

EVALUATION OF DAIRY DEVELOPMENT POLICY 2006 achievements and challenges

H.M.S.J.M. Hitihamu

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**Hector Kobbekaduwa Agrarian Research and Training Institute
114, Wijerama Mawatha
Colombo 07
Sri Lanka**

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Final typesetting and lay-out by: Dilanthi Hewavitharana
Cover page design by: Udeni Karunarathna

Tel. Phone : +94 11 2696981
 +94 11 2696437

Fax : +94 11 2692423

Email : librarian@harti.gov.lk

Web page : www.harti.gov.lk

FOREWORD

Vegans and even a considerable body of nutritionists would argue that the worth of dairy is vastly exaggerated. The fact remains, however, that dairy is comfortably located in current food habits and cultures and as such enjoys high demand. The very fact that there's public anxiety and even vocal protests in times of scarcity indicates the nature of the demand for dairy products, especially milk in powdered or liquid form.

The Dairy Development Policy, formulated in 2006, was a comprehensive strategy to address issues in the sector, self-sufficiency or rather the lack thereof being a key concern. As this study reveals, there have been certain gains even though the promotion of commercial entrepreneurs, streamlining institutional arrangements, cost of production and marketing remain vexed issues which remained unresolved.

The said policy included a total of 17 dairy development strategies and 10 dairy feed development strategies. Almost fifteen years later in a vastly different social, economic and political environment offering new and even stiffer challenges, a review of these is certainly timely.

This study therefore has assessed the relevance, effectiveness and efficiency of the programmes and projects in terms of stated goals, policy objectives, policy statements and policy strategies. The findings and the policy recommendations obtained from them would certainly be of immense value as relevant authorities adjust policies and design new ones pertaining to production levels, herd improvement, input supply, fodder development, management practices, economic dairy units, technological advances and other supply services.

Malinda Senaviratne
CEO/ Director

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H.M.S.J.M. Hitihamu
Senior Research Officer

EXECUTIVE SUMMARY

Dairy development is significant in the rural economy of Sri Lanka due to its ability to generate income and employment opportunities. Milk production, a traditional industry that has survived thousands of years, plays a key role in infant nutrition and alleviating nutritional deficiency in all age groups. Livestock has been a crucial source of high-quality protein, minerals and vitamins in the form of milk and meat. For many rural smallholder farmers, dairy animals are a 'living bank' that serves as a financial reserve during periods of economic stress. Domestic production fulfils 40% of the total milk requirement of the country. Over the years the import bill has increased significantly further burdening the economy.

Dairy development policies are implemented through projects and programmes by the central government, provincial councils, the private sector and NGOs. Most of the policies introduced to the dairy sector in Sri Lanka targeted increased milk production, enhanced producer incomes, consumer benefits and maintaining higher standards. To such ends, governments have focused on input provision, market facilities, value-added products, consumer protection and import restrictions.

In 2006, the then government introduced a dairy development policy with the objective of achieving self-sufficiency in milk production. Since then, all initiatives have been framed by this policy. Researchers have argued that prevailing dairy development policies have not been successful in making tangible impacts and insist that more should be done to encourage commercial entrepreneurs, improve the institutional arrangements, reduce the cost of production and design innovative approaches for milk marketing.

The overall objective of this study is to understand the impact of the 2006 dairy development policy and assess the implementation strategies; in other words, the task undertaken was to assess the relevance, effectiveness and efficiency of the programmes and projects implemented. A mixed method was used to collect data for this study. Information was gathered by reviewing annual reports, progress reports and secondary data sources. Additional information was gathered through focus group discussions and telephone interviews.

In total, there were 17 dairy development strategies and 10 dairy feed development strategies outlined in the said policy. The thrust was on areas such as promoting liquid milk market and liquid milk consumption, upgrading native herds in partnership with the government and private sector, expanding the role of buffaloes and goats in the domestic dairy industry and facilitating the transformation of the present subsistence level production into a viable commercially-oriented activity. In addition, providing a conducive environment for the domestic dairy industry to flourish by focussing on import policy and fiscal policy, governing the pricing mechanism for domestic milk, development of a viable, medium to large scale, commercially oriented private dairy farms, dairy farmer empowerment, the participation levels of farmers and the relevant processors in the value chain were also mentioned as priorities.

The Ministry of Livestock Development implemented several projects under three main sectors: upgrading native herd, farmer empowerment programme and promoting liquid milk market. Breeder farm development and importation of dairy animals were the key projects of the Ministry under the theme of national herd upgrading. Under the farmer empowerment programme, farmer training and women's empowerment programmes were implemented. In addition, liquid milk promotion programmes were designed to facilitate the establishment of milk sales outlets, cattle shed development, distribution of milk transport cans and developing the processing plants.

Artificial Insemination (AI) is the main tool for the genetic improvement of the national herds. Under this policy objective, the Kundasale and Polonnaruwa AI centres were strengthened. However, it is noted that the AI performance was unsatisfactory due to problems associated with semen quality, heat detection problems and other management practices as well as biotic and abiotic factors. Under the breeder farm development, 658 breeder farms were developed between 2015 and 2020. Nevertheless, there is still a lack of improved dairy animals and farmers experienced snags in finding the improved high-productive animals. In addition, under the herd improvement scheme, it was planned to import 20,000 improved dairy animals from Australia and New Zealand, but due to improper planning, this project has failed; despite the fact that the government spent a huge amount of money, the expected outcomes were not achieved.

Farmer empowerment programmes were carried out continuously by the Department of Animal Production and Health (DAPH) as a mandatory process. In addition, the State Ministry of Livestock Development, National Livestock Development Board, private sector milk collectors, NGOs and other government and non-government agencies engaged in farmer empowerment programmes. Several projects and programmes were undertaken under the liquid milk promotion programmes. However, it is noted that due to liquid milk being unaffordable and because of accessibility problems, the majority of the consumers continued to prefer powdered milk.

Under the feed resource development programme, the government focussed mainly on forage production enhancement and introduced several projects. However, land issues at the smallholder level and improving the quality of available grass were areas that seem to have been neglected. It is also essential to implement programmes to enhance concentrate feed ingredients such as maize and soybean, but this response has been vested with the Department of Agriculture. Due to the fertilizer issue that emerged in 2021, maize production has dropped, leading to an increase in animal feed prices.

The main goal of the policy was to achieve 50% self-sufficiency in 2015. DAPH calculates that 40% of the requirement was achieved in 2018. This indicates that the 2006 dairy policy contributed remarkably to enhance the total milk production of the country. However, it is pertinent to note that milk imports have increased from 2008

to 2020 from 65,312 MT to 102,355MT while the import bill increased from 30.8 billion Sri Lankan Rupees to 61.93 Billion Rupees.

Therefore, while it is correct to say that 2006 dairy policy contributed to increasing milk production to a certain extent, further attention needs to be paid to herd improvement, input supply, fodder development, improve management practices, identifying economic dairy units, technological advances and other supply services are needed for the dairy development of the country.

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LIST OF ABBREVIATIONS

AI	-	Artificial Insemination
AFS	-	Australian Friesian Sahiwal
AIC	-	Artificial Insemination Centre
BQ	-	Black Quarter
CBO	-	Community Based Organization
DAPH	-	Department of Animal Production and Health
DCD	-	Dicyandiamide
FAO	-	Food and Agriculture Organization
FMD	-	Foot and Mouth Disease
GBC	-	Goat Breeding Centre
GST	-	Goods and Service Tax
HS	-	Haemorrhagic Septicimia
NGO	-	Non-Government Organizations.
NLDB	-	National Livestock Development Board
PGF	-	Priostaglandin F2-alpha
TOT	-	Training of Trainers
VS	-	Veterinary Surgeons

CHAPTER ONE

1.1 Introduction

Dairy development is significant in the rural economy of Sri Lanka due to its ability to generate income and employment opportunities. Milk production is a traditional industry which has been surviving thousands of years plays a key role in infant nutrition and alleviating nutritional poverty in all age groups (FAO, 2020). It has been a crucial source of high quality protein, minerals and vitamins in the form of milk and meat. For many rural smallholder farmers, Dairy animals are a 'living bank' that serves as a financial reserve during periods of economic distress (Perera and Jayasuriya, 2008.) The Department of Animal Production and Health (DAPH, 2019) estimates that the domestic milk production was sufficient to meet 40% of the national milk requirement. According to the Department of Census and Statistics 2021, the total domestic milk production estimated at 513.30 million liters constituted of 413.63 million liters of cow's milk and 77.9 million liters of buffalo milk. Further, the total import bill was amounted to US\$ 61.93 in 2020 and it took a heavy toll on the economy of Sri Lanka (DAPH, 2020).

According to Perera and Jayasuriya (2008) revival of dairy industry has added benefits such as increased food security, decreased rural poverty, a decline in import bills and rural to urban migration. Furthermore, constraints that inhibit the progress of the dairy industry are difficulty to access credit facilities, finding the correct breeding stock, difficulties in approaching advisory and veterinary services in an effective manner and finding niche markets. Achchuthan and Kajanathan (2012) a value chain analysis in the Killinochchi district found that majority of the farmers engage in dairy as a small-scale industry; hence, to gain a higher income the farms should transform into large-scale farms. Further, the farmers are not updated on new knowledge and technology that help boost their income congruent with the above finding Perera and Jayasuriya (2008) explained that such an initiative should take effect with the government and private sector partnership.

Policy instruments are the tools used by governments to influence the behaviour of economic agents in a society for the purpose of achieving specific policy goals and the types of policy instruments used by a government to achieve its policy goals are stated in national policies, acts and regulations. In the Sri Lankan context, national policies present a set of statements setting up directives to achieve certain development objectives (Weerahewa and Jacque, 2020). Mogan (2009) explained that all policy interventions of the dairy sector development are designed to ensure the objective of stable and high producer income. Different governments have introduced dairy development policies and programme to enhance the dairy production. In 2006, a policy document of the Ministry of Livestock proposed to achieve 50% of self-sufficiency in milk by 2015. However, according to Department of Animal Production and Health in 2019 Sri Lanka produced 40% of the total requirement, indicating high prospects in reaching that end. The 2006 policy document contained the policy

targets, policy objectives, policy statements and strategies that they have adopted to attain the outlined goals and objectives of the policy which was in force since 2006.

1.2 Problem Statement

Successive governments have taken several policy decisions to develop the dairy sector of Sri Lanka by considering various sectors of dairy development such as input provision, market facilities, value added products, consumer protection and import restrictions (Perera and Jayasuriya, 2008). With the emerging governments the respective national policy statements always included certain policies directed at dairy development. Further, the ultimate aims of all government policies are to become self-sufficient in milk and upgrade the local dairy industry. Further, according to the 'Vistas of Prosperity and Splendour' policy document, by introducing suitable breeds that are adaptable to the agro ecological region the dairy industry will inevitably benefit. Further, effective milk collection, storage and distribution, grass development to enhance the nutritional standards of the herd, provide higher prices for milk, upgrading small scale farms to large scale farms and mechanization of the milk production have also been targeted.

Despite the favourable state policies and prospects of the dairy industry, the dairy farmer population is gradually dwindling due to various reasons: the livelihood being susceptible to various natural and artificial shocks and lack of efficient marketing channels that result in weak market integration. Supporting these farmers to engage in different income generating activities including marketing and processing of dairy products could be instrumental to build resilience in the face of such vulnerabilities (Thornton, 2010).

Mendis and Edirisinghe (2014) who investigated the government policy impact on powdered milk imports concluded that the price of imported milk powder and domestic fresh milk production have significant negative and positive effects on the import demand and milk production, respectively. Further, an attempt to discourage imports to save foreign exchange earnings, domestic supply side policies, may be more effective than import price restriction policies such as tariffs. Milk price policy has the highest impact on reducing imports than expanding herd sizes. In addition, technological advances are essential to improve the milk production and improvement of genetic capabilities of milk production through cross breeding is also vital.

At present, most of the dairy development policies are implemented as major projects and benefits are distributed all over the country though the Department of Animal Production and Health. Only some of these projects are successful. According to an assessment study conducted by Hector Kobbekaduwa Agrarian Research and Training Institute on the Dairy Village Development project, this project was successful and farmers received higher returns while the post-project milk production has increased by 30% (Hitihamu et al., 2008).

As Herath (2016) pointed out that Sri Lanka's milk industry is threatened by poor distribution channels, high input cost particularly the feed cost, labour cost, veterinary services, poor storage and market problems and technical problems. The government policies should contribute to solve problems along the milk value chain. With new economic concerns, raw milk consumption should be encouraged than powdered milk. The high cost of fresh milk is a challenge that has to be addressed by government policymakers. It is crucial to reduce the gap between producer price and the selling price.

