

# **Investigation of Peri-Urban Dairy Production System in Seethawaka Area**

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## **FOREWORD**

Seethawaka area can be identified as a potential dairy farming area and the exhibition, "Seethawaka Abimana" reflected that dairy farming is an important sector which can be used to improve the lives of the farmers. Developers and planners of Seethawaka area need to investigate the dairy industry in the area as a peri-urban system which is located in the Colombo district and having an increased demand for milk due to urbanization. Therefore, HARTI undertook this study with the aim of identifying the characteristics of peri-urban system. It explores the marketing system, socio-economic conditions issues and constraints and finally proposes recommendations.

This study has revealed that the cost of production of milk per litre including the labour cost was around Rs.43.00 and without family labour it was Rs.28.00. Therefore with the opportunity cost dairy farming is a profitable industry. Moreover, the good quality breeding stocks with high value animals also a big asset to dairy farmers.

Further, this study also found that the cost of concentrate feed is the most challenging issue. Unavailability of natural grasslands is also becoming a threat to the expansion of the sector. Other than the government assistance, extension service should be strengthened with the efforts of new agricultural graduates by providing appropriate technology to farmers to improve the milk production process.

This study will help policymakers to provide a new outlook to the dairy sector development in peri-urban areas with necessary impetus to transform the present dairy sector to a developed sector in Sri Lanka.

**Haputhanthri Dharmasena**  
**Director/HARTI**

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**Sagarika Hitihamu**  
**M.D.Susila Lurdu**

## EXECUTIVE SUMMARY

Peri-urban refers to the landscape interface between town and countryside and rural urban transition where urban and rural uses mix and often clash. The Seethawaka Divisional Secretariat belongs to the wet zone where dairy production thrives and can be classified as a peri-urban dairy production system with a long history of supplying milk to the urban market.

Sri Lanka's economy is moving towards the service sector. Therefore, the contribution of GDP from the agriculture sector was 11.1 % by 2012. Livestock and fisheries sectors have contributed around 2.7% for the agriculture sector and the dairy sector alone contributed around 1% to the total GDP in year 2013. The total annual production of milk is 299 million litres which include 61.4 million litres of buffalo milk and 237 million litres of cow's milk. The domestic production meets around 40% of the national requirement of the country (Department of Census and Statistics, 2012).

Seethawaka as a potential dairy production area hence, widely believed that the dairy sector in this area should be developed. At this juncture, policymakers in the field requested HARTI to undertake a research study on the peri-urban dairy industry in Seethawaka area.

The research was conducted in Homagama, Padukka and Kosgama DS divisions of the Colombo district. According to the registered dairy farmers in three DS divisions, 10% of the dairy farmers were selected for the questionnaire survey. The sample population consists of 117 farmers of Padukka, 106 farmers of Kosgama and 80 farmers of the Homagama VS range. The total sample population comprises 303 dairy farmers.

In line with the objectives of the study, the method of data collection consisted of three major components: a comprehensive literature review, focus group and key informant discussions and a questionnaire survey. Majority of farmers (75%) belonging to the age group of 30-60 years represent the middle age group. The youth contribution to dairy sector is relatively low. It is 8% of the sample.

Gender distribution shows that 85% are male and 16% are female in the sample. This indicates the lower female participation of dairy farming in the study area. Religion is also a very important factor in animal rearing because it determines certain types of animal husbandry such as pig farming. Then 95% of farmers are Buddhist, 15% are Hindu and 4% are Catholic. Forty four per cent of the sample farmers are engaged in dairy farming as their main occupation. Twelve percent of the vegetable farmers and four percent of the paddy farmers are also engaged in dairy as a secondary

occupation. Private sector workers represent seventeen percent of the total sample as the main occupation and the rest of the farmers' main occupation include government jobs, self-employment ventures and labour related jobs.

In the sample population, 68% of the farmers practise semi-intensive type of management systems while 1/4<sup>th</sup> of the sample population practises extensive type. Intensive management is practised by 7% of farmers. Involvement of farmers in producing value added products is 13%. Farmers' interest in future involvement in value addition with the government support is only 27%. Presently, the dominant value added products are yoghurt and curd.

Majority (43%) received a Rs.10,000-30,000 monthly income and 18% of the farmers obtain a monthly income below Rs.10,000. The average herd size is five and milk animal contribution is 30% of the total cattle population. Buffalo rearing is performed by 22% of the total sample which represents 38% from Padukka, 14% from Kosgama and 6% from Homagama. Buffalo herd size of Padukka and Kosgama is six animals but in Homagama it is thirteen. Buffalo breeds are distributed in the study area as Murrah 15%, Niliravi 27% and Thoraty 52% of the total population. The average production per day was calculated as 10 litres, 8 litres and 3.8 litres of the breeds of Murrah, Niliravi and Thoraty respectively.

Jersey represents 65% of the cattle population and 15% are Frisian. Other available breed types are Ayershire, local Sahiwal, Graded and AFs. Average production of Jersey breed per day is 8.3 litres and this breed yields the highest production in the area and the maximum production goes up to 15 litres. The second dominant breed type is Frisian and their average production per day is 6.41 litres and the maximum production was 17 litres/day.

The average selling price of a milk litre is Rs.49.00. If the family labour is included in the variable cost as an opportunity cost farmer can produce a litre of milk at the cost of Rs.43.00. If the family labour is not included in the variable cost the farmer can produce a litre of milk at the price of Rs.28.00. The major problem faced by dairy farmers is the cost of concentrate feed. It represents 46% of the total cost. The cost of 1 kg of poonac is Rs.60.00 and Prima feed costs Rs.40.00-45.00.

The other main problems faced by farmers are lack of natural grasslands (31.35), lack of quality breed and problems of buying good animals, animal theft (16.5), low milk prices from private collectors (17%) (Rs.40.00-43.00 / ℓ), breeding problems (20%) lack of co-ordination and difficulties in connecting with the vet office, specially in the Homagama area.

Dairy industry in the Seethawaka area is being practised in a progressive manner and it is a profitable industry with the opportunity cost of family labour. The situation of

dairy industry can be further upgraded by incorporating the recommendations such as programmes to reduce concentrate feed cost. It is important to establish breeding farms with government intervention to control the price of breeding materials such as small female calves, heifers and milking cows. However, to maintain the quality of breeding materials with quality assurance, Extension Services are insufficient in the study area due to lack of extension officers, therefore, acquiring the service of new agricultural graduates (2-3) at VS office level would be timely.

The number of AI technicians in the study area is also insufficient. Therefore, recruitment of new AI technicians is important and the number of AI technicians should be increased according to the VS range. Further, the service of private AI technicians to increase the competitiveness of AI should be introduced and it will be a solution for the dearth of AI technicians.

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# CHAPTER ONE

## Background

### 1.1 Introduction

Urbanization is a population shift from rural to urban areas and the ways in which the society adapt to the change and peri-urban refers to landscape interface between town and countryside and rural urban transition where urban and rural uses mix and often clash ([www.wikipedia](http://www.wikipedia)). Generally liquid milk is the most consumed dairy product throughout the developing world but the demand for processing products has increased ([www.fao.org](http://www.fao.org)).

Demand for milk among the urban population has been a driving force for the establishment of urban and peri-urban dairy farms. These farms are mostly intensive and are located within or close to major towns and cities. The Seethawaka Divisional Secretariat belongs to the wet zone, where the dairy production system is and can be classified as a peri-urban dairy production system with a long history of providing milk to the urban market.

At present, the Sri Lankan economy is moving towards the service sector. Therefore, the contribution of GDP from the agriculture sector was 11.1% by 2012. Livestock and fisheries sectors have contributed around 2.7% to the agricultural sector and the dairy sector alone contributed around 1% to the total GDP in 2013. The total annual production of milk is 299 million litres which include 61.4 million litres of buffalo milk and 237 million litres of cow's milk. The domestic production meets around 40% of the national requirement of the country (Department of Census and Statistics, 2012). Formal milk collection is jointly carried out by the state sector and the private sector. The milk collected is processed inside the country and sold mainly in the form of milk powder. Due to the higher demand for local milk powder and speculations of possible chemical contamination of imported milk powder, import of powdered milk declined considerably (Sri Lanka Central Bank report, 2013).

The main issues in the milk production sector are high cost of production, low productivity, lack of high quality breeding materials, lack of extension and other supporting services. Suburban areas of the Colombo district have seen an explosion in the population which in turn raised the demand for milk and milk products. Therefore, to increase the supply to meet the demand it is essential to develop this farming system in the peri-urban areas. With appropriate government policy support and access to market and services, there is a great potential to develop the peri-urban smallholder dairy farming systems in the Colombo district.

## **1.2 Relevance to the Study**

The demand for milk and milk products is also increasing due to rapid urbanization, increase in per capita income and the population growth (www.fa.org). To make use of this opportunity small scale dairy production system is expanding as a means to improve the living standards of farmers through increasing family income and employment generation, achieving food security and alleviating poverty as well as improving the nutritional status of the family. Despite its importance, there is little information on the main constraints affecting the dairy improvement in peri-urban areas in Sri Lanka. Therefore, this study is timely and relevant to increase the production efficiency and economic viability of dairy farming in Sri Lanka.

## **1.3 Problem Statement**

Historically, Seethawaka area can be identified as a potential dairy farming area because even today co-operative systems involved in milk marketing systems in Seethawaka area play a vital role. Other than that the key informant discussions disclosed that the Bomiriya milk co-operative is the most ancient and the best collecting point in the Seethawaka area. In the “Seethwaka Abimana” exhibition, it was revealed that dairy farming is an important sector which can be used to improve the living standards of the farmers. Therefore, it is necessary to expand the sector with well-drawn out projects and programmes. This study primarily looks into the dairy production system in the Seethawaka area, assessing its effects on stakeholders (farmers, processors and other middle level players) and identifying the areas for further improvement in order to formulate and plan the future dairy development programmes.

## **1.4 Objectives of the Study**

The main objective of the study is to analyze the prevailing situation and potentiality for promotion of the peri-urban dairy sector in the Seethawaka Divisional Secretariat area.

### **Specific Objectives**

1. To ascertain the major characteristics of the peri-urban dairy production and marketing systems, and socio-economic conditions of the dairy farmers in the Seethawaka area
2. To analyse the issues and constraints for the promotion of the peri-urban dairy sector
3. To make recommendations for the promotion of the peri-urban dairy sector

## **1.5 Methodology**

In line with the objectives of the study, the method of data collection consisted of three major components: a comprehensive literature review, focus group and key informant discussions and a questionnaire survey.

### **1.5.1 Literature Review**

Various project documents, data bases and previous studies in both print and electronic versions in the field of peri-urban dairy sectors in other countries were utilized in designing, planning and conducting this research. The records available in the office of Veterinary Surgeon (VS) ranges in the Seethawaka area (Padukka, Kosgama, Homagama) helped select the dairy farmers for the study.

### **1.5.2 Focus Group and Key Informant Discussion**

Officers including veterinary surgeons in three VS offices and Livestock Development Instructors of the area were interviewed following guidelines. Discussions were held with managers of the milk collection centres such as Milco, Fonterra Cooperative Society, Sukhi and Milki with a semi structured questionnaire. Dairy farmer representatives and Agricultural Research and Production Assistants (ARPAs) were also interviewed at village level.

### **1.5.3 Questionnaire Survey**

For the questionnaire survey farmers were selected according a list of farmers available in the office of three veterinary surgeon divisions. Primary data was obtained using pre-tested structured questionnaires.

Data collection was done using the following main themes of dairy farming.

- a) Dairy management systems
- b) Socio-economic standards of dairy farming
- c) Herd composition
- d) Production characteristics
- e) Milk consumption
- f) Clean milk production
- g) Milk processing
- h) Breeding and fertility performances
- i) Economic status
- j) Welfare and health status
- k) Extension

#### 1.5.4 Sampling Procedure

The survey was conducted in the Seethawaka DS areas. The Seethawaka area consists of 3 divisional secretariat divisions. The Survey was conducted in three veteran surgeon divisions such as Padukka, Kosgama and Homagama. According to secondary data available at VS offices, in the list of registered farmers about 10% were selected from each VS division. Thus, 117 farmers from Padukka, 106 farmers from Kosgama and 80 farmers from Homagama were randomly selected for the questionnaire survey.

#### 1.5.5 Study Locations

**Table 1.1: Study Locations**

VS Range	Villages	No. of Farmers
Padukka  117	Siyabalawa	12
	Angamuwa	10
	Uggalla	12
	Malagala	15
	Waga West	14
	Horagala East	09
	Horagala West	11
	Pinnawala	10
	Dampe	12
	Liyanawala	12
Kosgama  106	Mawalgama	10
	Suduwella	15
	Walikanna	8
	Brandhigampola	12
	Tunnana	16
	Kadugoda	5
	Diddeniya	10
	Niripola	10
	Mawathagama	8
	Kahatapitiya	10
Homagama  80	Prasannapura	13
	Pitipana	15
	Jalthara	7
	Godagama	8
	Walpita	8
	Meegasmulla	10
	Kuruduwatta	10
	Artigala	9
<b>Total</b>	<b>28</b>	<b>303</b>

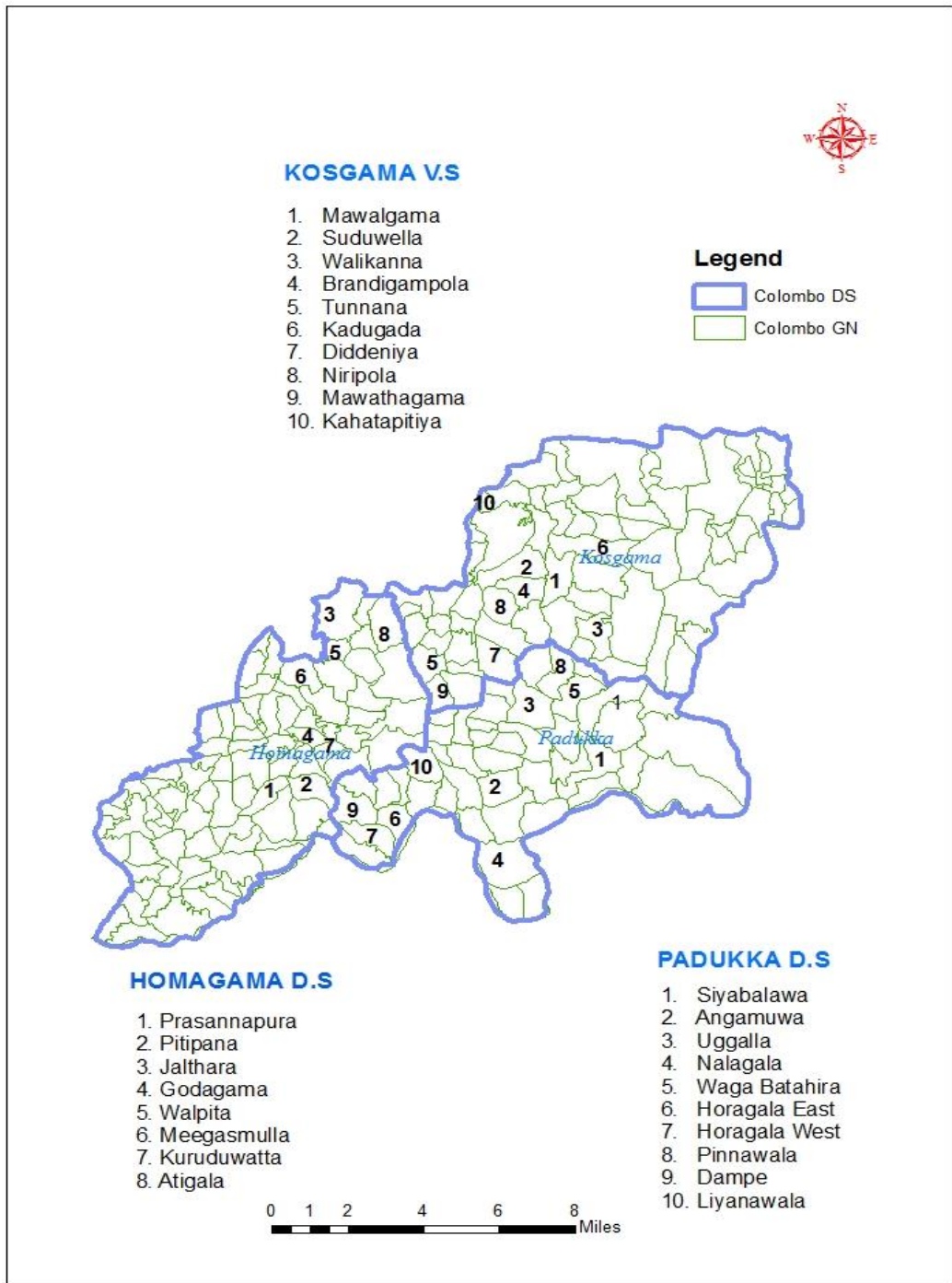


Figure 1.1: Map of the Study Locations

Homagama, Padukka, and Kosgama DS divisions are located in the Colombo district and Homagama area is much urbanized than the other two DS divisions. Padukka area has more rubber lands and abundant paddy fields.

### **1.5.6 Analytical Framework**

Primarily, data analysis was done using descriptive techniques. Further, the cost of production and income identification was used to assess the profitability of farming, processing and system diversifications.

### **1.6 Study Period**

The field data collection was carried out from May – August of 2013.

### **1.7 Limitations of the Study**

Very often farmers were either reluctant or unable to provide accurate information because majority of the farmers do not keep records concerning the management of their herds. Further, exact milk production levels and other income (especially from selling animals) are underestimated and the expenditures are over estimated. More time was spent on collecting accurate information on input and output values. Negative attitudes of some farmers also affected the gathering of information.

## CHAPTER TWO

### Literature Review

#### 2.1 Introduction

This chapter illustrates the present situation of the dairy industry in Sri Lanka and the world. Peri-urban dairy production, advantages of milk consumption for humans and value added products are also discussed.

#### 2.2 Dairy Industry in Sri Lanka

The dairy industry has a potential to contribute to the development of the national economy. Milk production has been a traditional industry which has survived thousands of years, playing a key role in infant nutrition and alleviating nutritional poverty in all age groups. The dairy sector is important due to the extensive number of employment opportunities that the industry offers (Ranaweera, 2007).

Sri Lanka is endowed with an abundance of lands, mountains and valleys. However, the land under economic utilization is a small percentage. Highland plains and valleys provide viable grounds for productive farmlands of high yielding dairy industry. Similarly, in the dry zone a vast extent of land ideal for dry zone cattle and goat farming is available ([www.dailynews.lk](http://www.dailynews.lk)).

Sri Lanka is largely self-sufficient in most animal products other than in dairy. The consumption of dairy products increased dramatically since the country adopted open economic policies in the mid 1970s. In 2007, Sri Lanka met about 15-20% of the milk requirement through local production, mostly fulfilling the requirement by way of imported milk powder. The government at the same time has an ambitious target for growth in dairy production, to increase the production towards 50% of the requirement by 2015. At the annual growth rate of 1-2% the sector will need to grow at about 15% annually for the next eight years with no increase in total consumption, which is an uphill task when analysing the current state of the industry (Ranaweera, 2007). According to "Mahinda Chinthana" 50% self-sufficiency was to be achieved by 2015. But at present, the total domestic contribution meets only 40% of the total requirement.

The expanded milk industry would create opportunities for economic growth and creation of gainful employment. With foreign direct investment (FDI) flow on dairy development, gradual and steady import cuts from milk food imports and investment on alternative dairy development could accelerate the fresh milk production and small and medium associated industries ([www.dailynews.lk](http://www.dailynews.lk)).

According to the statistics, the largest cattle populations are reported from the dry and the intermediate zones. The wet mid and up-country areas are often perceived as the main dairy producing areas of Sri Lanka.

Dairy industry is a prime employment generating field with many avenues for interconnected industries, all of which could help improve the economy and promote the standard of life of the unemployed youth. Thus, the dairy industry would gain strength, patronage and viability to become a mainstay in the economy (dailynews.lk).

The main problem that the Sri Lankan liquid milk market is facing is the production due to the lack of good dairy cows. In Sri Lanka, there are 1.2 million neat cattle (local dairy cows) that have not significantly increased during the last 30 years. Most of these animals end their lives at the slaughter house at a very high price leaving a negative impact on the more important dairy industry (dailynews.lk).

**Table 2.1: Main Dairy Production Systems in Sri Lanka**

<b>Production Systems</b>	<b>Average Dairy Milk Production per cow (litres)</b>	<b>Popular Management System</b>
Hill country	6–8	Intensive
Mid country	4–5	Semi-intensive
Coconut Triangle	3–3.5	Tethered, Semi intensive
Low country dry zone	1–1.5	Extensive
Low country wet zone	3–3.5	Tethered

Source: Bandara, 2007

The Table 2.1 illustrates the main farming systems and average milk production per cow per day. According to Ranaweera (2007), in hill country and mid country, the average production is higher than the other farming systems but the situation of management type is different at present due to lack of available natural grazing lands. In most of the farming systems the dominant management type is semi intensive.

As shown in the Annex number 01, the overall percentage of milking cows represents 22% of the total cattle population. Milking at present also contributes around 22% and other cow category also represents around 20% of the national figures. Therefore proper management and intensification of dairy industry is necessary to improve the dairy production in the country.

Annex number 02 illustrates the national buffalo population from 2003-2012. Accordingly 23% of the total herd is milking at present and 19% of the buffaloes are



not milking at present (pregnant or dry cow). Twenty four percent of the total buffalo herd were represented by bulls in 2012.

### **2.3 Peri-urban Dairy Farming**

As part of the agricultural production system, dairy farming is a prerequisite to alleviate poverty. It supplements other income generating activities to eradicate poverty and creates adequate opportunities in milk production – advanced genetic traits, cellular mechanism, animal management and health for enhanced rural and peri-urban employment, income generation and economical access to food. The horizontal expansion in dairy farming is still in progress. The increasing human population of the urban areas, the rising income levels and the awareness about the need of animal proteins in human diet, has resulted in an increasing demand for milk and meat. This demand for food items and the rising levels of prices, call for expansion of the dairy and livestock industry (Subhan *et al*, 2012).

Dairy farms provide a unique environment for the development of special social norms. Dairy farms are located in the peri-urban areas of the major cities to meet the demand for milk of the urban populations. The farms are established without adhering to scientific parameters which need to be observed in construction of dairy farms and facilities of their operations.

