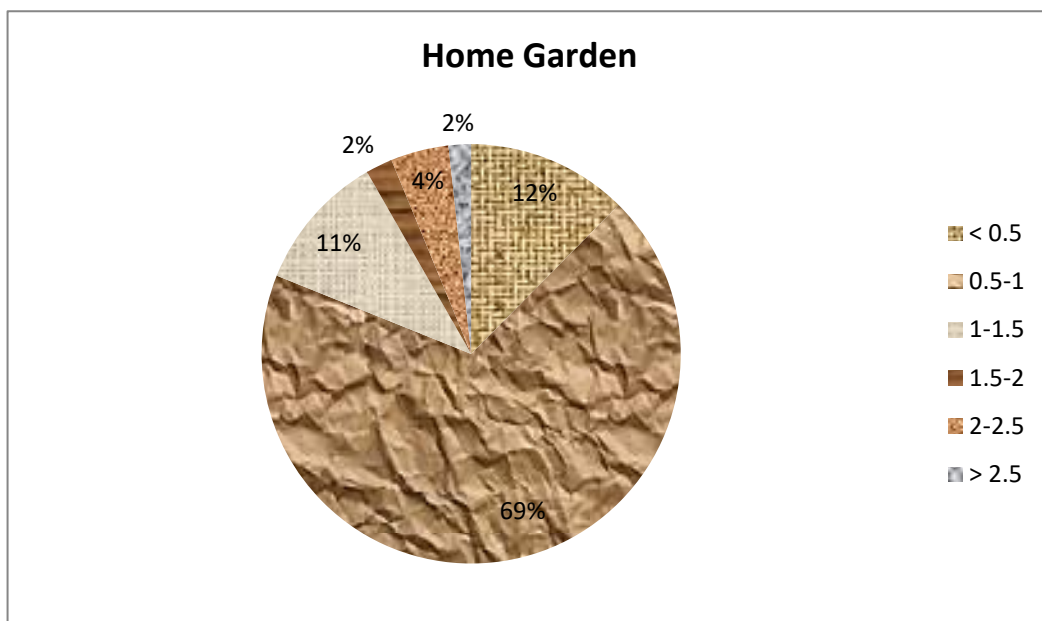
Source – Survey Data, 2013

Figure 3.2: Home Garden availability in Mahaweli H area

The Figure shows the home garden availability in the Mahaweli H area and majority owned 0.5-1 ac of home garden (69%) in the study area. The farmers who owned less than 0.5 ac of home garden were around 12.5% of the farm families. The area of land is diminishing due to fragmentation of land among family members. Other than that 10% of the sample farmers owned 1 -1.5 ac of home garden land. In the study area, 99% of the farmers owned home gardens.

Table 3.5: Percentage of their Availability of Low Lands in Mahaweli H Area

Land Size (areas)	Nochchiya-gama	Eppawala	Thambuth--thegama	Thalawa	Meegah-alawa	Galnewa	Total
> 0.5	3.3	2.8	-	3.13	-	2.7	3
0.5-1	11.5	4.8	3.75	9.38	20	8.3	9
1-1.15	24.6	14	6.25	9.38	16	14.4	14
1.5-2	5	4.7	2.5	3.13	4	5.1	4
2-2.5	54	60.3	76.25	56.25	60	62.3	60
>2.5	1.6	13.5	11.25	18.75	-	7.2	10
	100	100	100	100	100	100	100

Source: Survey Data, 2013

According to the table, 60% of the sample farmers owned 2- 2.5 acres of lowland area. But this amount of land is less than the distributed land area. Because of the initial stage, farmers received 2 ½ acres of land. The table also showed that 12% of the sample is having less than 1 ac of low land. Other than that 3% of the sample farmers do not own any lowland in the Mahaweli H area. This refers that the land fragmentation and when it comes to second or third generation, farmers have to pay their attention to other income generating activities such as dairy farming.

3.7   Water Availability

According to the survey, it was revealed that 99% of the famers do not expend money on water in their farms. However, some large scale farms practising intensive farming used pipe borne water for farming activities. In some large farms additional labour is utilized to draw water from the wells. The survey also revealed that only 105 of the sample farmers received pipe-borne water facilities for their homes. Majority farm facilities (87%) utilize well water Apart from that, a few farmers do not own any type of water supply mechanism for their houses but they rely on the nearby wells and public wells which are situated in the area. In dairy farming animals need water for both drinking and cleaning purposes. But it was very clear that the cleaning of animals in the Mahaweli H area was difficult due to unavailability of water. Farmers tend to clean their animals only when water is released for irrigation purposes from the tanks. According to the observations, the hygienic conditions of the farms were poor due to water problems.

CHAPTER FOUR

Characteristics of Dairy Farming of Mahaweli H area

4.1   Introduction

This chapter illustrates characteristics of dairy farming in Mahaweli H area such as reasons for engaging in dairy farming, herd size, herd distribution, dairy farming experience, milk production details, feeding, milk marketing, animal breeding and hygienic conditions.

4.2   Reasons of Engaging in Dairy Farming

According to the survey, the reasons of engaging in dairy farming were investigated and found that 30% of the farmers are involved in dairy farming as a main income generating activity. Other than that, to obtain additional income 48% of the farmers are engaged in dairy farming. Some farmers (13%) of the sample practise dairy farming because it is their traditional family living and 6% of the respondents are involved in dairy farming because of interest. Moreover some practise it for more than one reason given above.

Table 4.1: Herd Size by Block Level

Block	Herd Size
Nochchiyagama	5.4
Eppawala	7.3
Thabuthegama	5.9
Talawa	7.1
Meegalawa	4.8
Galnewa	7.7
Total Average	6.4

Source: Survey Data, 2013

The total average herd size is 6.4 animals and this situation slightly varies according to the individual block. Eppawala shows the highest average herd size which is 7.3% animals.

Thalawa, Galnawa and Eppawala blocks consist of higher herd sizes compared to the other blocks in the study area because in Thalawa and Galnawa, there are some organized farmers compared to other areas and more farmers have identified the dairy industry as a good income source compared to paddy farming in this area.

Table 4.2: Buffalo Herd Distribution

Type of Animal	Nochchiyagama		Eppawala		Talawa		Total	
	No	%	No	%	No	%	No	%
Milking cow	33	42.3	24	35.3	1	11.1	59	37.8
Dry cow	10	12.8	5	7.4	-	-	15	9.6
Heifer	28	35.9	12	17.6	4	44.4	44	28.2
Female calves	7	9.0	3	4.4	2	22.2	12	7.7
Male calves	-	-	20	29.4	-	-	20	12.8
Bulls	-	-	4	5.9	2	22.2	06	3.9
Pregnant animal	-	-	-	-	-	-	-	-
Non pregnant animal	-	-	-	-	-	-	-	-
Total	78	100.0	68	100.0	9	100.0	156	100.0

Source: Survey Data, 2013

According to the table, in Nochchiyagama, Eppawala and Thalawa blocks farmers reared buffaloes. The average milking cow percentage of herd is 37.8 and heifers represent 28.2% of the herd. This milking cow percentage of buffalo is in a good condition compared to the national average milking animal percentage.

The table illustrates herd composition of the cattle population in the study area. Accordingly, 35% of the herd consists of milking cows, which is higher than the national average (18%). In the Nochchiyagama block, 46% herd represent the milking cows. Both male and female calves represent around 19% of the herd composition. Dry cows represent 5.6% of the herd and bulls' contribution is 5.4% of the herd.