However, research findings reveal that the traditional form of dairy farming is not attractive to the youth of the country and more farmers leave the industry. In addition, country-specific studies are needed to understand the efficiencies and effectiveness of the prevailing dairy development policies to understand the sustainability of the system. Policy evaluation is the systematic collection and analysis of information to make judgments about contexts, activities, characteristics, or outcomes of one or more domain(s) of the Policy Process (CDC.gov, 2021) Further, policies should change over time on par with the modern dairy production requirement.

Dairy sector development provides employment opportunities to around 0.4 to 0.5 million people in the country. Further, such development also helps achieving economic stability and reducing nutritional poverty while exercising frugality with regard to foreign reserves. Further, Daniel (2008) argues that the prevailing dairy development policies have not been successful in making tangible impacts on dairy development while insisting on a policy on promoting commercial entrepreneurs, improving the institutional arrangements, reducing the cost of production, and innovative approaches for milk marketing.

Dairy development policies are mainly implemented by three governing agents in Sri Lanka: The Central Government, Provincial Government and the NGOs. According to the State Ministry of Livestock Development, in 2021 the development projects such as Dairy Village Development Project, Liquid Milk Promotion Programme, Breeder Farm Development Project, and Buffalo Farm Development Projects were implemented by the Ministry of Livestock Development. Further, the Department of Animal Production and Health focussed on aspects such as genetic improvement of the animals and health issues. In addition, other dairy related institutions and NGOs have focussed on the economic potential of dairy farming by improving the quality and the quantity of the milk.

Further, policy analysis provides opportunities to understand the level of achievements of defined goals, efficiency of implementation, effectiveness of the implemented projects and programmes and sustainability of the sector. Therefore, it is important to study the 2006 dairy policy to understand the gaps that inhibit the progress, impediments in the implementation process to suggest appropriate strategies to develop and sustain the dairy sector of the country.

1.3 Objectives

The overall objective of this study is to understand the impacts of dairy development policy 2006 and evaluate policy implementation strategies.

Specific Objectives

1. To assess the relevance, effectiveness and efficiency of the programmes and projects implemented for dairy development in Sri Lanka for last 15 years
2. To examine the implementation strategies of the considered policies

Limitations of the Study

This study was designed to understand the relevance, efficiency and effectiveness of the 2006 dairy development policies. However, due to Covid-19 impact, it was unable to conduct a field survey to understand the effectiveness of the policies implemented. In addition, due to the closure of the government and Non-government Organizations for a long period of time in 2021, dairy development information from the Provincial Department of Animal Production and Health and non-governmental organizations, private sector information could not be extracted. Those flaws limited the actual outcomes of the study.

CHAPTER TWO

Literature Review

2.1 Policy Evaluation

Policy evaluation is a core instrument of sound public governance that can contribute to avoiding policy capture, fostering learning and promoting accountability (CDC, n.d.). Policy evaluation refers the continuous examination of the content of different policy components. In order to understand and explain public policy, different stakeholders' insights of the policy problem need to be analysed. A policy evaluation should also enable the understanding of policy in a broader context. What values and order does the policy or programme endorse? Using an open evaluation framework and a mix of criteria can facilitate a broader interpretation of the policy process (Hanberger, 2010). Policy evaluation is conducted for checking the effects of the policies of respective ministries and for evaluating the policies in terms of necessity, efficiency, validity, etc. to improve the planning and implementation process. Policy evaluation contributes fundamentally to sound public governance. It can help governments improve the design and implementation of public policies that, in turn, can lead to prosperity for their country and well-being for citizens. Policy evaluation contributes to promoting public accountability, learning and increased public sector effectiveness through improved decision-making. Generally, countries show strong commitment to policy evaluation. Some countries have embedded policy evaluations in their constitutions, and around two-thirds of responding countries have developed some kind of legal framework for policy evaluation. Similarly, most countries have adopted guidelines on policy evaluation applicable across government (CDC, n.d.). Policy analysis emerged to both better understand the policymaking process and to supply policy decision makers with reliable policy-relevant knowledge about pressing economic and social problems. Further, policy analysis as "an applied social science discipline which uses multiple methods of inquiry and arguments to produce and transform policy-relevant information that may be utilized in political settings to resolve policy problems" (CDC, n.d.).

2.2 What is Policy Evaluation?

1. Policy evaluation can be better defined as a process by which general judgments about quality, goal attainment, programme effectiveness, impact and cost can be determined (The Peninsula State University, n.d).
2. Elected officials, policy makers, community leaders, bureaucrats, and the public want to know what policies work and what policies don't, The purpose of evaluation is to determine whether an implemented programme is doing what it is supposed to and through evaluation, we can determine whether a policies effects are intended or unintended. And whether the results are positive or negative for the target population and the society as a whole (The Peninsula State University, n.d).

3. The consequences of such policy programmes are determined by describing their impacts, or by looking at whether they have succeeded or failed according to a set of established standards. The perspectives are:
 - Evaluation is the assessment of whether a set of activities implemented under a specific policy has achieved a given set of objectives.
 - Evaluation is the effort that renders a judgment about programme quality.
 - Evaluation is information gathering for the purposes of making decisions about the future of the programme.
 - Evaluation is the use of scientific methods to determine how successful implementation and its outcomes have been. (The Peninsula State University, n.d).

2.3 Types of Policy Evaluation

2.3.1 Process Evaluation

This refers how well a policy or programme is being administered. This type of evaluation is employed more often by programme managers to determine what can be done to increase the implementation, the aspects of service delivery, of the programme. It does not directly address whether or not the policy or programme is achieving the desired outcome or impact on the target population (The Peninsula State University, 2022).

2.3.2 Outcome Evaluation

Output evaluation is a method of determining how well a programme achieved its objectives by measuring results. Further, outcome evaluation assesses the effectiveness of a programme in producing change. It focusses on what happened to programme participants and how much of differences the programme made for them.

2.3.3 Impact Evaluation

An impact evaluation depends on rigorous methods to govern the changes in outcomes which can be attributed to a specific intervention based on cause-and-effect analysis. Impact evaluations need to account for the counterfactual, what would have occurred without the intervention through the use of an experimental or quasi-experimental design using comparison and treatment group. Impact evaluations often serve an accountability purpose to determine how well a programme worked. Impact Evaluations can also help answer programme design questions to determine which, among several alternatives, is the most effective approach (The Peninsula State University, n.d). Impact evaluation provides information about the impacts produced by an intervention. It can be undertaken of a programme or a policy, or upstream work such as capacity building, policy advocacy and support for an enabling environment. This goes beyond looking only at goals and objectives to also examine unintended (Roger, 2016).

2.3.4 Cost Benefit Evaluation

A cost benefit evaluation (also known as a benefit cost analysis) is a procedure by which organizations can analyse decisions, systems or projects, or determine a value for intangibles. The model is built by identifying the benefits of an action as well as the associated costs, and subtracting the costs from benefits. When completed, a cost benefit analysis will yield concrete results that can be used to develop reasonable conclusions around the feasibility and/or advisability of a decision or a situation. Organizations rely on cost benefit analysis to support decision making because it provides an agnostic, evidence-based view of the issue being evaluated without the influences of opinion, politics, or bias. By providing an unclouded view of the consequences of a decision, cost benefit analysis is an invaluable tool in developing business strategy, evaluating a new hire, or making resource a allocation or purchase decisions(Weller, 2016).

2.4 Government Intervention in the Dairy Sector

Successive governments have introduced different policies and programme to develop the dairy sector and special focus has given to increase the domestic production of the country. The main set policy target was to become self-sufficient in milk production and save milk related import expenditures. It is argued that dairy policies are favoured consumers than producers. Therefore, it resulted more imported and higher demand did not increase the domestic dairy production with intensified system (Mendis and Edirisinghe, 2014). Further, Mendis and Edirisinghe 2014, said that Prior to open economic policies introduced in mild 1970s the import quantity of milk was low and the demand for the milk was at lower level in that era. Therefore, there was no any adverse effect to the dairy industry of Sri Lanka. However, with the liberal economic policies the pattern has changed over the time and milk powder importation has increased rapidly and trading of milk powder became a high profitable venture because the global prices of milk and milk products were relatively low due to highly subsidized systems of develop countries which encourage dairy product export. In addition, these multinational companies spend huge amount of money for the milk powder advertisement and changed the attitudes towards milk powder consumption. This resulted that majority of the Sri Lankan would prefer to consume imported powdered milk (Daniel, 2008). Further, he added, in 1978, the tariff rate for the powdered milk was 5% whereas for the liquid milk is 60%. In spite of the supply promotion policies of dairy sector, it was allowed to import powdered milk for attractive prices and encroach the local markets. In addition, policy makers concern the consumer protection by announcing milk as an essential food in 2007 and all taxes and Levis had been removed to safeguard the consumers. Therefore, the trend of milk import has increased. This trend of importation was progress until the melamine and DCD issue raised in 2014. With the melamine and dicyandiamide (DCD) issue the public concern has focused to the domestic dairy production improvements and government has increased the price of imported powdered milk and increased the custom duty waiver of powdered milk from Rs. 18 to Rs. 68 in February 2014 (Central Bank Report, 2014).

2.4.1 Institutional Support for Dairy Development

Department of Animal Production and Health (DAPH). DAPH is the main state organization responsible for providing technical leadership to the dairy sector and its stakeholders. The DAPH presently operates five (05) divisions such as Animal Health, Animal Breeding, Veterinary Research, Human Resource Development, Livestock Planning and Economics. The Department is also responsible for the livestock extension supply. In addition to above mentioned government and private sector organizations there are several institutes that help dairy farmers to provide necessary trainings and other knowledge, which required practicing better dairy practices. Accordingly, Government farms, Sri Lanka Sumurdhi Authority, Fontera milk processors, Industrial Development Board, Co-operative Societies, Mahaweli Authority, CIC Agribusiness Private Limited and Other institutes provide training and other support to develop the sector. However, there is no interrelation with these institutes to make sure a formal provision of training and knowledge.

2.4.2 Fiscal and Monetary Policies for Dairy Development

There are several dairy development loan schemes initiated with the support of central bank. It is noticed that the utilization of such loan schemes are at lower level and these loans utilize for other family matters. Bank of Ceylon has introduced commercial scale dairy development loan schemes with the objective of increase milk production, establish large scale (Maga) farms more than 7 cows and encourage dairy value added activities.

2.4.3 Implementing National Level Projects and Programmes

Further, Sri Lankan government has allocated remarkable amount of money for the dairy development through implementing national level projects and programmes by the Department of Animal Production and Health: Heifer calf rearing programme, Dairy Village Development project, Liquid milk promotion programme, promotion of private breeding farms, Continues the dairy breeding project by providing facilities for artificial insemination, Pasture development programme, Milk cattle importation programme to upgrade the national herd to enhance the milk production, development of Ridigama farm. In addition, another Milco processing unit at Badulgama also established for the dairy development (Ministry of Livestock development 2010-2020).

2.4.4 Liquid Milk Pricing Policy

Usually raw milk price is determined by the amount of fat and Solid Non Fat (SNF) levels of the milk. The collecting agents have adjusted the prices according to the levels of fat and SNF. Generally higher fat level resulted better market prices. The price of raw milk is determined by the level of fat and Solid Non Fat(SNF) level of the raw milk. However, the production prices of raw milk were calculated by different

dairy related organizations and government determine the price to protect dairy farmers

2.4.5 Banning Slaughtering of Milking Cow

The important policy decision has taken in 1987, banning the slaughtering of milking cows and buffaloes. This was basically due to decrease of national herd of the cattle. However, this policy did not resulted reduction of the national herd therefore, government ban of the illicit transport of cattle and introduced heavy penalties.

2.4.6 Dairy Farmer Insurance Programme

Agriculture insurance board has introduced some cattle insurance programmes. However, farmers are not much connected with these insurance programme. The requirement of dairy farmer insurance scheme also needed.

2.4.7 Cattle Importation

In 2013, the government initiated a project to promote medium and large-scale dairy farming by importing 20,000 high-yielding cows to Sri Lanka with the aim of becoming self-sufficient in milk by 2016. They also, introduced a commercial scale dairy development loan scheme to promote the use of modern machinery and state-of-the-art infrastructure. Different governments continued this project and distributed more than 5000 heifers to medium-scale private farmers. However, these farms are now struggling to make profits due to the high feeding cost and poor quality of important animals that are difficult to survive in given environment and showing low production performances.

2.4.8 Animal Feed

As described by Ibrahim et al. (1999), In 1998 government introduce a new taxation called Good and Services Tax(GST) which is charged at 12.5 % on the value addition on a manufacturing process or providing some kind of service. Therefore, importing cattle feed will have subjected to GST and resulted higher feed costs that leads to increase the cost of production. In addition, finished animal feed also subjected to taxations. This basically to improve the locally available feed resources and providing markets for local feed ingredient such as coconut poonac, rice polish shell powder etc.

2.4.9 Pasture and Fodder for Dairying

In general dairying in Sri Lanka is primarily dependent on pasture and fodder found on road sides, tank bunds, ravines and other common areas. However, at present as Hitihamu et al. (2021) explained that some farmers maintain very limited grasslands at their farms due to lack of land for grass cultivation which is highly intensified for the crop production as land become a limiting factor in the country.