According to Subhan (2012), the living standards of Pakistan dairy farmers are low due to low profitability of the farms. The high and non-regulated cost of inputs and state-controlled lower price of the products make the profit margin low. Lack of state-subsidy and the hostile marketing system damage these enterprises. Under such circumstances the living standards of the dairy farmers have definitely deteriorated. The farmers have little chance to send their children to better educational institutions which are usually expensive. The children drop-out of school after the primary standard. Self-employment is provided to the children by their parents at dairy farms and their potential for better contribution to the society is wasted.

The labour cost at the peri-urban dairy farms is higher as compared to rural areas. Milkmen are hired for milking the lactating buffaloes, instead of milking machines. The milkmen are conscious about their time spent at the farm. They try to finish off the milking duty as soon as possible. As a routine practice, the young calf is used for milk let down through suckling stimulus. However, as the calf keeping is considered expensive, calves are disposed of at an earlier age. Under such conditions the milkmen use oxy toxin for milk let down. It poses a public health hazard as well as an undesirable effect over the reproductive endocrinology of the dairy buffaloes.

## 2.4 Body Condition Score

Body Condition Score (BCS) reflects the overall energy status of the body, depending upon the intake of nutrients and their utilization for milk yield, growth and maintenance. Osorio and Wright (1992) and De Rouen *et al* (1994), concluded that BCS at calving significantly affected postpartum reproductive performance in cows. O'Rourke *et al* (1991) reported that cows with BCS of  $\geq 8$  had a conception rate of 33% higher than those with score  $\leq 5$  (scale 3-9). Buffaloes in poor BCS had inactive ovaries and long postpartum anoestrus periods (Jainudeed and Wahab, 1987). Bhalaru *et al* (1987) reported that conception rates were significantly higher (88.3%) for buffaloes with moderate BCS (2.5 to 3.5) than for female buffaloes scoring 1 to 2 (65.8%) or 4 to 5 (40.8%). The reason for low reproductive performance in the animals with low BCS was perhaps the non-availability of nutrients for reproduction.

In urban and peri-urban commercial dairy farms, feed accounts for more than two third of the operational cost. This is because animals are stall-fed all the times with purchased feed and fodder. Moreover, the system is highly intensive and profit motivated, the animals are fed a large amount of concentrates to get more milk.

## 2.5 Advantages of Milk Consumption for Human

Consumption of dairy products as part of a nutrient-rich diet has long been recognized as an important contributor for maintaining health and nutrition for people of all ages. Diets rich in milk, cheese, yogurt and other dairy products provide important vitamins and minerals essential for human growth and development. Use of milk in its natural form provides abundance of nutrients needed for health and body growth. They include a range of essentials including fat, carbohydrates, minerals, vitamins, proteins. Vitamins A,D,E,K and many acids the body needs but cannot produce on its own. Those are supplied in cow's milk fat which is dispersed right through the milk globules. This and the pleasant taste and texture of fresh cow's milk is its special character. One litre of milk is said to be equal to 21 eggs in calcium and 12 kg lean beef and 2.2 kg wheat bread (dailynews.lk).

It is a common fact that dairy products are an essential part of a healthy, balanced diet, and although preventing osteoporosis is often rated first when the health benefits of consuming dairy products are concerned. There are numerous ways that dairy can improve the health (eatwisconsincheese.com).

Dairy products are an excellent source of nutrients including calcium, potassium, phosphorous and vitamins A and D. An adequate intake of calcium helps to reduce the risk of osteoporosis, high blood pressure and colon cancer. Milk is a good source of high quality protein, which means it contains all essential amino acids, the 'building blocks' of protein.

Other minerals are phosphorous, which helps strengthen bones: potassium, which regulates the body's fluid balance and helps maintain normal blood pressure, magnesium, which is found in bones and teeth; and zinc, which helps keep skin, bones and hair healthy. The major fat-soluble vitamins in milk are A, which helps maintain normal vision and skin and D, which helps the body absorb calcium. In addition to help building strong bones, low fat dairy products can help reduce the risk of hypertension and certain cancers and can play a role in better weight management.

Milk is also a good source of the water-soluble vitamins niacin and B12. Niacin plays an important role in maintaining the normal function of enzymes in the body. B12 helps build red blood cells that carry oxygen from the lungs to working muscles.

Milk is an excellent source of riboflavin (B2), which helps converting food into energy and promotes skin and eye health. (<http://docs.google.com>)

### **2.5.1 Milk and Osteoporosis**

The debilitating bone disease osteoporosis is a major public health threat for aged 50 and older. There is no cure for this disease, but health experts agree that an adequate intake of calcium throughout life, especially in childhood and adolescence, is an important step to building strong bones and preventing osteoporosis. Counting calcium can be crippling, expensive and sometimes deadly. The lack of calcium in the diet, which can lead to osteoporosis and other health problems, is now a public health priority. Milk and other dairy products are the richest source of calcium, people can find with a lot of other benefits ([eatwisconsincheese.com](http://eatwisconsincheese.com)).

### **2.5.2 Milk and Hypertension**

Hypertension is characterized by high blood pressure. It increases the risk of coronary heart disease, stroke and kidney disease. Dietary factors have been studied and shown to reduce blood pressure and adequate intake of calcium, potassium and magnesium. Milk is a good source of those nutrients ([milkfacts.info](http://milkfacts.info)).

### **2.5.3 Milk and Cancer Effect**

Calcium and vitamin D may reduce the risk of colon cancer. The protective effect of calcium and vitamin D was observed in numerous human studies in several countries. Whey proteins were shown to inhibit colon cancer cell growth in laboratory settings. Calcium and vitamin D consumption has also been shown to have a protective effect against breast cancer in humans. Whey proteins have been shown to inhibit breast cancer in laboratory settings ([milkfacts.info](http://milkfacts.info)).

#### **2.5.4 Milk and Diabetes**

Diabetes is a disease of carbohydrate metabolism. Type I diabetes is caused by an inability to produce insulin and is controlled by insulin injections. Type II diabetes is caused by an inability to respond to insulin that typically occurs in adults and can be controlled through diet and exercise (milkfacts.info).

#### **2.5.5 Milk and Pro Biotic**

Pro biotic are defined as live bacteria that provide health benefits when consumed in adequate amount. The majority of the benefits of pro biotic are seen in the digestive system. Pro biotic improves the general health of the gastrointestinal tract, reduces the symptoms of lactose intolerance, helps in the treatment of diarrhoea, inflammatory bowel disease and irritable bowel syndrome and helps prevent colon cancer. Pro biotic also enhances the immune system and helps reduce some allergic reactions.

Many probiotic bacteria are lactic acid bacteria, meaning that they use lactose as an energy source and hence are associated with dairy products. Yogurt is often associated with pro biotic because the bacterial cultures used fermented milk into yogurt are probiotic cultures and it is a nutritionally complete food for the maintenance of other pro biotic that are added for further health benefits. (milkfacts.info)

### **2.6 Milk Production and Consumption in Sri Lanka and Other Countries**

#### **2.6.1 Domestic Situation**

Consumption of dairy products in Sri Lanka has increased over the last two decades. The growth demand has largely been met by imports, particularly of milk powder (fao.org).

According to last 15 years of milk production data, it is clear that the total cattle and buffalo milk production has increased. During the last 5 years, performance of the production showed better results due to various projects and programmes implemented by the livestock developers.

**Table 2.2: Cow's and Buffalo Milk Production 1998 – 2012**

Year	Annual Milk Production (Litres)		Total Annual Milk Production (Litres)
	Cow's Milk	Buffalo Milk	
1998	147,381,600	29,707,445	177,089,045
1999	149,686,800	30,196,800	179,883,600
2000	151,245,600	30,210,148	181,455,748
2001	152,764,800	30,262,800	183,027,600
2002	152,840,880	30,354,120	183,195,000
2003	156,546,000	30,258,000	186,804,000
2004	159,696,000	30,600,000	190,296,000
2005	161,816,400	30,925,200	192,741,600
2006	164,977,200	31,646,160	196,623,360
2007	169,728,000	32,281,200	202,009,200
2008	172,442,406	35,650,685	208,093,090
2009	184,064,880	49,251,360	233,316,240
2010	191,919,600	55,634,400	247,554,000
2011	203,454,000	54,849,600	258,303,600
2012	237,639,600	61,610,400	299,250,000

Source: Department of Census and Statistics, Colombo, Sri Lanka

## 2.6.2 World Milk Production

Based on the increasing population in the world and also the rising per capita consumption, the global milk demand is growing by 10–15 million a year. This quantity represents the annual milk volume of Australia or New Zealand.

The total milk consumption (as fluid milk and processed products) per person varies widely from highs in Europe and North America and lows in Asia.

Even within regions such as Europe, the custom of milk consumption varies greatly. For example, the high consumption of fluid milk in countries such as Finland, Norway and Sweden can be compared to France and Italy where cheese consumption dominates milk consumption.

Table 2.5 shows the quantity of raw milk produced around the world and Table 2.6 illustrates the milk per capita consumption information from various countries of the world (foodsci.uoguelph.ca).

**Table 2.3: Milk Production ('000 tons) in Selected Countries in the World (2006)**

<b>Country</b>	<b>Milk production ('000 tons)</b>
United States	82,462
India	39,759
China	31,934
Russia	31,100
Germany	27,955
Brazil	25,750
France	24,195
New Zealand	15,000
United Kingdom	14,359
Ukraine	13,287
Poland	11,970
Italy	11,186
Netherlands	10,995
Mexico	10,352
Argentina	10,250
Turkey	10,000
Australia	9550
Canada	7854

Source: International Dairy Federation, Bulletin 423/2007

Global milk production is now anticipated to reach 678 million tons in 2007, 2.3 percent up from last year, a much lower growth than was expected in the last Food Outlook. Importantly, the slowdown is now expected in a number of key milk product exporting countries. Milk production of the five leading exporting countries, (Argentina, Australia, European Union, United States and New Zealand) which produce over 40 percent of the world's milk but contribute over 80 percent of global exports, was expected to remain unchanged compared with year's earlier levels. (thecattlesite.com).

**Table 2.4: Per Capita Consumption of Milk and Milk Products in Various Countries, 2006 Data**

Country	Liquid Milk (Litres)	Cheese (kg)	Butter (kg)
Finland	183.9	19.1	5.3
Sweden	145.5	18.5	1.0
Ireland	129.8	10.5	2.9
Netherlands	122.9	20.4	3.3
Norway	116.7	16.0	4.3
Spain (2005)	119.1	9.6	1.0
Switzerland	112.5	22.2	5.6
United Kingdom (2005)	111.2	12.2	3.7
Australia (2005)	106.3	11.7	3.7
Canada (2005)	94.7	12.2	3.3
European Union	92.6	18.4	4.2
Germany	92.3	22.4	6.4
France	92.2	23.9	7.3
New Zealand (2005)	90.0	7.1	6.3
United States	83.9	16.0	2.1
Austria	80.2	18.8	4.3
Greece	69.0	28.9	0.7
Argentina (2005)	65.8	10.7	0.7
Italy	57.3	23.7	2.8
Mexico	40.7	2.1	Not available
China (2005)	8.8	Not available	Not available

Source: International Dairy Federation Bulletin 423/2007

## 2.7 Value Added Production in Dairy Industry

Promotion of value added products is another aspect of increasing the farmer income. With the value addition, the quality should be given due consideration. Milk can be converted into a range of products which are universally popular. There are several types of processed milk products available in Sri Lanka.

Standardized cow's and buffalo milk  
 Skimmed milk  
 Sterilized milk  
 Flavoured milk

Low fat milk  
 Pasteurized milk  
 Ultra heat treated (UHT) milk  
 Evaporated milk

Full cream condensed milk  
Yoghurt  
Butter  
Dairy cream  
Ice cream

Powdered milk  
Curd  
Buttermilk, butter oil and ghee  
Cheese  
Milk toffee

Among value added milk products, pasteurized and sterilized milk, curd, yoghurt, ice cream and milk toffee are common in Sri Lanka. In addition, the production of butter and cheese can also be promoted at farmer level. Initially, these products should aim at the local consumer market and with the experience of the farmers the products can further be improved and commercialized (Gamage *et al*,2009).

## **2.8 Fresh Milk Demand in Sri Lanka**

Fresh milk has a regular countrywide consumer demand in every town and city. Given the current levels of malnutrition in the country, particularly among pre-school children and pregnant women, milk production is an important activity both for the improvement of nutrition, saving foreign exchange and creation of employment opportunities (Ranaweera, 2007).



## CHAPTER THREE

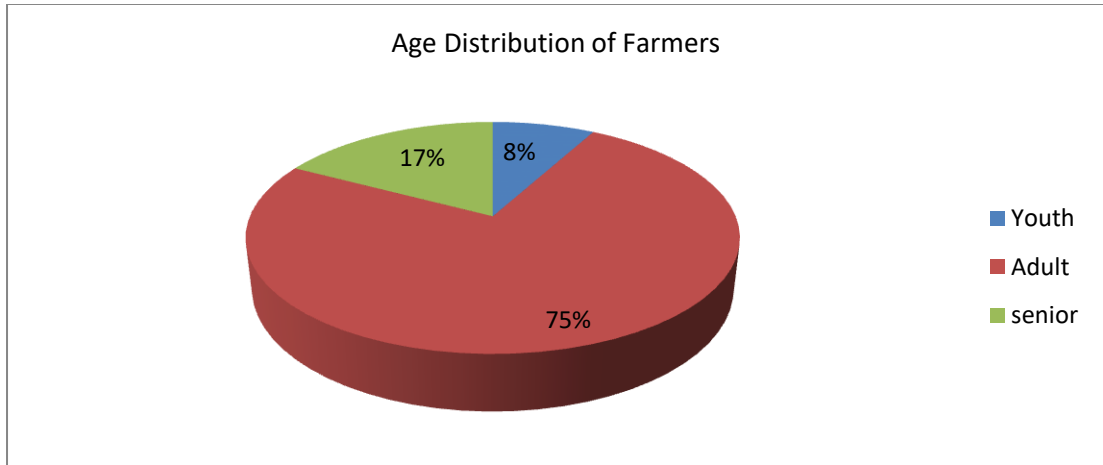
### Socio-economic Background of the Dairy Farmers

#### 3.1 Introduction

Socio-economic characteristics such as age, gender, religion, education level, occupation, labour and land use, income sources, dairy farming experience, resource availability for dairy farming are briefly discussed in this chapter. Furthermore, the above themes will be discussed at the Veterinary Surgeon Rangers levels of the study areas: Homagama, Kosgama and Padukka.

To represent the characteristics of the peri-urban dairy systems in the Seethawaka area in the Colombo district three veterinary surgeon divisions (Homagama, Kosgama and Padukka) were selected. The sample population consists of 117 farmers of Padukka, 106 farmers of Kosgama and 80 farmers of the Homagama VS range. The total sample population comprises 303 dairy farmers. The family size ranges from 1-8 members with an average of 3.8.

#### 3.2 Age Distribution of Farmers



Source – Survey Data, 2013

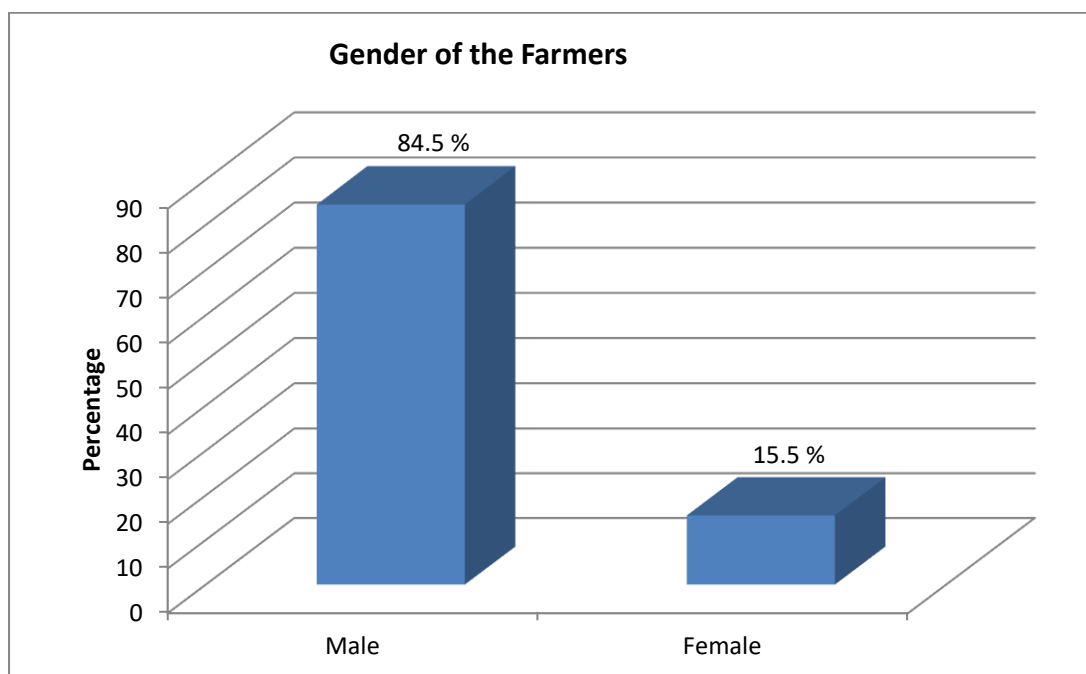
**Figure 3.1: Percentage of Farmers According to the Age Distribution**

The Figure 3.1 illustrates the age distribution of dairy farmers in the Seethawaka area. As shown in the figure the youth (below 30 years) involvement in the dairy sector is relatively low (8%) compared to other age groups. It is important to note that the majority of the dairy farmers are (74.8%) aged between 30-60 years and

they are in the middle age group. Senior citizens are those above 60 years and they represent 17% of the total sample.

According to the findings, the farmers in Seethawaka area are mature farmers and attraction of new farmers to the industry is less. In addition, existing farmers do have more experience and rely mainly on traditional knowledge.

### 3.3 Gender Distribution of the Dairy Farmers



Source- Survey Data, 2013

**Figure 3.2 : Gender Distribution of the Respondents**

As shown in the chart 3.2, the male and female farmers in the sample are 84.5% to 15.5% respectively. This situation is more or less similar in the Padukka and Kosgama area as well. But in Homagama male farmers represent 93.6% of the sample population and 6.3 % are female farmers. This indicates that a less number of female farmers are involved in dairy farming in the Homagama area.

### 3.4 Religion of the Farmers

Religion of the dairy farmers is also an important factor in livestock rearing. Some of the livestock management such as pig farming is normally practised by Catholic farmers. The sample consists of 94.8% of Buddhist farmers, 0.7% of Hindu farmers and 4.6% of Catholic farmers. Moreover, the Catholic and Hindu farmers of the

sample were found only in the Kosgama and most of these Catholic farmers are involved in pig and goat rearing along with dairy farming.

### 3.5 Main Occupation

The Table 3.1 illustrates the main occupation of the sample farmers in the Seethawaka area. Out of total sample population 44% are occupied in dairy farming as their main job. Other than that, 15% of the dairy farmers depend mainly on the vegetable and paddy farming sector. Furthermore, 17% of the private sector employees are also engaged in dairy farming. Moreover, the rest of the farmers are engaged in government sector jobs, self-employment and labour related jobs as their main occupation.

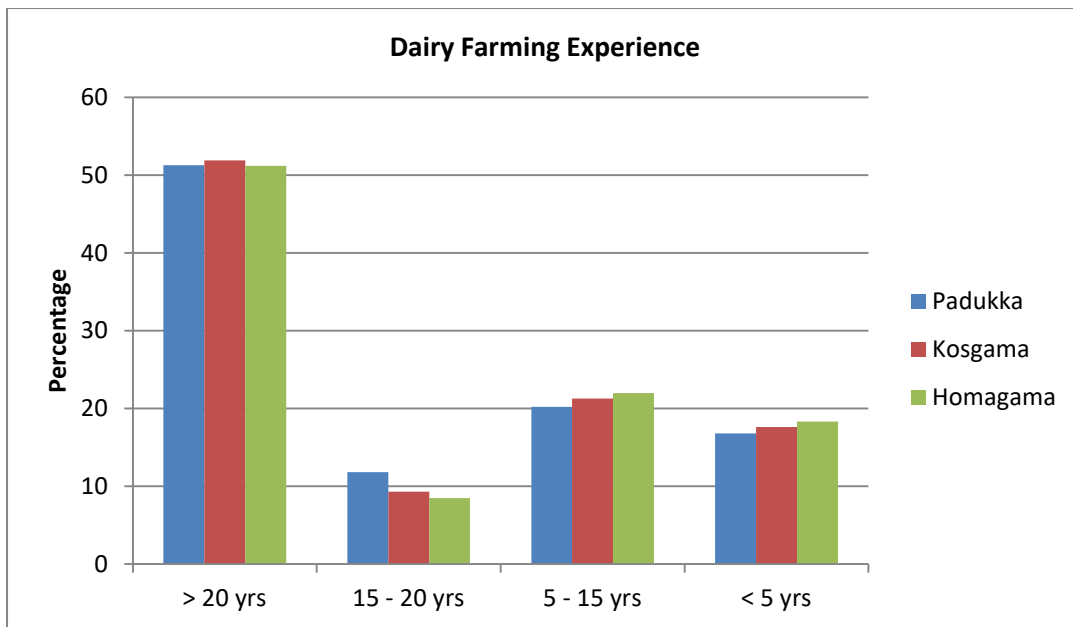
**Table 3.1: Main Occupation of the Farmers (Percentage)**

Occupation	Padukka	Kosgama	Homagama	Total
Dairy farming	45.5	42.1	45.5	44.3
Vegetable Farming	10.7	13.1	11.4	11.7
Paddy Farming	7.1	1.9	3.8	4.4
Private Sector	16.1	18.7	16.5	17.1
Government	6.3	3.7	7.6	5.7
Self-Employment	10.7	4.7	12.7	9.7
Labour	2.7	1.4	1.3	6.4
Skilled labour	0.9	1.9	1.3	1.3
<b>Total</b>	100	100	100	100

Source: Survey data, 2013

### 3.6 Dairy Farming Experience

The dairy farming experience was examined to understand the experience of the dairy farmers. More than half (51.5%) of the farmers are engaged in dairy approximately for 20 years and 20% of the farmers had experience of 5-10 years. Moreover, 10% of the farmers are involved in dairy farming for 15-20 years. The newcomers to the dairy sector (less than 5 years) are around 17.5 % in the sample. Experience on dairy farming increases the effectiveness of farming activities but on certain occasions these farmers face difficulties in adapting to modern technologies which are essential for production improvement.