4.3   Dairy Farming Experience
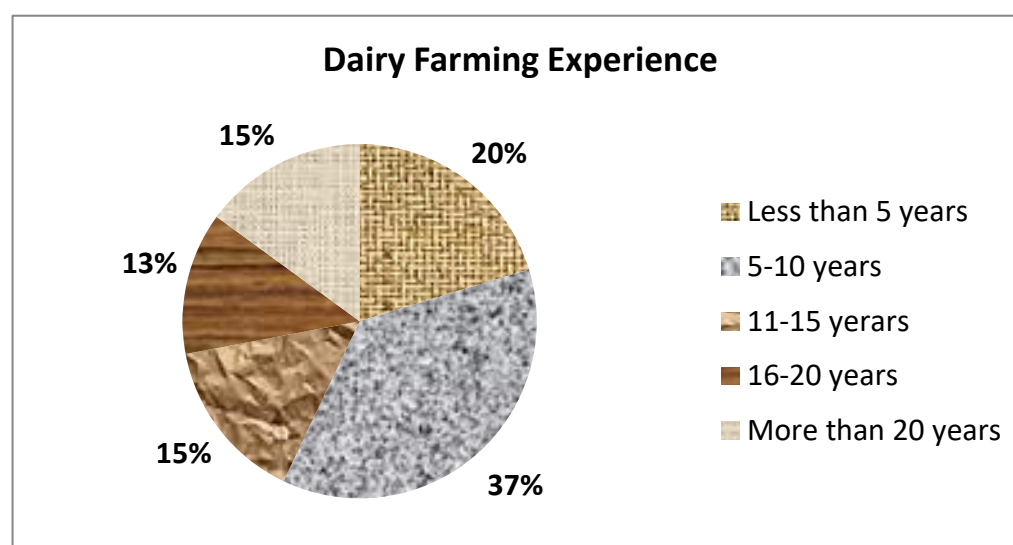
Source: Survey Data, 2013

Figure 4.1: Years of Experience in Dairy Farming

As shown in the figure, majority of the farmers had more than 5 years of experience on dairy farming and 13.7% of the samples are engaged in dairying for over 20 years. This indicates that farmers are having better experience on dairy farming in the Mahaweli H area and some farmers started dairy with the colonization of the Mahaweli schemes. But the newcomers represent 15% of the sample because during last year farmers' shifting to dairying is not much impressive.

4.4   Milk Production

Table 4.3: Milk Production by Breed Type of Neat Cattle

| Breed | Production/Day | | | | | | | | | | | | Total Average |
| | Nochchiyagama | | Eppawala | | Thambuttegama | | Thalawa | | Meegalewa | | Galnewa | | |
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	
Jersy	5.7	7.3	5.7	6.8	6.6	7.4	5.9	7.1	7.1	7.8	5.3	7.3	6.10
Sahiwal	4.6	5.4	6.0	6.71	4.1	4.9	5.3	5.5	3.3	6.3	6.8	8.2	5.07
Jersey Sahiwal	5.0	6.2	5.0	6.5	6.7	7.6	6.0	6.4	6.7	7.9	7.0	8.2	6.10
Frisian Sahiwal	4.5	7.0	8.3	10.7	5.1	7.6	6.0	6.1			8.0	8.0	5.3
AFS	6.7	7.3	7.0	8.5	6.1	6.3	6.2	7.0	8.0	8.0	7.6	8.5	6.9
Indigenous	4.5	4.5	6.1	6.2	3.9	4.00	4.3	4.7	2.2	2.58	4.0	4.0	4.19

Source: Survey Data, 2013

As shown in the table several breed types can be identified in the Mahaweli area. According to the survey, Jersey Sahiwal cross breed is the most common breed in the area. These breeds show different levels of production performance. Except the indigenous cattle breeds all other breeds produce around 5-7 liters of milk per day. Among all breeds in Mahaweli H area, AFS produces the highest quantity of milk per day (6.9 liters per day). Other than Jersey Sahiwal Cross, Jersey Cross produces around 6.1 liters of milk per day. Within 6 different blocks milk production performance is more or less similar in the study area.

Table 4.4: Average Milk Production by Block

Block	Present Production (l/day) (Average)	Maximum Production l/day
Nochchiyagama	7.1	8.8
Eppawala	7.8	9.9
Thambuththegama	7.3	8.2
Talawa	7.2	8.1
Meegalawa	6.5	7.5
Galnawa	7.5	9.1
Total Average	7.2	8.6

Source: Survey Data, 2013

According to the table 4.4, the total average milk production in the Mahaweli H area is 7.2 liters per day and the average maximum production was calculated as 8.6 liter/day. Compared to the other blocks of the study area, Eppawala produces the highest amount of milk which accounts for 7.8 liters/day average and maximum as 9.9 liters per day. The reason is compared to other blocks Eppawala practices more intensive farming and some standard breed types such as Jersey Sahiwal crosses also can be seen.
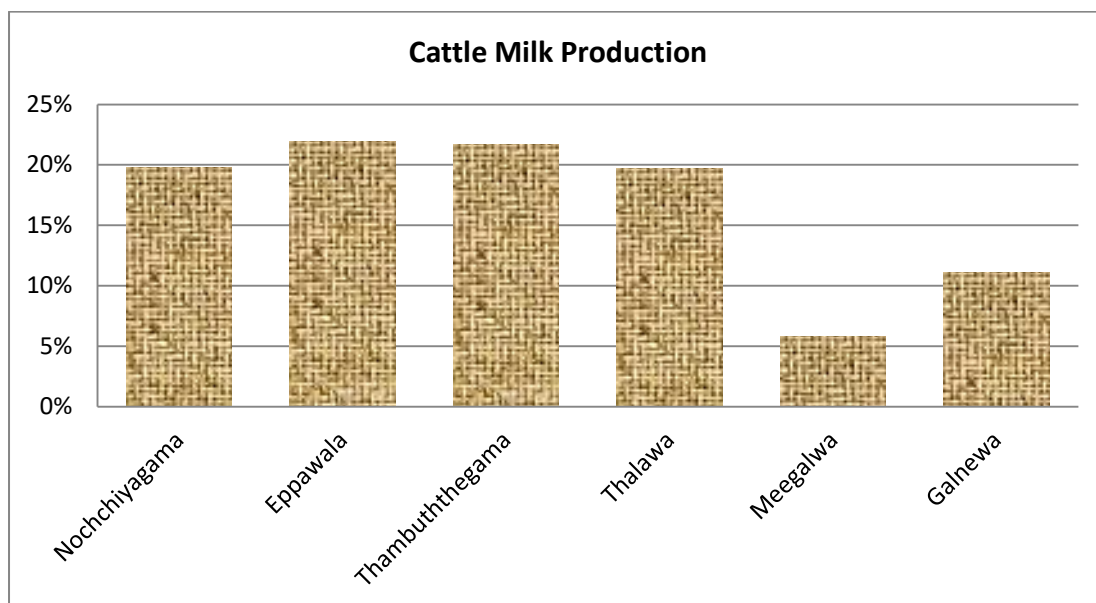
Source: Survey Data, 2013

Figure 4.2: Percentage of Milking Animals in Different Blocks of Mahaweli H

The figure describes the number of milking animals in the study area. Accordingly Thambuththegama, Eppawala, Nochchiyagama and Thalawa showed more or less similar percentages as compared to the national averages. Meegalawa and Galnawa consisted of very low percentages of milking cows because the management of herds is not adequately done in these regions and the priority given to the dairy sector is minimal in these regions and majority of the farmers practice dairy as a secondary source of income generating activity.
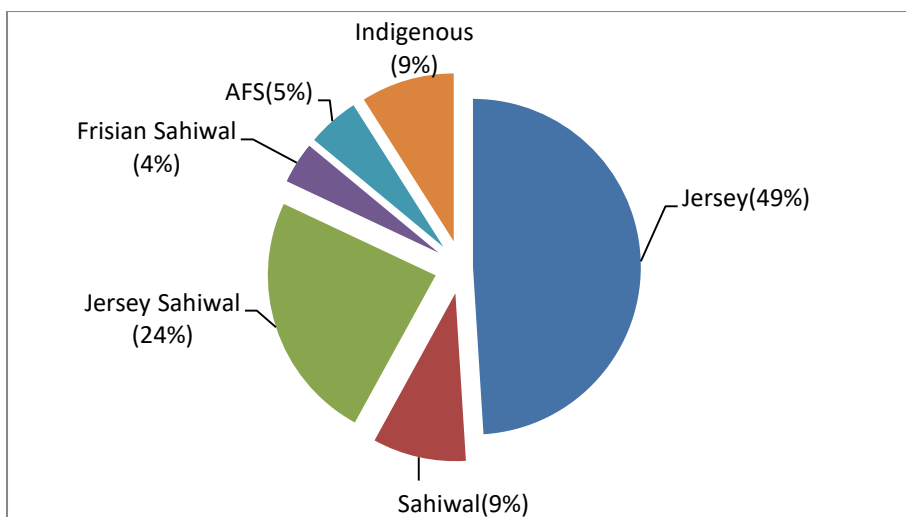
Source: Survey Data, 2013