2.4.10 Promotion of Private Sector Activities

In line with the government policy of promoting free market for dairy processing and marketing offered several concessions and fiscal incentives to the private sector to enter into dairy processing (Ministry of Livestock Development, 2018)

CHAPTER THREE

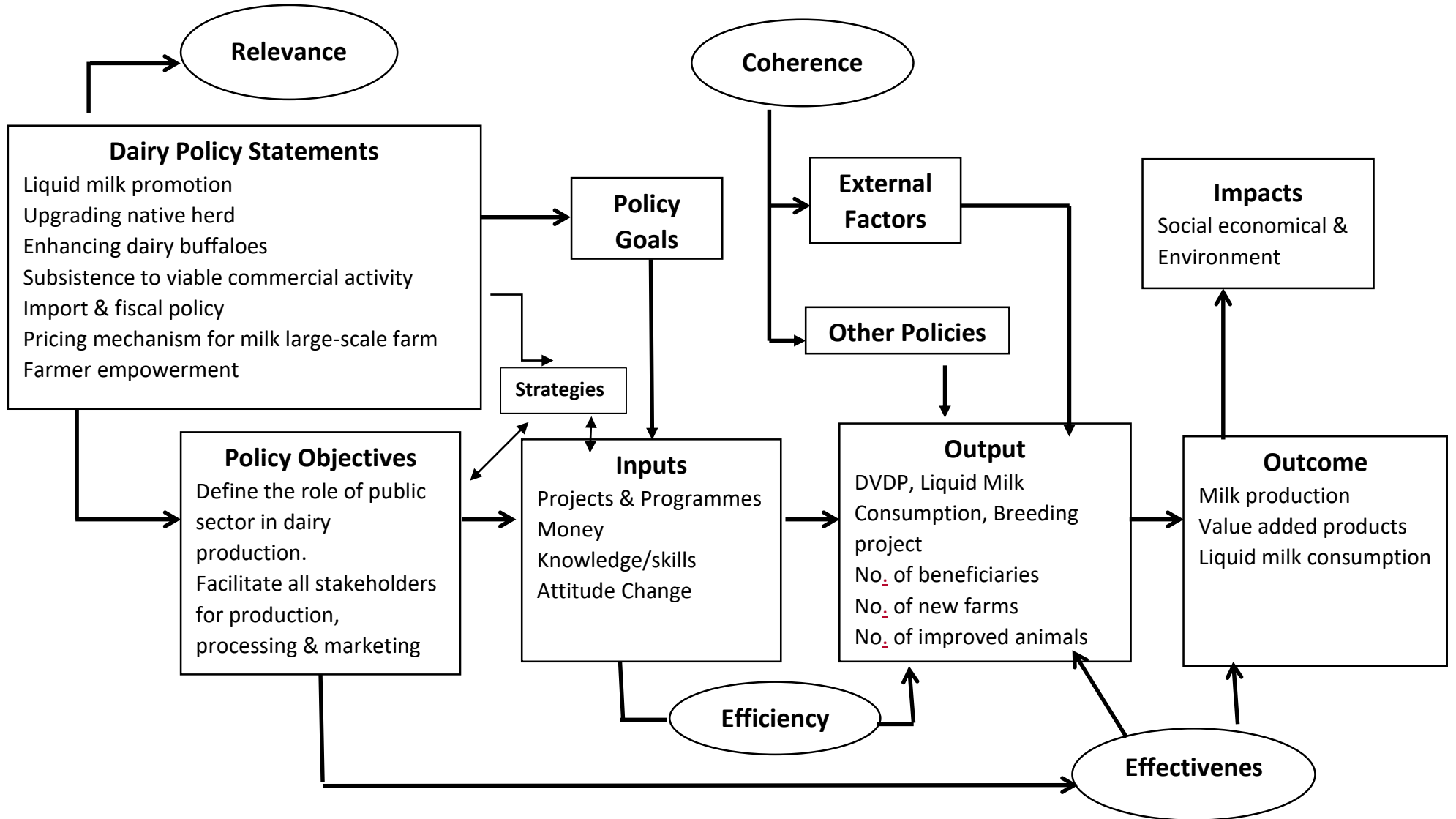
Methodology

For this study data collection was done using the mixed method. “Mixed methods” refers to an emergent methodology of research that advances the systematic integration, or “mixing,” of quantitative and qualitative data within a single investigation or sustained programme of inquiry (Johnson *et.al*, 2010). Information was gathered through the literature survey, focus group discussion and reviewing the reports related. Secondary data collection was done using databases from, the Department of Census and Statistics, Central Bank, Department of Animal Production and Health, State Ministry of Livestock Development and Other published and unpublished data sources.

3.1 Conceptual Framework

Policy evaluation can be briefly described as a procedure that appraises the worth of a policy, and considers the special context and political and economic variables of the situation. Further, evaluation research may pinpoint the extent to which the goals of a policy are achieved besides identifying the constraints associated with it. Firstly, the dairy development policy statements were identified and from that perspective the focussed policies were considered. Secondly, the goals and objectives were identified and how the strategies were employed to obtain the said objectives was investigated in the evaluation framework. According to the Ministry of Livestock Development, policy objectives are achieved through the implementation of the projects and programmes mainly, Dairy Village Development Project, Breeder Farm Development Project, Liquid Milk Promotion Programme and Buffalo Farm Development Programme. Further, dairy extension and health related programmes were undertaken by the Department of Animal Production and Health. In the evaluation framework inputs and outputs were identified and efficiency of input-output relationship was investigated. Here the efficiency was studied by evaluating the level of effort invested to achieve the required outcomes of the project. The effectiveness of the policy objectives was identified by investigating the level of outcome that achieved by the beneficiaries. In addition, in the conceptual framework, the relevance of the policy statements to achieve the said objectives was also studied. In addition, coherence of the policy was also investigated by considering external factors that affect the dairy development and other opposing policies for the sector development. Sustainability of the policy was also studied by considering the social, economic and environmental impacts of the policy.

Policy Evaluation Framework



3.2 Implementation of Objectives

3.2.1 To Assess Relevance, Effectiveness and Efficiency of the Programmes and Projects Implemented for Dairy Development in Sri Lanka from 2006 to 2020

To assess the relevance of the dairy policy, it was planned to discuss the policy goals, objectives, policy statements and policy strategies separately, using the researcher's knowledge and other information on dairy development. Effectiveness and efficiencies were assessed using the progress reports and the annual reports of the relevant institutes.

3.2.2 To Examine the Implementation Process of the Considered Policies

In achieving this objective, how the strategies were employed to implement the policies during the last 15 years will be investigated via interviews and focus group discussions with the respective officials at the field level and others. This information will be analysed descriptively, employing content analysis.

3.3 Information on Dairy Policy – 2006 Prepared by Ministry of Livestock Development

Policy Goals and Targets

1. To achieve sustainable and equitable economic and social benefits
2. To Increase the supply of domestic milk products at competitive prices to the consumers.
3. To achieve 50% self-sufficiency in milk by 2015.

Policy Objectives:

1. Spell out the dairy development goals clearly and define the role of public sector in dairy development activities in the country.
2. Facilitate the private sector and other interested agents to identify the scope and possibilities for production, processing and marketing of milk and dairy products.
3. Rationalizing investments on the dairy sector from the Consolidated Fund and avoid crowding out.

Dairy Development Policy Statements

1. Dairy sector is regarded as a priority sector for public sector investment in the Livestock Department.
2. Promoting the liquid milk market by expanding liquid milk consumption to the regions outside the traditional centres of milk consumption, is identified as a pre-condition for increasing the competitiveness of domestic milk production.
3. Upgrading the native herd is considered a fundamental requirement for dairy

development. While this is regarded a thrust area of public investment, active involvement of the private sector for same is essential.

4. Similar to developing the dairy cattle, efforts will also be made to increase the productivity of dairy buffaloes and dairy goats in the domestic dairy industry.
5. Government will facilitate the transformation of the present subsistence level dairy production into a viable commercial oriented activity.
6. Import policy and fiscal policy on dairy products will focus on providing a conducive environment for the domestic dairy industry.
7. The market focus will govern the pricing mechanism for domestic milk and the government role in this will be limited to increasing the competitiveness in the market.
8. The development of a viable, medium to large scale, commercially oriented private sector that plays an active role in dairy production is regarded crucial for the long-term sustenance of the domestic dairy industry.
9. Dairy farmer empowerment and the participation of dairy farmers and processors in the value chain of dairy products will be actively facilitated.

Animal Feed Resources

1. Developing the feed resource base, including pasture and other natural forages as well as coarse grains, agricultural waste and by-products, is regarded as paramount to develop the livestock sector.
2. The governments will facilitate the trading of feed ingredients for the livestock industry while providing adequate protection and incentives for the growing and production of feed resource locally.

Dairy Development Strategies

1. Implementation of projects and programmes to support small scale dairy farmers and acting as a catalyst for commercialization of dairying where feasible.
2. A strategy of cost sharing with private entrepreneurs, farmer societies and corporative and CBOs with a proven track record will be introduced by the government to undertake liquid milk processing at village level. This will also help meet consumer needs of the periphery and thereby expand the market for processed liquid milk and will also provide easy access to milk of high hygienic standard to consumers outside the main towns.

3. Similar cost sharing arrangements with the private sector will be introduced to set up breeder farms to facilitate dairy animal breeding including cattle, buffaloes and goats and help improve the supply of breeding animals in the country.
4. As means of promoting milk consumption among the public, measures will be made to make processed milk available within easy reach of the consumers through a network of milk sales outlets strategically located in schools, near hospitals, workplaces etc.
5. Organizing dairy farmers into collective groups and empowering them for decision making regarding their dairy production activities.
6. Similarly, these farmer associations as well as dairy processors will be supported to increase efficiencies in the value chain of the dairy products.
7. Spearhead teams of specially trained officials in varied disciplines of dairying will be used to work closely with the provincial authorities to accelerate the attainment of self-reliance of milk in the country.
8. Programmes for technology transfer for improving the dairy herd performance and greater farm productivity will be undertaken and where appropriate, suitable tools for mechanization of dairy farm activities such as machine milking, reapers for pasture and fodder harvesting, hay/straw baling etc. will be introduced to facilitate the medium to large scale commercial dairy farming sector.
9. Similarly, in a bid to complement the public sector efforts in dairy development and as a strategy for the sustenance of the smallholder dairy sector, the corporate sector will be facilitated and linkages between these two groups are promoted.
10. Also, measures will be taken to ensure the small scale dairy operators and those who rear dairy cattle for their subsistence are adequately serviced and supported through public sector development programmes so as to guarantee them of their regular dairy income.
11. Artificial insemination will be the preferred method adopted by the government for genetic improvement of the native herd. However, in areas where artificial insemination is not feasible then the use of superior bulls, under different modalities, will be utilized to disseminate selected genomes of dairy cattle and buffaloes to the native herd.
12. Since the herd composition is crucial for the improvement of the industry, a national level coordination mechanism of all cattle and buffalo breeding activities will be established to spearhead the dairy breeding programmes in the country.
13. The National Animal Breeding Committee will be setup under the Ministry to provide guidance for animal breeding programmes.

14. Special attention should be paid to improve the role of buffalo in national dairy development efforts.
15. Regular reviews of the cost of production of milk and profitability of dairying will be performed to make informed decisions on the adequacy of tariff protection for the local dairy industry as well as to identify measures to improve competitiveness of the locally produced milk.
16. Arrangements will be made to increase dairy farmer equity in the ownership of Milco (Pvt) Ltd. and thereby ensuring a greater transfer of benefits to the dairy farmers in the value addition to their milk.
17. For enhancing the value of dairying in the farming systems models of integrated farming, improved technologies of compost digestion and biogas generation and technologies of compost making will be popularized.

Feed Resource Development Strategies

1. Increased funding of research and extension on pasture and forages for ruminant feeding and enhancing the nutritive value and the utilization of locally available feed resources.
2. Salinity tolerant pasture species will be introduced and lands with high salinity and paddy lands abandoned due to salinity will be utilized for rearing of cattle, buffalo and goats.
3. Methods of pasture production in paddy fields will be demonstrated as a strategy to extend the grazing period in fallow paddy fields.
4. Introduction of suitable pasture and fodder species for varied farm holding and dairy production systems and the correct utilization of same using chaff cutters etc. will be demonstrated for higher utilization of roughages in ruminant feeding.
5. Other feed resources such as rice polish, sugar cane tops, bio gas and other crop residues will be harnessed as feed resources for increased production.
6. Systems will be introduced to make greater use of grass by developing haymaking and silage systems to enhance availability of forage in dry periods.
7. Technologies for fibrous feed utilization will be introduced and promoted for greater and more effective use of paddy straw that is abundant in many parts of the country.
8. State lands will be made available to the private sector to promote superior planting materials for feed and fodder, appropriate cultural practices of production and harvesting of same will be demonstrated and out-grower

operations for cereals and coarse grains production as animal feed ingredients will be carried out.