Source: Survey data, 2013

**Figure 3.3: Dairy Farming Experience**

### 3.7 Reasons of Starting Dairy Farming

According to the survey, 70% of the farmers stated that, they are involved in dairy farming to earn an additional income. However, 11% of the farmers said that it is their main income. Other than that, 33% of the farmers practise this as a family tradition. Some farmers have more than one reason to begin dairy farming: availability of land and other inputs and having extra time and knowledge regarding dairy farming.

### 3.8 Total Land Availability in the Study Area

The total land availability in the study area comprises different crops grown in areas such as home gardens (64%), paddy (29%), grassland (1.2%) and the rest of lands are rubber, coconut and vegetables.

As shown in the Table, 3.2, 50% of the farmers owned 0-1 acres of home garden in the study area. From this, about 26% farmers have less than 0.5 ac of home garden land. Other than that 20% of the sample owned home garden land. The farmers having 2-5 acres of home garden is about 25% and more than 5 acres of land is owned by only 5% of the sample.

**Table 3.2: Home Garden Size of the Dairy Farmers**

Land Size (Acres)	Padukka (%)	Kosgama (%)	Homagama (%)	Total (%)
<0.5	21.19	27.62	31.65	26.16
0.5 - 1	21.19	28.57	22.78	24.17
1 – 1.5	15.25	9.52	6.33	10.93
1.5 – 2	12.71	5.71	8.86	9.27
2 – 2.5	5.93	6.67	7.59	6.62
2.5 – 3	5.08	4.76	3.80	4.64
3 – 3.5	3.39	2.86	3.80	3.31
3.5 -4	4.24	3.81	1.27	3.31
4 – 4.5	5.93	2.86	2.53	3.97
4.5 - 5	2.54	2.86	3.80	2.98
>5	2.54	4.76	7.59	4.64

Source: Survey Data, 2013

**Table 3.3: Income Distribution of the Farmers (Monthly Average)**

Income Range (Rs)	Padukka (%)	Kosgama (%)	Homagama (%)	Total (%)
Below 10,000	18.9	14.8	21.1	18.1
10,000 – 20,000	32.4	14.8	10.5	21.7
20,000 – 30,000	21.6	22.2	21.1	21.7
30,000 – 40,000	8.1	29.6	36.1	20.5
40,000 – 50,000	10.8	3.7	10.5	8.4
More than 50,000	8.1	14.8	5.3	9.6
<b>Total</b>				<b>100</b>

Source: Survey Data, 2013

The Table 3.3 illustrates the average monthly income of the farmers in the study area. A total of 18% farmers disclosed that the average monthly income is below Rs.10,000/-. This is because most of the farmers underestimate their income information. The majority (around 60%) of the farmers can be categorized into Rs.10,000 to Rs.40,000 income range. Moreover, 8.4% of the farmers earned Rs.40,000-50,000 monthly and 9.6% of the farmers earned over Rs.50,000 per month.

The farmers who operate 3-4 animals in the herd generally earn Rs.15,000/= per month.



## CHAPTER FOUR

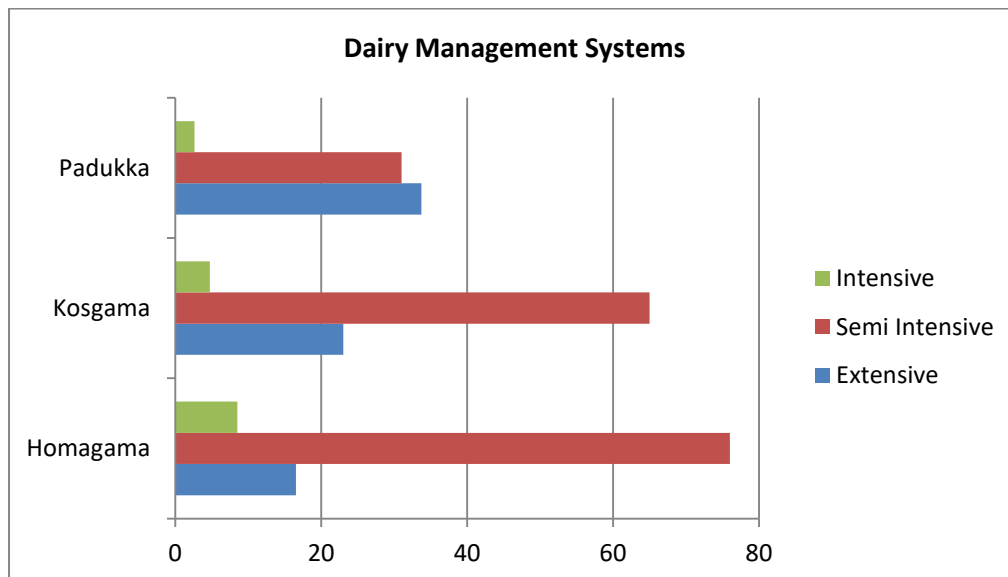
### Characteristics of Dairy Farming in Seethawaka Area

#### 4.1 Introduction

Chapter Four describes the characteristics of dairy farming in different aspects such as type of management, mechanization of dairy industry, crop livestock integration, milk processing and attitudes towards milk processing, cattle and buffalo herd composition, milk production and milk yield by breed type, milk marketing, milk breeding and fertility performance, animal welfare and healthcare, housing conditions, grassland availability, calf rearing, extension, credit facilities, subsidies and waste management.

#### 4.2 Dairy Management Systems

Three main management systems, intensive, semi intensive and extensive systems were identified in the study area and the characteristics of these systems are displayed below.



Source: Survey Data, 2013

Figure 4.1: Dairy Management System

#### **4.2.1 Intensive System of Management**

The intensive system of management is a high tech, expensive and efficient method in dairy farming. The following salient features are observed in this system: higher level of input per unit of land area, housing indoors and zero grazing (housing is a necessity). A system, under which the animals are given following facilities, is considered an intensive system of management.

- ❖ Cut and feed management, zero grazing and required skilled labour
- ❖ Housing facilities provided with other necessary inputs within the house.  
As peri urban area in Seethawaka farmers kept their animals within the cattle sheds and they practiced cut and feed system and provided concentrate feeds.

#### **4.2.2 Extensive Management System**

This method of management is a low cost and less productive operation system. The system characterizes large extents of land for grazing, low input per land unit and animals are allowed free range on natural pastures and minimum housing requirements. It requires lesser cost and labour. Most of the farmers rear local and cross breeds than pure hybrids under this system.

In Seethawaka area farmers accommodate their animals in nearby reservation, paddy field or rubber land in the morning and bringing them back to the place where animals rest at night. No proper shelter is provided to the animals. No cut and feed system is practiced. In draught periods farmers provide water and feed.

#### **4.2.3 Semi Intensive Management System**

This method has both intensive and extensive management characteristics. Animals are sent for grazing during day time and housed during the night. Further, in special physiological conditions such as heavy pregnancy, animals are fed with cut and feed system and medium level input/unit of land area.

As shown in the Figure 4.1, 68% of the farmers practise semi intensive management system. This type of management is dominant in all three VS ranges. In Homagama VS range, more than 75% of the sample farmers reared the animals under semi intensive management type. The Intensive type of management is less in Padukka (2.6%) and Kosgama (4.7%) compared to Homagama (8.5%). Furthermore the study reveals that  $\frac{1}{4}^{\text{th}}$  of the sample population practices extensive type of dairy management in the study area. Extensive management of dairy farming is popular in Padukka compared to other areas because the extent of the available grazing land is larger than other two VS ranges.



Semi Intensive method in the study area seems to have both intensive and extensive characteristics. During some physiological status (heavy pregnancy, first three month of lactation) animals are not allowed to go out for grazing.

### 4.3 Machinery Available for Dairy Farming

Table 4.1 describes 11.8% of the farmers or 36 farmers owned machinery such as feed millers, grass cutters and farm vehicles. These farmers are somewhat advanced farmers and they try to mechanize their dairy farms.

**Table 4.1: Machinery Owned by Farmers**

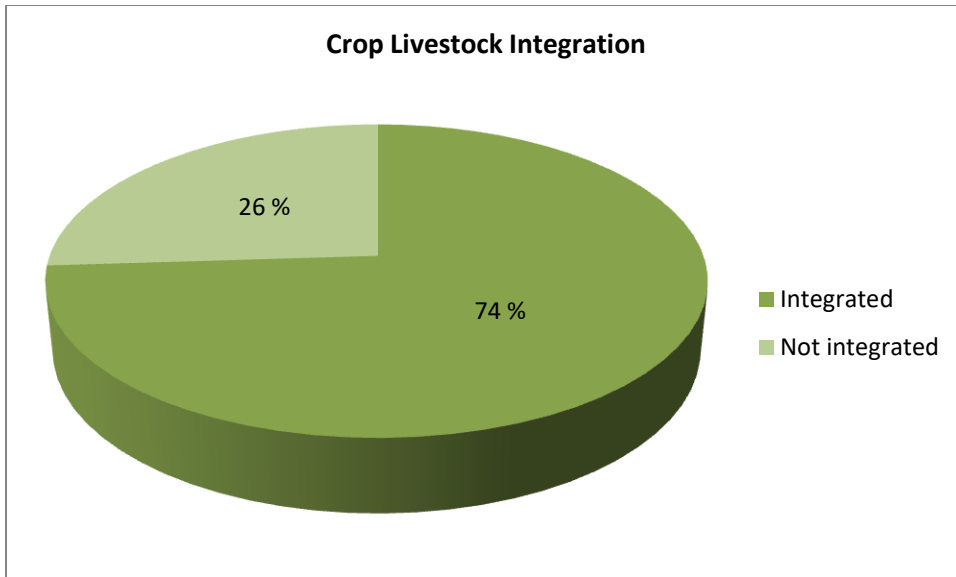
Resource	Vet Range							
	Kosgama		Padukka		Homagama		Total	
	No of Farmers	Quantity	No of Farmers	Quantity	No of Farmers	Quantity	No of Farmers	Quantity
Feed Mill	3	3	1	1	3	3	4	4
Grass Cutters	4	4	7	10	2	2	14	17
Farm Vehicle	4	5	12	15	5	5	18	22
<b>Total</b>	<b>11</b>	<b>12</b>	<b>20</b>	<b>26</b>	<b>5</b>	<b>10</b>	<b>36/300</b>	<b>43</b>

Source: Survey Data, 2013

As shown in the above table farmers who used machinery for the dairy farming are managing their farms intensively and these farmers also owned very basic machines needed for the farms.

### 4.4 Crop Livestock Integration

Crop livestock integration refers to crop farming done with dairy farming and both activities benefit each other. Cow dung or organic fertilizer from cattle is used as input in crop cultivation and the crop residues are used as input for animal feeding. According to the Figure 4.2, 74% of the farmers can be categorized as integrated farmers whereas 26% farmers did not practise crops and livestock integration. The reason for not integrating is not paying much attention in this regard by most of them. Some farmers were aware of the benefits of crop- livestock integration but they did not practise due to lack of interest.

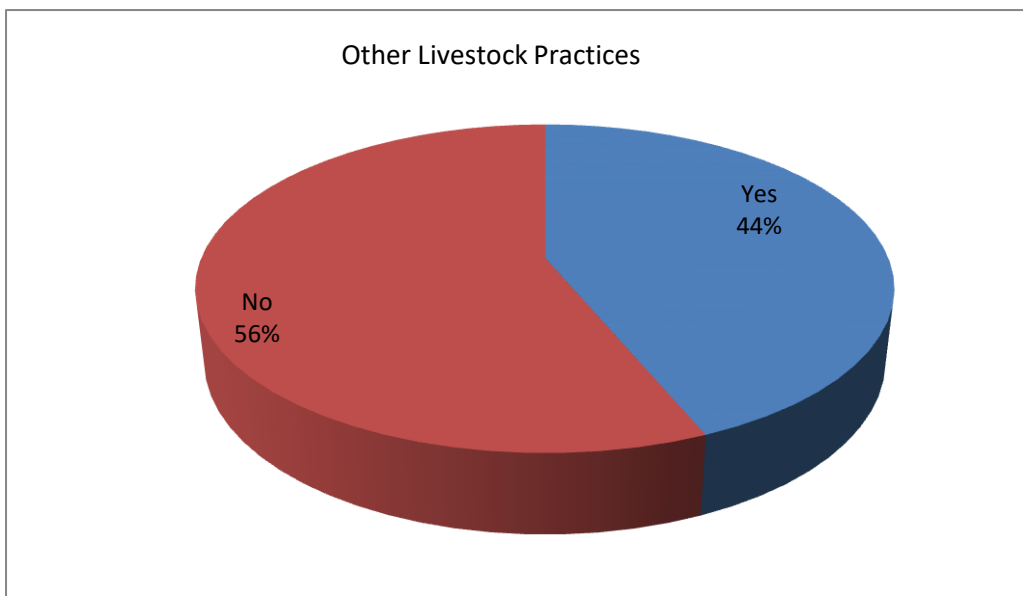


Source: Survey Data, 2013

**Figure 4.2: Percentage of Farmers Practicing Crop Livestock Integration**

The study also reveals that paddy (57%), vegetable (44%) and coconut are the main crops grown by dairy farmers. Other than that, tea, rubber, fruit, spices are also grown in small scale by the dairy farmers.

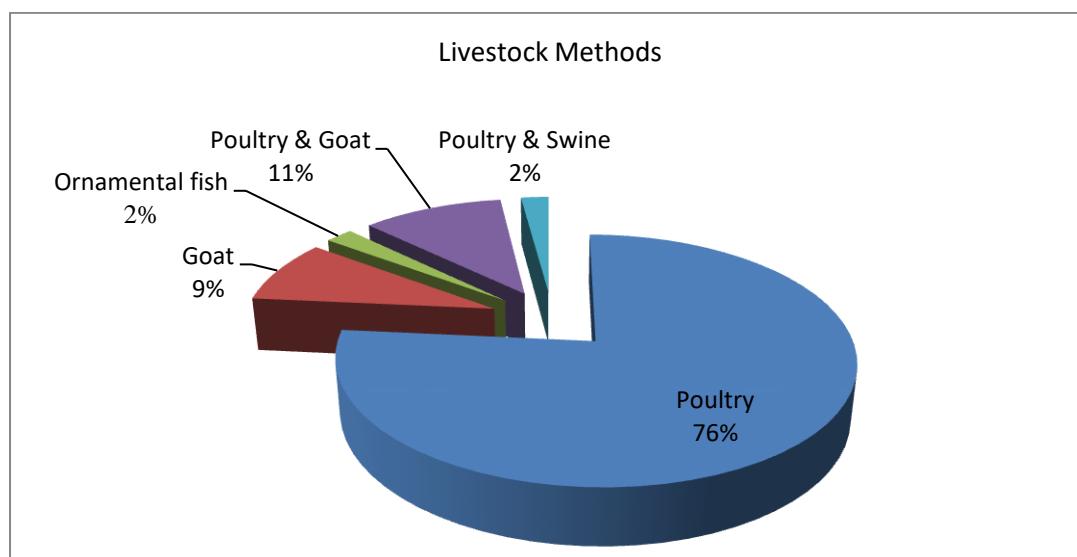
#### 4.5 Rearing of other Livestock with Dairy Farming



Source: Survey Data, 2013

**Figure 4.3: Rearing of other Livestock with Dairy Farming**

The Figure 4.3 shows that 56% of the farmers are engaged in other types of livestock activities other than dairying. In Homagama VS range, more than 67% of the farmers do not practise other livestock activities along with dairying. Moreover, the farmers who practise other livestock activities are mainly involved in poultry farming. As shown in Figure 4.4 practising of poultry farming with dairy farming was more than 75%. Furthermore, some farmers practise more than one type of livestock rearing with dairying such as poultry with goat farming and pig farming. In Kosgama VS range, due to the religious impact, farmers are involved in poultry, goat and swine farming. In the Niripola area, most of the farmers are Catholic and they tend to involve more in medium scale goat, poultry and pig rearing.

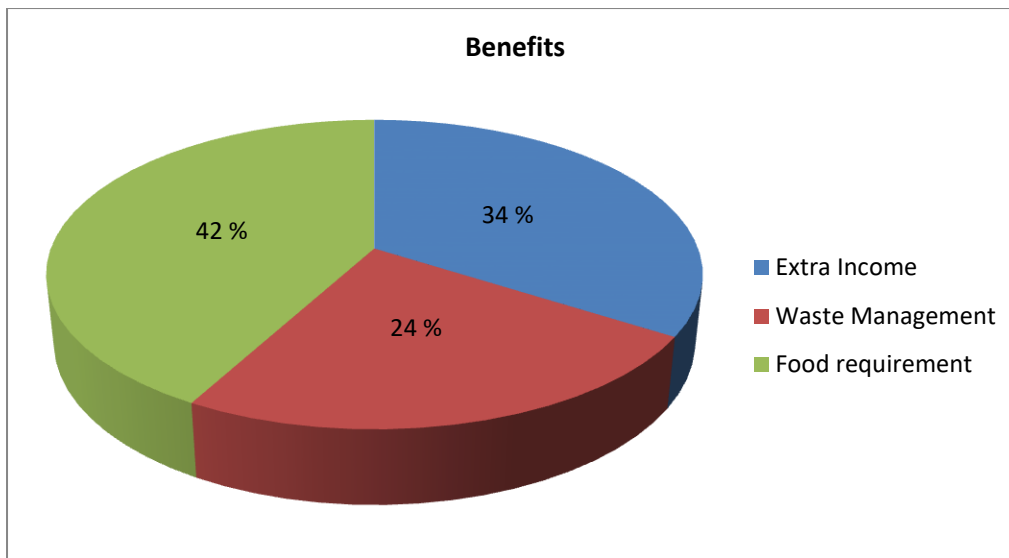


Source: Survey Data, 2013

**Figure 4.4: Types of Other Livestock Rearing in the Study Area**

#### 4.6 Benefits of Integrated Farming

The Figure 4.5 illustrates the types of benefits obtained from the integrated farming in the study area. Accordingly, 42% of the farmers practised other types of livestock such as backyard poultry for food security. Other than that, 34% of the farmers received an extra income and the rest is engaged in the sector for waste management.



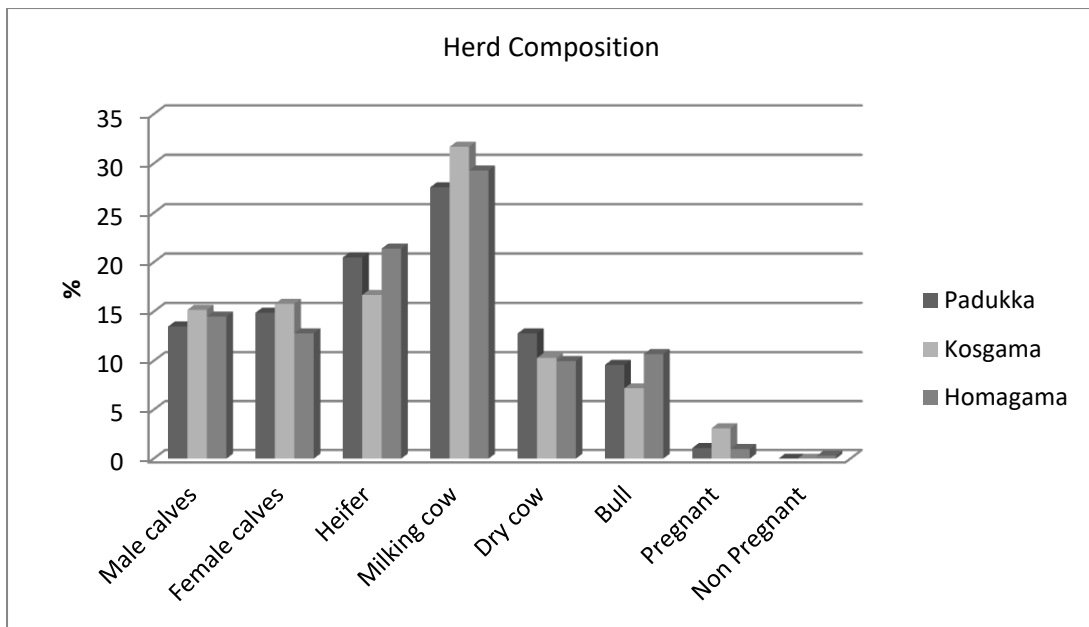
Source: Survey Data, 2013

**Figure 4.5: Benefits of Integrated Framing**

## **4.7 Herd Composition**

### **4.7.1 Herd Composition - Cattle**

The total herd composition comprises male and female calves, milking cows, dry cows, bulls, pregnant and non-pregnant animals. The average herd size is 5.4 in the study area. However, it is slightly different in 3 veterinary service divisions as Kosgama 6, Padukka 6 and Homagama 3 animals/herd.



Source: Survey Data, 2013

**Figure 4.6: Herd Composition of the Study Area Cattle**

According to the Figure 4.8, 30% of the herd comprise milking cows —the most economic component in the dairy farm. According to national statistics, milking at present is 20% of the total herd. However, this contribution is higher in the Seethawaka area. Moreover, Heifers also represent 19% of the total herd which will contribute to the future production performance of the herd at present. Other than that, around 15% of the herd constitutes of female calves which also determine the future production of the dairy farm. Male calves represent 14% of the total herd and 9% of the herd comprises bulls in the farm. The pregnant animals used for milking also represent 2% of the total herd. Further, the study determines that the male and female ratio is largely similar and it is 1:1.