Figure: 4.3: Neat Cattle Distribution by Breed Type

The figure 4.3 illustrates the cattle distribution by breed type. Accordingly, nearly 50% of the sample comprises Jersey breed with heat tolerant capabilities. Other than that, Jersey Sahiwal represents $1/4^{th}$ of the neat cattle population in the sample. Indigenous and Sahiwal breed types were found as 9% each and other cross breeds are also popular in the area.

4.5 Buffalo Milk Production

In the Mahaweli H area, out of 6 blocks in which the study was conducted, only Nochchiyagama, Eppawala and Thalawa 12 farmers were identified as buffalo farmers. In other areas cattle rearing was practised by the sample population.

Table 4.5: Buffalo Distribution According To Breeds

Breed type	Nochchiyagama		Eppawala		Talawa		Total	
	No	%	No	%	No	%	No	%
Murrah	-	-	23	34	4	44	27	19
Niliravi	60	85	45	66	-		105	71
Indigenous	10	15	-	-	5	56	15	10
Total	70	100	68	100	9	100	147	100

Source: Survey Data, 2013

As shown in the table the dominant buffalo breeds in Mahaweli H are Murrah and Niliravi. Niliravi represented 70% of the sample, specially in Nochchiyagama one large scale farm owned majority of the breeds in Mahaweli H area. Other than that, 19% of the Murrah animals are also found in the blocks of Eppawala and Thalawa. The indigenous buffaloes represent 10% of the breeds of the study sample.

4.6   Buffalo Milk Production by Breed Type

Table 4.6: Average and Maximum Production of Buffalo Milk

Breed Type	Production 1 litre per Day per Animal						Total average
	Nochchiyagama		Eppawala		Thalawa		
	Avera	Max	Avera	Max	Avera	Max	
Murrah	5	6.5	5.3	6.4	-	-	5.25
Niliravi	4.5	6.5	5	15	-	-	4.75
Indigenous	3	4	-	-	2.8	4	2.9

Source: Survey Data, 2013

The table illustrates average and maximum buffalo milk production in different blocks of Mahaweli H area. Buffalo rearing has been practised in 3 blocks of Mahaweli area and the available breeds are Murrah, Niliravi and Indigenous type of animals. In Nochchiyagama, Eppawala and Thalawa few farmers are engaged in buffalo farming and Murrah produced the highest average production of milk which was 5.25 liters per day and in Eppawala and Nochchiyagama they showed maximum production of about 6.5 liter per day. Breed of Niliravi produced average of 4.75 liters, of milk per day but in Eppawala in a well managed farm this breed has a capacity of producing 15 liters of milk per day. This is an advanced condition where with better management performances farmers can obtain a considerable amount of milk. Moreover the indigenous animals produce maximum 4 liters of milk in Thalawa and Nochchiyagama.

Table 4.7: Average Milk Price

Block	Price of Cow's Milk Rs. litre	Buffolo Milk Price Rs. litre
Nochchiyagama	49.50	59.00
Eppawala	53.00	56.00
Thabuththegama	46.50	-
Thalawa	50.00	60.00
Meegalawa	48.00	-
Galnewa	46.25	-
Average Price	48.87	58.50

Source: Survey Data, 2013

As shown in the table, in different blocks the price of milk slightly differs. It mostly depends on the available fat and SNF content of the milk. Normally cow's milk is cheaper than buffalo milk. In Mahaweli area cow's milk average price was around Rs.50/= and per litre buffalo milk priced about Rs. 58/= per litre. Nestle' pays them based on the weight (kg) of the milk.

4.7   Value of Animals (Milking Cows)

As shown in the table, according to the breed type the market value or price of an animal varies. The price differences also differ based on the cattle breed and buffalo breed.

Table 4.8: Average Prices of Different Breed of Cattle and Buffalo

	Breed Type	Average Price (Rs)
Cattle	Jersey	42,500.00
	Sahiwal	37,300.17
	Jersey Sahiwal cross	43,200.00
	Frisian Sahiwal cross	47,800,00
	AFS	40,450.00
	Local	25,000.00
Buffalo	Murrah	65,360,00
	Niliravi	52,750.00
	Local	36,650.00

Source: Survey Data, 2013

Frisian Sahiwal cross breeds are the most expensive cattle breeds in the Mahaweli H system and it costs around Rs. 48,000 per animal and a Jersey sahiwal cross animal also costs around Rs. 43,000. According to the table, except local animals all other breed types are expensive (more than Rs. 40,000 per animal). Buffalo breeds are costlier than cattle breeds and the cost also depends on the milk production performance. The Murrah and Niliravi breeds value more than Rs. 50,000/animal.

4.8   Feeding

Since Feeding is a very important activity in dairy farming lack of appropriate natural grasslands has become a major constraint. In Mahaweli H system all farm families were relocated as paddy farmers and only 31% of the sample practiced dairy as a major occupation. Further, cultivated grasslands also cannot meet the grass requirement of the animal. Moreover, during dry period of this region it is very difficult to find green grass.

According to the survey, majority of the farmers collected grass from tank bunds, fallow paddy fields and road sides. Farmers cannot find any bare lands or reservations in the study area for cattle grazing. Therefore, finding quality grass has become one of the major problems.

4.8.1   Concentrate Feed

Concentrate feeding of animals in the dairy production is very important. Proper feeding will definitely lead to better yields. Cost of concentrate normally accounts

for more than 40% of the total cost of production. Therefore, green forages and roughages can be considered as the cheapest source of feed for milk production for a certain extent without concentrates. But a combination of green fodder or roughages with concentrate feeds gives better milk yields.

4.8.2 Type of Concentrate Feed
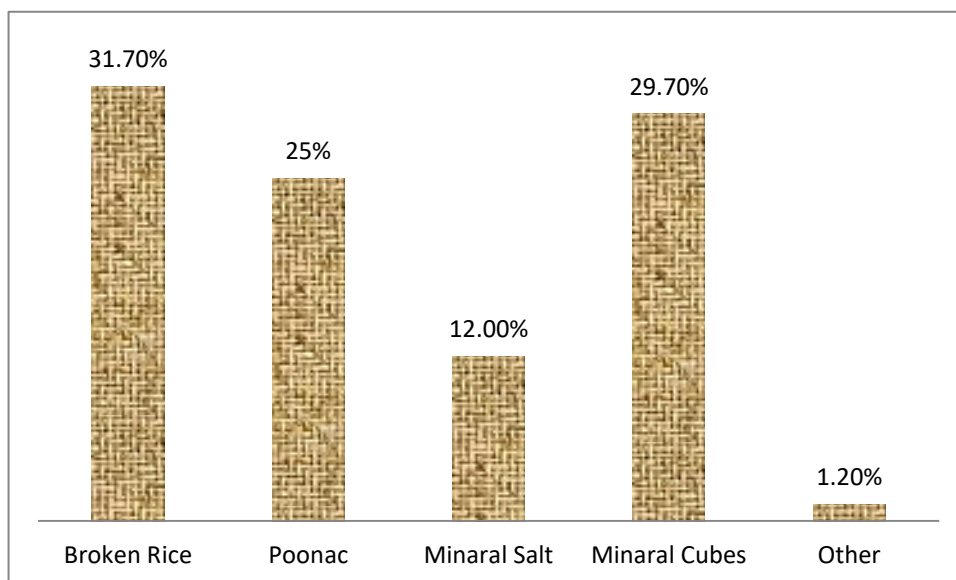
Source: Survey data 2013

Figure 4.4: Types of Concentrate Feed Utilized in Farms of Mahaweli H

The figure illustrates the different types of concentrate feed and other supplements used in Mahaweli H area. Accordingly, broken rice and poonac are mainly fed to the animals because compared to other formulated feed stuffs the prices of broken rice and poonac are lesser. Broken rice is used by 31% of the farmers, poonac is used by 25%.