9. Adoption of an appropriate trade and tariff policy that is supportive of domestic production of animal feed ingredients such as maize, soybeans, coconut poonac, rice polish and fishmeal.
10. Anomalies in the tax incentives provided for the BOI and non-(BOI) registered corporate feed milling sector which is primarily manufacturing animal feed for the domestic market will be rectified for creating a competitive structure in the feed milling sector.

CHAPTER FOUR

Results and Discussion

4.1 Relevance of the Policy

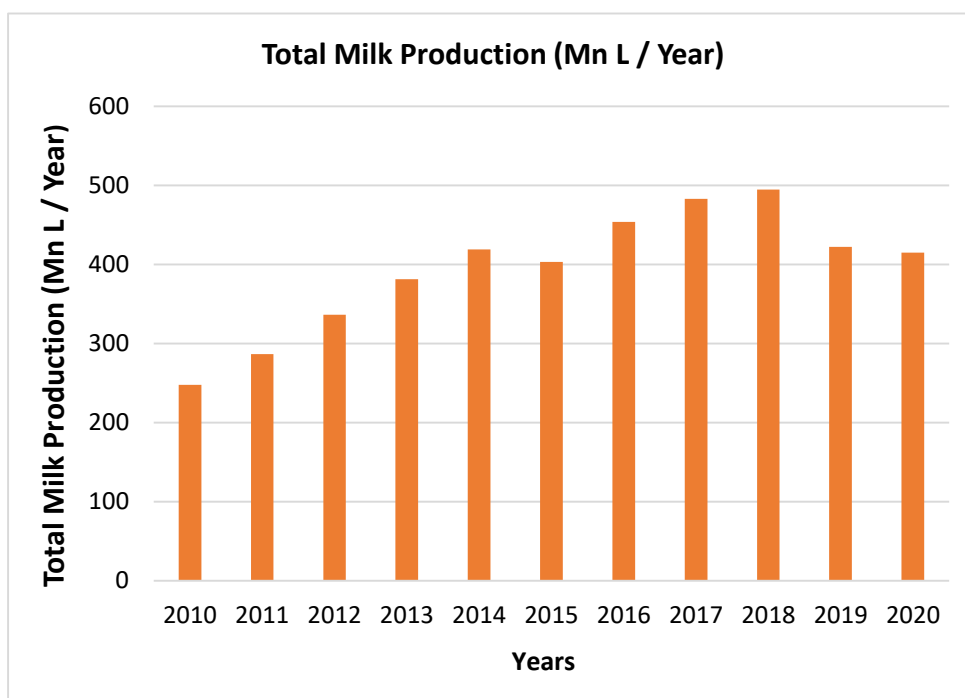
According to the policy document, it consists of policy goals, targets, policy objectives and policy statements. In terms of policy goals, 17 dairy development strategies and 10 dairy feed development strategies have been identified in realizing them. The thrust is on the areas such as promoting liquid milk market and liquid milk consumption, upgrading native herds in partnership with the government and private sector, expanding the role of dairy buffaloes and dairy goats in the domestic dairy industry and facilitating the transformation of the present subsistence level dairy production into a viable commercially oriented activity. In addition, providing a conducive environment for the domestic dairy industry by focussing on import policy and fiscal policy, governing the pricing mechanism for domestic milk, development of a viable, medium to large scale, commercially oriented private dairy farms, and dairy farmer empowerment and the participation of dairy farmers and the processors in the value chain of dairy products are also priorities. The policy statements in the document have clearly addressed the current dairy development challenges.

4.2 Effectiveness of the Policy

Effectiveness of 2006 dairy policy was determined by investigating milk production performances, herd improvements disease control, national level project implementation and farmer empowerment programmes.

4.2.1 Milk Production Enhancement

It was outlined in the 2006 policy document to achieve 50% self-sufficiency in milk by 2015, focusing mainly on herd improvement in terms of both cattle and buffaloes. Providing technical expertise in herd development is vested with the Department of Animal Production and Health (DAPH). It is noted that under the herd development programme, the DAPH has initiated several programmes for milk production enhancement.



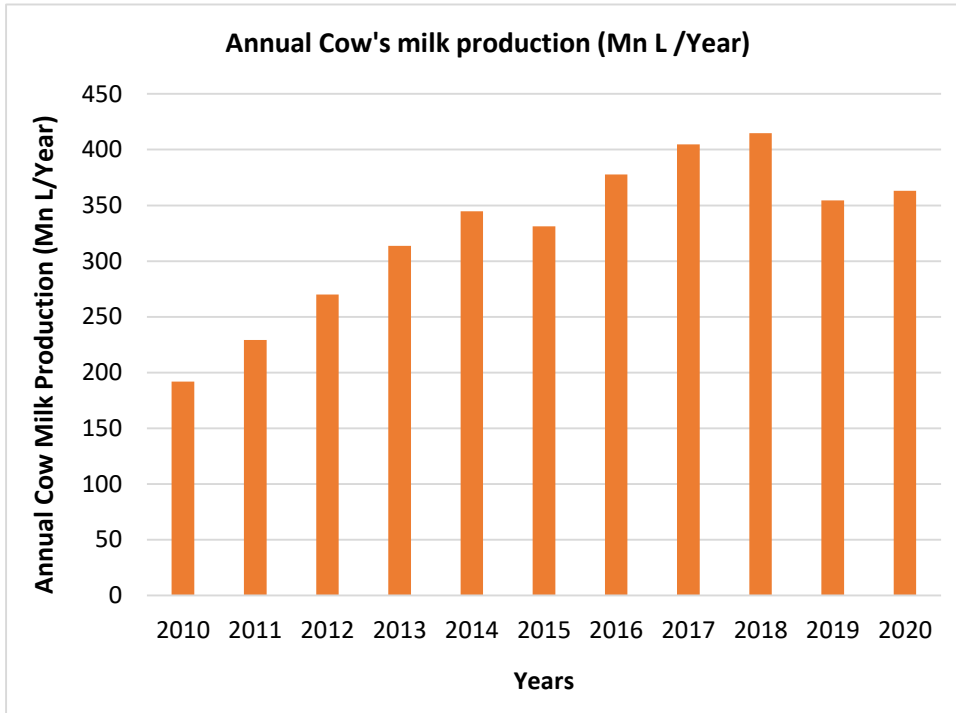
Source: Department of Animal Production and Health, 2010-2020

Figure 4.1: Annual Total Milk Production from 2010 to 2020 , DAPH

Figure 4.1 illustrates the annual milk production during year 2010 to 2020. Accordingly, the milk production has increased over the years until 2018 followed by a dip in the succeeding years. The production decreased considerably in 2020 due to high cost of concentrate feed. Further, according to DAPH, in 2018 40 % of self-sufficiency in milk was achieved.

4.2.2 Production of Cow's Milk

Figure 4.2 describes the annual cow's milk production from 2010 to 2020. It is evident that the cow's milk production sustained a boom from 2010 to 2018 before experiencing a slight setback during 2019 and 2020. However, during the prospered period the production has doubled.



Source: Department of Animal Production and Health, 2010-2021

Figure 4.2: Cow's Milk Production from 2010 to 2020

4.2.3 Neat Cattle Herd Improvement

The phenotypic expression of milk production traits (e.g., milk yield and composition) are controlled by genes, which may or may not be transferred to the offspring (Sammy, 2012). The genetic value of a trait indicates the likelihood of such transformation. Consequently, when for the selection of breeding stock takes place, dairy producers are typically more concerned with an animal's genetic value rather than its phenotypic value. The phenotypic value refers to the presence or absence of particular traits; the genetic value is indicative of the potential preferred (or probability) traits that may be passed down. The challenge of the dairy breeder is, therefore, to determine the animals that are effective in bestowing high quality milk production traits and other desirable attributes on their progeny (Sammy, 2012).

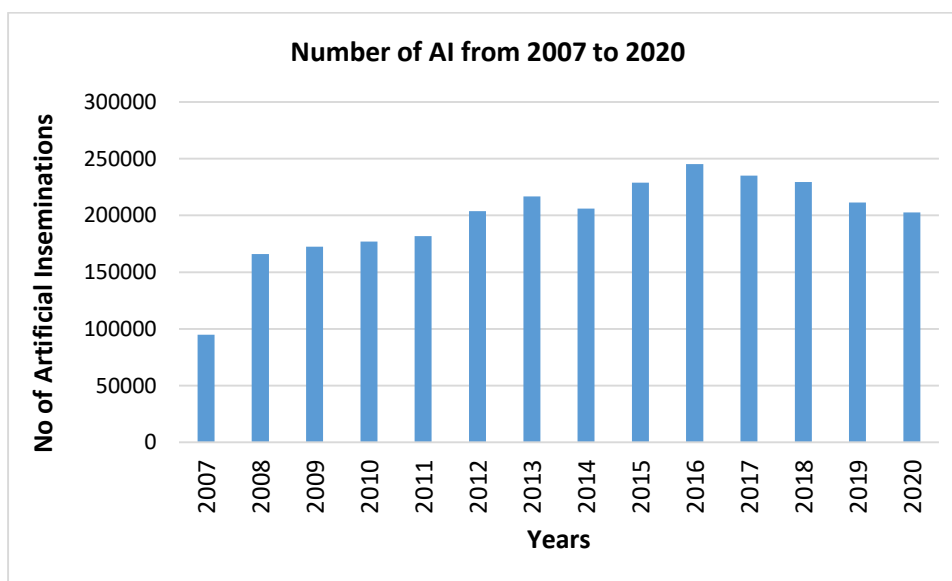
According to the 2006 Dairy Policy, it was highlighted that Artificial Insemination (AI) is the main tool for genetic improvement or upgrading the national herd. Accordingly, Table 4.1 explains the number of Artificial Insemination, pregnancy diagnosis and carvings reported during 2007 to 2020. Figure 4.3 explains the number of AI completed annually since 2007. Accordingly, the number of AIs increased remarkably during last 15 years. The number of pregnancy diagnosis and carvings are lower than the number of AIs performed. However, experts explain that mostly to achieve a pregnancy AI has to be performed more than once. Further, transport and other handling issues affect the quality of semen, which results in repeated performance of AI. In addition, all AI animals are not subjected to pregnancy diagnosis and sometimes

the calving information is also not reported. However, the farmers in the heifer cow programme report the calving details to Veterinary Surgeon Officer as female calves receive the feed subsidy until their first calving.

Table 4.1: Number of Artificial Inseminations, Pregnancy Diagnosis and Number of Carvings Reported

Year	Number of AI Done	Number of Pregnancy Diagnosis Done	Number of Carvings Resulted from AI
2007	94960	24172	10800
2008	165853	44813	40659
2009	172319		51581
2010	177000	48572	57334
2011	181725	45905	56144
2012	203753	49798	66860
2013	216660	57010	71878
2014	205949	66908	51781
2015	228890	66493	-
2016	245265	75043	68975
2017	234924	70347	66184
2018	229418	74101	69520
2019	211356	72447	66157
2020	202516	59877	57051
Total	2770588	755486	734924

Source: Annual Reports of DAPH (2007-2020)



Source: Department of Animal Production in Health, 2007-2020

Figure 4.3: Number of Artificial Inseminations from 2007 to 2020.