#### 4.8 Buffalo Herd Composition

**Table 4.2: Buffalo Herd Composition**

Herd Composition	Padukka		Kosgama		Homagama		Total	
	No	%	No	%	No	%	No	%
Male calves	29	13.7	15	14.7	26	16.8	70	14.9
Female calves	25	11.8	14	13.7	16	10.3	55	11.7
Heifer	44	20.8	10	9.8	38	24.5	92	19.6
Milking cow	40	18.9	23	22.5	25	16.1	88	18.8
Dry cow	34	16	24	23.5	43	27.7	101	21.5
Bull	37	17.5	14	13.7	7	4.5	58	12.4
Pregnant	3	1.4	2	2	0	10	5	1.1
Total	212	100	102	100	155	100	469	100

Source: Survey Data, 2013

The Table 4.2 illustrates the number of animals of different categories of the buffalo herd. According to the table the milking cow percentage of the study area is around 19%. It is much similar to the national averages of the milking animal population. However, the dry cow represents 22% of the total herd and it is the highest contribution. Other than that, heifer contribution (20%) is also higher than the milking cow contribution. Moreover, the male and female calves born in the herds were not in 1:1 ratio and shows slight changes (55:45, male: Female). This indicates that in the buffalo herds majority of the newborns were male.

#### 4.9 Distribution of Dairy Animals

**Table 4.3: Maximum, Average and Mode of Animals in Herd**

VS Division	Maximum No. of animal	Average no. of Animals	Mode
Padukka	20	6	4
Kosgama	21	6	5
Homagama	30	4	4
Total	30	6	5

Source: Survey Data, 2013

As shown in the Table 4.3, average herd size in Padukka, Kosgama and Homagama are 6, 6 and 4 animals respectively. The maximum number of animals in a herd of Padukka and Kosgama are 20 and 21 animals. The mode is 4 animals in Homagama and Padukka.

**Table 4.4: The Number of Cattle owned by Percentage of Farmers**

No of cattle	Padukka	Kosgama	Homagama	Total
Less than 5	50.85	40.95	64.56	50.99
5-10	27.97	42.86	32.91	34.44
More than 10	21.19	16.19	2.53	14.57
Total	100	100	100	100

Source: Survey Data, 2013

The Table 4.4 illustrates the number of cattle owned by the farmers in the study area. Accordingly 50% of the farmers owned less than five animals in their farms. This situation is the highest in Homagama and it represents 65% of the farmers. The cattle number between 5-10 represents 35% of the total sample and the rest of the farmers owned more than 10 animals. This indicates that in the study area most of the farmers practise small scale dairy farming as an income generating activity.

**Table 4.5: Average Monthly Income**

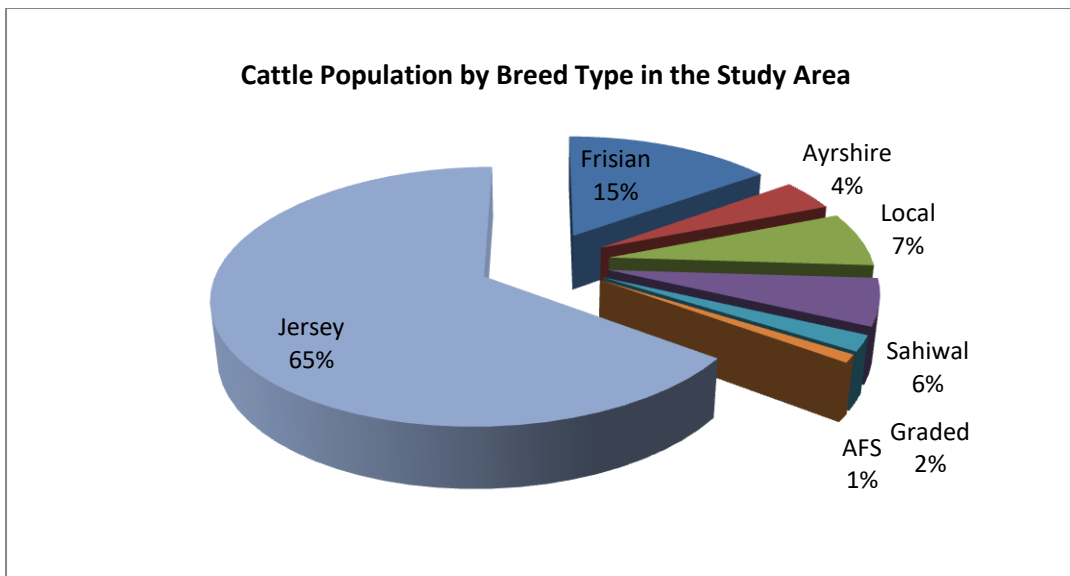
Income Category	Padukka (Rs)	Kosgama (Rs)	Homagama (Rs)	Total (Rs)
Major Income	26986	33667	30600	30417 (73%)
Milk Income	12269	12232	8002	10834 (27)
Total	39256	45899	38602	41251 (10%)

Source: Survey data, 2013

The Table 4.5 illustrates the income contribution of the farm families in the study area. Accordingly, 73% of the total income was received from various other income sources. The average total income of a household is Rs.41,251 and the milk income contribution is Rs.10,834.00

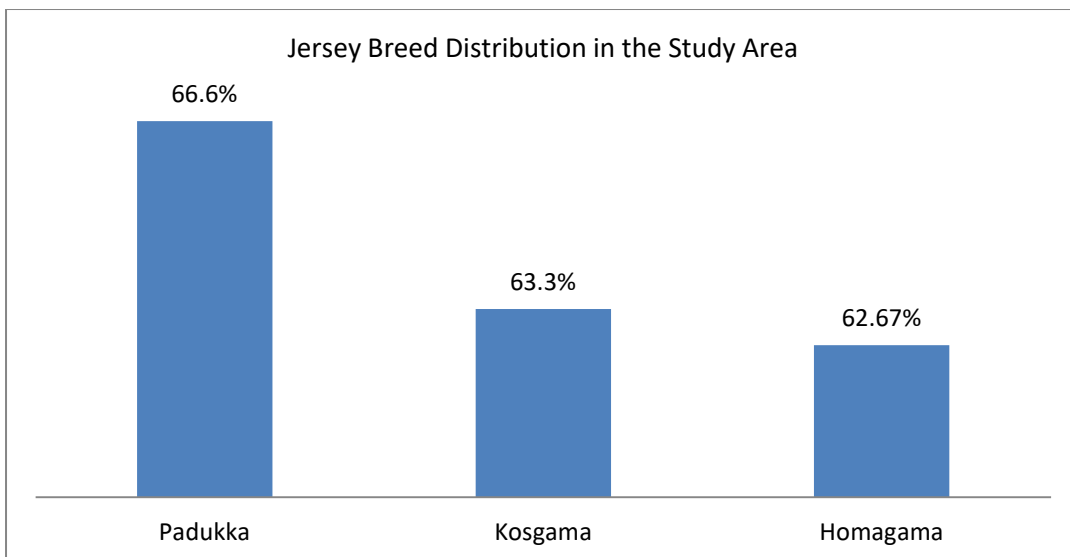
#### 4.10 Distribution by Breed Type

The Figure 4.7 describes the breed type of the cattle population in the study area. For the convenience of the study, a breed which shows more characteristics of a particular type counted as one of that breed types, for example, cross breeds with more Jersey characteristics is considered as a Jersey breed. Accordingly 7 breeds were identified: Jersey, Frisian, Ayrshire, local breed, Sahiwal, Graded animals and AFS. Graded animals are categorised as animals which continuously upgrade their blood level using same breeds. According to the figure, the majority (65.6%) of the cattle belonged to the Jersey breed and 15% of the animals were Frisian breeds. The local animals represent 7% of the total sample.



Source: Survey Data, 2013

**Figure 4.7: Cattle Population by Breed Type in the Study Area**



Source: Survey Data, 2013

**Figure 4.8: Jersey Frisian and local Breed Distribution in the Study Area**

About 67% of cattle breeds in Padukka, 63% in Kosgama 63% Homagama animals are Jersey. Jersey breed is the most popular in the area because it shows certain good characteristics such as production performances and high heat resistance.

The second most common breed type in the study area was Frisian which accounted for 15% of the total sample. In Homagama VS range Frisian contribution is around



20% because more farmers are accustomed to practice intensive farming as they do not have much space for free grazing.

The local breed contribution is 7% in the study area and in the Kosgama area local breeds represent 9% of the sample population.

#### 4.11 Average Milk Yield by Breed Type

**Table 4.6: Milk Yield by Breed Type**

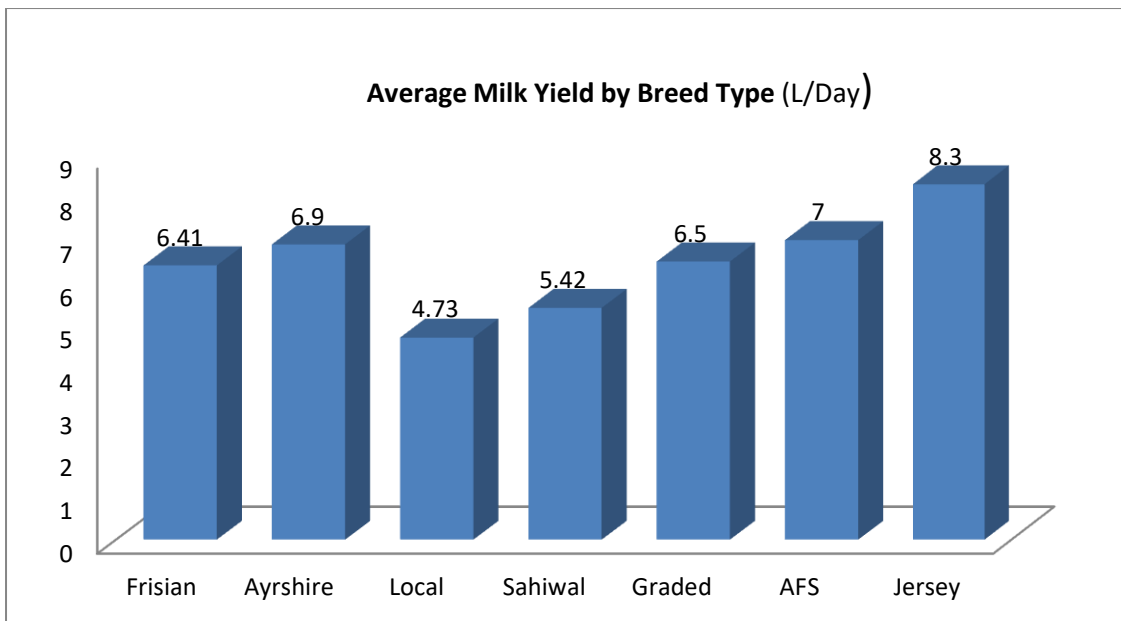
Breed Type	Milk Yield (Litres/day)		
	Average	Minimum	Maximum
Jersey	8.32	3	15
Frisian	6.41	2	17
Ayrshire	6.40	1	15
Local	4.73	1	12
Sahiwal	5.42	1.5	10
Graded	6.50	5	10
AFS	7.0	5	10

Source: Survey Data, 2013

As shown in the table the average, minimum and maximum milk yields by different breed types are described. Accordingly the highest average production is shown by Jersey breeds (8.3litres).

Frisian breeds show average performance of 6.4 litres/day. The maximum yield performance was shown by Frisian. It was recorded as 17 litres/day. Moreover, the other higher producers were observed in the breeds of Jersey and Ayrshire because they produce 15 litres/day. The breeds such as AFS, Graded and Ayrshire also produced more than 6 litres/day.

Other than that, the local crossbreeds supply an average milk yield of 4.7 l/day and the maximum yield was 12 l/day.

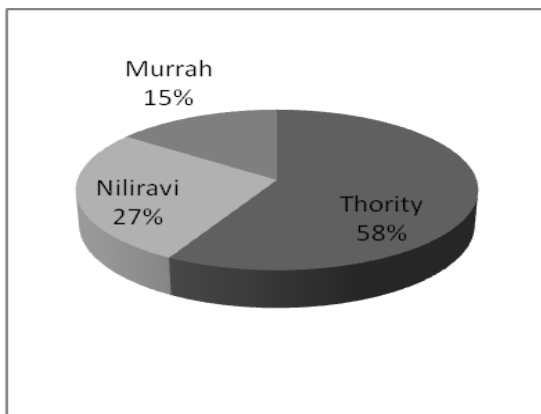


Source: Survey data, 2013

**Figure 4.9: Average Milk Yield by Breed**

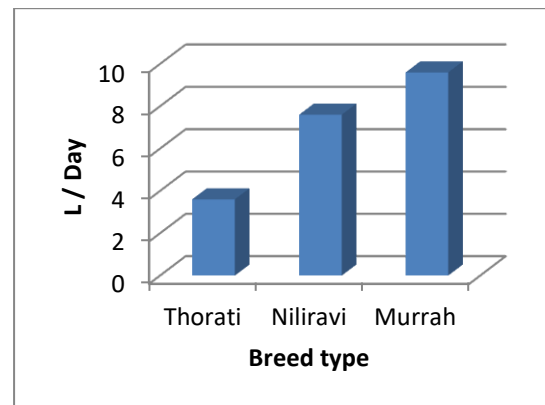
#### 4.12 Buffalo Breed Distribution

According to the survey, three breed types were identified as Murrah, Niliravi and Thorati. Buffaloes are easy to rear as it requires lesser inputs than cattle rearing. However, the main problems in the study area for buffalo farming are limited in bellowing area and lack of natural grasslands for grazing. As shown by the figure 4.10, Thorati represents 58%, 27% of the breeds of buffalo are Niliravi and 15% are Murrah. Furthermore, a number of buffaloes in Padukka and Kosgama are higher than the Homagama area.



Source: Survey Data, 2013

**Figure 4.10: Buffalo Breed Types**



Source: Survey Data, 2013

**Figure 4.11: Buffalo Production by Breed**

The Figure 4.11 illustrates the milk production of three breeds in Seethawaka area. Accordingly, Murrah produces the highest production of 10 litres/day and Niliravi produces 8 litres/day.

**Table 4.7: Average Prices of Cattle and Buffalos by Breed**

Breed Type	Price (Rs)
<b>Cattle</b>	
Jersey	90.000.00
Frisian	79.500.00
Aryshire	50.000.00
Shahiwal	40.000.00
<b>Buffalo</b>	
Murrah	120.000.00
Niliravi	110.000.00
Thorati	35.000.00

Source - Survey Data, 2013

As shown in the Table 4.7 the prices of milking animals are comparatively higher than other animals in the herd. Dominant high producing breeds such as Jersey, Frisian are much higher than other breeds of cattle. The buffalo breeds of Murrah and Niliravi are the most valuable animals in the study area.

#### **4.13 Milk Processing**

Processing of milk refers to adding value to the fresh milk and it will increase the shelf life of milk to a certain extent. The study reveals that only 13% of farmers practise milk processing. In Homagama and Padukka VS ranges, around 15% of the farmers are engaged in milk processing to earn extra money or to earn profit. Other than that a very less number of farmers practise value addition or preservation for their family consumption other than marketing because these farmers do not have proper marketing channel for their products. Facilities such as storage, cooling, preservation and heating for milk processing in the farmer premises are available for only 40% of the processing farmers. However, about 60% of the processors did not have adequate facilities even if they did processing. The study also found that 52% of the sample farmers were unable to produce value added products due to financial constraints.

#### 4.14 Milk Processing Facilities of Farmers

**Table 4.8: Processing Facilities Available with Farmers**

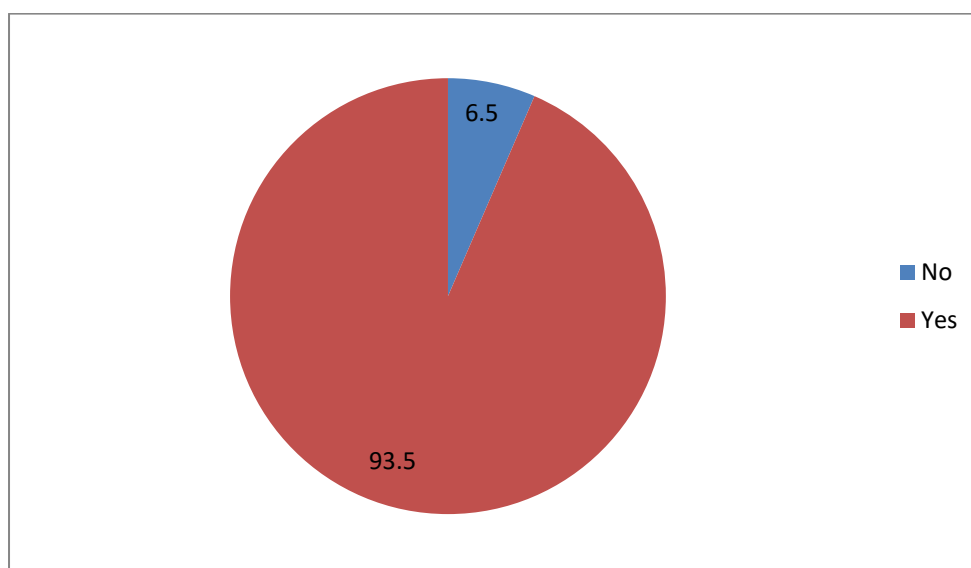
Processing facilities	Percentage	
	Yes %	No %
Availability of separate place	34.1	65.9
Availability of basic equipment	75	25
Hygienically sound	73	27
Water facilities	89	11

Source: Survey Data, 2013

According to the Table 4.8, it is clear that most of the farmers who produce value added products believe they have better processing conditions. However, it is important to note that except in a few places, the production quality should improve. Even though the farmers stated that they have adequate facilities, the hygienic condition of the processing places is required to be upgraded.

#### 4.15 Farmers' Attitudes towards Milk Processing

As shown in the figure 4.12, 93.5% of the farmers are willing to change their attitudes regarding milk processing. If farmers received better advice and financial support for the advancement of processing they would prefer further expansion.



Source: Survey Data, 2013

**Figure 4.12: Ability to Change the Attitudes**

**Table 4.9: Willingness Towards Milk Processing (Percentage)**

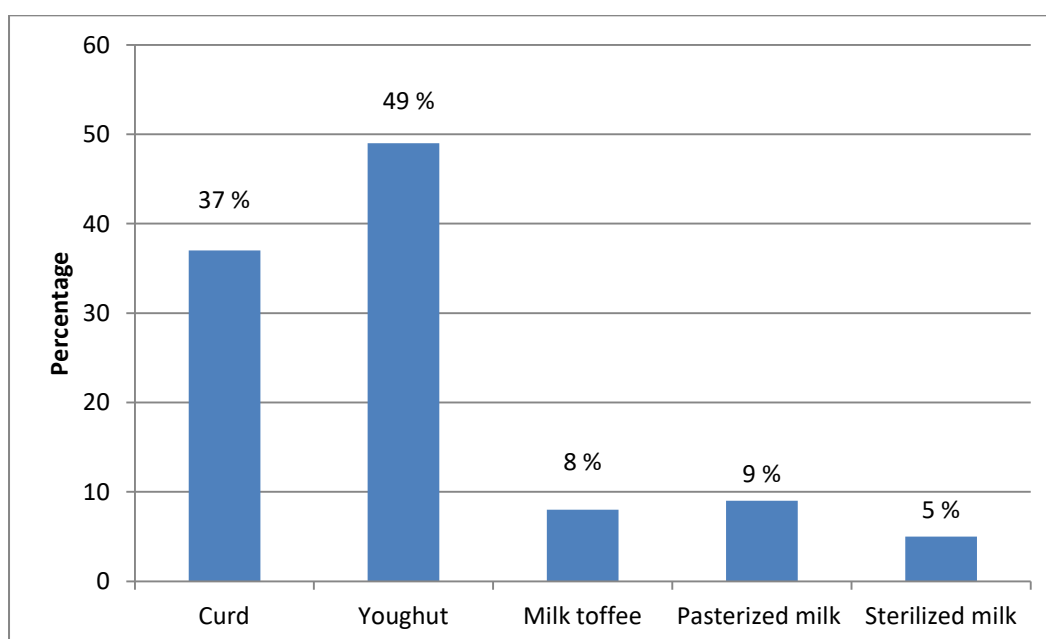
Willingness	Padukka	Kosgama	Homagama	Total
Yes	37	20	24	27
No	63	80	76	73

Source: Survey Data, 2013

As shown in the Table 4.9, 73% of the farmers expressed that they are not interested in producing value added products, due to unavailability of labour capital and lack of enthusiasm to produce value added products. Other than that, farmers stated that it will be difficult to compete with popular dairy products as marketing problems may arise.

#### **4.16 Types of Value Additions**

The Figure 4.13 describes the types of value added products that farmers are willing to produce. Majority (49%) of the farmers prefer producing yoghurt and 37% farmers prefer curd. Other than that farmers are willing to process milk toffee, pasteurized milk and sterilized milk.



Source: Survey Data, 2013 (Percentages and totals are based on the number of respondents)

**Figure 4.13: Products which Farmers Prefer to Produce**

#### 4.17 Difficulties in Milk Processing

The Table 4.10 illustrates the problems and constraints in milk processing. About 52% of the respondents face financial difficulties in milk processing. Due to lack of labour 34% of the respondents were unable to process milk. Infrastructure, awareness and storing facilities are other problems in processing milk and around 35% of the farmers wish to produce value added products. Other than that approximately 10% of the farmers were in short of quality water and electricity facilities for milk processing.

**Table 4.10: Constraints in Processing Milk**

Type of Constraints	Farmers' Responses							
	Padukka		Kosgama		Homagama		Total	
	No	%	No	%	No	%	No	%
Electricity	5	9.4	2	5.9	5	21.7	12	10.9
Clean water	1	1.9	3	8.8	5	21.7	9	8.18
Labour	11	20.8	14	41.2	12	52.2	37	33.6
Other Infrastructure	15	28.3	16	47.1	12	52.2	43	39.1
Awareness	17	32.1	16	47.1	6	26.1	39	35.4
Storage facilities	18	34.0	14	41.2	6	26.1	38	34.5
Capital	23	43.4	20	58.8	14	60.9	57	52
Lack of time	3	5.7	4	11.8	3	13	10	9.0
	53		34		23	26.1	110	

Source: Survey Data, 2013 (Percentages and totals are based on the respondents)

According to the study, farmers stated that the knowledge on value added products is required for better production. At the same time, 68% of the farmers requested to conduct awareness and practical training programmes on how to produce value added products as a micro enterprise in their households.

#### 4.18 Milk Marketing

The Table 4.11 illustrates the milk collectors according to the milk selling agents in the study area. In Padukka, majority (52.2%) of the farmers sell milk to Milco and 23% of farmers sell to private collectors. These private collectors also sell their collection to Milco. If one person supplies more than 50 litres every day Milco provides extra Rs.1000 per month as an incentive. Therefore in Padukka area 3-4 private collectors were observed.

