CHAPTER – 1

INTRODUCTION

1.1 Introduction

This study on Quality Management in KMF Milk Unions and the analysis of Consumer Satisfaction of Nandini Milk Consumers in Karnataka is undertaken for the award of the degree of Doctor of Philosophy by Karnatak University, Dharwad. A detailed study is made at six out of the thirteen milk unions under KMF and also their milk cooperatives to understand the system adopted by them at various stages to ensure timely availability of good quality milk. The research work also ascertains the consumer satisfaction with the help of a questionnaire covering the different sections of the consumers in the six cities served by the six milk unions selected for the study.

1.2 Milk and its Food Value

Milk is a white liquid produced by the mammary glands of mammals. It is the primary source of nutrition for young mammals before they are able to digest other types of food. Early lactation milk reduces the risk of many diseases in the newly born. There are basically two types of milk consumption. One is as natural source of nutrition for all infants and the second as a food product for all human beings of all ages. Initially, the ability to digest milk was limited to children as adults did not produce lactase, an enzyme necessary for digesting the lactose in milk. Many years later the production of lactase in adulthood in humans took place. This allowed milk to be used as a new source of nutrition which could sustain populations when other food sources failed.
In addition to vitamin D, milk contains 15 essential nutrients. The ingredients of milk and their benefits are briefly described below:

Protein – Helps build and repair body tissues and creates antibodies which fight infection.

Vitamin A – Helps in the development of teeth and bone. Also aids in the maintenance of night vision and healthy skin.

Vitamin B12 – Contributes to the formation of red blood cells.

Vitamin B6 – Helps to convert food into energy and also formation of tissues.

Riboflavin – This also helps in energy conversion and tissue formation.

Niacin – Aids in normal growth.

Thiamine – Releases energy from carbohydrates and aids in normal growth.

Pantothenic acid – Also a factor in the conversion of food, into energy and tissue formation, including bones.

Folate – Aids in red blood cell formation

Vitamin D – Strong bones and teeth as a result of Calcium and Phosphorous absorption.
Calcium – Strong bones and teeth

Magnesium – Helps in maintaining health of bones and teeth and also in the tissue formation.

Phosphorous - Formation and maintenance of strong bones and teeth.

Potassium - Aids in the correct functioning of nerves and muscles.

Zinc – Helps in tissue formation and food conversion into energy.

Selenium - Due to its antioxidant effect, it helps in the correct functioning of the immune system.

It is wrong thinking that consumption of milk and milk products may increase the weight. In fact, consuming the recommended serving of milk and milk products every day as part of a calorie – reduced diet could help one manage the weight in a healthy way. No doubt, milk stands to its name of a ‘Balanced Diet’. It is an important component of a balanced diet. It is considered one of the world’s most ‘Complete’ foods and the richest dairy source of calcium. The nutrients in dairy foods help in preventing dental cavities, osteoporosis, high blood pressure, stroke and kidney stones. Milk is composed of 87.6% water, 4.7% carbohydrates, 3.8% fat, 3.3% protein and 0.6% vitamins and minerals. (Australian Dairy Foods, 1999). The composition, of course, varies from place to place and also during the different seasons of the year depending on the quality of feed and weather conditions. Technology also plays its part in adjusting the composition of milk today.
Apart from being consumed as milk, it is also processed into a variety of dairy products such as butter, yoghurt, cheese, paneer, buttermilk, ice-cream, sweets etc. The sugar lactose is found only in milk and a few shrubs. The enzyme needed to digest lactose i.e. lactase reaches its highest levels in the small intestines after birth and then begins a slow decline unless milk is consumed regularly. Hence those who consume milk from early ages continue to tolerate milk and have exercised great creativity in using the milk of sheep, goats, yaks and camels.

1.3 Demand for Milk in the Global Scenario

Milk is one of those natural products consumed by people all around the world in one form or another. Milk is rich in calcium. Milk contains carbohydrates which are the most important source of energy in our diet. Milk and dairy products have become an inseparable part of our daily lives. Milk and milk products, such as cheese and butter are the main source of calcium in the diet of people in western and non – western countries. Milk also contains fats which are also an important constituent of human cell walls. Milk has extraordinary nutritional value and is called a balanced diet. Milk and milk products are one of those very few items commonly consumed across all sections of people around the world. It is interesting to trace the history of organized milk production and the effect it had on the life of the people in various countries.

About 650 to 700 billion litres of milk are produced each year by all countries put together in the world. India produces more milk than any other country, but its farmers do not deliver all of this milk to dairy plants. In terms of the volume of milk produced on farms, India is the world number one in 2007. U.S came first in terms of the quantity of
milk delivered by the farmers to dairy plants. New Zealand leads in terms of dairy exports.

About 700 billion litres of milk is processed each year by dairy companies around the world. The global demand for dairy products is constantly on the rise. The reasons for the growth in demand are population growth, rising incomes and the urbanization and westernization of diets particularly in developing countries. The Asian continent continues to be the major growth market globally accounting for 34% of all dairy imports in 2011. Asia accounts for 53% of the world’s Skim Milk Powder (SMP) and 40% of the world’s Whole Milk Powder (WMP) imports.

A country’s supply and demand of milk is determined by the volume of milk demanded by consumers and the amount supplied by cows. This definition is theoretical and the reality is much more complicated. Milk and milk products form the basis for the dairy products that are traded in international markets. Hence one needs to look at the global scenario. The size of the global population and the purchasing power of the people as well as the consumer preferences are the key drivers of demand. The drivers of supply are the number of calves that are bred into matured milking cows, feed given to the cows and the seasonal variations.