Table 4.9: Concentrate prices of Mahaweli H

Type of Food (1kg)	Average Price (Rs.)
Prima	42.50
Broken Rice	25.86
Poonac	34.63
Mineral Salt	217.00

Source: Survey Data, 2013

As shown in the table, 1kg of prima priced at around Rs.43 in Mahaweli H area where as broken rice (Rs.26/=) and poonac (Rs.34/=) are lesser in price than prima. Normally dairy farmers try to feed their milking animals with concentrate feeds. But

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due to the cost of formulated feed and other household activities dairy farmers were unable to provide the correct amount.

Table 4.10: Place of Purchase of the Concentrate

Place	Number of Farmers	%
Village collection centre	128	45.2
Out of village	60	21.2
Town	32	11.4
Regional collection centre	63	22.2
Total	283	100

Source: Survey Data, 2013

As shown in the table, 45% of the farmers obtain concentrate feed from the village collection centre. It minimizes the transport cost of the feed. But more than 50% of the farmers bought concentrate feed from outside the village markets, surrounding towns and from the regional milk collection centers. Twenty two percent of the farmers brought concentrate feeds from different collecting centers situated at the regional collection centre. The rest of the farmers (9%) do not utilize concentrate feed.
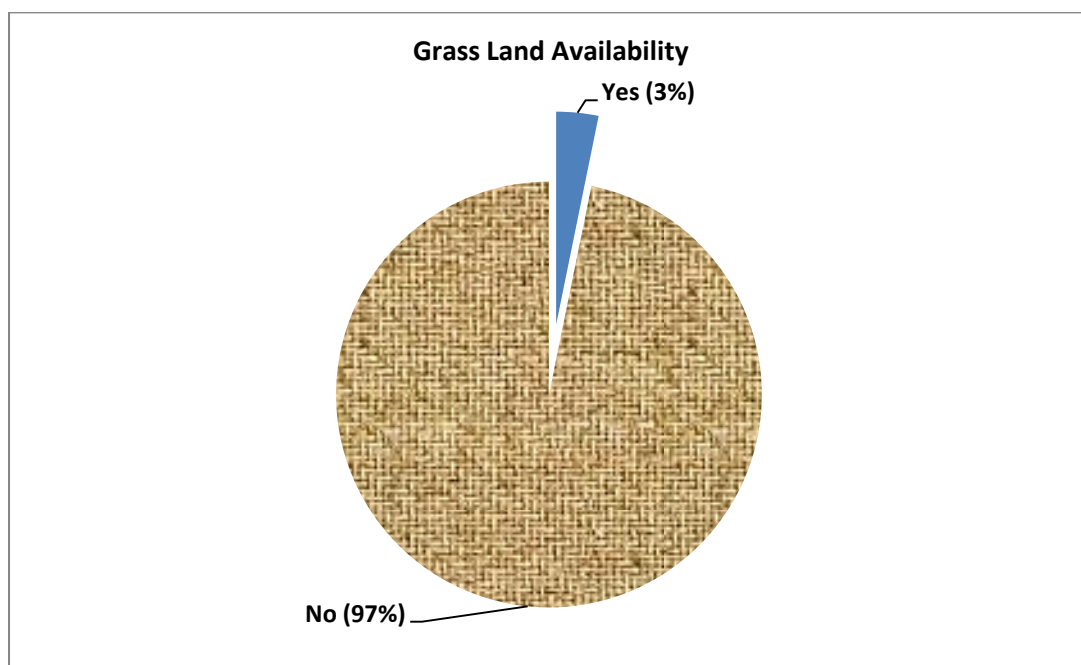
Source: Survey Data, 2013

Figure 4.5: Grassland Availability

As shown in the figure, 97% of the farmers did not maintain their own grasslands for animal feeding but some farmers in Galnawa (14%) Nochchiyagama (6%) and Talawa (7%) had grown less than ¼ of grasslands. Some innovative paddy farmers used

around 10 perches of their paddy lands for grass cultivation. A farmer in Eppawala area cultivated his own grassland which was 1 ½ ac. He obtains better yields. The Niliravi breed in his farm produced the maximum production of 14 liters per day.

4.9   Cultivated Grass Varieties
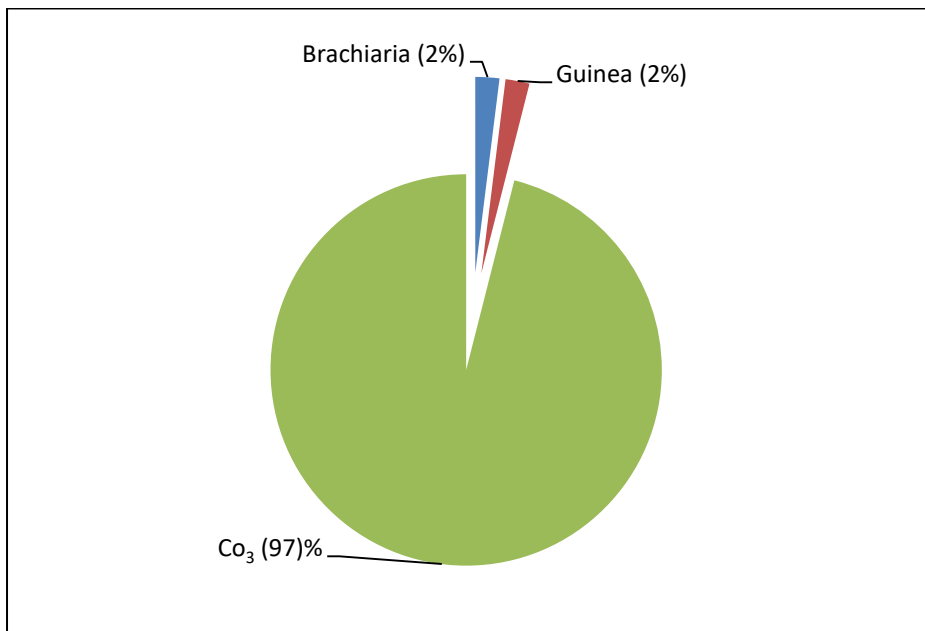
Source: Survey Data, 2013

Figure 4.6: Grass Varieties Cultivated in the Mahaweli H

As shown in the figure, majority of the grass cultivated farmers have grown Co-3 in their lands as animal feed. Guinea (2%) and Brachiaria (2%) were also grown by a very less number of farmers in the area.

Farmers are not in a position to grow grasslands due to lack of water. Sometimes the required amount of water for dairy farming activities such as cleaning the sheds, animals and maintaining of hygienic conditions is difficult to supply due to water scarcity.