4.2.4 Disease Control and Vaccination Programme

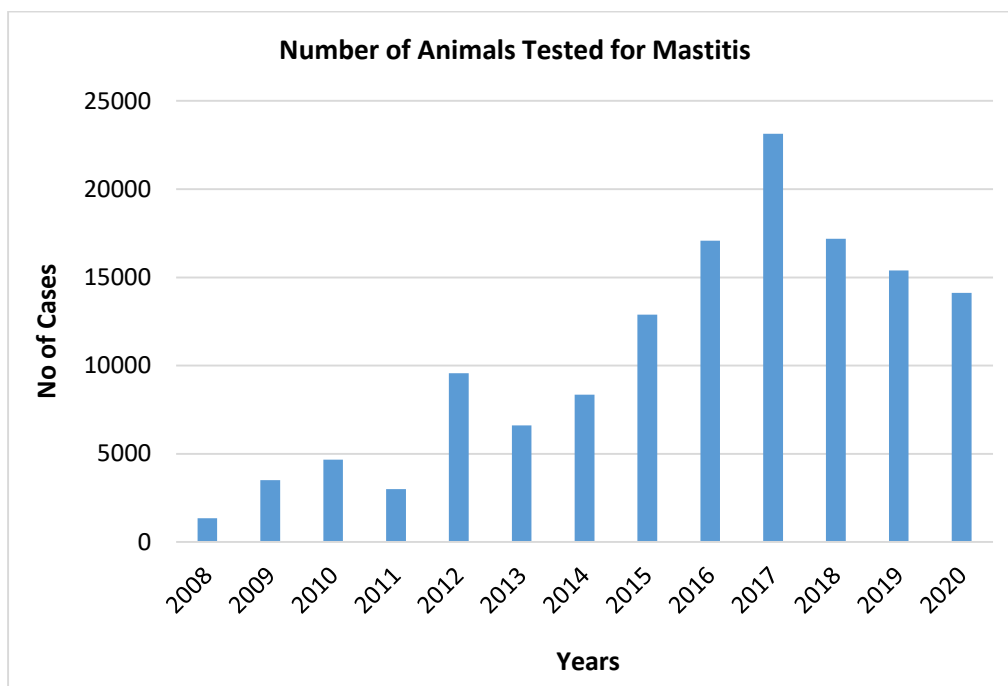
Other than the upgrading programme, the Department of Animal Production and Health mainly concentrates on the disease control and vaccination programmes. Table 4.2 illustrates the number of vaccines supplied during 2008 to 2020. Contagious Diseases Control and Preventive Vaccination programmes have been carried out against economically important major livestock diseases such as Foot and Mouth Disease (FMD) and Black Quarter (BQ) in earmarked locations in the country. BQ vaccine was produced locally in adequate amount to meet the demand for preventive as well as control vaccination in case of outbreaks. Hemorrhagic Septicemia Alum precipitated vaccine was produced as an emergency pre requisite to control any outbreak of HS that may occur unpredictably. In some years Bovine Brucellosis vaccine also provides protection to animals from the disease outbreaks. In year 2014, 2015 and 2018, a considerable amount of FMD vaccines were imported to prevent possible infections.

Table 4.2: Disease Control and Vaccination Programme

Year	Number of Vaccine Doses Supplied (doses)				Number of Imported FMD Vaccines (doses)
	Foot and Mouth Disease	Hemorrhagic Septicemia	Black Quarters	Bovine Brucellosis	
2008	498100	1020000	195822	-	-
2009	460750	519930	145167	-	-
2010	506550	-	-	-	-
2011	735750	799270	203775	-	-
2012	334980	848520	244134	-	-
2013	481720	-	-	5932	-
2014	558825	-	139748	4525	675000
2015	719921	-	129415	5262	600000
2016	-	-	-	5984	-
2017	-	-	835557	-	600000
2018	947610	-	-	-	-
2019	970160	303600	221843	-	-
2020	226600	351010	146619	-	-
Total	6440966	3842330	2262080	21703	1875000

Source: DAPH Annual Reports (2008-2020)

Mastitis is a common disease that directly influences the milk production of milking cows. Therefore, prevention of mastitis helps enhance the milk production. DAPH, being responsible in prevention of mastitis incidence, many efforts were taken in that direction, but of little avail. Therefore, action was taken to control the number of mastitis cases. Figure 4.4, explains that the testing of mastitis has increased over the years.



Source: Annual Reports DAPH (2008-2020)

Figure 4.4: Cases for Mastitis Tested

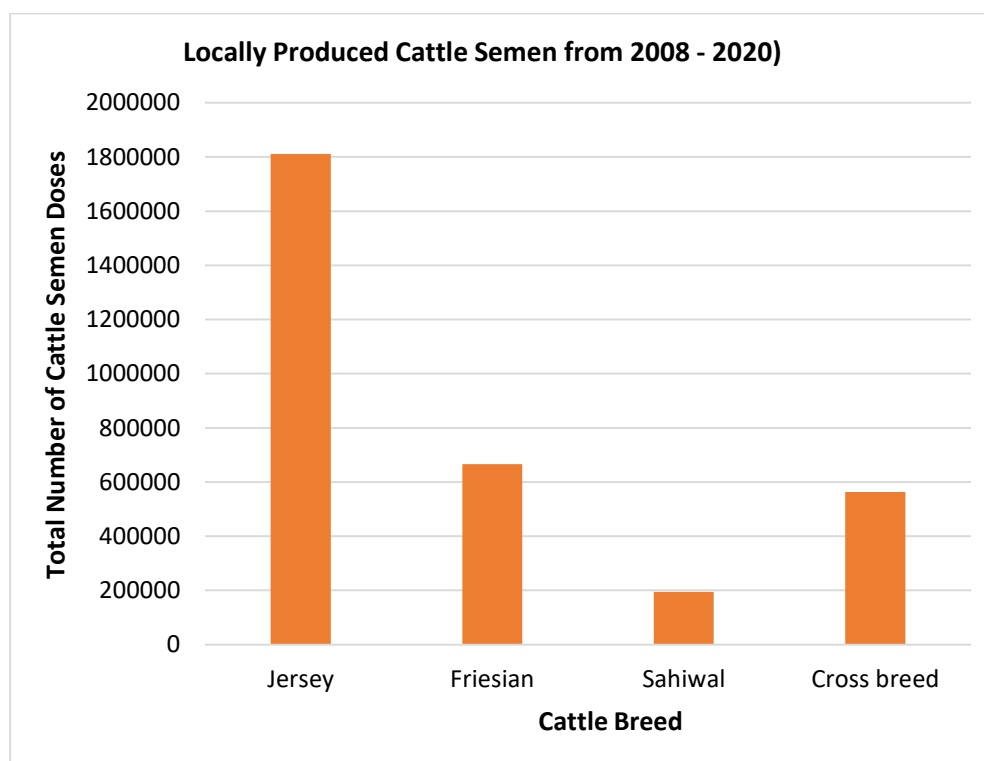
4.2.5 Semen Production and Importation – Neat Cattle

Table 4.3 shows the locally produced and imported semen quantities from 2008 to 2020. Accordingly, Jersey, Frisian, Sahiwal and Crossbred semen were produced locally in large quantities while lesser quantities were imported. Jersey semen is the highest used for the upgrading programme, followed by Friesian semen and crossbreed semen. DAPH explained that for different climatic zones different breeds are compatible. Accordingly, for wet zone Jersey and Frisian semen are recommended in terms of the milk yield and quality while for the dry zone Sahiwal and AFS are recommended. However, at the ground level farmers do not heed these recommendations and they practice AI with the available semen or according to their wish.

Table 4.3: Semen Production and Importation of Neat Cattle

Year	<u>No. of Locally Produced (doses)</u>				<u>No. of Imported (doses)</u>			
	Jersey	Friesian	Sahiwal	Cross breeds	Jersey	Friesian	Sahiwal	Cross breed
2008	106967	25635	10160	28225	38	-	4087	-
2009	86256	15450	2798	34240	-	-	3651	751
2010	104226	37170	17201	35117	-	-	-	-
2011	103757	34830	17403	38290	3500	900	-	-
2012	136940	41534	18735	26899	3500	3982	-	-
2013	157535	28865	24720	32811	-	-	-	4990
2014	165769	125790	23240	47194	-	-	-	-
2015	116843	153015	22030	69040	500	-	-	-
2016	170385	90653	22124	73063	500	-	-	-
2017	124773	68655	24090	82310	900	500	-	1000
2018	183199	16964	11986	81742	986	-	2996	3982
2019	210341	11149	-	10670	2453	3478	-	-
2020	144079	16325	-	3434	-	-	-	-
Total	1811070	666035	194487	563035	12377	8860	10734	10723

Source: Annual Reports DAPH (2008-2020)



Source: Department of Animal Production of Health, 2008-2020

Figure 4.5: Quantities of Locally Produced Cattle Semen

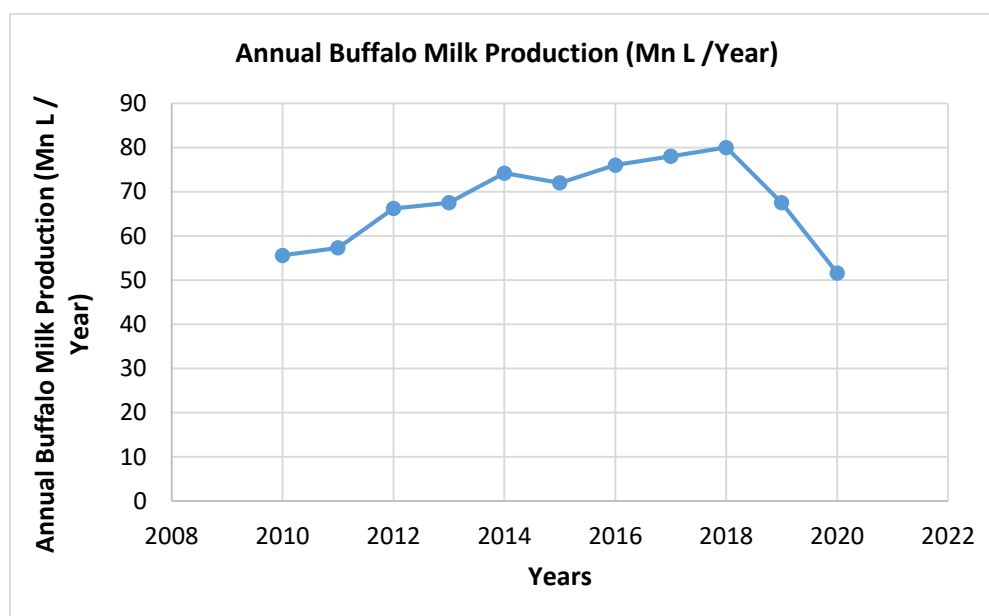
4.2 6 Buffalo Farm Development

According to 2006 Dairy Policy, upgrading the native herd is considered fundamental for dairy development and identified as a thrust area for investment. Further, in policy statement, similar to developing the dairy cattle, efforts will also be made to increase the role of dairy buffaloes for dairy development.

Table 4.4: Buffalo Milk Production

Year	Annual Buffalo Milk Production (Mn L /Year)
2010	55.6
2011	57.3
2012	66.2
2013	67.5
2014	74.2
2015	72
2016	76
2017	78
2018	80
2019	67.5
2020	51.6

Source- Department of Animal Production and Health, (2010-2021)



Source: Department of Animal Production and Health, (2008-2020)

Figure 4.6: Buffalo Milk Production from 2010 - 2021

According to Figure 4.5, buffalo milk production increased over the years reporting minor fluctuations until 2018 from 2010. However, after 2018 it has decreased remarkably.

4.2.6.1 Projects and Programmes Implemented to Enhance the Buffalo Milk Production

Table 4.5 describes the buffalo semen production importation and distribution activities implemented by DAPH for buffalo dairy development. Accordingly, DAPH mainly concentrated on upgrading of existing buffaloes by crossing two dairy breeds for improving the existing animals in the herd. Upgrading can also introduce desirable characteristics such as size, milk production temperament, meat or dairy qualities into an established breed. Some livestock breeders also use upgrading to build herds that are specially adapted to their climate and pastures. In the Upgrading programme is ought to enhance the qualities of existing animals.

The rare breed (Breed A) is left to mate the common breed (Breed B). The offspring will be 1/2 pure Breed A.

The 1/2 pure cattle are left to mate 100% purebred members of Breed A. The offspring from this cross will be 3/4 pure.

The 3/4 pure animals are left to mate other purebreds. Now the offspring will be 7/8 pure.

If farmers practice the correct breeding as mentioned above, it is possible to achieve 7/8 of the characteristics of a rear breed or an improved breed.

As described in Table 4.5, for buffalo upgrading the leading breeds are Murrah and Niliravi. From 2008 to 2020, different activities such as semen production, semen importation, and distribution have taken place. It is evident that the DAPH mostly promoted Murrah buffaloes than Niliravi as they produce more milk per day

It is also noted that, the domestic production of Murrah and Niliravi semen has increased in the last 15 years, because in 2008 and 2009 Kundasale and Polonnaruwa semen production stations were well equipped for the production and processing of deep frozen semen and Thinnaveli station for chilled semen production. In addition, Insemination Station (CAIS), Kundasale, has been developed to the international standards with high tech equipment. Further, equipment has been imported to strengthen the Kundasale. Chemicals have been purchased along with 50,000 straws for filling semen and Oestrous Synchronization Programme for buffaloes was introduced. This programme was conducted in buffalo herds located in the dry and intermediate zones. It is recorded that 162 buffalos were treated with PGF 2 α hormone for heat induction.

Table 4.5: Semen Production and Importation and Distribution (Buffalo)

Year	Semen Production (doses)		Semen Importation (doses)		Semen Distribution (doses)	
	Nili Ravi	Murrah	Nili Ravi	Murrah	Nili Ravi	Murrah
2009	247	8083	738	5167	-	-
2010	-	2093	-	-	-	-
2011	-	-	-	-	-	-
2012	-	5927	10	425	-	-
2013	-	5847	60	10	-	-
2014	-	4935	10	125	-	-
2015	-	5061	71	209	-	-
2016	-	6846	343	91	-	-
2017	-	844	-	-	12	1205
2018	-	212	-	2497	145	4067
2019	-	6520	-	-	2155	4793
2020	-	3350	-	-	1800	2073
Total	247	49718	1232	8524	4112	12138

Source: Department of Animal Production and Health (2009-2020)

Table 4.6 illustrates the number of Artificial Insemination training programmes conducted and the number of bull calves distributed. During the last 15 years a total of 919 AI training programmes were conducted, targeting buffalo herd performances. As indicated in Table 4.6, in certain years AI training was not conducted. In addition to AI, authorities focussed on the promotion of natural breeding with improved stud bulls in medium scale farms. Accordingly, 254 bull calves of both Murrah and Niliravi were distributed to the farmers for natural breeding.