**Table 4.11: Collecting Agents in the Study Area**

Collecting Agent	Padukka		Kosgama		Homagama		Total	
	No	%	No	%	No	%	No	%
Nestlè	1	0.9	1	1	0	0	2	0.7
Milco	60	52.2	15	14.6	24	36.3	99	34.6
Neighbour	11	9.6	11	10.7	10	15.2	32	11.3
Fonterra	2	1.7	47	45.6	10	15.2	59	20.8
Co-operative	1	0.9	26	25.2	14	21.2	41	14.4
Sukhi	6	5.2	0	0	0	0	6	2.1
Milki	8	7.0	0	0	0	0	8	2.8
Own business	0	0	0	0	2	3	2	0.7
Private collector	26	22.6	1	1	4	6.1	31	10.9
Private Producer	0	0	2	100	2		04	1.4
<b>Total</b>	<b>115</b>	<b>100</b>	<b>103</b>		<b>66</b>	<b>100</b>	<b>284</b>	<b>100</b>

Source: Survey Data, 2013

#### 4.19 Milk Centres in the Seethawaka Area

##### 4.19.1 Milco

Meepe is the main Milco milk collecting centre in the Seethawaka area. The total chilling capacity is around 3450 liters. Milk is daily collected through a formal milk collecting channel. There are six main sub collecting centres: Kaduwela, Udahamulla, Bokundara, Homagama, Ingiriya and Kosgama. The highest collection is obtained in May-June months. During this period fresh grass availability is high compared to other periods. The milk production is less in August due to the dry period of the year.

Pricing is determined based on the fat and SNF (Solid Non Fat) content of the milk. Lactometer is utilized to measure the amount of SNF (Lactometer reading /4 = SNF). For different fat and SNF levels, the prices are determined according to their pricing chart. Milco collecting centre consists of 24 Farmer Managing Societies managed by their representatives. In the study area the following six Milco collecting centers were observed.

**Table 4.12: Milco Collecting Centers in the Study Area**

VS Division	Village	Collection Day (L)	No. of Farmers
Padukka	Horagala	100	15
	Waga	80	10
	Meepe	500	50
Kosgama	Illukowita	30	4
Homagama	Homagama VS office	160	18
	Pitipana	56	15
<b>Total</b>		<b>926</b>	<b>112</b>

Source: Meepe Milco Collecting Centre, 2013

A management committee appointed by the farmer managing societies is in-charge of the Meepe collecting centre. Monthly Rs.15,000/= basic allowance and for each liter of milk 50 cents is provided by the Milco Company Limited to the collecting centre. Other than that, cleaning equipment is also provided by the Milco. Milk collection is practised only in the morning. The collection hours in the Meepe centre is from 8.00 a.m to 1.00 p.m. Farmers use both stainless steel and plastic containers as milk transporting equipment.

Farmers who sell their milk to Milco have better opportunities and are members of the Milco Farmer Social Security Fund. Milco Company Ltd has arranged special payment systems for the farmers in their special social events. The amount of money paid for different social activities as well as other family functions are listed below.

1. Death of a farmer Rs.50,000 or 25,000/=
2. Incidence of heart attack and surgery - Rs.50,000/=
3. Incidence of a cancer - Rs.20,000/=
4. Total disable condition - Rs.20,000/=
5. Partly disable condition – Rs.10,000/=
6. University education for children of a farmer family - Rs.10,000/=
7. Wedding of a member – Rs.7,500/=
8. Death of a family member – Rs.5000/=
9. In the event of getting through the Year 5 Scholarship Exam by farmers' child Rs.3000/=
10. When a girl child of a farmer attains puberty - Rs.3000/=

In the Meepe collection centre, value added products are not produced. Milco officials stated that purchasing of refrigerated milk is problematic because if the milk is not refrigerated immediately after milking fat separation can be seen. Therefore, the quality of milk might drop. If the fat content of the milk is less than 2.5 and SNF content is less than 8, the milk is rejected by Milco. If the fat + SNF is 12.5, the price of a litre is Rs.50/=. But the SNF + Fat value is 12 the price is Rs.45/litre. Other than



that, for every 0.1 increase of fat the price increases by 97 cents and with a 0.1 SNF the price also increases by 97 cents.

In addition, the Milco Company Limited distributes Highland feed through Milco collecting centres. This feed is manufactured using omi, poonac, rice bran and milk powder by-products. The price of one kilogram of Highland feed is Rs.34/=. Feeds are distributed to farmers and the money for that will be deducted from that price paid for the milk. However, this feed distribution programme has collapsed due to a quality problem of feed.

Milco Company Limited has also implemented Dairy Village Development Programme to enhance animal well-being by providing subsidies to construct cattle sheds.

#### **4.19.2 Milky Collecting Centre**

Milky collecting centre is a private formal collector started in 2010 in the Padukka VS range and collects 800-1000 l/day. There are around 50 farmers providing milk to this collecting centre and these farmers maintain Farmer Managing Society under the Milky collection centre. In addition, Milky provides some subsidized inputs for dairy farming such as animal feed and milk transport cans. The price of milk varies from Rs.50.00 – Rs. 65.00 per litre. Normally, the cow's milk price is determined by the fat + SNF content of the milk and it is always more than 50/litre. The buffalo milk price is around Rs. 60/litre. Milky collects milk both in the morning and evening.

Milky produces curd and cottage cheese in the collecting centre and they have an organized network of fresh milk distribution at household level and retail fresh milk marketing is carried out in their own shops at Wellawatta. Other than that cottage cheese are sold to Tamil restaurants at Wellawatta. To produce one kilo of cottage cheese the required amount of fresh milk is 10 litres. The cost of producing 1 kg of cottage cheese is round Rs.600. But they sell 1 kg of cottage cheese at Rs.900. Moreover, a litre of curd is sold at Rs.150 in their selling centres. The capacity of chilling tank in Milky collecting centre is 1500 litres and the lowest collection is 700 litres. During peak production times, Milky has arrangements to sell excess collection to the Nestlè collectors at a less price. Milky owner stated that in his network about 70% of the farmers are young. In the collection centre two labourers are employed. According to him for the development of the dairy sector the following steps should be implemented by the government.

1. Provide good animals with high milk yielding capacity for low capital
2. Provide cattle feed at a subsidized rate

3. Government service should be developed towards extension, workshops and changing the attitudes.
4. Help farmers build self-esteem with dairy farming.

#### **4.19.3 Sukhi Milk Collector**

Sukhi is one of the dominant milk collecting centres at the Padukka VS range of the Seethawaka area. They also collect milk from 80-100 farmers from the surrounding area which expands up to 35-40 km from the factory. Accordingly, Sukhi collects milk by sending the vehicles to the dairy farm itself. The collection time is from 8.30 a.m to 11.45 a.m. As Milky does, Sukhi also collects milk separately as buffalo and cow's. The average price for 1 litre of cow's milk is Rs. 55/= and buffalo milk is Rs.60/=. The pricing is also determined based on the fat and SNF content of the milk. Sukhi also produces yoghurt, ghee and curd. Normally Sukhi produces 3,000 cups of yoghurt per day. There are 25-35 labourers working in the company. The company also has links with the Nestle company Ltd because in peak production periods the excess collection is sent to the Nestle. In the rainy season the demand for yoghurt is low and selling of these products is problematic. The manager of Sukhi explained that at the very beginning of the company most of the farmers produced adulterated milk. However, following their advice now farmers reduce the adulteration to a certain extent. Furthermore, some farmers even add urea to increase the SNF content of the milk. Therefore, special attention has to be paid to raise farmers' knowledge, change attitudes and social ethics associated with the dairy production process. Further, it was revealed that due to financial constraints milk powder production is not performed in the factory.

#### **4.19.4 Fonterra Collecting Centre**

Fonterra is a famous collecting network in Kosgama and the Homagama VS range of the Seethawaka area. In Kosgama, daily Fonterra collection varies from 1000-1050 litres. There are 70 farmers registered to supply milk to Fonterra at Kosgama area and out of this 40 farms sell cow's milk and the rest of them are buffalo rearing farmers. The pricing mechanism is based on the kilograms of milk and the cow's milk price varies from Rs.45.00 to Rs.55.00. The average buffalo milk price is around Rs.60.00. Usually milk collection is done separately as cow's and buffalo milk. Other than that the centre is provided with the chilling facility of 2500 litres of capacity. Once in every two days the chilled milk is transported to their main factory at Biyagama. In addition, farmers are advised by the company to refrigerate their milk in the evening. They explained that there are 30 farmers refrigerate milk in the evening and transport to the collecting centre in the following morning. The payment is made within 15 days.

The company also contributes towards the dairy development in the region and they have implemented a special development programme. In Kosgama, as an initial step they select 10 dairy farmers and provide all facilities at a subsidized rate.

Further, they provide all updated knowledge and measures for clean milk production and facilities to conduct these small tests in their dairy farms.

#### **4.19.5 Hanwella Co-operative Milk Society**

The Co-operative Milk Society is managed under the supervision of the Ministry of Livestock Development. This society consists of 25 farmers who were 22 cow's milk providers and 2-3 buffalo milk farmers. The total cow's milk collection per day varies from 80-100 litres. Further, 1 litre of cow's milk costs more than Rs.50/= and buffalo milk is Rs. 60/=. This society produces value added products such as milk toffee, yoghurt, curd and they sell their products at the same place. There are four labourers working at the Co-operative Society with a manager. Their salaries are paid by the Co-operative Society and all income is usually sent to the fund of the main Co-operative Society.

In the Hanwella Co-operative Society, they produce milk toffee using 36 litres of milk. In the morning, milk toffee is prepared using 18 litres of milk and in the evening the same amount of milk is utilized to prepare milk toffee at the collection centre.

#### **4.19.6 Curd Production**

Curd production is carried out in the centres using the buffalo milk collected. Using a litre of milk around six buddy curd pots are prepared. These small pots are sold at Rs.30 each.

#### **4.19.7 Average Income and Average Profit Analysis of Curd (buddy)**

1 lt. of buffalo milk	=	Rs.60/=
Cost of a pot (4.50 x 6)	=	Rs.27/=
Production cost with labour	=	Rs.30/=
Total cost	=	Rs.117.00
Selling price	=	Rs. 30.00
Income (30 x 6)	=	Rs. 180.00
Profit (180-117)	=	Rs.63.00
		=====
1 litre Pot		
1 litre of milk	=	Rs.60.00
Cost of Pot	=	Rs. 14.00

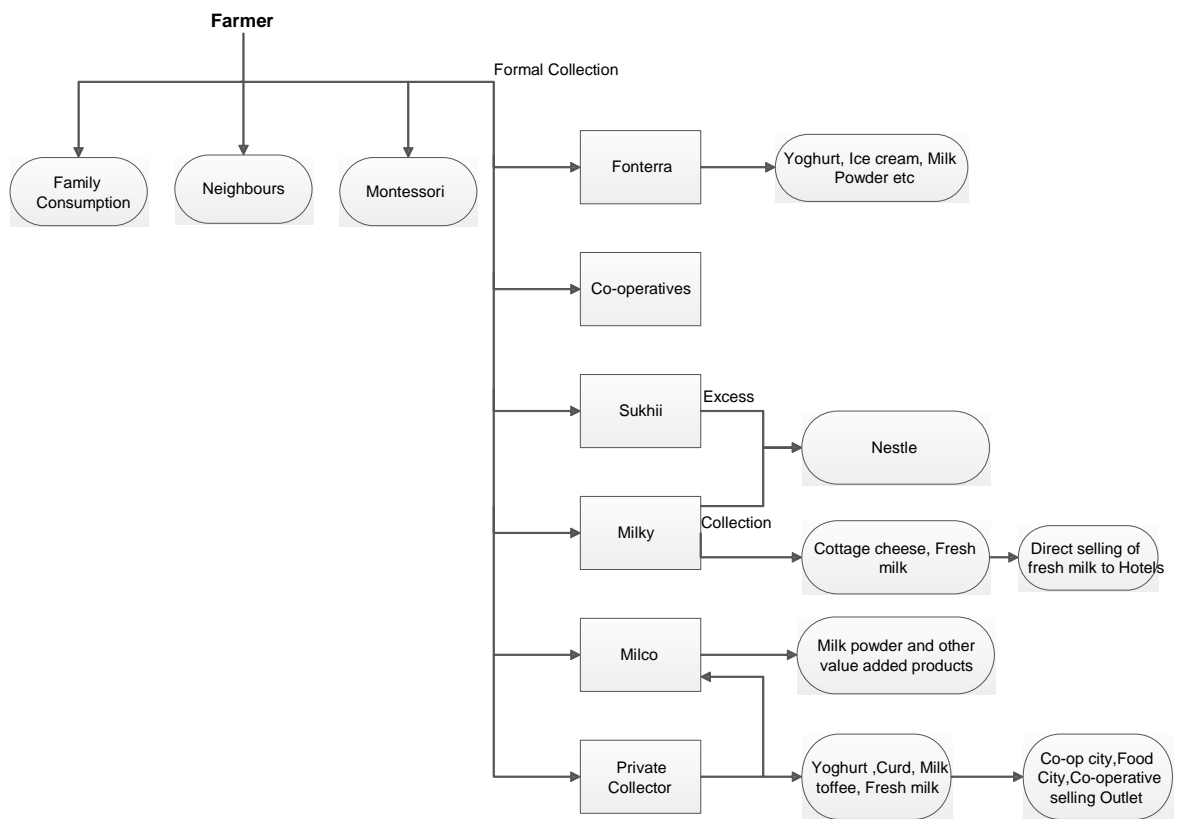
Production cost with labour	=	Rs. 30.00
Total Cost	=	Rs.104.00
Selling Price (Income)	=	Rs.150.00
Profit	=	Rs. 150-104.00
	=	Rs. 46.00
		=====

During sunny days 25-30 pots each containing one litre can be sold at the centre.

#### **4.19.8 Yoghurt Production**

Yoghurt production is done using 30 litres of milk and it produces 300 cups. Cost per container is Rs.3.10 and the price of a cup with yoghurt is Rs. 25/=. Only for other co-operative shops they sell a cup of yoghurt at Rs. 20/= and the usual selling price is Rs.30.00 each.

This Society sells their products to hotels, supermarkets and other co-operative societies and consumers in the area. The co-operative societies in the Seethawaka area include, Padukka, Meepe, Mawathagama, Pahathgama, Diddeniya, Hanwella, Thummodara, Kadugoda and Mawalgama. Moreover, during the high production period direct sale of fresh milk also occurs. In the rainy season, the Co-operative Society also sells their milk to Milco and Fonterra milk collectors.

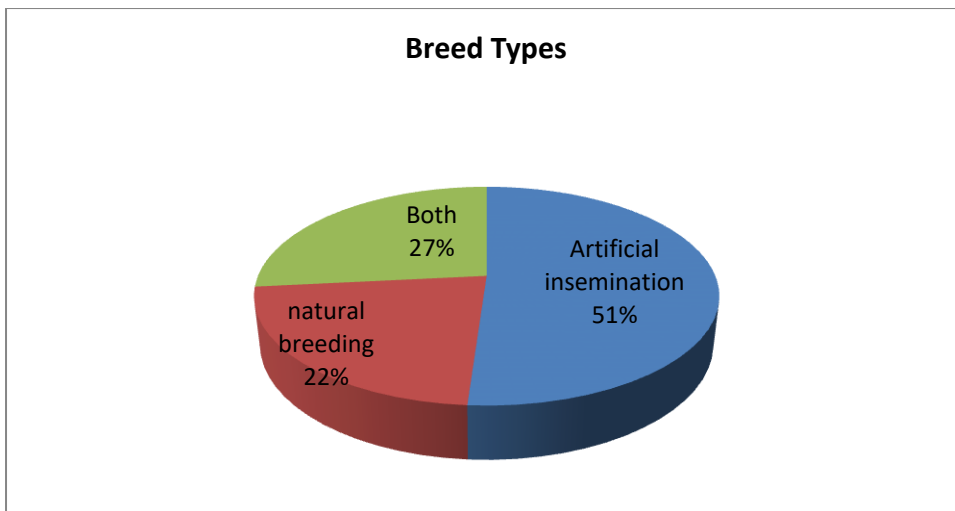


**Flow Chart 4.1: Milk Marketing in Seethawaka Area**

## 4.20 Breeding and Fertility Performance

### 4.20.1 Breeding Method

Breeding is the most important step in the future production of the dairy farming sector. In this study breeding methods used by dairy farmers were examined.



Source: Survey Data, 2013

**Figure 4.14: Breeding Methods followed by Dairy Farmers**

Artificial insemination (AI) is the most common type of breeding in the study area (51.1%). The number of AI followers are slightly different (Padukka - 44.9%, Kosgama - 57.4 and Homagama 51.9) in 3 VS ranges. Furthermore, natural breeding is practiced by 22.3% of the farmers, which is little high in Homagama. In the Homagama area high performing bulls are maintained specially for breeding activities. Farmers also stated that the success rate of natural breeding is higher than artificial insemination. In Homagama area for natural mating owner claims Rs.1000 for insemination. In addition, 27% of the farmers practise both methods because in some herds there are both improved breeds as well as local animals. Therefore, farmers practise these two types of breeding. Farmers reported that despite several rounds of AI pregnancy does not occur, at times. Therefore, farmers use bull to make the animals conceive. Out of the total farmers practising both types of breeding methods, about 13% farmers said both AI and natural breeding practices were done due to problems in conception. For AI to be successful farmers should recognize the heat signs of the animals and insemination should be done at the correct time. To evaluate farmers' awareness in identifying heat signs several questions were asked. Accordingly, 96% of the farmers knew about the heat signs and during the heat period several signs such as reddish vulva, vaginal discharge, bellowing, sniffing, loss of appetite, milk reduction and mounting could be detected. According to the experience of the farmers, the method of observation of heat signs is different. Some farmers check the heat signs (23%) every day and some observed heat signs during day and night (22%). When farmers detect the heat signs, they inform the AI technician or introduce a bull, depending on their method of breeding. To check the awareness on the correct time to practise artificial insemination, data on the determination of AI time following the detection of the 1<sup>st</sup> heat sign was recorded.

**Table 4.13: Farmers' Decision on Insemination Time**

Time	Padukka		Kosgama		Homagama		Total	
	No	%	No	%	No	%	No	%
As soon as detected	16	16	12	14.5	8	12.5	36	14.6
6-12 hours from detection	47	47	49	59	46	71.9	142	57.5
12-18 hours from detection	32	32	16	19	8	12.9	50	22.7
18-24 hours from detection	5	5	06	7.2	2	3.1	13	5.3
<b>Total</b>	<b>100</b>	<b>100</b>	<b>83</b>	<b>100</b>	<b>64</b>	<b>100</b>	<b>247</b>	<b>100</b>

Source: Survey Data, 2013

As shown in the Table 4.13, 58% of the farmers stated that 6-12 hours after the first heat sign is suitable for AI. At the same time, 15% of the farmers said insemination is done just after the signs are detected. Within 12-18 hours 23% of the farmers believed it was the best insemination time. Moreover, 5 % of farmers said that is 18-24 hours. Even though most of the farmers received training on dairy farming, and breeding methods their knowledge remains poor. However, during the discussions with farmers it was confirmed that more than 20% of the farmers correctly inform the time of insemination.

Artificial insemination in Seethawaka is entirely carried out by Livestock Development Instructors (LDI). Private AI technicians were not available in the area. Farmer families living in the interiors occasionally complain that their LDIS were not available. Further, more farmers complained that during holidays AI service is not functional.

## **4.21 Welfare and Healthcare**

### **4.21.1 Tick Treatment**

Majority of the farmers inform that ticks are a serious problem. Approximately once in every two months, farmers applied tick treatments. As a tick treatment 90% of the farmers used Biotical and other 10% used Asentol. VS Office of Kosgama sometimes provided tick treatments free of charge.

#### 4.21.2 Worm Treatments

As found, 67% of the sample treated their animals for worms. For calves and milking animals worm treatment is essential.

**Table 4.14: Type of Medicine used in Worm Control by Farmers**

Type of Medicine	Padukka		Vet range Kosgama, Homagama				Total	
	No of Farmers	%	No of Farmers	%	No of Farmers	%	No of Farmers	%
Nagazan	33	47.8	29	37.7	15	26.3	77	37.9
Albendazole	33	47.8	43	55.8	33	57.9	109	53.7
Nilworm	2	2.9	1	1.3	05	8.8	8	3.9
Rintal	0	0	2	2.6	2	3.5	4	2
Anaigan	1	1.4	2	2.6	0	0	3	1.5
Guard	0	0	0	0	2	3.6	2	1.0
<b>Total</b>	<b>69</b>	<b>100</b>	<b>77</b>	<b>100</b>	<b>57</b>	<b>100</b>	<b>203</b>	<b>100</b>

Source: Survey Data, 2013

Welfare and healthcare is an essential practice in promoting the dairy sector, because if an animal is free from diseases, they produce higher yields. In most of the developed countries animal welfare is a priority.

According to the Table 4.14, the most popular medicine for worms is Albendazole. This is used by 57% of the farmers. The second most common medicine is Nagazan which is used by 38% farmers. Other than that Nilworm, Rintal, Anaigan and Guard are also used by a lesser number of farmers in the study area.

The study also found out the types of practices used to control worms in the farms. Artificial or western medicines are used by 77% of the farmers and around 8% of the farmers still used their indigenous knowledge to treat the animals. However, 15% of the farmers practise both methods to control worms.

According to the survey, the knowledge on worm controlling was mainly gathered (76%) from the training programmes and the livestock officers at the relevant field. Some farmers (3%) explained that they received this knowledge by reading. For, 10% of farmers it was self-discovered while another 10% received this knowledge from other farmers.