4.10   Legume Feeding

Legumes provide the Nitrogen requirement of the animals that is needed to increase the Human Microbial Population to digest coarse materials and produe glucose. Majority of the farmers in the Mahawlei H area did not used legumes. They used to feed the legumes specially, during the dry season during which they cannot find proper green grass.
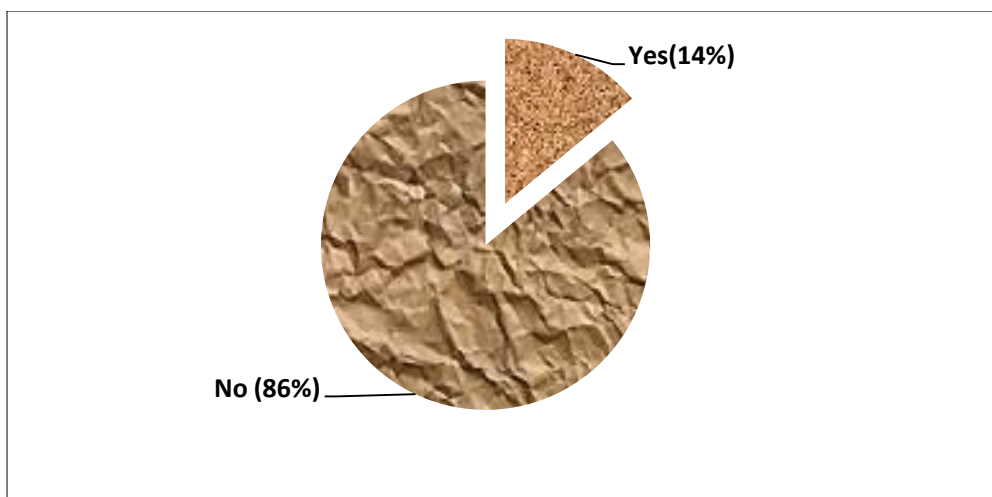
Figure 4.7: Percentage of Legume Feeding

The figure demonstrates the percentage of farmers who fed their animals with legumes. Fourteen percent of the farmers fed their animals with legumes such as Ipil Ipil, gliricidia, Acasia and wetamara. Majority of the farmers did not feed with legumes due to lack of knowledge and famers stated that animals do not eat legumes but in reality farmers do not try to feed them with legumes.

4.11   Straw Feeding

The survey data shows that 21% of the sample farmers fed their animals with straw. But the majority did not utilize straw because they said animals do not prefer straw. Very few farmers fed animals with the urea treatment. This is a great advantage that farmers can utilize these crop residues during the lean season of green fodder. Other than that, farmers are not familiar with these methods and how the palatability of feed is increased. The introduction of straw should be done at the calf stage. In the Mahaweli H area famers can obtain straw from their own paddy fields. Therefore, farmers do not need to buy straw for the animals. Farmers who do not feed their animals with straw utilize it to fertilize the paddy lands. Very few (0.7%) farmers burned straw in their paddy fields due to lack of knowledge as they want to clean the paddy fields.

4.12   Silage and Hay Production

In the study area no one is producing silage in their farms. But over 35% of the farmers have heard about silage through the training programmes conducted by different organizations. Production of hay is only done by three farmers in the sample. Even though the hay production can be done easily at the study area, farmers are reluctant to produce hay for the future utilization.

4.13   Milk Marketing

Farmers in 6 different blocks in the study area sell their milk to different collecting agents. The table below illustrates the percentage of farmers selling their milk to different collectors.

Table 4.11: Percentage of Farmers Selling Milk to Different Collectors

Collecting Agent	Nochchiya gama %	Eppawala %	Thambuthth egama %	Thalaw a %	Meegalawa %	Galnewa %	Total average %
Milco	83.3	51.8	27.4	73.2	45.8	97.1	63.1
Nestle	15	23.2	57.5	23.2	54.2	2.9	29.3
Co-operate Milk collection	-	7.1	1.4	-	-	-	1.41
Private Milk Collectors	-	1.8	2.7	-	-	-	0.75
Individual producers	1.7	-	-	1.8	-	-	0.58
Rich Life	-	14.3	11	-	-	-	4.2
Other (Eg. Montessori and Neighbors)	-	1.8	-	-	-	-	-

Source: Survey Data, 2013

The survey found that 63.1% of the total milk from Mahaweli H area was collected by Milco. The Milco collector is much dominant in Galnewa and Nochchiyagama collecting 83%. Nestle' also collects 30% of the sample farmers' milk in the study area. In Meegalawa and Thambumththegama, Nestle' collects more than 50% of the farmers' milk and in Eppawala and Thalawa around 25% of the farmers sell their milk to the Nestle' collector. In Nochchiyagama block there is a farmer who collects milk from other farmers and engage in production of yogurt and curd. Eppawala block was identified as a potential milk producing area because the Mahaweli Authority implemented several programmes and projects to develop the sector. Several years ago Eppawala farmers contributed to producing value added products and send those to Colombo to sell at the Mahaweli Dairy Centre. This programme has collapsed due to several management problems. But some farmers have diversified dairy farming into different value added products therefore, there are different types of collectors in the Eppawala block. That includes co-operative milk collectors (7.1%), private collectors (1.8%), Rich Life (14.3%) and other different selling sources such as kindergarten, neighbouring shops etc. In Thabuththegama also Rich Life collects 11% of the farmers' milk and it contributes 4.2% of the total sample farmers' milk.

4.14   Milk Collectors in the Nochchiyagama Block

Table 4.12: Milco Collectors in Nochchiyagama Block

Collection Center No.	No. of Farmers Registered	Liters Collected per Day
246	25	165
203	22	140
265	20	135
232	18	116
271	18	120
Total	103	676

Source: Milco Collecting Center

As shown in the table, in the Nochchiyagama block 103 farmers sell their milk to Milco and they collected 676 liters of milk per day. Nestle' collects milk through 12 collecting centers in Nochchiyagama from 180 farmers. There is a Nestle' chilling center at Haimillagama and its capacity is 25,000 liters. Nestle' collected milk in kilograms and they paid around Rs. 50/ per kg.

4.15   Extension Service

Extension service plays a major role in milk production and maintaining a standard dairy farm.   Survey information indicates that farmers received extension for different aspects of dairy farming specially animal feeding, diseases, farm management, insurance, marketing, biogas units, value addition etc. Accordingly there are several institutional structures identified in Mahaweli H area for providing extension services for dairy farms.

Table 4.13: Percentage of Extension Providers

Extension Provider	%
Mahaweli Authority	86.4
Veterinary Office	21.1
Agriculture Department	10.4
Neighbours	15.4
Milk Collectors	42.3

Multiple response Question
Source: Survey Data, 2013

According to the table, majority of the farmers (86%) in the study area received extension services from the Mahaweli Authority. Even though Veterinary Offices are situated in these areas those contributed only in disease controling and hygienic programmes. But 21% of the farmers expressed that they received the service from Veterinary Officers. Other than that, the Department of Agriculture, neighbors and

milk collectors also provide advice and extension services to the farmers in Mahaweli H area.

4.16   Animal Breeding

Animal breeding plays a significant role in the milk production progress in the farm. The figure below describes the method of breeding used by the sample population.
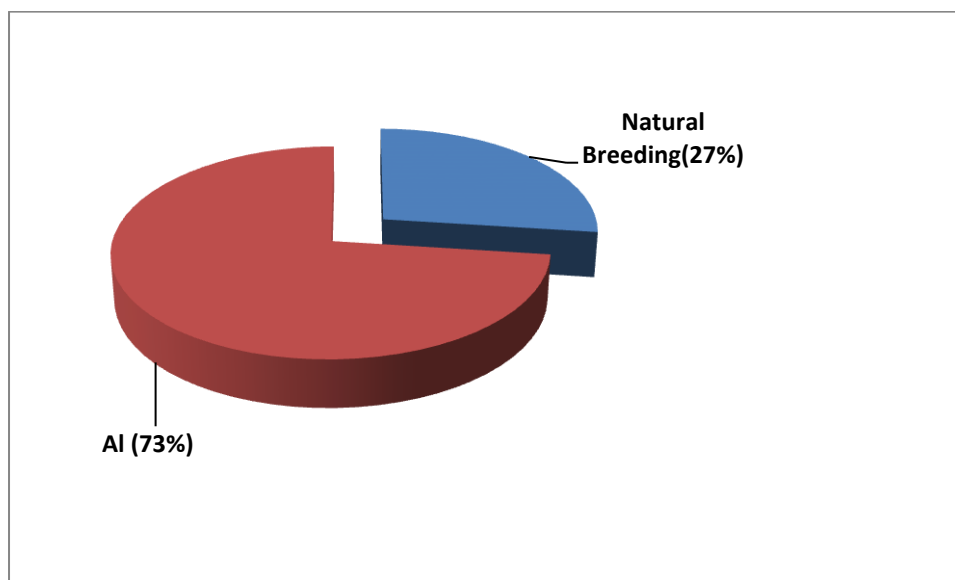
Source: Survey Data, 2013

Figure 4.8: Method of Breeding

According to figure 4.8, 73% of the farmers practise artificial insemination as a breeding technique and 27% of the farmers practise natural breeding. Some farmers (properly managed) bought male animals for breeding purposes in their farms. Eg: In Nochchiyagama in a medium level buffalo farm Niliravi bull was bought to breed their animals. He explained that the bull cost around Rs.0.1 million. More than 18% of the farmers stated that they practise natural breeding without having a proper management. The rest of the farms practised natural breeding with bulls of their own farms or another farm's bull.