Table 4.6: Number of AI Training Programmes and Distribution of Bull Calves

Year	Number of Participants Trained	Number of Bull Calves Issued
2009	-	-
2010	-	-
2011	-	72
2012	145	86
2013	86	-
2014	-	-
2015	150	62
2016	-	2
2017	294	-
2018	155	32
2019	-	-
2020	89	-
Total	919	254

Source: Annual Reports DAPH (2009-2020)

4.2.7 Upgrading Native Herd

For upgrading native herds, the Ministry of Livestock Development has implemented several projects and programmes. The main focus was on establishment of breeder farms and importing high yielding animals from New Zealand and Australia. Under these projects, from 2015 to 2020, a total of 658 breeder farms were developed. In addition, a total of 15,672 animals were imported during 2015 to 2020.

Development of breeder farms is essential for milk production enhancement. However, importing improved cattle was not successful as expected. Government invested a huge amount on dairy production enhancement but with little effect.

Table 4.7: Progress of Native Herd Upgrading by Ministry of Livestock

Year	Project / Programme	Allocation
2015	<p>1). Establishment of 252 Animal Breeder Farms</p> <p>2). Importation of Dairy Animals - 2,000 pregnant dairy cows were imported for distribution among dairy farms at Bopaththalawa, Manik Palama and Dayagama belonging to the NLDB.</p> <p>3). Existing traditional cattle sheds were modernized to facilitate removal of animal waste and increasing efficiency of the imported animals. 1,183 milking cows have been imported by the NLDB for rearing in the Ridiyagama dairy farm.</p> <p>The daily milk production capacity of imported milk cows is 23,000 – 25,000 litres, and the average production of a mother cow has been increased to 19 litres per day. By the end of September 2015, 804 heifers and 2,763 male calves of high breed including 455 heifers and 508 male calves born of the imported milk cows were issued to farmers by the farms belonging to the NLDB. 365 female animals are being reared in livestock farms at Bopaththalawa, Manik Palama and Dayagama for the benefit of the next generation.</p>	
2016	<p>1). Cattle Importing Programme - 2,489 dairy cows were imported by the NLDB for rearing at Ridiyagama farm.</p>	

2017	<p>1). The construction of 207 breeding farms has been completed</p> <p>2). Importation of dairy cows - 5000 dairy cows have been imported from New Zealand and Australia in year 2017 and distributed to the investors in five districts: Kurunegala, Badulla, Nuwera Eliya, Matale and Kandy.</p>	1) Rs. 20.7 Million
2018	1). Establishment of 104 Animal Breeder Farms	1) Rs.10.5 million
2019	<p>1). Importation of Dairy Animals - 2,000 dairy cows were imported from New Zealand and 3,000 dairy cows were imported from Australia and distributed among investors. Imported animals have given birth to 5,650 calves as at 31.07.2019 and 21.12 million liters of milk was added to the local milk production.</p> <p>2). Establishment of veterinary offices and other infrastructure facilities in the Northern Province.</p> <p>3). Establishment of 40 breeder farms.</p>	<p>2) Rs.20.0 million</p> <p>3) Rs.4 million</p>
2020	<p>1). Establishment of 55 breeder farms.</p> <p>2). Importation of Dairy animals - 2,000 dairy cows were imported from New Zealand and 3,000 from Australia (2017) and they were distributed among 68 investors.</p>	<p>1) Rs.100 million (Expected Investment)</p> <p>2) Rs.13.50 million (Foreign Loan)</p>

Source: State Ministry of Livestock Development (2015-2020)

4.2.8 Farmer Empowerment Programmes

Farmer empowerment programmes were carried out continuously by the DAPH as a mandatory process. Under this programme, it is expected to impart holistic knowledge on dairying to dairy farmers. In addition, the Ministry of Livestock Development, Milco, NLDB and other related organizations are engaged in dairy farmer empowerment. The following table illustrates the activities implemented by the Ministry of Livestock Development under farmer empowerment. The programmes implemented were farmer and officer training, provision of training modules as booklets, broadcasting TV programmes, empower small scale farmers by granting a 50% subsidy for milking cows, and women empowerment programmes.

Table 4.8: Activities Taken to Empower the Farmers by Ministry of Livestock Development

Year	Projects / Activities	Allocation
2007	1). 360 farmers were trained in clean milk production. 525 milk cans and other necessary inputs and assistance to improve their cattle sheds were provided. 2). Training programme on Animal Husbandry - 901 farmers and 1,019 technical officers were trained. 48,910 booklets were issued. 65 TV and radio publicity programmes were also conducted.	
2012	1). Dairy village programme - 988 dairy villages were established.	
2015	1). Encouragement of small-scale dairy farmers - provide cows or heifers under the scheme of 50% contribution, to new entrants to the dairy farming sector. 2). Skills Sector Development Programme - development of facilities at livestock colleges at Seppukulama & Karandagolla.	2) Rs.60 million
2016	1). Improving the quality of dairy production of small scale dairy farmers through women empowerment - selected beneficiaries will be provided with financial assistance amounting to Rs. 50,000 each with 50% government contribution. Upgrade the quality of production of cows whose produce is above 20 litres per day. It is also expected to enhance the living standards of female milk producers. 2). Encouraging Small Scale Dairy Farmers - provide small dairy farmers with cows or heifers at half of the price; 76 farmers benefited. 3). Empowerment of Dairy Extension Services through Improvement of Knowledge - 10 officers benefited.	2) Rs. 2.265 million
2017	1). Project on distributing dairy cows among female headed families - 50% of subsidy up to Rs. 60,000 for farms in the districts of Jaffna, Killinochchi, Kurunegala, Polonnaruwa, Kalutara, Moneragla, Matara, Matale, Ratnapura and Batticaloa; 79 farmers benefited. 2). Empowerment of milk collecting network - establish 03 milk collecting centres in year 2017, 03 milk coolers with the capacity of 5000 litres have been provided to Milco Company (Pvt) Ltd. 3). Empowerment of Dairy Extension Services through Improvement of Knowledge – provided training to ten officers (six-week training on dairy farming) 4). Empowering Small-scale Dairy Farms - 50% of subsidy up to Rs. 60,000; 400 projects have been implemented through Milco (Private) Limited.	4) Rs. 50 Million
2018	1). Empowerment of Small Scale Dairy farms - 50% financial assistance subject to a maximum of Rs. 60,000 per beneficiary is granted to encourage quality milk production; 180 farmers benefited.	
2020	1). project for the empowerment of small scale dairy farms - 179 small scale dairy farm development projects were completed.	

Source: State Ministry of Livestock Development (2007-2020)

Table 4.9: Farmer Empowerment Programmes Conducted by DAPH

Year	Project / Activity
2008	1). Twenty six of training programmes were conducted and 708 farmers participated.
2010	1). Project on small Scale Farming Improvement through Genetic and Feeding Management Improvement in Sri Lanka - Suitable progeny testing methods were developed in Sri Lanka, Techniques related to AI were improved, feeding and dairy management of dairy farmers were improved. 2). Special Dairy Development programmes in the Sabaragamuwa Province - Four training programmes on production of cheese and butter were conducted in Deraniyagala.
2011	1). Entrepreneurship Development and Self-Employment support services - Dairy Management, Biogas & Organic Manure Production, Small Scale Milk Processing Training Programmes for self-employment; 247 participants benefited. 2). Project on small Scale Farming Improvement through Genetic and Feeding Management Improvement in Sri Lanka -11 training programmes were held for satellite farmers, short-term study tour at Kerala Livestock Development Board (KLDB) in India was conducted for field staff, Training cow model and GI cow crushes for AI were installed at the Polonnaruwa AI training Center for utilizing as practical AI training materials. 3). A Pedigree and Performance Recording Scheme (PPRS) was established involving about 2500 lactating animals 4). Trained extension staff of the Department of Animal Production and Health in performance recording and genetic improvement - 414 officers and 216 farmers were trained.
2012	1). Project on small Scale Farming Improvement through Genetic and Feeding Management. Improvement - A bulk semen storage tank and two (02) units of liquid Nitrogen tank for AI were installed at Kundasale AI station, Ten (10) training programmes were conducted for satellite farmers, Training on progeny testing was conducted
2013	1). Entrepreneurship Development and Self-Employment Support Services - The Entrepreneurship Development and Self-Employment Support Training programmes were conducted on small scale milk processing practices.
2015	1). Training programme for farmers at Sri Lanka School of Animal Husbandry (SLSAH), Seepukulama - 2 programmes were conducted and 78 participants benefited.
2016	1). Implementation of training programme - nine training programmes were conducted for farmers and 456 farmers were benefited.
2018	1). Special training programmes were conducted at Sri Lanka School of Animal Husbandry (SLSAH), Seepukulama - six programmes were conducted and 190 farmers participated. 2). Entrepreneurship development and self - employment support services - 19 programmes were conducted and 459 farmers participated. 3). Implementation of technical training programmes - two programmes were conducted and 52 farmers participated.

Source: Annual Reports, DAPH (2008-2018)

4.2.9 Promoting Liquid Milk Market

Liquid milk promotion programme is one of the main policy objectives. To achieve this objective all the institutions in the livestock sector are involved and especially the Ministry of Livestock Development provide facilities to promote of liquid milk consumption by establishing milk outlets, providing financial supports, modernizing large scale processing centres and helping to the dairy cooperatives.

Table 4.10: Programmes Implemented to Promote Liquid Milk

Year	Project / Activity	Allocation
2012	1). Facilitation and Promotion of Liquid Milk Consumption - Establishment of 656 milk outlets.	
2015	1). Milk cans with a capacity of 10 litres have been distributed among farmers. 975 farmers benefited. 2). Facilitation and Promotion of Liquid Milk Consumption - Strengthening of the island wide milk-collection network.	1). Rs.3.1 million 2). Rs.30 million
2016	1). Programme for the improvement of the Quality of the Milk produced by Small Scale Dairy Farmers - selected beneficiaries are provided with financial assistance up to a maximum of Rs. 60,000 each with 50% Government contribution which may be used for obtaining milk collecting equipment, procuring facilities for pasture/grassland development or obtaining a dairy cow of high breed. 2). Establishment of a Dairy Processing Plant at Badalgama.	2) Rs.10 million
2018	1). Facilitation and Promotion of Liquid Milk Consumption - Financial assistance subjected to the maximum of Rs.30,000 per farm was granted with government contributing 50% of the cost for laying concrete on the floor of the cattle shed; 310 dairy farms benefited. 2). Distributing dairy cows among female headed families - Dairy cow of high strain is distributed among female headed dairy farms subjected to the maximum of Rs.60,000 at 50% subsidy . 3). producing value added dairy products within the relevant areas and popularizing the consumption of milk.	1) Rs.46.31 Millions
2019	1). Development of Mini Dairy Cooperative Societies - develop six selected small scale milk producing centres.	1) Rs.2,065 millions

Source: State Ministry of Livestock Development (2012-2019)

4.2.10 Animal Feed Resources Development

Policy statements under animal feed resource development are as follows:

1. Developing the feed resource base, including pasture and other natural forages as well as coarse grains, agricultural waste and by-products, are of paramount importance in developing the livestock sector.
2. The governments will facilitate the trading of feed ingredients for the livestock industry while providing adequate protection and incentives for the growing and production of feed resource locally.

4.3 Projects and Programmes Implemented during 2006 to 2020 for Feed Resource Development

According to Table 4.11, during the last 15 years, the government has taken action to enhance the dairy feed resource base. Accordingly, 773 acres of new pasture lands were established and Gliricidia sticks were planted by NLDB. In addition, pasture and fodder utilization promotion programmes were implemented in private breeder farms in 2008 by establishing fodder plots. Further, improved fodder varieties such as CO-3 and Bracharia were cultivated in the Kundasale and polonnaruwa AI centres. Training programmes were conducted by the Animal Breeding Division on cultivation, maintenance, and utilization of fodder/pasture and dairy farmers, Livestock Development Officers of DAPH and Extension Officers of MILCO benefitted. In 2009 16 large, medium and small-scale registered animal feed manufacturing establishments were in operation. A load of 6,575.15 mt of cattle feed was produced in 2009. Pasture development programmes are implemented every year after the policy implementation. Furthermore, hay production programmes, provision of equipment to conserve the grass, providing new licences and renewing licences to import feed and irrigation facilities were provided to the pasture lands in Kundasale.