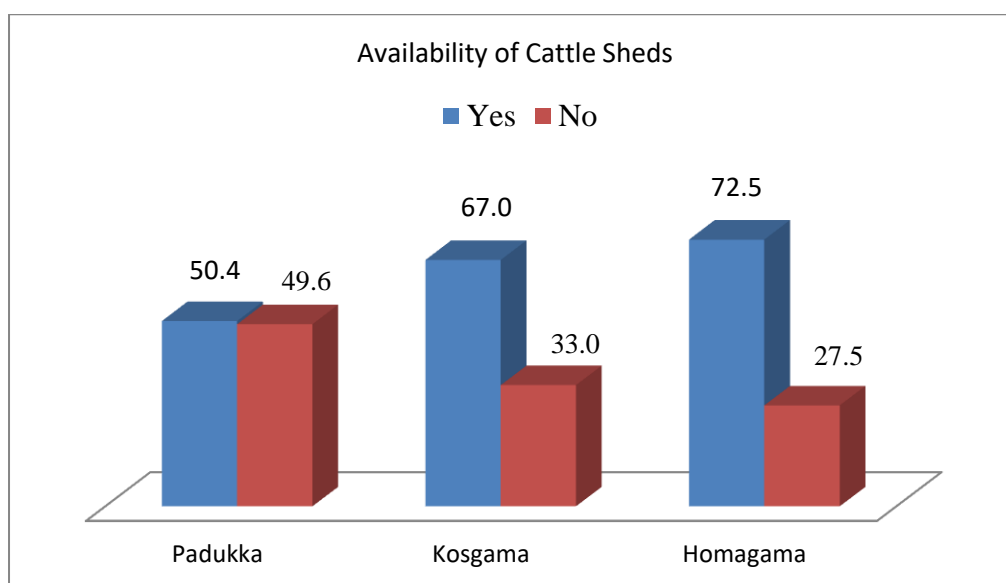


### 4.21.3 Diseases

In the Seethawaka area, other than worm and tick problems, some diseases were also observed. The most common disease was foot and mouth disease. It is around 88% from the reported diseases. Other than that mastitis disease was also observed in the farms.

### 4.22 Housing Conditions

A good shed for dairy cattle provides comfort to the animal, decreased wastage of feed stuff and ensures better environmental control. In the absence of a proper cattle shed, the health, welfare and production of cattle will be affected. The figure 4.15 indicates, 63% of the sample is having a cattle shed and the rest does not have any type of cattle sheds. In Padukka VS range, only 50% of the farmers owned a cattle shed, Kosgama 67% and Homagama 72.5%. More subsidies were distributed to construct cattle sheds in Kosgama and Homagama.



Source: Survey Data , 2013

**Figure 4.15: Availability of Cattle Sheds**

#### 4.22.1 Type of Sheds

As found, 43.5% of the farmers constructed permanent cattle sheds<sup>1</sup> to house their animals. Moreover, 36% of the farmers having semi permanent<sup>1</sup> type of sheds and 21.5% farmers owned temporary<sup>2</sup> types of cattle sheds.

<sup>1</sup>Permanent cattle shed refers to a shed prepared with cement and proper roofing. Waterers, feeders and other necessary parts are present in the shed.

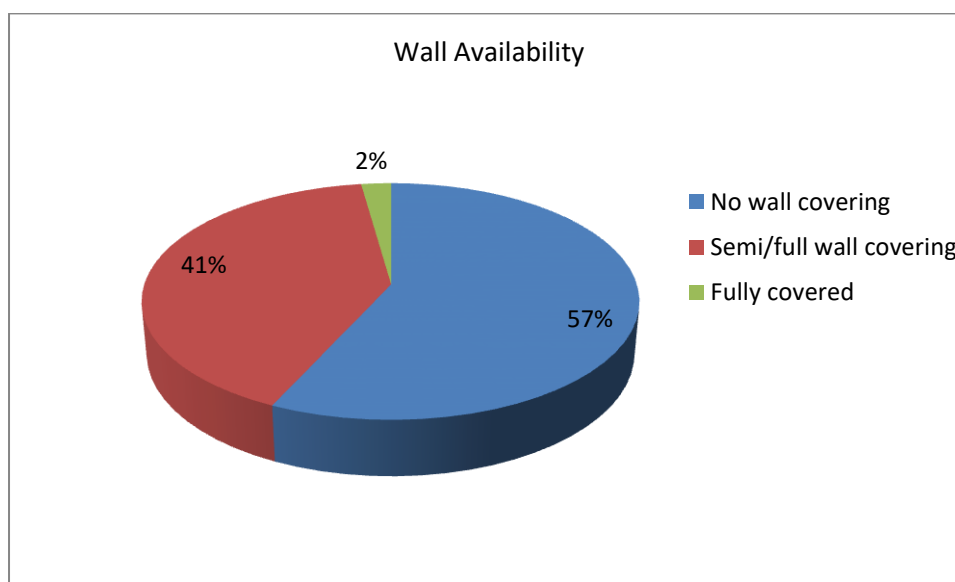
#### 4.22.2 Roofing Materials

The three types of cattle sheds in the study area covered with different roofing materials. As discovered by the study, aluminium sheets, asbestos, straw, rubber sheets, tile, cadjan and polythene are used as roofing materials of sheds.

Aluminium sheet is the common roofing material and it is used by 61% of the farmers. Other than that, asbestos sheets are used by 23% of the farmers and the rest of the farmers used straw, rubber sheets, tile and cadjan. In addition, straw, rubber sheet, tiles, cadjan and polythene are utilized to cover the cattle sheds.

#### 4.22.3 Wall Materials

In these areas it is not recommended to have walls because the study area belongs to high temperature area and due to high heat animal's production can decline. The study reveals that 54% of the farmers do not have wall materials. But 39% farmers have wall or semi wall covers constructed using bricks. A very less number of farmers used aluminium sheets and gunny bags as wall covers.



Source: Survey Data, 2013

**Figure 4.16: Wall Materials of the Cattle Sheds**

As shown in the figure 4.16, only 2% of the farmers built fully covered cattle sheds. These sheds were not constructed under the subsidy programmes of Dairy Village

<sup>1</sup> Semi-permanent sheds are not constructed with cement and roofing but done using Cadjan or straw and no feeders and waterers.

<sup>2</sup> Temporary –a covered place to house milking animals and other animals.

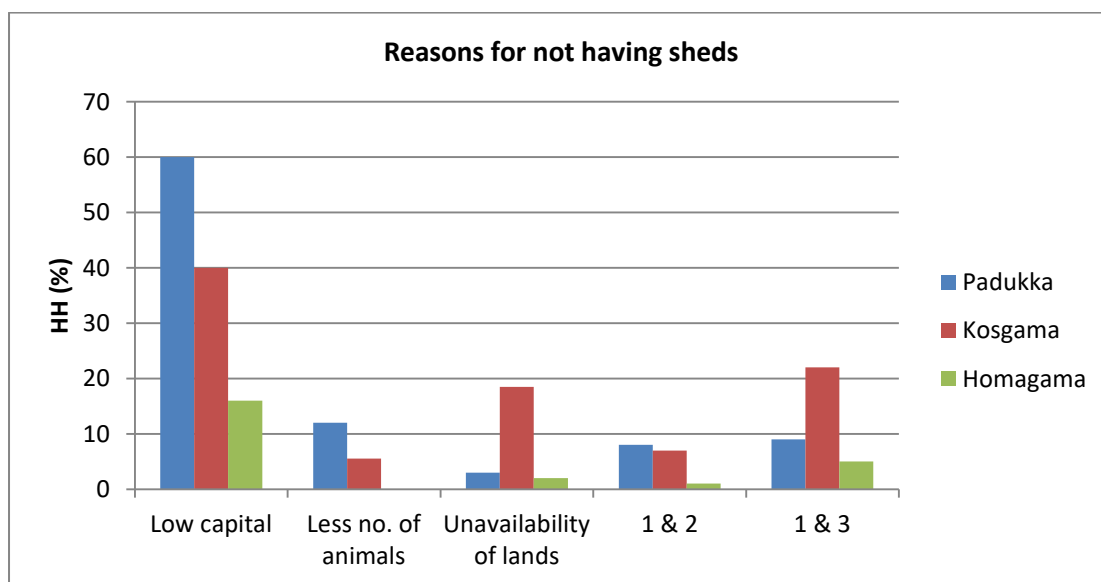
Development Project. Semi covered cattle sheds also represent 39% of the sample but the most appropriate cattle sheds for Seethawaka area should not have wall covers. Accordingly 58% of the sheds were built as instructed by the officials of the Ministry of Livestock Development.

#### 4.22.4 Floor Condition

The study reveals that, in 18.5% of the cattle sheds, floor condition shows a good grip and they maintain better cleaning activities in their sheds. Other than that, in 72% of the sheds the floor condition showed medium level grip and the water accumulation was not detected. The rest of the sheds show slippery (8%) and very slippery floor conditions in their sheds. Therefore in cattle shed construction, proper guidance of VS office is essential.

#### 4.23 Breeding Materials

The type of bedding materials used in the cattle sheds was tested. Normally 93.8% of the farmers do not use any bedding materials in their sheds. As found in the study, 2.8% of the respondents used rubber sheets and straw (3.4%) specially, for the newborn animals for 2-3 weeks to provide warm conditions in the sheds.



Source: Survey Data, 2013

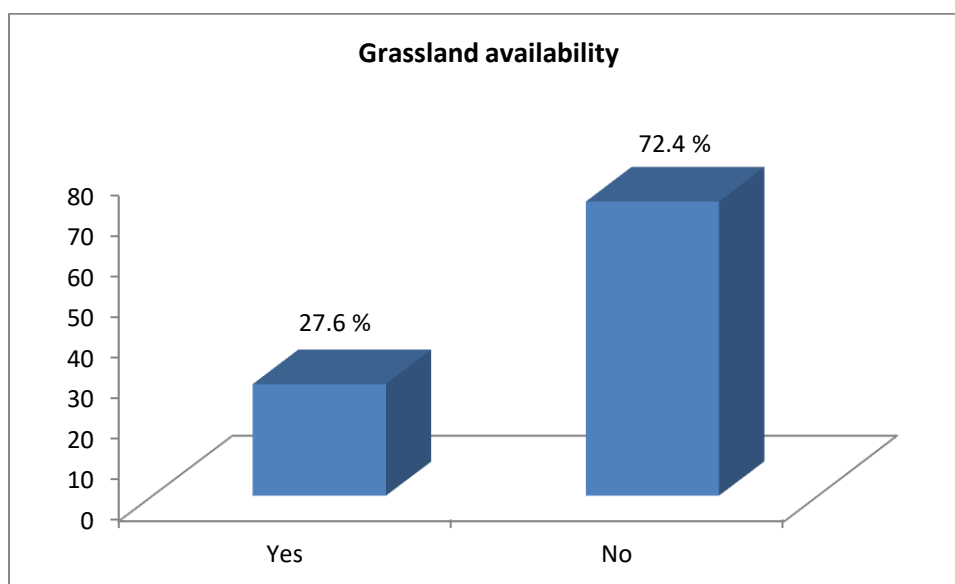
**Figure 4.17: Reasons for not having Sheds**

The Figure 4.17 illustrates the reasons for non-availability of sheds. Due to lack of capital 54.8% of the total sample did not construct cattle sheds. In addition, 60.3% of Padukka, and 40% of Kosgama and 63.6% of Homagama farmers do not have sheds due to low capital. Other than that, less number of animals (7.8%), unavailability of

lands (8.7%) are also reasons for that. Moreover, a combination of above all factors lead to unavailability of cattle sheds.

#### 4.24 Grassland Availability

Quality forages play a significant role in the production performance of animals. Accordingly, 27% of sample farmers maintain grassland. The rest of the farmers rely on the grasses from paddy fields, other lands and road sides. The area of grassland cultivation also varies from one perch to 1 ac in the sample population.



Source: Survey Data, 2013

**Figure 4.18: Grass Land Availability**

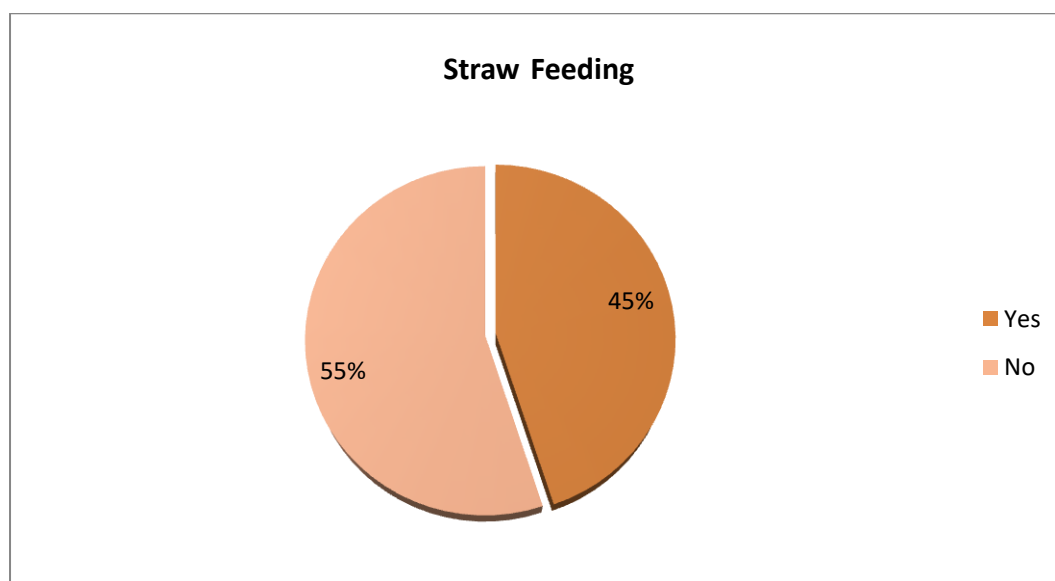
##### 4.24.1 Types of Grass

As found from the study, the CO-3 is the most common and famous grass type recommended by the Department of Animal Production and Health, for this region. From the total sample, 87% of the farmers grow CO-3. In addition, clone – 13 (1%), Napier (3%), Brachiaria (6%) and Guinea (2%) are the other types of grass which were grown in the area.

##### 4.24.2 Legume Feeding

Legume also contains a huge amount of Nitrogen which is needed to increase the milk production of the animals. Accordingly, legume is utilized to feed their animals only by 42% of the sample farmers. Of these, 90% of the farmers used Gliricidia and others used 'Pohorawal'. Farmers practising legume feeding are less in Homagama

area (35%). Fifty five per cent of the farmers expressed that they were unaware of the legume use.



Source: Survey Data, 2013

**Figure 4.19: Straw Feeding by the Sample**

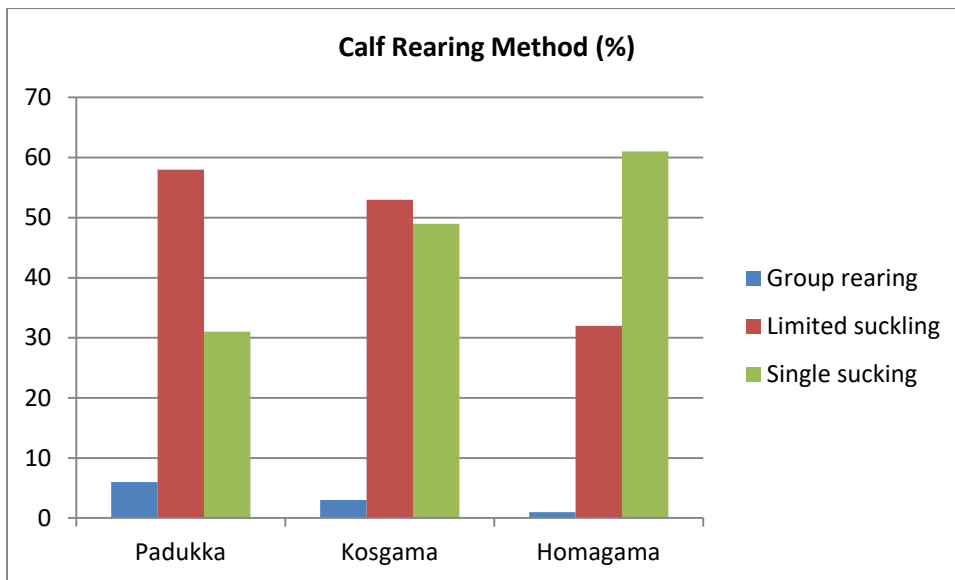
As shown in the Figure 4.19, 45% of the farmers fed their animals with straw. Farmers provided straw from surrounding paddy fields (95%) without any additions. However, 3% of farmers used straw with urea to feed their animals and 2% of farmers add water to the straw when they feed with straw.

#### **4.24.3 Grass Preservation**

In the study area, 98% of the farmers do not preserve any type of grass for future use. But six farmers in the sample population practise hay preparation. These farmers manage their dairy farms intensively and have a better knowledge on dairy production.

#### **4.25 Calf Rearing**

Calf rearing is the most important activity in a farm because the future production mainly depends on the calves at present. Farmers in the Seethawaka area are practising different types of calf rearing methods.



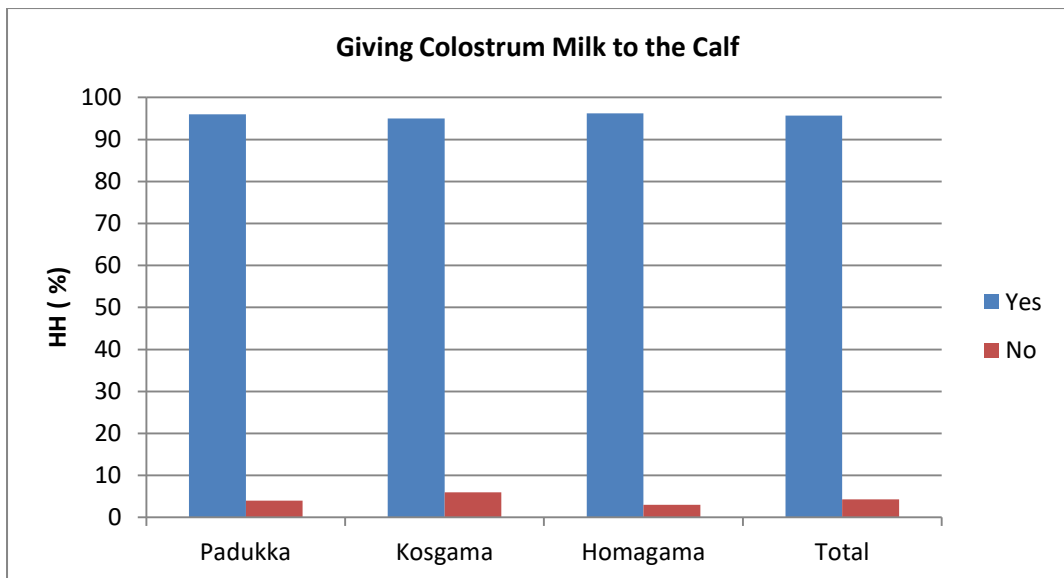
Source: Survey Data, 2013

**Figure 4.20: Calf Rearing Method**

As shown in the figure 4.20, group rearing is practised by five farmers and it is 2% of the total sample. Limited suckling is practised by 53% of the farmers. In the milking process some milk was kept for the calf and allowed to suckle. Other than that 45% of the farmers practicing single suckling as a stimulant; before starting milking the calf is allowed to suckle.

#### **4.25.1 Colostrum Feeding**

In calf rearing the most important activity is colostrum feeding. As the figure shows, of the total sample population, 96% of the farmers practise colostrum feeding.

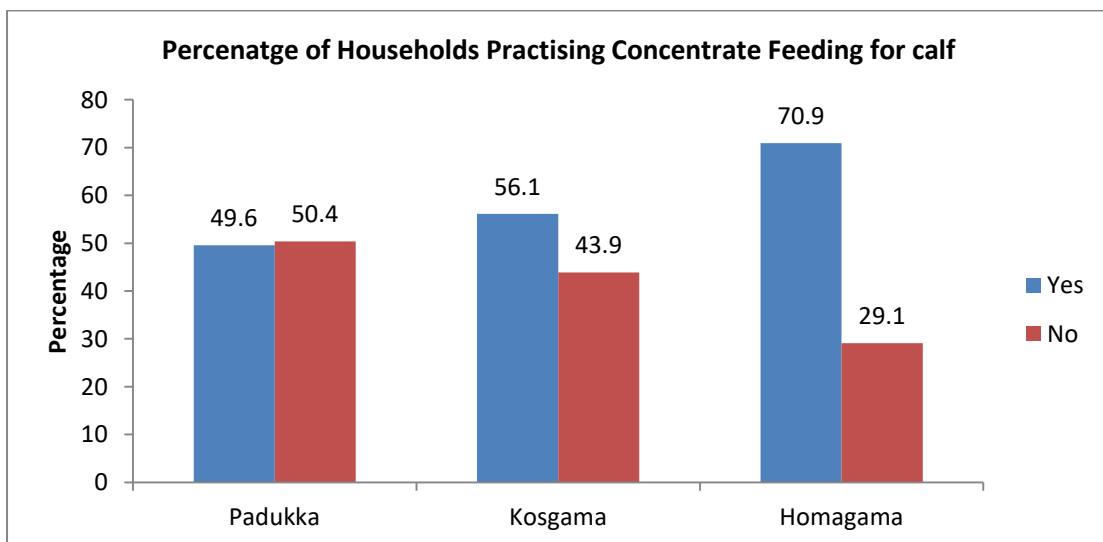


Source: Survey Data, 2013

**Figure 4.21: Giving Colostrum Feed to the Calf**

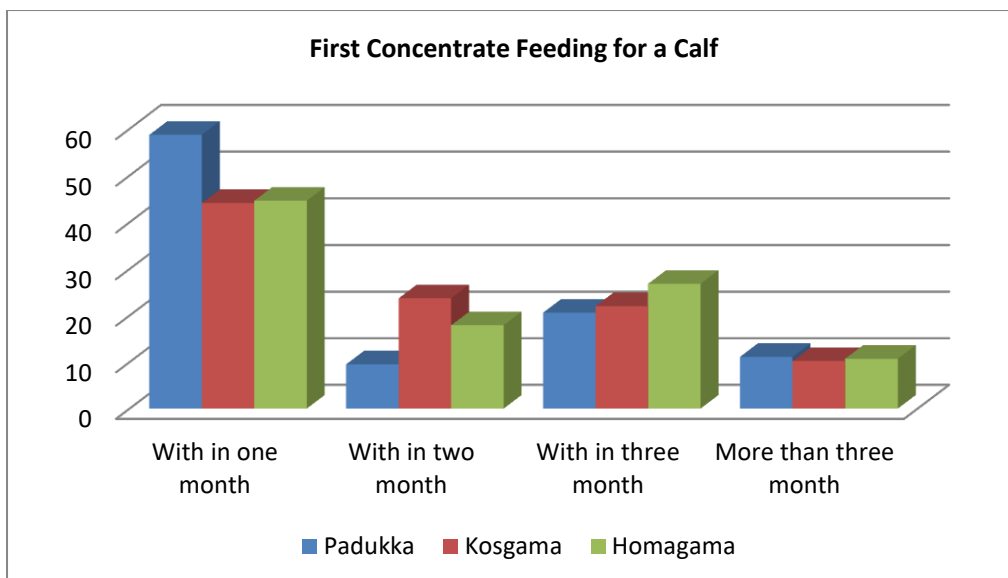
#### 4.25.2 Concentrate Feeding for Calf

According to the survey, 57% of the sample farmers provide concentrate feeds to the calves. Nearly, 50% of the farmers fed calves with concentrate feed for one month. Seventeen percent farmers fed their animals with formulated feed for one to two months.