According to the survey, most of the farmers stated that artificial insemination has to be practiced two or three times to conceive. Therefore, animals with high quality are famous in the area and it resulted in the efficiency of breeding.

4.17   Artificial Insemination

In Mahaweli H area, artificial insemination was practised by the Livestock Development Officers attached to the Department of Animal Production and Health. Other than that, private AI technicians (government registered) also practise in the

study area. With the onset of the heat signs farmers inform officers for artificial insemination. But farmers complained that they have to perform 2-3 times of artificial insemination for conception. According to the survey, it was found that 2.3 of average artificial inseminations should be done for conceiving. This is a very costly operation for dairy farmers. Normally for one AI, officers claim Rs. 250-350.

4.18   Hygienic Condition

To maintain a better dairy industry maintaining hygienic conditions within the farm and handling of animals should be done properly. But in the field survey it was identified that the quantity of milk produced specially the handling is not done cleanly. Normally in dry zones it is difficult to find the adequate amount of water for farm management. Therefore, farmers do not wash their animals properly. Sometimes it is skeptical whether they clean even the udder area.

Table 4.14: Disease Condition during 2012-2013

Disease	Percentage of Animals Affected
Foot and mouth disease	28.1
Mastitis	48.4
Back quates	14.8
Bloating	4.7
Fever	0.8

Source: Survey Data 2013

The table shows the diseases found during 2012-2013 among the cattle population.

4.19   Breeding

The figure illustrates the method of breeding in the study area. Accordingly on average 80% of the farmers follow artificial insemination as a breeding tool. It is slightly changed in different blocks of Mahaweli H system. Thambuththegama, Eppawala and Nochchiyagama more than 85% of the farmers get the service of AI. Other than that, natural breeding is practised by a few farmers in different blocks. This natural breeding is practised using several types of bulls in the study area. Some farmers allow animal to mate naturally without farmer management. Similarly allowing animal to mate with their animals is 8%. Moreover, few enable their animals to mate with a selected bull of another herd in the area. Furthermore, when natural breeding is practised, majority of the farmers use government farmers' bulls.
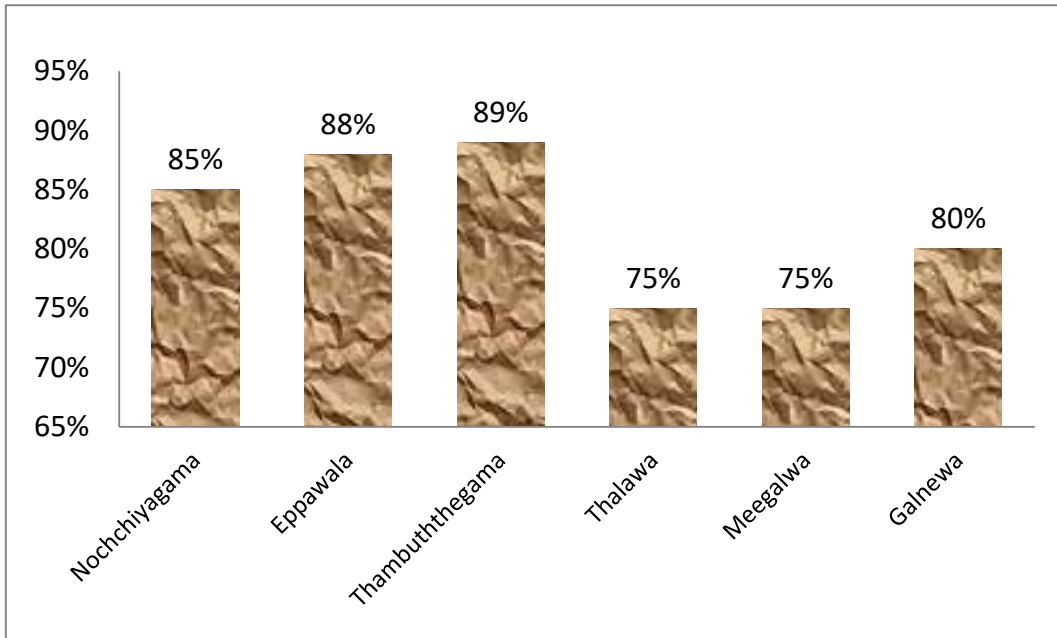
Figure 4.9: Percentage of Farmers following AI and Natural Breeding

CHAPTER FIVE

SWOT Analysis

In this chapter, strengths, weaknesses, opportunities and threats of dairy industry in Mahaweli H area are discussed in detail. SWOT is an acronym for strengths, weaknesses, opportunities and threats. By definition strengths (S) and weaknesses (W) are considered to be internal factors over which there is some measure of control. Also by definition, opportunities (O) and threats (T) are considered to be external factors over which essentially there are no controls (http://www.investopedia.com).

5.1 Strengths of Dairy Industry in Mahaweli Area

1. A large number of animals with different genetic backgrounds
   In Mahaweli H area the dominant breed types were identified as Jersey, Sahiwal, Crosses of Jersey Sahiwal and several other mixed breed types. Therefore development of the dairy industry will be easy because of a variety of breed types and will be able to utilize these breeds for upgrading programs within proper plans.

2. A huge number of smallholder farmers contribute to national production
   According to the secondary information, in Mahaweli H area under 6 blocks approximately 1500 smallholder farmers can be found. These farmers produce a considerable amount of milk, therefore, with proper progrmmes these farmers can be a strength to the sector.

3. Employment opportunities/self enterprises milk-value added production
   Dairy farming provides a form of self employment which can be practised with other farming activities.

4. Asset for farmers during troubled times
   At present, dairy animals are expensive than good quality animals thus, can be sold at higher prices when farmers face financial difficulties in their families. Therefore, rearing quality breeds acts as an asset to the farmers.

5. Organize and competitive collection network
   Formal milk collection network in the Mahaweli H area seems to be very strong and competitive. Therefore farmers have multiple choices to sell their milk at better prices.