According to the policy statements 2006, DAPH and other relevant organizations implemented a host of programmes to develop feed resources in the country. It is observed that most of the feed resource development programmes were targeting NLDB, Milco, and other government owned agencies however, farmer targeted feed promotion programmes were minimal.

In Sri Lanka, majority of the farmers are confined to small scale dairy entrepreneurship and the land resource is limited for the farmers to allocate for the grazing propose. Prompt attention should be on resolving the land issue. In addition, majority of farmers have turned into road side grazing and grazing on fallow lands. Therefore, for increasing the feed conversion efficiency, feed resource development should be undertaken while providing training to enhance the feed utilization efficiency.

Further, under the feed resource development programme, the government focussed mainly on forage production enhancement. Further, it is essential to implement programmes to enhance the concentrate feed ingredients such as maize and soybean. However, this responsible has been vested with the Department of Agriculture. Due to the prevailing fertilizer issue that emerged in 2021, the maize production has dropped, leading to an increase in the animal feed price.

All in all, the policy documents clearly articulated the importance of developing feed resources following which a series of vital projects and programmes was initiated. However, the focus should also be on the land issues at small holder level and improving the quality of available grass.

Table 4.11: Projects and Activities for Feed Resource Development, Increasing Local Animal Feed Production and Provide Incentives

Year	Projects / Activities
2006	1) Pasture and Fodder development programme - NLDB established 538 Ac of new pasture in the dairy farms. Established 57,785 of Glyricidia sticks during 2006.
2007	1) Pasture and Fodder development programme - NLDB established 235 ac of new pasture in the dairy farms. Established 56,347 of Glyricidia sticks.
2008	<p>1) Distribution of Minerals-Molasses Blocks - 35,524 mineral blocks were issued to field Veterinary offices in 2008.</p> <p>2) Fodder and Pasture Utilization pramotion programme - A total of 776 fodder / grass demonstration plots (each of 500 m2 area) were established. 61 fodder plots (each of 1 ac area) were established in private breeder farms. 28 acres in Kundasale and Polonnaruwa AI centers were improved with fodder varieties of CO 3 and Bracharia grass.</p> <p>3) Training programmes were conducted by the Animal Breeding Division on cultivation, maintenance, and utilization of fodder/pasture. A total of 1591 individuals benefited (Dairy farmers, Livestock Development Officers of DAPH and Extension Officers of MILCO).</p>
2009	<p>1) Fodder and Pasture Utilization Promotion Project - A total of 713 fodder / grass demonstration plots were established during in 2009. Pasture establishment was carried out in 7 ha. Glyricida was planted in 1.75 ha and fodder nurseries were developed in 2.0 ha in the AI Centre, Polonnaruwa.</p> <p>2) A total of 1,643 individuals of dairy farmers, Livestock Development Officers of DAPH and Extension Officers of MILCO were trained on cultivation, maintenance, and utilization of fodder/pasture</p> <p>3) Sixteen (16) large, medium and small-scale registered animal feed manufacturing establishments were in operation. Cattle feed of 6,575.15 mt was produced.</p>

2010	<p>1) Pasture and fodder cultivation programme - About three (03) acres were replanted with CO-3 in 2010. 1.0 Mt of CO-3 planting materials were issued to fulfil provincial request from fodder lands. About 1,458 Mt of green fodder was harvested. 2.0 Mt of hay was produced and fed to animals during the year.</p> <p>2) Pasture Development Programme - 10 ac pasture and legume seed production at AIC ,1029 Farmer Training on Utilization of pasture and fodder, 20 ac establishment of fodder at AI Centers, Establishment of five AC tree Fodder at Goat Breeding stations-, four fodder nursery development, Establishment of 540 fodder plots in VS ranges , 64 Mt fodder conservation (Hay making).</p> <p>3) Implementation of animal feed production programmes – seven new licenses were issued to animal feed importers. Cattle feed (10534.28 Mt) was produced.</p>
2011	<p>1) Pasture Development Programme - Conducting training programmes for farmers as well as for officers, Establishment of four Provincial level nurseries and Strengthening of provincial nurseries, 78 Mt of pasture conservation as hay. Training on pasture production and utilization (1567 days), Fodder nursery development in two fodder banks, Tree fodder establishment (legumes plants in 10 acres) Establishment of 500sq.m. 420 pasture plots.</p> <p>2) Implementation of Animal Feed Production Programmes - 19 large, medium and small-scale registered animal -feed manufacturing establishments. 28,244.4 Mt of cattle feed production.</p>
2012	<p>1) Pasture Development Programme - six-day farmer training on production and utilization of pasture and fodder. Extent of fodder production 16.5 ac at AI Centers. Two nurseries were established. 250 Mt of fodder was conserved as hay blocks.</p> <p>2) Implementation of Animal Feed Production Programmes - 32 new licenses issued for animal feed manufacturing. 14,687.90 Mt of cattle feed was produced.</p>
2013	<p>1) Pasture Development Programme - Monitor the progress of six provincial fodder nurseries. Establishment of fodder in unutilized 12 ha lands in tea estates. Conduct TOT programmes for 48 participants. Adaptive testing of fresh fodder type: in four ha.</p> <p>2) Implementation of Animal Feed Production Programme - establishment of 19 large, medium and small-scale registered animal feed manufacturing.</p> <p>3) New licenses (23) were issued for animal feed manufacturing. 94,331.75 Mt of cattle feed was produced.</p>

2014	1) Pasture Development Programme - six fodder nurseries were monitored. Established new fodder in 1 ha. Conduct TOT programmes for 307 participants. Adaptive testing of fresh fodder type: cultivated another two ha.
2015	1) Pasture /fodder development activities - Establishment of fodder in 2.5ha, six fodder nurseries were improved, 2.5 Mt fodder were conserved as hay. 1,171 of animal feed products were renewed. New licenses were issued for 40 animal feed products for manufacturing and for 161 animal feed product importing. 30,541.72 Mt of cattle feed was produced.
2016	1) pasture /fodder development programmes - Establishment of fodder in eight ha, six fodder nursery were improved, 12 Mt of fodder was conserved as hay/silage. A maximum of Rs.100,000 is made available to a single farm as financial assistance for fodder cultivation.
2017	1) Provision of equipment for conservation of grass to the suppliers of Milco Company - Action has been taken under this project to purchase the equipment for making silage with 50% contribution of the beneficiary and with the maximum contribution of the Ministry of Rs. 100,000/- (Total amount of is Rs. 200,000/-) per beneficiary; 50 benefited.
2018	1) Pasture / fodder development programmes – nine Mt of fodder were conserved as hay; nine fodder nurseries were improved. 2) Provision of equipment for improvement and conservation of pasture - contribution of Rs. 50,000 per head with 50% contribution from each beneficiary. Financial assistance was extended for purchasing equipment required to produce silage at a total value of Rs. 100,000; 104 farms benefited.
2019	1) Renewals/ new licenses for animal feed - Renewal of 1,936 licenses of animal feeds;- licenses issued for 190 animal feed manufacturing, 533 for animal feed imports.
2020	1) Pasture development programme - Established sprinkler irrigation system for 1.5 acres of <i>Brachiaria</i> cultivation at AIC Kundasale. Seven acres of pasture land rehabilitation was carried out at GBC Thelahera.

Source: Annual Reports DAPH, 2006-2020

4.4 Dairy Imports

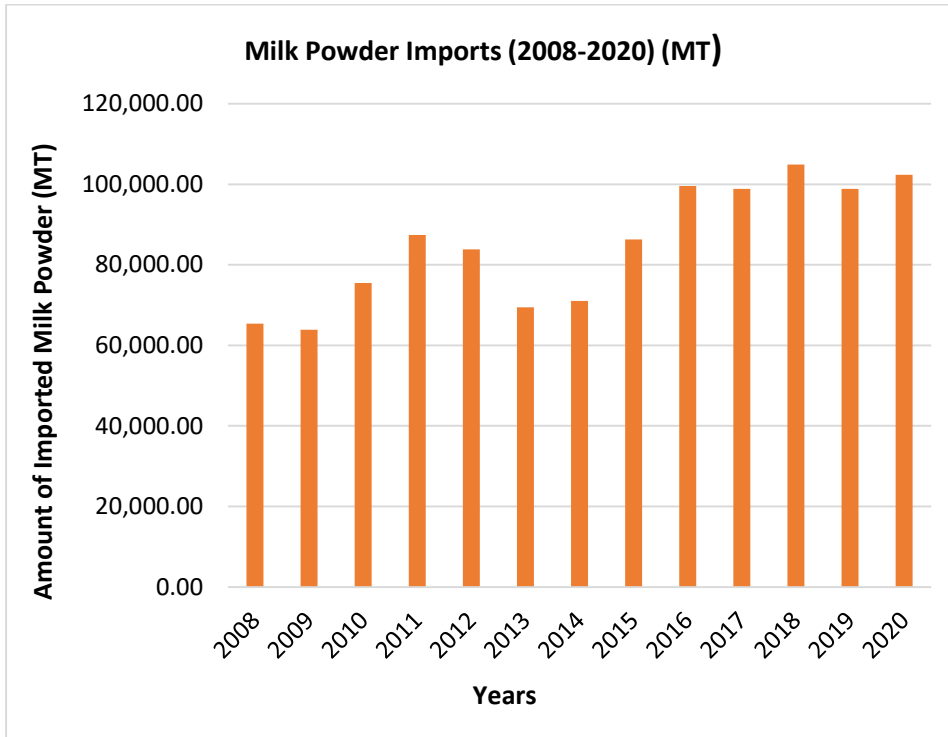
According to the DAPH statistics, Sri Lanka only produced the 40% of the total milk requirement of the country and the balance rests on imports, at an exuberant cost. Table 4.12 illustrates the imported amount and the allocation. Accordingly, it is evident that the amount and the allocation increased over the years from 2008 to 2020. However, due to the economic impact of the Covid-19 pandemic, the Government imposed import restrictions from late March to prevent the foreign

exchange outflow. This inevitably redresses the local industries by replacing the import items with locally produced milk while serving the former objective.

Table 4.12: Importation of Dairy Products

Year	Programmemes/ Activities Imported dairy products (MT)	Output	Allocation Rs Billion
2008	65,376.12	An increase of 6.7 % of milk product quantity since 2007	30.80
2009	63,873.5	40% decrease from 2008 value	18.61
2010	75,482.6	An increase of 18.17% over the last year importation 63,873.5 MT in 2009	29.00
2011	87,381.62	An increase of 15.76% of milk product quantity over the 2010	37.90
2012	83,817.74	A decrease of 4.08% of milk product quantity over the 2011	39.00
2013	69,452.36	A decrease of 17.13% of milk product quantity over the 2012	37.00
2014	71,026.84	An increase of 2.26% of milk product quantity over the 2013	44.00
2015	86,327.48	An increase of 21.5% of dairy products over the 2014	34.00
2016	99,593.43	An increase of 15.3% of dairy products over the 2015	36.33
2017	98,863.89	A decrease of 0.73% of dairy products over the 2016	48.15
2018	104,861.87	An increase of 6.06% of dairy products over the 2017	54.00
2019	98,837.76	A decrease of 6.09% of dairy products over the 2018	55.65
2020	102,355.53	An increase of 3.4% of dairy products over the 2019	61.93

Source: Annual Reports DAPH, 2008-2020



Source- Department of Customs, 2008-2020

Figure 4.7: Milk Powder Imports (2008-2020)

CHAPTER FIVE

Evaluation of Dairy Development Strategies

This chapter explains the strategies implemented by different organizations and their current situation.

Strategy	Evaluation
1) Implementation of projects and programmes to support small scale dairy farmers and acting as a catalyst for commercialization of dairying where feasible	Most of the projects and programmes are implemented to support the existing farmers by enhancing their production performance. Commercialization of Dairy farms is not practiced
2) A strategy of cost sharing with private entrepreneurs, farmer societies and corporative and CBOs with a proven track record will be introduced by the government to undertake liquid milk processing at village level. This will also help meet consumer needs of the periphery and thereby expand the market for processed liquid milk and will also provide easy access to milk of high hygienic standard to consumer outside the main towns.	This strategy is highly relevant to the prevailing situation of the dairy industry. At present majority of our consumers rely on powdered milk which is less nutritious than the liquid milk. In addition, if we follow this kind of strategy, it is low cost and affordable for a certain extent, because this strategy need less processing requirement and limited transport. Therefore, expensive advanced conditions are not required when transporting. Therefore, this strategy must be implemented to obtain higher performances in the sector. As indicated in a study (HARTI 2021), some of the private sector entrepreneurs and co-operatives are engaged in milk processing at small and medium scales and these entrepreneurs help meet the consumer needs of milk and milk products to a certain extent. However, the liquid milk consumption promotion has not been fully addressed mainly due to milk distribution issue.
3) Similar cost sharing arrangements with the private sector will be introduced to set up breeder farms to facilitate dairy animal breeding including cattle, buffaloes and goats and help to improve the supply of breeding animals in the country.	Ministry of Livestock Development, DAPH and NLDB have implemented several programmes from 2007 to 2020. Accordingly, DAPH was engaged in Artificial Insemination, semen production and distribution, herd improvement and disease prevention activities.