Source: Survey Data, 2013

**Figure 4.22: Concentrate Feeding of Calves**



Source: Survey data, 2013

**Figure 4.23: First Concentrate Feeding for Calf**

As shown in the Figure 4.22, concentrate feed is introduced mostly within the first month of new born calves and Padukka farmers introduced much earlier than other farmers.

#### 4.26 Extension Work

Extension in livestock sector is moving generally slow because the number of extension officers is limited in the area as well as in Sri Lanka. In each VS division in the study area two LDIs are working at present. They conduct artificial insemination in the study area. Therefore, the extension activities are lagging behind and it is also common to the whole country. In dairy farming several main areas have to be strengthened with knowledge and attitudes. These are: Fodder management, reproduction, calf management, dry cow management, milking cow management, milking feeding, cow shed management and disease management.

VS office has been identified as the main institute of extension provider. Other than the Agrarian Service Centres, private collectors, Samurdhi Authority, NGOs have also been identified as other extension providers. These institutes conduct several workshops.

##### 4.26.1 Veterinary Surgeon's Office

Veterinary Surgeon's Office is the main government institute that is established to help and expand the dairy sector in the area. The VS office consists of one veterinary surgeon, two Livestock Development Officers, Office assistant and a driver. But this



staff has to cover a large area for livestock development. According to the study, several training activities were conducted by the Department of Animal Production and Health.

**Table 4.15: Number of Farmers received Training**

Training Activity	VS Range					
	Padukka		Kosgama		Homagama	
	No	%	No	%	No	%
Fodder management and conservation	17	17	22	24.4	4	14.3
Reproduction	11	11	17	18.9	6	21.4
Calf management	25	25	15	16.7	4	14.3
Dry cow management	3	3	7	7.8	7	25.0
Waste management	8	8	6	6.7	3	10.7
Milking processing	17	17	16	17.8	3	10.7
Feeding practice	19	19	7	7.8	1	3.6
Total	100	100	90	100	28	100

Source: Survey Data, 2013

As shown in the Table 4.15, 85% of the farmers from Padukka, 87% from Kosgama and 35% from Homagama received training during the last 10 years. The situation at Padukka and Kosgama is better compared to the Homagama VS range. These training programmes must be organized on several themes on dairy farming.

#### **4.26.2 Agrarian Services Centres**

The Agrarian Service Centers in Seethawaka area also provide better services to the dairy farmers through Agricultural Research and Production Assistants (ARPA). They individually visit dairy farms and provide information to improve dairy production. They also conduct training to impart knowledge to the farmers.

#### **4.26.3 Private Sector**

Milk collectors such as Milco, Fonterra, Sukhi and Milky in the Seethawaka area also provide training to farmers on hygienic milk production. It is important to note that the Fonterra Company Limited has initiated a practical programme on clean milk production and they provide knowledge and subsidies to farmers and they pay visits to farms to upgrade the production performance.

#### 4.26.4 Samurdhi Authority

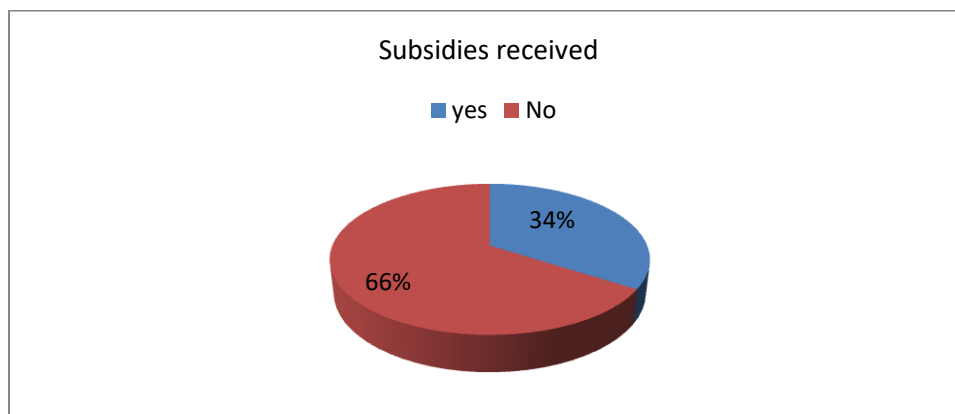
The Samurdhi Authority has also played a significant role in the Seethawaka area and they also provide information as well as credit for dairy development.

#### 4.27 Credit Facilities

Dairy farmers need a lot of support to improve the production. Therefore, credit is also a very important component in the dairy sector. Accordingly, in Padukka VS range 12% of the farmers obtained credit during the last five years. Kosgama 19% farmers and Homagama 13% farmers obtained credit facilities from various financial organizations. Of the total credit receivers 39% of the farmers obtain credit from the Hatton National Bank. Other than that, 13% of the credit is provided by the Samurdhi Bank. In addition, Bank of Ceylon, Sanasa Development Bank, Rural Development Bank, and other NGOs provided credit facilities to dairy farmers.

#### 4.28 Subsidies

Dairy farmers in the Seethawaka area also received subsidies from the government. According to the Figure 4.24, 34% of farmers received subsidies.



Source: Survey Data, 2013

**Figure 4.24: Subsidies Received**

Subsidies were distributed in different forms, such as financial and material including aluminium sheets, cement, iron bars to construct the cattle sheds and boots and milking cans to facilitate the dairy activities in the farm and planting materials (grass cutting) for improving the quality of feeding.

## 4.29 Waste Management

Waste management is essential for hygienic milk production and improvement of the health condition of the animals.



Source: Survey Data, 2013

**Figure 4.25: Waste Management**

As described in the figure 4.25, 30% of the farmers do not practise proper dung disposal methods in their farms. According to the field survey it was clear that some villages like Malagala in Padukka, were identified as very poor in waste management. Though they have cattle sheds, animals are tied around the garden and animal droppings are scattered all over, emanating a bad smell all over the area. This situation aggravates in the rainy season.

### 4.29.1 Reasons for Absence of proper Dung Disposal

As found in the study, majority (75%) of farmers do not practise proper dung disposal methods due to poor awareness and scant attention to dung disposal. Further, financial constraints in preparation of cattle sheds also result in an absence of proper dung disposal methods. Some farmers in the study area have increased the number of animals for profit maximization without considering the hygienic condition. This is due to lack of knowledge and negligence over waste management. The officials explained that despite their instructions, farmers do not practise proper dung disposal methods. Therefore attention to proper farming practices is very important. Other than that, water bodies are also contaminated due to bad practices. As a peri urban area, the attention on hygienic conditions is essential because the population density is also higher in the area.

Farmers who practise better dung disposal methods stated that they use cow dung for compost preparation (36%). Eighty nine percent of the compost producing farmers used cow dung for their crop cultivation, especially in some large scale coconut plantations and home gardening. Other than that, pineapple growers in the area also demand compost fertilizer. Therefore, the demand for cow dung has increased. The best method for dung disposal is the bio gas unit, but in the study area only three bio gas units are available. Majority of the farmers stated that they do not receive any subsidy to produce bio gas units, because majority of the farmers heavily rely on subsidies.

Certain farmers in Kosgama and Padukka complained that selling of cow dung is difficult. However, there is a big demand for cow dung in upcountry vegetable growing. Therefore, these buyers can be met with these small scale farmers to start enterprises to increase the family income through dairy farming.

Biogas units were not much implemented in the study area due to lack of capital, technology, having a less number of animals and poor awareness.

#### **4.29.2 Compost Production**

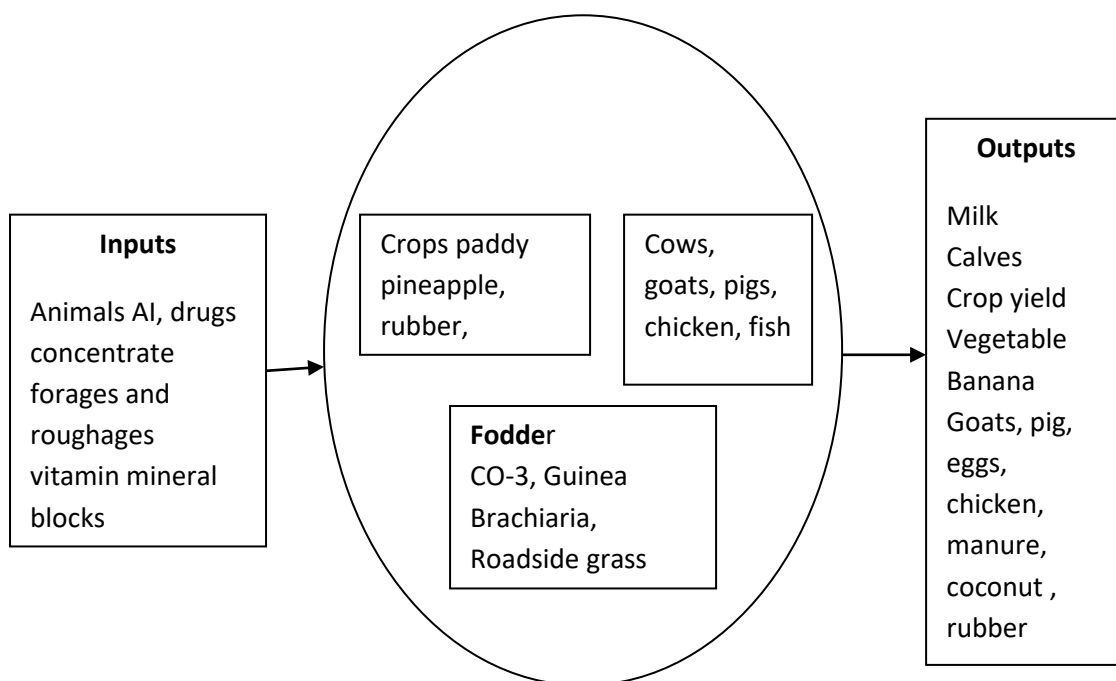
Compost production is an alternative way of fertilizer production. This organic fertilizer can be used for crop production in small scale home gardening. In addition, this compost can be used to pasturelands to increase pasture production. In Seethawaka area, 36% of the sample farmers practised compost production and this situation is more or less similar in all three VS ranges. Farmers use green manure or crop residue, kitchen waste, other decaying things, straw and animal manure for compost production. Two farmers from Homagama use urea also to accelerate the compost production. Furthermore, in investigating the methods of compost production, it was found that heaping method is the most popular method and 71% of the farmers have adopted that method. Pit method (10%), live fence (4%) and bins are used by the producers.

As described earlier cow dung has become a problem to 10% of the farmers in the study area because of poor dung disposal. Of this 50% explained that due to bad smell and 23% of the farmers said due to neighbours' complaints dung is problematic.

#### **4.30 Peri-urban Dairy System**

A variety of small holder dairy farm types were identified in the Seethawaka area. The most common system can be described as follows.

The farm is defined as a farmer's living area (home garden) with their house with a variety of activities in agricultural enterprises. It is characterized by an integrated farming system which involves growing crops (paddy, rubber, coconut, vegetable, pineapple) and rearing animals such as cows, buffaloes, pig, fish, goat, backyard poultry. The total land availability varies from ¼ acres to less than 10 acres.



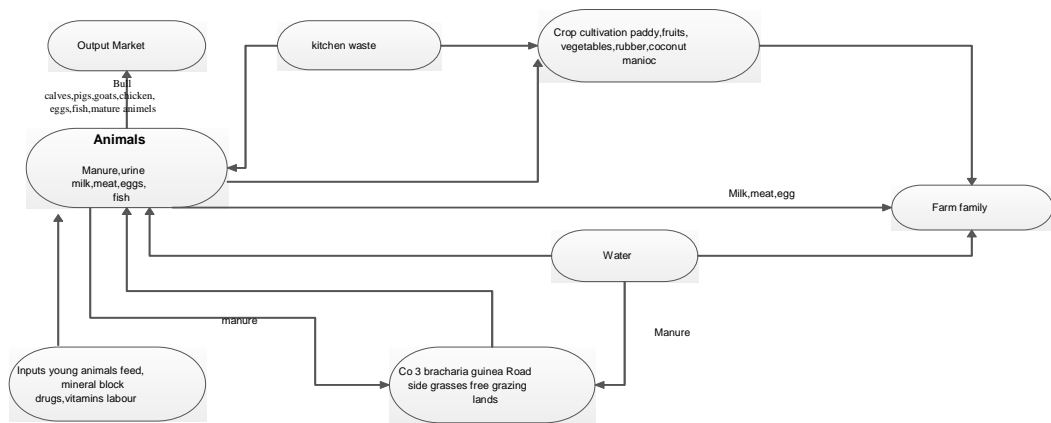
Source: Survey Data, 2013

**Figure 4.26: System Model of the Smallholder Peri-urban Dairy Farm**

Two to three milking cows of exotic breed (particularly Jersey and Frisian crosses) are housed in a stable and the main management style is semi intensive type. The cows are fed with feed supplements (concentrate feed, mineral). Breeding is done mainly by means of artificial insemination (AI). Milking is done manually in the morning only. Often, the calf is allowed to suckle for minutes first in order to stimulate milk let down, then it is separated from the cow and some milk is left for the calf to suckle again. Farmers usually take the milk to the nearest collection point or some collectors visit the farms to collect the milk. Some farmers who practise evening milking sell the milk to neighbours or keep in the refrigerator. Fresh milk consumption is very low among farm families.

Inputs to the system include labour, purchasing of young animals (calf, piglets, goat kids, chicken) feed supplement (concentrate feed, poonac, mineral blocks, vitamins), purchase of crop seeds, drugs and chargers for artificial insemination.

The main outputs from the system include sale of mature animals (pigs, goats, chicken, eggs, fish, calves) milk, manure, by-products (Yoghurt, milk toffee, curd, ghee) food crops (vegetables, paddy, fruits, coconut, rubber sheets).



**Flow Chart 4.2: Resource Flow of Peri-urban Dairy Farming System in Seethawaka Area**

A bio resource flow for the peri urban farm type is presented in the flow chart 4.2. Manure from the animals used to enrich the soils where fodder and crops are grown. Sometimes mature animals and male calves are sold for income generation. At times this income is used for several household activities such as construction of houses and settling the debts. Most of the time as majority of farmers are Buddhist, milking cows are not sold for meat and they keep the animals until death (no proper culling procedures). Average milk production is 8 liters/cow/day and home consumption is low. The home garden crops and fruits form the system are grown mainly for consumption in the homestead. Commercial cultivations of manioc, pineapple are grown for sale.

## CHAPTER FIVE

### Problems and Constraints

#### 5.1 Cost of Concentrate Feed

The most dominant problem faced by the dairy farmers in the Seethawaka area is the high cost of concentrate feed. This constraint is faced by more than 65% of the sample farmers. The price of 1/kg of poonac is Rs.60.00 and the Prima costs around Rs. 40.00 – 45.00 per kg. On the other hand, self-processing of animal feed was found only in four farms and they owned feed mills in their farms. Other than that, there is no proper place to purchase poonanc or concentrate feed at village level. Farmers need to buy these feeds from surrounding cities and they have to bear additional transport costs. The Milco has distributed concentrates at collecting points earlier but due to some quality problems of the feeds, farmers refused the Milco feed and that programme failed.

#### 5.2 Lack of Natural Grasslands

The survey proves that 31.3% of the sample farmers faced problems of lacking natural grassland in the study area. Compared to the Homagama VS range Kosgama and Padukka available land for grazing is higher, because the rubber lands and some coconut lands can be seen in the area. However, in the Homagama area due to urbanization land fragmentation is high and further, large estates were not observed. In addition, in the Kosgama area, farmers complained that a natural grassland reserve known as “Barawa” with 400 acres of land was utilized earlier for grazing. Due to the construction of an Army Camp in the area the use is prohibited. Therefore, they said it has affected the feeding of animals in the area. On the other hand, available grasslands or estate grasses were not of good natural roughage quality for dairy development. Therefore, a grassland development programme for dairy production in the area is needed.

#### 5.3 Breed Availability

According to the survey, 15% of the farmers said it is difficult to find good breeds. However, in the study area most of the farmers owned Jersey cross bred cattle and buffaloes of Murrah and Niliravi. The main problem is the price of animals and the difficulties in finding a good animal. If a farmer needs to find a high yielding animal there is no guaranteed place to purchase an animal due to absence of government intervention on maintaining breeding materials. For selecting an animal the respective VS officials help can be obtained. Normally a high yielding Jersey animal costs more than Rs.100,000 and a buffalo of Murrah or Niliravi costs around

Rs.140,000. Therefore, this is a very risky operation for a poor farmer to start or uplift the dairy farming in the area.

#### **5.4 Subsidies**

As shown in the study, 20% of farmers believed that, they need subsidies to develop the dairy farming. This requirement is higher in Padukka (29%) but in Homagama area the received amount of subsidies is less compared to other two areas. In Homagama VS range, a subsidy scheme of “Heifer Cow Management” is available to develop their milking animals in the herds. Distribution of subsidies to the correct person is also a huge problem in the study area. Some farmers’ complain that even under “Seethawaka Abimana” exhibition the subsidies were received by undeserving people. Similarly, some farmers received benefits every year outside the accepted procedure with the help of VS officials in the region. In addition, Homagama farmers complain that other subsidies from Samurdhi, Agrarian Services etc, are not also distributed in a transparent way.

##### **5.4.1 Animal Theft**

The survey found that, stealing of animals for illegal meat production is also a growing concern (17%) for the dairy farmers. In Padukka VS range especially in Uggalla and Malagala area 90% of the farmers stated that, it is very difficult to protect their animals from thieves. In Homagama also this problem mainly affected the future of the dairy sector. When buying an animal it costs a massive sum, it is difficult to protect these animals therefore farmers are reluctant to increase the number of animals or join as a newcomer. In addition, most of the “Ande” farmers face difficulties, if the animals are stolen they have to pay back the animal’s value to the owner. This threat has mainly affected the extensive type of management systems. Jalthara village in Homagama area also faced this animal theft problem.

##### **5.4.2 Low Milk Price**

According to the survey, 17% of the sample said that they received low prices for their milk, but it is debatable, because according to the collectors, the prices are fixed with regard SNF and fat content of milk. Other than the distance to the collecting centres in Homagama and Kosgama, prices are higher compared to Padukka because in Padukka there is a number of collectors. In Kosgama some private collectors who sell milk in bulk to Milco pay (Rs.40.00-43.00 per litre) lesser prices to farmers. Similarly, the transport cost is also higher in these places. Therefore, establishing a proper collecting network and creating competitiveness among collectors will fetch good prices for a litre of milk.



### **5.4.3 Animal Breeding**

The survey indicates that, breeding of animals in the study area is also problematic due to religious constraints. Accordingly 21% of the farmers faced breeding problems. Farmers explained that artificial insemination is not successful because, normally in some farms AI should be performed twice for conceiving. Other than that, there is no fixed price for a turn of AI. In Homagama especially in Artigala area most of the farmers practiced natural breeding using a bull. This costs around Rs.1000 and the farmers said it is successful. The correct time of heat sign detection is also problematic for some farmers in the study area.

### **5.5 Lack of Co-ordination of Vet Office**

As found from the study, the co-ordination between farmers and vet office is at a minimum level in the Homagama area. Padukka and Kosgama farmers receive better services compared to the Homagama area. In the sample, farmers of Homagama area are lacking the knowledge of artificial insemination, pregnancy diagnosis, vaccination, new medicines and feeding formulae. Other than that, the services are also not provided at the required time. Therefore, the death rates of the animals are also higher in Homagama area.

### **5.6 Other Constraints**

Other than the above mentioned major constraints, farmers pointed out several problems such as unavailability of labour (2%) complaints from neighbours (2%) regarding foul smells, low milk production from healthy cows (2%) high number of male animals (2%), lack of quality grasses (2%), diseases (2%) and lack of proper water facilities.



## CHAPTER SIX

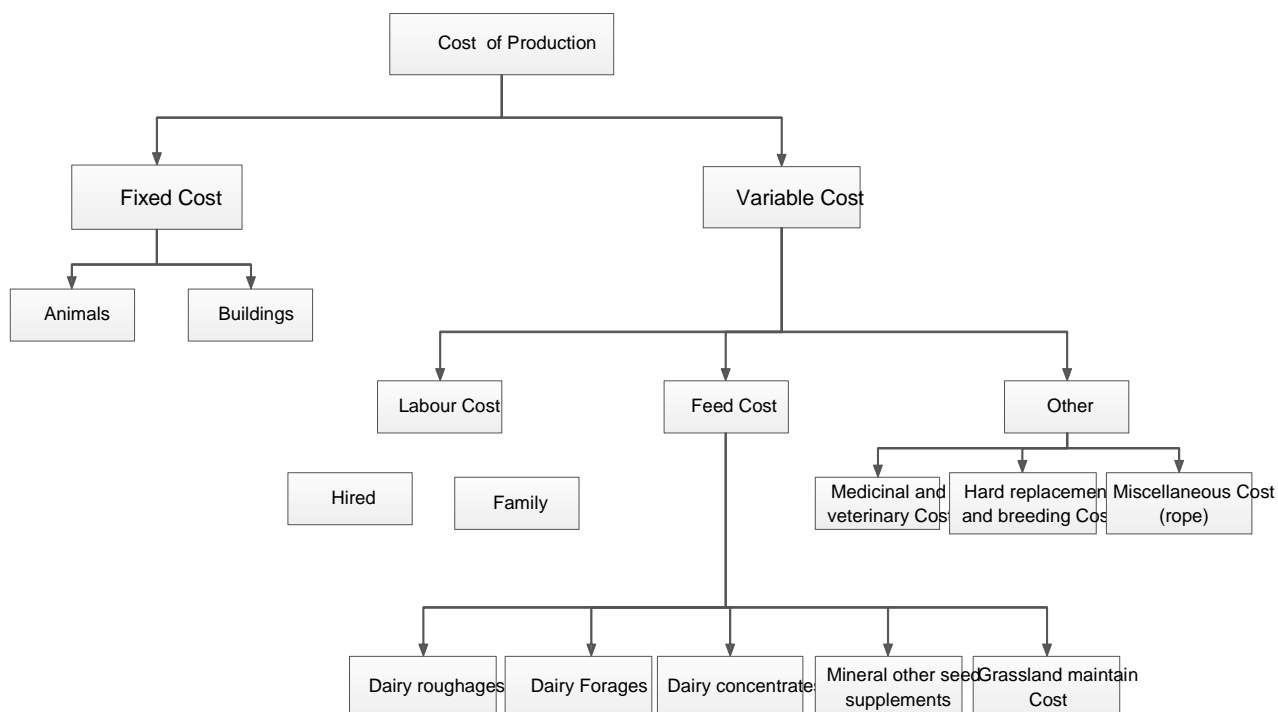
### Economics of Dairy Production

#### 6.1 Introduction

This study was carried out within Kosgama, Homagama, Padukka veterinary ranges of the Colombo district. The cattle population in the above veterinary areas was 1641. Most of the farmers in the area practise intensive and semi intensive cattle management systems.