6. Experienced farmers (majority with more than 5 years)
   Most of Mahaweli farmers had more than 5 years of dairy farming experience

7. Government support and the Mahaweli Authority's support

There is a good commitment from the government and the Mahaweli Authority to enhance diary sector through different projects and programmes

8. High quality and rich content of milk fat

5.2 Weaknesses

1. Youth contribution is less
2. Level of education is also at a marginal level
3. Lack of records
4. Lack of proper marketing system (no evening collection)
5. Due to lack of grasslands underfeeding of animals-economic loss
6. As this is a secondary activity they are not involved in full time and less attention
7. Hay/Silage/legume/straw feeding constraints
8. Perishability of milk leads to contamination
9. Infrastructure facilities are poor
10. Lack of extension programmes and poor access to support services
    Farmers in developed countries have better access support services which provide any level of production but as a developing country we do not have such services. At times the government extension services regarding livestock development also do not function properly. Especially in Mahaweli areas all these extension programmes and other supports should be provided through the Mahaweli Authority.
11. Limited access to credit
    Income from diary is usually spent on the basic needs of the household. Therefore the money required to spend on the farm is restricted. The credit system or other credit facilities were not introduced to dairy farmers and formal financial institutes also demand better security to release credit. Therefore, enhancing or developing farm activities was limited.
12. Low labor Productivity
    Small herds in the Mahaweli area combined with low milk yield resulted in poor labour productivity within the farms.
13. Poor quality milk
    In the study area due to unavailability of other resources for dairy farms the quality of milk is reduced. The hygienic condition of animals as well as equipment are also not up to the standard. Therefore, collectors sometime try to reject the milk and they cannot produce high quality products.
14. Inefficient information flow
15. Poor milk handling practices at producer group and farm level
16. High cost of production
    The total average cost of production per liter of milk was calculated as Rs.47.11 with family labour and excluding family labour the total average cost

per liter was Rs. 23.49. The price of one liter of milk in the area was Rs.49.00. Therefore the profit margin seems to be less.

17. Seasonal availability of green fodder and lack of natural grasslands

5.3 Opportunities

1. Need low capital- engaging in the business can depend on natural resource availability
2. Increased demand for animal and milk products (Domestically produced)
3. Better secondary source of income
4. Normal milk production of the study area per animal is around 4-5 liters. This amount can be increased up to a certain level according to the breed types of the animal with proper management, by introducing low cost feed rations and by providing better extension services.
5. Dairy farming and small scale processing are labour intensive therefore these small scale enterprises can provide job opportunities to rural people.
   Eg: In Nochchiyagama a young farmer had a dairy farm and a small processing unit. He provides job opportunities to 4 individuals in the village.
6. During last 10 years milk prices increased under different government policies. Further, due to high demand of locally produced milk, farmers have better chances to earn more.
7. Open new markets for dairy products
8. Availability of crop residues
9. Refusal of imported milk powder by the consumers leads to an increase in the demand for domestically produced milk.

5.4 Threats

1. Due to water scarcity, dairy farming activities, specially cleaning and other hygienic activities were unable to perform.
2. Lack of quality feed/unavailability of grassland
3. Decline in the interest of the younger generation to involve in diary farming
4. Problems in finding quality breeds, there is no trusted mechanism to purchase animals
5. Higher concentrate price leads to undernourished animals and results in a weak animal population
6. Lack of investment on diary industry and lack of a continuing programme or support
7. Even though the government needs to increase the diary development much attention has not been paid on the issues such as water scarcity, cost of feed and lack of extension services. Other than that, there are no proper area specific development plans.
8. Due to overgrazing tank bunds may be damaged. Further, water resources can be contaminated with animal excreta.

9. Continued increase of wage rates is a constraint for diary farming because dairy farmers in the study area cannot rely on hired labour. They should depend on family labour. However, sometimes the opportunity cost of employing in the dairy sector will be a problem with low production and low income.
10. Second generation of these farm families is always looking for white collar jobs. Therefore, the future of the dairy industry is in danger.

CHAPTER SIX

Economics of Milk Production

6.1   Introduction

In this chapter cost of production of milk in the Mahaweli H area and how the fixed cost affected the cost and variable cost affected the cost of production will be described. Cost of production of milk in the study area comprised both fixed cost and variable cost.

Fixed Cost

Two categories can be identified under the fixed cost: Animals and Buildings. According to Hitihamu, H.M.S.J.M. and Lurdu M.D.S., (unpublished) the fixed cost comprised 7% of the total cost.

Variable cost

Under the variable cost there are three main cost categories: Labour Cost, Feed cost and other cost such as medicinal, herd replacement and miscellaneous.

Labour Cost

Labour Cost can also be divided into two categories as hired and family labour. In the Mahaweli H system 96% of the sample farmers totally rely on the family labour. Very few scale farms utilized hired labour. Normally hired labour cost per day is around Rs. 1000/=.

Feed Cost

Feed Cost can be categorized into two main sectors such as forage and concentrate feed. In Sri Lanka as well as in Mahaweli H system finding forage can be calculated under the labour cost because buying forage is not common in our country. Other than that, maintainance cost of available small grasslands is also calculated under the feed cost.

As shown in the table 6.1 the total average cost of production per litre of milk was calculated as Rs. 47.11 with family labour. Excluding family labour the total average cost to produce one litre of milk was Rs. 23.49.

The table also illustrates that the highest cost component goes for labour cost and it was 50% the total cost. In this cost category, activities such as cut and feed and milking and marketing accounts for the highest amount within the labour cost. Other than that, the feed cost also accounts for 36% of the total cost. Normally farmers utilized Prima, broken rice or rice bran, poonac as concentrate feed. The cost of concentrate feed is higher in the area. The price of 1 kg poonac is approximately Rs. 35 whereas Prima costs around Rs. 50 per 1 kg. Rice and rice bran prices were around Rs.10/= per 1 kg.

Table 6.1: Cost of Production per Litre of Milk in the Mahaweli H area

Cost Category	Activity/Type	Cost (Rs.)
Concentrate Feed	Prima	34.25
	Broken Rice/Rice bran	25.53
	Poonac	22.60
	Mineral and Salt	3.43
	Pasture management	1.26
Veterinary and Medicine	Tick and worm Control	2.94
	Disease management	0.70
	Breeding Cost	1.45
Labour	Management practices	7.29
	Milking and marketing	65.62
	Grazing and cut and fed	43.75
	Medicinal treatments	1.44
Transport	Feed straw and inputs	1.44
	Milk	6.25
Cow shed maintenance		5.48
Payments for crop damages		1.50
Cost for water and electricity		1.85
Fixed Cost		4.56
Milking equipment		1.78
Earth and shed cleaning equipment		0.50
Ropes and other		2.94
Total Cost		235.56
Milk Production (Litre)		5.00
Cost of Production Milk/litre		47.11
Without family labour		23.49

Source: Survey Data 2013

In addition, veterinary and medicine costs are accounted for 2.1% of the total cost. Other than the transport cost, cost for insurance, cost for water and electricity, ropes and other are accounted for around 7.9 of the total cost.

According to the cost of production details the average milk production per animal is five litres per day.

6.2   Income by Selling Animals

Dairy industry in Mahaweli H area is mainly focused on milk production. But herd management is also a very important activity. Dairy farmers in the H area thinks rationally and they sell males in the herd when the animal is 1 or 1 ½ years old. Accordingly, farmers sell their animals on live weight basis and normally a 1 year old bull costs Rs. 20,000-25,000. Other than that, when farmers face financial difficulties they tend to sell their animals. The prices of dairy cows in the area are higher (a Jersey Shaiwal cross costs around Rs. 40,000).

CHAPTER SEVEN

Conclusion and Recommendations

7.1   Findings

1. Around seventy five percent of the dairy farmers belong to the middle age group (35-60 years) and 80% of the farmers have educated up to grade 8-10.
2. The total average family income for a month is Rs. 10,000-15,000.
3. Thirty percent of the sample farmers fed their animals with concentrate feed and the high cost of concentrate also affected significantly. Nearly 65% of the farmers practise semi intensive management while 18% of the farmers manage animals intensively.
4. The main problem is lack of reservation or natural grazing lands for animals. Further, limited land availability for pasture establishment is another constraint. At present tank bunds are also utilized for cultivation. Therefore farmers were unable to find the required amount of green fodder.
5. A strong milk marketing channel was observed and Milco is the leading collector which collects 63% of the sample farmers' milk. Nestle' also collects 29% of farmers' milk in the study area. Except few places in Nochchiyagama and Eppawala value addition was not observed in the study area.
6. Jersey Sahiwal cross is the most dominant breed type (80%) in the Mahaweli H system and only 2% of the total sample represents buffalo farmers. The total average production of cow's milk is 7.5 *l*/day. Average production of Jersey Sahiwal is 6.1 liters.
7. Cattle shed availability at Nochchiyagama Thalawa, Eppawala, Thambuththegama is around 50% and Galnawa and Meegalawa 80% of the farmers owned cattle sheds following the Diary Village Development Project.
8. Sixty two percent of the farmers utilize artificial insemination as a breeding tool and natural breeding is practised by 38% of the farmers. In Nochchiyagama private AI technicians also facilitate AI. But the success of AI is achieved offer 2-3 times.
9. Hygienic condition of milk is low because animals are not washed properly due to lack of water facilities in the farms.
10. Average cost of production per liter of milk is Rs.36.62 and the estimated cost needed for maintaining dairy cow/day is Rs.104.83.