<p>4) As means of promoting milk drinking among the public, processed milk will be made available within easy reach of the consumers through a network of milk sales outlets strategically located in schools, near hospitals, workplaces etc.</p>	<p>It is noted that there are several milk sales outlets established targeting the schools and other private and public institutes. Milco, NLDB and other private collectors and processors establish milk sales outlets in cities and public places to increase the fresh milk consumption and as an income generating activity. This strategy is highly relevant and further need to enhance this activity to increase the fresh milk consumption.</p>
<p>5) Organizing dairy farmers into collective groups and empowering them for decision making by facilitating their dairy production process.</p>	<p>Empowering Dairy farmer manage Societies and Co-operatives for decision making in milk production is very important and at present, dairy farm manage societies are engaged in milk collection and cooperatives are mainly involved in value added products. However, decisions regarding dairy production with these associations are lacking. This strategy is practised in some occasions, for instance, some milk collecting agents are providing concentrate feed and training programmes to enhance the dairy production and clean milk production. However, this strategy should Implement with more focus with the production enhancements such as fodder production, input supply and collective market power.</p>
<p>6) Farmer associations as well as dairy processors will be supported to increase efficiencies in the value chain of the dairy products.</p>	<p>Dairy processors and Farmer Managed societies are currently involved in development of the value chain efficiencies in many ways. Dairy processors involve in value chain efficiency by introducing different value added products. In addition, private collectors and processors provide outbound logistics of value chain development in milk collection, transport, processing and distributing the final products. Therefore, private processors and farmer associations are actively participating in value chain development at present. However, further involvement of farmer association for milk production and processing is crucial.</p>
<p>7) The use of spearhead teams of specially trained officials in varied disciplines of dairying will be</p>	<p>This strategy is not implemented.</p>

<p>directed to work with the provincial authorities to accelerate the goals of higher levels of self-reliance of milk in the country.</p>	
<p>8) Programmes for technology transfer for improving the dairy herd performance and greater farm productivity will be undertaken and where appropriate, suitable tools for mechanization of dairy farm activities such as machine milking, reapers for pasture and fodder harvesting, hay/straw baling etc. will be introduced to facilitate in the medium to large scale commercial dairy farming sector.</p>	<p>Mechanization of dairy farm activities to the medium and large scale farms are undertaken under this strategy. NLDB farms are equipped with modern machine milking and it provide facilities to maintain the production records of the herd and easily apply the selections and herd improvement programmes. In addition, these farms are also equipped with pasture and fodder harvesting machines, sprinkler irrigation facilities, grass preparation machines, silage and hay making facilities which are essential to milk production performances. This strategy is highly relevant to increase the milk production.</p>
<p>9) Also, measures will be taken to ensure the small scale dairy operators and those who rear dairy cattle for their subsistence are adequately serviced and supported through public sector development programmes so as to guarantee them of their regular incomes from dairying.</p>	<p>Government dairy development programmes such as Dairy Village Development Project, Heifer Calf Development Project and Breeder Farm Development Project are supporting projects implemented by the Ministry of Livestock Development and DAPH. A research study on midterm evaluation of Dairy Village Development Project found that after implementing the Dairy Village Development project, milk production has increased by 24%. Therefore, government projects and programmes have increased the economic potentials of dairying.</p>
<p>10) Artificial insemination will be the preferred method adopted by the government for genetic improvement of the native herd. However, in areas where artificial insemination is not feasible the use of superior bulls, under different modalities is practised to disseminate selected genomes of dairy cattle and buffaloes to the native herd.</p>	<p>Artificial Insemination programmes are carried out by the DAPH and both cattle and buffalo upgrading programmes are undertaken</p>

<p>11) Since the Dairy herd composition is crucial for the future development of the dairy industry, a national level coordination mechanism of all cattle and buffalo breeding activities will be established to spearhead the dairy breeding programmes.</p>	<p>This strategy has not been implemented.</p>
<p>12) National Animal Breeding Committee will be setup under the Ministry to provide guidance for animal breeding programmes.</p>	<p>This strategy is not implemented</p>
<p>13) Regular reviews of the cost of production of milk and profitability of dairying will be undertaken to arrive at evidenced based decision on the adequacy of tariff protection for the local dairy industry as well as to identify measures to improve the competitiveness of the locally produced milk</p>	<p>Livestock policy and planning division of DAPH and other institutions engaging in research for calculate the cost of production of milk to determine the milk prices.</p>
<p>14) Action will be made to attract dairy farmer equity in the ownership of Milco (Pvt) Ltd., thereby ensuring a greater transfer of benefits to the dairy farmers in the value addition to their milk.</p>	<p>Dairy farmer managed societies maintained by MILCO provides several benefits to the milk farmers and it increases inclusiveness.</p>
<p>15) Emphasis will be made through models of integrated farming, introduction of improved technologies of compost degradation and biogas generation, technologies of compost making etc. for enhancing the value of dairying in the farming systems</p>	<p>Integrated farming is practiced by conventional dairy farmers. They engage in compost production which is essential in the current scenario of fertilizer scarcity. In addition, Government and several NGOs support to build a bio gas unit which is highly advantageous to meet the household energy requirement.</p>
<p>Feed Resources Development Strategies 1. Increased funding of research and extension on pasture and forages for ruminant feeding and for enhancing the nutritive value and the utilization of locally available feed resources.</p>	<p>Under the feed resources development policy statement, there are 10 strategies outlined. However, some strategies such as pasture species that are tolerant to salinity were not promoted. In addition, any actions regarding pasture production in paddy fields are also not prioritised. However, for different farming systems, suitable fodder species were distributed.</p>

<p>2. Pasture species tolerant of salinity will be introduced and cultural practices demonstrated for the utilization of lands with salinity and paddy lands abandoned due to salinity, for rearing of cattle, buffalo and goats.</p>	<p>No information found</p>
<p>3. Methods of pasture production in paddy fields will be demonstrated as a strategy to extend grazing in fallow paddy fields.</p>	<p>This strategy is not implemented</p>
<p>4. Introduction of suitable pasture and der fodder species to different farm holding and dairy production systems and demonstrating the correct utilization of same using chaff cutters for higher utilization of roughages in ruminant feeding.</p>	<p>Introducing of suitable pasture species for different farming system is taking place with the assistance of DAPH and NLDB</p>
<p>5. Other feed resource such as rice polish, sugar cane tops and bio gas and other crop residues, residues from food processing plants etc. will be harnessed as feed resource for livestock production.</p>	<p>This special concentrate feed is popular in certain areas such as North Western Province. However, a planned programme for enhancing these feed resources was not observed. Other supplementary feed resources such as rice polish, sugar cane tops and bio gas and other crop residues, residues from food processing plants and etc are used by animals and those feed resources are also expensive.</p>
<p>6. Systems will be introduced to make greater use of grass by developing haymaking and silage systems to enhance availability of forage in dry periods.</p>	<p>Hay and silage making is practised in NLDB farms.</p>
<p>7. Technologies for fibrous feed utilization will be introduced and promoted for greater and more effective use of paddy</p>	<p>Though paddy straw is widely available its utilization is minimum. This strategy must be</p>

<p>straw that is abundantly available in many parts of the country.</p> <p>8. State lands will be made available to the private sector to promote superior planting materials for feeds and fodder, and to demonstrate appropriate cultural practices of production and harvesting of same and engage in out-grower operations for cereals and coarse grains production as animal feed ingredients.</p> <p>9. Adoption of an appropriate trade and tariff policy that is supportive for the domestic production of animal feed ingredients such as maize, soybeans, coconut poonac, rice polish, fishmeal etc.</p> <p>10. Anomalies in the tax incentives provided for the BOI and non-(BOI) registered corporate feed milling sector which are primarily manufacturing animal feed for the domestic market will be rectified for creating a competitive structure in the feed milling sector.</p>	<p>implemented to protect the natural resources.</p> <p>NLDB farms were earmarked for pasture growing. However, other common lands were not allocated for this purposes.</p> <p>These policies are imposed, however, farmers do not exploit these policy avenues.</p> <p>Need to investigate further.</p>
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CHAPTER SIX

Findings, Recommendations and Conclusions-

Dairy Policy implemented in 2006 was planned and documented with all essential elements for milk production improvements. The dairy policy is targeted to fetch sustainable economic and social benefits to producers and consumers especially by increasing the domestic milk production. It was also targeted to achieve 50% self-sufficiency of domestic milk production in 2015.

The policy objectives are to explain the dairy development goals and responsibilities of the public sector to achieve the targets by appropriate utilization of consolidated fund and private sector investments. In addition, it explains the role of private sector and participation in milk production, processing and marketing.

There are nine dairy development policy statements focussed on dairy development: promotion of liquid milk markets outside the tradition milk consumption centres, upgrading native herds of both cattle and buffaloes, transforming existing subsistence farms to commercial farms, regulating the import and fiscal policy for the benefit of dairy producers, introducing a pricing mechanism for domestic milk, promoting viable medium and large scale farms, dairy farmer empowerment and participation of stakeholders to develop the dairy value chains. Furthermore, two policy statements were identified to improve the animal feed resources. The policy document consisted of 27 dairy development strategies by considering all sectors for the dairy enhancements.

It was planned to support small scale dairy farmers by implementing national level dairy development projects and programmes. Under this policy statement, several projects and programmes were implemented. The State Ministry of Livestock Development implemented several projects under three main sectors: upgrading native herd, farmer empowerment programme and promoting liquid milk market. Breeder farm development and importation of dairy animals are the main focussed projects of the Ministry under the theme of national herd upgrading. Under the farmer empowerment programme, farmer training and women empowerment programmes were implemented. In addition, the liquid milk promotion programmes were designed to facilitate the establishment of milk sales outlets, cattle shed development, distribution of milk transport cans and developing the processing plants.

It was targeted to achieve 50% self-sufficiency in milk and milk products by 2015. To achieve this end, herd improvement of both cattle and buffaloes was at the centre. Technical expertise on herd development was directly linked to the Department of Animal Production and Health. AI is the main tool for genetic improvement or upgrading the national herd using the domestically produced high quality semen and imported semen. In 2008, the semen production centres at Kundasale and Polonnaruwa were equipped with all facilities and the production of semen within the

country increased. Further, the highest preferred neat cattle semen is Jersey and Frisian. In buffalo milk production Murrah semen is the most requested followed by Niliravi semen. Furthermore, it is noted that the performance of AI is unsatisfactory as it has to be repeated to achieve success. This is mainly due to semen quality deterioration and problems in heat detection.

With the objective of upgrading native herds, the Ministry of Livestock Development has implemented several projects and programmes. The main focus was on the establishment of breeder farms and importing high yielding animals from New Zealand and Australia. Under these projects from 2015 to 2020 a total of 658 breeder farms were developed. In addition, a total of 15,672 animals were imported.

Development of breeder farms is essential for the milk production enhancement through herd development. However, importing more than 15,00 improved cattle was not successful as expected. Government invested a huge amount for the dairy production enhancement but with little effect.

Farmer empowerment programmes were continuously conducted by the DAPH. Under this programme, it is expected to enhance dairy farmer's knowledge on all aspects of dairying. In addition, the Ministry of Livestock Development, Milco, NLDB and other related organizations are engaged in dairy farmer empowerment. The programmes implemented were farmer and officer training, provision of training modules as booklets, broadcasting TV programmes, empowering small scale farmers by granting a 50 % subsidy for milking cows, and women empowerment programmes. Government has taken several actions to enhance the dairy feed resource base. Accordingly, 773 acres of new pasture lands were established and Gliricidia sticks were planted by NLDB. In addition, pasture and fodder utilization promotion programmes were implemented in private breeder farms in 2008 by establishing fodder plots. Further, improved fodder varieties such as CO-3 and Bracharia were cultivated in the Kundasale and Polonnaruwa AI centres. Training programmes were conducted by the Animal Breeding Division on cultivation, maintenance, and utilization of fodder/pasture to serve dairy farmers, Livestock Development Officers of DAPH and Extension Officers of MILCO. In 2009 Sixteen (16) Large, medium and small-scale registered animal feed manufacturing establishments were in operation. Cattle Feed production also increased (6,575.15 MT) in 2009. The pasture development programmes are implemented every year following the policy targets. Furthermore, hay production programmes, provision of equipment to conserve the grass, providing new licences and renewing licences to import feed and irrigation facilities were provided to the pasture lands in Kundasale. In conclusion, it is evident that the dairy development policy implemented in 2006 reflects the objectives of policy and several dairy development projects and programmes were implemented successfully with the aim of improving dairy production. However, high efficiency needs to be achieved by focussing on feeding, breeding, technology and knowledge improvement on dairy management.

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