Information for this study was collected using a well-structured pre-tested questionnaire. The data were gathered by visiting individual dairy farmer. The study covered 303 dairy farmers.

When calculating the cost of production only dairy farmers who have permanent cattle sheds and milking cows were considered. Thirty eight farmer families who constructed cattle sheds adhering to the standards given by the VS office were selected. There are 97 milking cows observed in above farmer families.

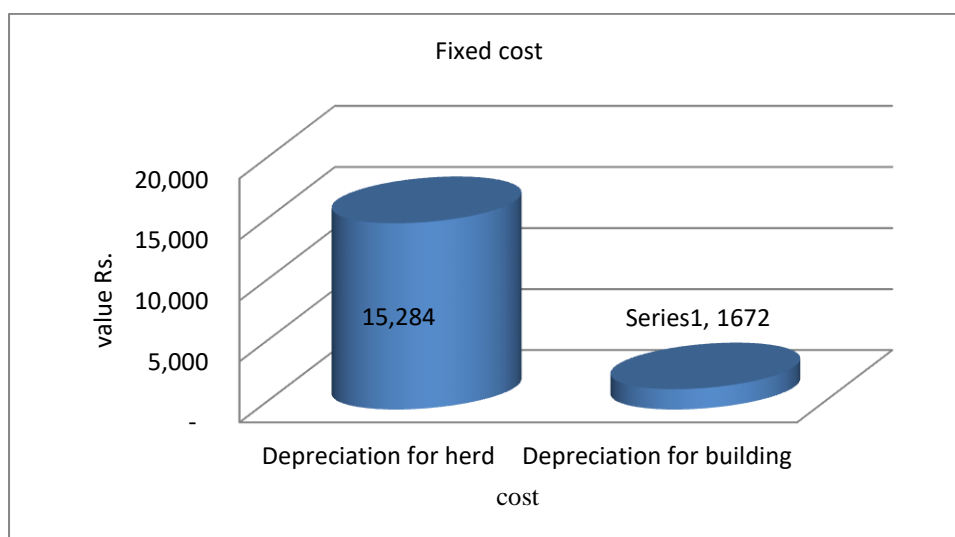


**Flow Chart 6.1: Cost Distribution of Milk Production**

There are two categories of costs. Fixed cost and recurrent cost are major categories. The cost of animals and buildings were categorized under fixed cost. The highest amount has been spent on feed and it was estimated to be 47% of the total cost while 35% of the total cost represents the labour cost. The percentage summary of the total cost is represented as follows to identify various cost categories in the dairy industry.

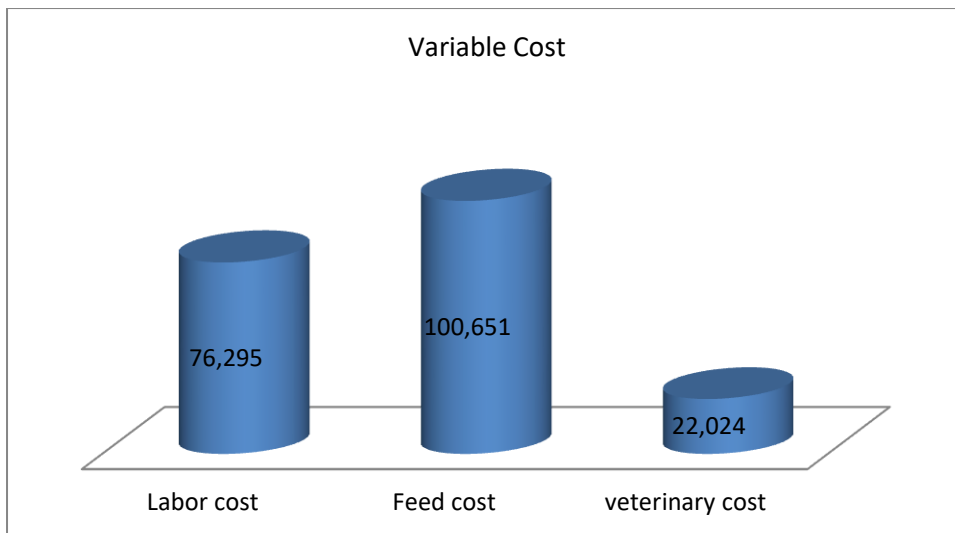
### Summary of the Total Cost

Fixed cost	Rs./Year	%
Depreciation for herd	5,284	7.08
Depreciation for building	1672	0.77
<b>TFC</b>	<b>16,956</b>	<b>7.85</b>
Labour cost	76,295	35.33
Feed cost	100,651	46.61
veterinary cost	22,024	10.20
<b>TVC</b>	<b>198,970</b>	<b>92.15</b>
Total cost per year/per farm	215,926	



Source: Survey Data, 2013

**Figure 6.1: Fixed Cost**



Source: Survey Data, 2013

**Figure 6.2: Variable Cost**

## 6.2 Herd Expenses

Most of animals in the selected farms were cross breed and two or three of local animals were available. Popular cross breeds were Frisian, Jersey, Ayresshire and Sahiwal. Jersey crosses are the mostly available. The average number of milking cows per farm was 2.55.

The total cost spent for animals can be calculated as follows;

## 6.3 Depreciation

### 6.3.1 Depreciation of Milking Cows

Purchasing cost of animals – Estimated value of a cow's life after seven years  
Number of years of productive life

It was assumed that the productive life of a cow is 7 years and after 7 years the established value is Rs.12,000/=

$$\begin{aligned} \text{Depreciation} &= \frac{(53,912 \times 2.55) - (12,000 \times 2.55)}{7} \\ &= \underline{\underline{\text{Rs. } 15,284/\text{ per year}}} \end{aligned}$$

### 6.3.2 Depreciation of Building

According to the field survey the cattle sheds constructed are not up to the standard in many cases. In most cases the floor had been constructed using cement or mud and the roof with Aluminum sheet or asbestos. Most of the cattle sheds have no wall covering.

It was assumed that an individual animal requires about 70 square feet floor area and the cost per square feet is Rs. 187.

$$\begin{aligned}\text{The total cost per cattle shed} &= 70 \times 187 \times 2.55 \\ &= \text{Rs.}33,432.93 \\ \text{Depreciation Value} &= \frac{\text{Rs.}33,432.09}{20}\end{aligned}$$

Assuming that the durability of cattle shed is 20 years.

$$\begin{aligned}\text{Depreciation per year} &= \text{Rs.}1671.65 \\ \text{Total fixed cost} &= \text{Depreciation of herd expenses} + \text{depreciation of building expenses.} \\ &= \text{Rs.}15,284 + 1671.65 \\ &= 16,955.48 \text{ per year}\end{aligned}$$

### 6.4 Variable Cost

According to the survey data, feed cost is the highest amount in the variable cost. Also labour cost has demonstrated a high value among the variable cost. Almost all the farmers are using family labour except one farmer. One farmer has used hired labour for his industry. In these calculations, it was assumed that each family labourer would have earned the wages similar to the hired labour during the study period. This study has included opportunity cost assuming that these farmers can engage in various other occupations.

According to the survey data, payment for a farmer was Rs.1000 per day.

Then the total labour cost was (family/hired) per month = Rs. 773,125

This labour cost is spent for the maintenance of three hundred and four cows.

Therefore Rs.2543.17 is spent for a cow per month. It was Rs.30, 518.04 for a year (multiplied by 12)

Therefore Rs.76, 8871.00 has been spent per farm per year (2.55 animals per farm).

#### 6.4.1 Feed Cost

Survey data reveals that the costs of concentrates are high while dairy roughages and mineral vitamins costs are low. Some farmers have their own grasslands and some bring them from outside. Concentrate farmers are used to feed KB/RP/OMI/Prima/Poonac.

Total cost of dairy roughages and concentrates per month is Rs.158,385

Per cattle =  $\frac{158,385}{97}$  = 1,632.84 (number of concentrate fed animal-97)

Cost per farm/per cattle = Rs.50, 016.32

Average feed cost (including mineral and vitamin, grassland, maintenance, other rope) = Rs. 100,651.22 per farm/per year

#### 6.4.2 Veterinary Cost

Total veterinary cost = Rs.23, 727 (33 farms)

Average medicinal and veterinary cost/farm = 719 per month

Average Medicinal &veterinary cost/farm per year = Rs.22, 024

#### 6.5 Income

In every farm the major portion is received through selling of milk. The other income sources are selling of animals, selling of manure and selling of products. A considerable income is received by selling of animals but the income from selling products or selling cow dung was not reported.

##### 6.5.1 Milk Income

Average number of litres per day/per cow = 8 L

Average number of litres per/per farm = 8 x 2.55  
= 20.42 L

Average length of the location period of a cow (days) = 248

Total milk yield per year/per farm = 20.42 x 248  
= 5070 L

Average price per liter Rs.49.00

Total income from milk per year/ per farm = Rs.5070 x 49  
= Rs. 248,994

### 6.5.2 Income by Selling Animals

$$\begin{aligned} \text{Income by selling animals per year Rs} &= \frac{\text{Total income by selling animals}}{\text{Total no. of cows sold}} \\ &= \frac{1,595,000}{31} \\ &= 51,451 \\ \text{Per farm} &= 51,451 \times 2.55 \\ &= \text{Rs. } 131,377 \end{aligned}$$

Total variable cost

Total fixed cost = Deprecation for herd expenses + deprecation for building

Total Cost = Fixed cost + Variable Cost

Total income by selling milk and selling animals per year/per farm = Rs.380, 371

When family labour cost is valued and included in the variable cost.

The average total cost of production per litre of milk =  $\frac{\text{Total cost of year}}{\text{Total no. of milk liters per year}}$

$$\begin{aligned} \text{Rs.} &= \frac{215,926}{5070} = 43 \\ \text{If family labour is excluded in variable cost} \quad \text{Rs.} &= \frac{139,630.80}{5070} = 28 \end{aligned}$$

According to above factors this industry is a profitable one. The average selling price of a litre of milk is Rs.49.00. If the family labour is included in variable cost as an opportunity cost, the farmer can produce a litre of milk at the cost of Rs.43.00. If the family labour is not included in the variable cost the farmer can produce a litre of milk at Rs.28.00.



## CHAPTER SEVEN

### Summary of Findings, Recommendations and Conclusion

#### 7.1 Summary of Findings

1. Majority of farmers (75%) belonging to the age group of 30-60 years represent the middle age group. The youth contribution to dairy sector is relatively low. It is 8% of the sample.
2. Gender distribution shows 85% to 16% of male to female in the sample, thus indicates a lower female participation in dairy farming in the study area.
3. Religion is also very important in animal rearing because it allows/disallows certain types of farming activities such as pig farming. Then 95% of farmers are Buddhist 15 Hindu and 4% are Catholic.
4. Forty four per cent of the sample farmers are engaged in dairy farming as their main occupation. Twelve percent of the vegetable farmers and four per cent of the paddy farmers are also engaged in dairy as their secondary occupation. Private sector workers represent seventeen percent of the total sample as the main occupation and the rest of the farmers' main occupation include government jobs, self-employment ventures and labour related jobs.
5. Sample population of 68% of farmers practise semi intensive type of management systems while 1/4<sup>th</sup> of the sample population practises extensive type and intensive management is practised by 7% of farmers.
6. Mechanization of dairy farming is very less in the study area. Ownership of tractors, grass cutters and feed mills are represented by 10% of the farmers.
7. Crop livestock integrationist practised by 79% of the farmers with paddy, vegetable and perennial crops but 56% of the sample practises livestock integration specially with backyard poultry.
8. Involvement of farmers in producing value added products are 13%. Farmers' interest in future involvement in value addition with the government support is only 27%. Presently, the dominant value added products are yoghurt and curd. These products were produced by 49% and 37% respectively and 52% of the farmers face problems of expanding and modernizing the system due to financial constraints.
9. Majority (43%) received a Rs.10,000-30,000 monthly income and 18% of the farmers obtain below Rs.10,000 of a monthly income.
10. The average herd size is five and milk animal contribution is 30% of the total cattle population.

11. Buffalo rearing is practised by 22% of the total sample which represents 38% from Padukka, 14% from Kosgama and 6% from Homagama. Buffalo herd size of Padukka and Kosgama is six animals but in Homagama it is thirteen.
12. Jersey represents 65% of the cattle population and 15% are Frisian. Other available breed types are Ayershire, local Sahiwal, Graded and AFs.
13. Average production of Jersey breed per day is 8.3 litres and this breed yields the highest production in the area and the maximum production goes up to 15 litres. The second dominant breed type is Frisian and their average production per day is 6.41 litres and the maximum yield obtained was 17 litres /day.
14. Buffalo breeds are distributed in the study area as Murrah 15%, Nilravi 27% and Thoraty 52% of the total population. The average production per day was calculated as 10 litres, 8 litres and 3.8 litres of the breeds of Murrah, Niliravi and Thoraty respectively.
15. Milk marketing in the study area is well organized. Milco, co-operate collector, Fonterra, Sukhi and Milky are the dominant collectors. The most famous collector Milco collects more than 35% of the farmer's collection. Fonterra collects 21% of the milk and co-operative collector collects 14% of the sample farmer's milk. Even though the formal milk collection network is strong in some areas in Padukka, the private collectors collect milk from farms established far off from the main collectors paying farmers a lesser price. Therefore, checking feasibility and establishing new collecting centres need to be considered. Co-operative milk collecting centre produced value added products such as curd, yoghurt and milk toffee. Other than that, Milky and Sukhi also produce several value added products.
16. The dominant method of breeding in the study area is Artificial Insemination (more than 50%). Natural breeding is practised in 22% of the farms and it is famous in Homagama area, 27% of the farmers practised both AI and natural breeding as most of the time when AI is not successful natural breeding is practised. Therefore, the correct time of heat detection is important (done by 22% of the farmers).
17. Worm treatment and tick treatment is done using synthetic medicines by 77% of the farmers. The common diseases are foot and mouth disease and mastitis.
18. The survey disclosed that 63% of the farms have any type of cattle sheds and 43% of the farms have permanent sheds and 36% owned semi permanent type cattle sheds. The cattle sheds are unavailable mainly due to lack of financial assistance (55%).

19. Grasslands are maintained by 27% of the farmers and the average grassland size is less than  $\frac{1}{4}$  acre and the famous grass variety is CO-3 and it is the most suitable type for the area.
20. Cholostrum feeding is practised by 95.7% of the farmers and concentrate feeding was practised by 58% of the farmers.
21. Extension is mainly done by VS office, but the number of officers are very limited. Extension is planned to be provided through Livestock Development Instructors but their service is limited in artificial insemination. Other than the VS office, extension is provided by Agrarian Services Centre, Samurdhi Authority and private milk collectors.
22. Credit facilities were used by a very limited number of farmers (15%) Hatton National Bank provided credit facilities in Padukka and Kosgama area for dairy development.
23. Subsidies were received by 66% of the farmers and they were mainly given financially and in other forms of materials such as aluminium sheets, cement, iron bars under dairy village development project. But most of the farmers complained that transparency of these distribution programmes was a debatable issue.
24. Waste management is carried out well by 70% of the farmers. Though the farmers stated that the waste management is functioning well in certain areas like Malagala and Uggalla, it is unsuccessful due to poor awareness and lack of attention. This may cause contamination of water bodies in the area and the foul odour has also affected the surrounding population. Biogas units were established by four farmers in the sample and they managed their farms in an advanced manner.
25. Compost production is practised by 36% of the farmers and the popular method is heaping.
26. The average number of animals in a farm family is 5 and the maximum is 30 animals and mode represents 5 animals.
27. The farm families which owned less than 5 animals were 51%, 5-10 animals represent 34% of the farmers and the rest of farmers owned 10 animal herds.
28. The total average household income is Rs.41,251 which represents Rs.30,417 (73%) from other incomes and Rs. 10,834.00 (27%) from the milk income.
29. The major problem faced by dairy farmers is the cost of concentrate feed. It represents 46% of the total cost. The cost of 1 kg of poonac is Rs.60.00 and Prima feed costs Rs.40.00-45.00/kg.
30. Other main problems faced by farmers are listed below.
  1. Lack of natural grasslands (31.35)

2. Lack of quality breed and problems of buying good animals
  3. Animal theft (16.5)
  4. Low milk prices from private collector (17%) (Rs.40.00-43.00)
  5. Breeding problems (20%) (to conceive 2-3 times of AI and the high cost for natural breeding).
  6. Lack of co-ordination and links with vet office specially in Homagama area.
  7. Labour shortage
  8. Bad odour emanated to the surrounding environment
  9. Lack of quality grass
  10. Diseases and lack of water facilities in certain places.
31. The total cost comprises fixed cost and variable cost. The fixed cost included depreciation for herd and buildings which represent 7.08% and 0.77% respectively. The labour cost incurred is 33%, feed cost 47% and veterinary cost 10% of the total cost.
32. The total average cost of production per litre of milk with family labour cost is Rs.43.00 and the cost without family labour is Rs.28.00.

## **7.2 Conclusions**

1. Milk production is a profitable industry with the opportunity cost of labour and without labour cost.
2. The cost of concentrate feed accounts for 47% of the total cost of production and feed cost is the main problem for dairy farmers in the study area.
3. The total average milk income contributes to 27% of the total income.
4. The other main problems are lack of quality breeding materials, animal stealing, unavailability of natural grasslands and breeding problems and lack of co-ordination with VS officials.
5. Majority of the farmers practise dairy farming semi intensively and in small scale.
6. Permanent cattle sheds were owned by 44% of the farmers and these were constructed under the Dairy Village Development Project.
7. Extension services are insufficient in the study area due to lack of relevant officials.
8. AI is the dominant breeding technique and 2-3 times of insemination is needed for pregnancy.
9. Buffalo farming is profitable compared to the cow's milk production.

10. Mechanization of dairy farming is very less.
11. Youth contribution in the dairy farm sector is very low
12. Production of value added products are very less in the study area.

### **7.3 Recommendations**

1. Cost of concentrate feed is the main problem in the milk production. Therefore, a subsidy scheme is needed for concentrate feed in the dairy production and attention should be paid to formulate new rations with low cost.
2. Milk production is mainly practised in subsistence level (small scale and semi intensively). Hence, it is important to introduce dairy as an enterprise which is practised intensively and having a minimum number of 10 milking cows in the herd. This will lead to constant milk production during the year. Therefore, to increase dairy production, some innovative young farmers should be identified and strengthened them financially with the required knowledge and improve the mechanization of dairy farming.
3. Presently due to the absence of a breeding farm, farmers were unable to buy good animals, therefore it is important to establish breeding farms with government intervention to control the price of breeding materials such as small female calves, heifers and milking cows and to maintain the quality of breeding materials with quality assurance.
4. Provide financial support further for constructing cattle sheds with further expansion of the dairy village development project under the Ministry of Livestock Development.
5. Extension services are insufficient in the study area due to lack of extension officers, therefore, provide the service of new agricultural graduates (2-3) at VS office level.
6. The number of AI technicians in the study area is also insufficient. Therefore, recruitment of new AI technicians is important and the number of AI technicians should be increased according to the VS range. Further, the service of private AI technicians to increase the competitiveness of AI should be introduced and it will be a solution for the dearth of AI technicians.
7. Buffalo farming is a more profitable industry compared to cattle farming, therefore, identification of interested buffalo farmers are important and providing financial and other supports to increase the sector is needed. Similarly, identifying cattle farmers who are keen to rear buffalos to increase

profit margins is vital, since it does not require several needs such as concentrate feeding and etc.

8. To attract youth to dairy farming advanced techniques (mechanization) should be introduced and financial support with proper training opportunities should be planned and provided.
9. Provide proper guidance, training and explain the profitability of the value added products of milk. Further, innovative farmers should be identified and provided credit facilities to expand value addition at medium level.
10. To establish natural grasslands, it is important to have a society at village level so that Farmer Manager Societies can be formed. First the most suitable area for pasture establishment at village level can be identified. Introduction of rules and regulations for maintaining and utilization of the pasture lands is important. Government, semi government and private sector support should be given for the establishment of pasture lands at village level.
11. To control animal theft, it is important to identify the danger areas and plan a protection program with the support of police officials, Grama Niladhari and relevant other officials and the dairy farmers in the affected area.
12. Provide a continuous service to farmers on several themes such as hygienic milk production, feeding, breeding, milking, animal welfare, value addition and on improving and strengthening of dairy farmers with new knowledge.
13. Introducing school and preschool milk programmes. In Kosgama area farmers received better prices for selling milk to pre-schools. According to Nancy Morgan FAO Bangkok, school milk programmes with a focus on small holders can support dairy development. This can be linked with local milk consumption as well. However, this programme needs financial commitment and better supervision.

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### Annex 01: Cattle Population (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
	Not Milking 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: Number of Buffaloes (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
	Not Milking at Present	45,776	49,688	50,606	51,630	52,146	51,082	58,776	80,230	76,900	77,180
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		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