7.2   Conclusion

Dairy farming in the Mahaweli H areas is carried out with marginal developments by majority as a secondary income source. Some innovative farmers (1%) are engaged in the industry as entrepreneurs and have obtained better incomes (over Rs. 50,000-100,000 per month) to upgrade the industry as an enterprise.

7.3 Recommendations

1. Facilitate tank bunds for pasture establishment and check the possibilities to distribute 1/4 ac of tank bund area for pasture cultivation (Co-3) on temporary basis
2. Provide quality breeding materials or encourage to establish private breeding farms as an enterprise.
3. Initiate programmes of subsidized or low cost concentrate feeds or provide training and financial support to initiate local feed mills at regional level and design a distribution channel.
4. Design proper training programmes and field days to educate dairy farmers to increase their knowledge, specially on clean milk production, proper hygienic conditions, feeding, breeding and etc.
5. Facilitate and provide financial support to farmers who wish to produce value added products.
6. Provide basic requirements needed for dairy farming, specially water.

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Annexes

Annex 01: The Population of Neat Cattle in Sri Lanka 2003 – 2012

Cattle		Year									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Milk Cows	Milking at Present	213,599	217,168	222,880	223,580	238,610	249,315	237,675	248,740	251,490	280,250
	Milking not at Present	279,756	284,235	288,871	287,644	289,664	283,205	269,106	275,610	281,330	286,760
Other Cows		209,363	212,715	216,185	215,267	216,778	211,944	201,393	206,260	210,660	213,500
Bulls		180,318	183,205	186,194	185,403	186,705	182,541	173,454	177,650	181,510	183,280
Calves		265,334	269,582	273,980	272,816	274,732	268,605	255,233	261,410	266,860	271,760
Total Cattle		1,148,370	1,166,905	1,188,110	1,184,710	1,206,490	1,195,610	1,136,860	1,169,670	1,191,850	1,235,540

Source: Department of Census and Statistics, Sri Lanka, 2003 – 2012

Annex 02: The Population of Buffalo in Sri Lanka 2003 – 2012

Buffaloes		Year									
		2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Milk Cows	Milking at Present	51,600	53,060	54,620	55,930	57,580	63,117	77,912	89,900	86,220	94,290
	Milking not at Present	45,776	49,688	50,606	51,630	52,146	51,082	58,776	80,230	76,900	77180
Other Cows		70,953	77,016	78,439	80,027	80,826	79,178	91,102	67,340	64,530	64,540
Bulls		54,931	59,626	60,727	61,956	62,575	61,299	70,531	104,370	100,030	100,870
Calves		57,220	62,110	63,258	64,538	65,183	63,853	73,470	80,810	77,450	77,750
Total Buffaloes number of		280,480	301,500	307,650	314,080	318,310	318,530	371,790	422,650	405,120	414,630

Source: Department of Census and Statistics, Sri Lanka, 2003 – 2012

Annex 03: Average Herd Composition

Animal Category	Nochchiyagama		Eppawala		Thabuththegama		Talawa		Meegalawa		Galnawea		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Milk cows	134	40	137	32	153	35.3	139	32.6	41	35.3	77	28.5	681	34
Dry cow	26	8	24	5.6	10	2.3	24	5.6	3	2.6	26	9.6	113	5.6
Heifers	39	12	73	17.2	46	10.6	61	14.3	20	17.2	34	12.6	273	13.6
Female calves	63	19	83	19.5	93	21.4	80	18.7	21	18.1	56	20.7	396	19.8
Male claves	71	21	76	17.9	90	20.7	80	18.7	24	20.7	45	16.7	396	19.3
Bulls	-	-	27	6.4	33	7.6	25	5.9	5	4.3	18	6.7	108	5.4
Pregnant animals	-	-	-	-	-	-	1	2	-	-	-	-	1	0
Non pregnant animals	-	-	5	1.2	9	2.1	17	4	2	1.7	14	5.2	47	2.3
Total	333	100	425		434	100	427	100	116	100	270	100	2005	100

Source: Survey Data 2013

Annex 04: The Population of Neat Cattle in Districts of Dry Zone Sri Lanka 2003 – 2012

District	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
National Total	1,148,370	1,166,905	1,188,110	1,184,710	1,206,490	1,195,610	1,136,860	1,169,670	1,191,850	1,235,535
1. Jaffna	47,900	48,300	49,300	51,760	53,000	53,000	66,150	61,700	63,430	61,050
2. Kilinochchi	32,000	33,000	33,000	33,000	33,000	33,000	-	-	32,250	31,580
3. Mannar	22,000	23,000	23,500	24,700	24,900	24,050	24,530	36,190	39,590	42,270
4. Vavuniya	35,703	41,985	30,390	35,530	38,630	42,775	42,970	61,320	87,720	94,540
5. Mullativu	25,900	30,000	30,600	32,100	36,680	36,680	-	21,180	30,560	53,560
6. Batticaloa	54,900	60,000	61,300	24,360	67,540	63,810	65,740	69,610	63,140	72,470
7. Ampara	65,600	65,000	66,300	69,600	70,600	100,965	97,830	79,590	73,450	78,970
8. Trincomalee	45,800	50,000	47,500	48,270	48,770	50,035	56,070	61,890	57,570	57,690
9. Anuradhapura	142,000	144,800	149,740	155,240	151,980	158,855	146,500	140,850	133,320	134,870
10. Polonnaruwa	35,700	37,500	37,810	39,600	42,070	32,600	45,940	45,860	35,290	38,220

Source: Dept. of Census and Statistics, Sri Lanka

Annex 05: The Population of Buffalo in Districts of Dry zone Sri Lanka, 2003 – 2012

District	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
National Total	280,480	301,500	307,650	314,076	318,310	318,530	371,790	422,650	405,120	414,630
1. Jaffna	-	-	-	-	-	-	-	90	-	-
2. Kilinochchi	510	1,100	1,150	1,150	1,150	1,150	-	na	1,490	1,240
3. Mannar	1,160	2,100	2,100	2,100	2,100	2,100	600	770	1,850	1,700
4. Vavuniya	700	2,000	2,000	2,000	1,640	1,150	1,190	2,370	2,490	2,410
5. Mullativu	3,370	3,500	3,500	3,500	3,500	3,500	-	4,760	9,520	12,900
6. Batticaloa	9,520	18,000	18,400	18,400	19,500	23,600	28,280	27,750	26,130	30,300
7. Ampara	9,020	10,000	10,200	10,800	10,700	14,120	26,090	26,320	19,030	19,770
8. Trincomalee	8,650	11,000	11,200	11,300	11,250	13,390	20,840	26,380	27,200	27,140
9. Anuradhapura	33,830	34,000	34,500	35,100	35,800	35,800	54,770	62,160	54,590	53,280
10. Polonnaruwa	13,140	13,500	14,000	14,500	16,000	15,590	19,830	20,860	13,090	17,770

Source: Dept. of Census and Statistics, Sri Lanka

The highest cattle and buffalo population is recorded from Anuradhapura district and it represents 10.9% of the present national herd size in 2012. Kilinochchi district has the lowest cattle and buffalo population in dry zone.