In western countries, milk has been a staple part of the daily diet. In these countries people eat and drink the equivalent of 240 to 250 kilograms per person per year. In non-western countries, the consumption is around 60 kilograms per person per year. The dairy farming is part of a long and proud agricultural tradition in New Zealand. The first refrigerated shipment of milk products took place in 1882 from New Zealand to the
United Kingdom. The temperate climate of New Zealand coupled with highly innovative and efficient dairy cooperatives enabled the dairy industry to grow as one of the most important industries in New Zealand. New Zealand now exports to China, United States and Japan amongst other countries. DCANZ – Dairy Companies Association of New Zealand was constituted in 2003 so that the member dairies could work collectively on public policy issues of importance to dairy companies and could represent with authorities in New Zealand and other countries.

Fonterra is global milk cooperative in New Zealand who collects 22 billion litres of milk every year and shares it with the world. Fonterra is the world’s largest global milk processor and dairy exporter. Through their integrated supply chain popularly called “grass to glass”, they deliver high quality dairy products and a portfolio of consumer brands to customers around the globe. Over the last 140 years, their farmer shareholders have built up their cooperative to be a world leader in dairy excellence. The dairy products are made available to millions of consumers in 140 countries every day. About 10500 New Zealand farmer shareholders produce 16 billion litres out of the 22 billion litres processed annually by Fonterra. The farmer shareholders maintain their farms to produce the lush green grass which the herds graze all the year round to produce quality milk. The quality is further assured with rigorous testing and quality standards so that they are able to meet the highest customer expectations.

Dairy products are a major source of nutrition in the United States. The milk production and milk yield per cow have increased and also the per capita consumption of dairy products mainly due to the government policy and support for commercialized agriculture. Organic Valley, a dairy cooperative with headquarters in Wisconsin is one of
the companies now meeting a strong consumer demand for safe dairy products. According to Organic Valley, the family farms and cooperatives make a promise to the community that they can provide healthy, natural and nutritious milk products. In the beginning the cooperative was made up of local small family farms, but soon expanded across the nation. In 2007 Organic Valley had 1056 member farms and by 2012 it has increased to 1723 member farms.

1.4 Role of Cooperatives

A cooperative is generally viewed as an autonomous association of persons united voluntarily to meet their common social and economic needs. A cooperative is a socio economic organization that is expected to have its members’ interest truly at heart.

The cooperatives play a very important role in the milk dairy sector. Half of Europe’s top 10 dairy companies are cooperatives. Nestle and Danone are companies in the private sector. FrieslandCampina is the biggest dairy cooperative in the world. In terms of revenue, Nestle, a Switzerland based company is the largest in Europe followed by Danone from France. Aria Foods, Denmark is the 4th largest dairy cooperative in the world in terms of revenue. In the year 2010 the revenue was 6.9 million Euros. Aria Foods is a Swedish – Danish cooperative based in Arihus, Denmark and is the largest producer of dairy products in Scandinavia. FDB or The Danish Consumers Cooperative Society is a consumer cooperative based in Denmark. FDB is the largest member and consumer organization in Denmark with more than 1.6 million members.

The cooperative movement in India was introduced with the promulgation of Cooperative Societies Act in 1904. Cooperatives are the vital agencies to face the
challenges posed by globalization. Cooperatives are known as the third sector of the economy and its development is important. The presence of a network of social organizations, like cooperatives, would aid in the generation and utilization of social capital. Greater the social capital, greater will be the possibility of development. Hence the cooperatives have a role in future to promote collectivism and also preserve the social capital base of the country. Cooperatives can act as pressure groups to voice peoples’ views in the market.

Cooperatives have played an important part in promoting agricultural and rural development in India. The dairy cooperatives of Gujarat and the sugar cooperatives of Maharashtra are good examples of cooperatives that can promote and sustain rural development. The first Prime Minister of India, Nehru had strong faith in the cooperative movement. Sardar Patel, the first Deputy Prime Minister and Home Minister of India had great faith in cooperative as a means of promoting farmers’ wellbeing. He was the prime source of guidance and assistance for the Kheda District Cooperative Milk Producers Union Limited which later became a model of cooperative dairy development in India. Anand milk union limited (AMUL) became a household name in India.

1.5 Quality Management in Milk Cooperatives

Quality, is simple terms, can be defined as the sum total of the features and characteristics present in a product or service that bears on its ability to meet the purpose for which the product or service is created and also satisfy the consumers consistently over long periods of time. Quality is not to be inspected or checked at the end of process but is to be built in during the process. Quality is never by chance or by accident, it is the result of sincere and serious efforts on the part of everyone concerned in the various
activities that go towards making the product. Quality is a culture, philosophy and a way of life. TQM or Total Quality Management aims at involving everyone in the organization and also ensure steps are taken to maintain and improve quality at each stage during the process that should ultimately result in satisfaction of all stakeholders.

Milk is no exception. On the contrary, the quality of milk has a direct bearing on the physical and mental well being of the citizens in that country or society. It is extremely important and necessary to carefully define and specify the quality of milk and then make all efforts to ensure compliance. The quality of milk starts at the farm stage. It depends on the health of the animals and the quality of feed and fodder consumed by the animals. The farmers should get the animals checked by veterinary doctors at regular intervals. They should also keep a close check on the quality of feed and fodder as received from the suppliers. Strict rules concerning storage temperature, hygiene and bacteria level are also to be followed by the farmers. Before collecting the milk in the cooling tank, it is checked for physical appearance, temperature and smell. Separate samples are taken to check in the QC Lab and also to analyze the contents of protein, lactose, minerals and fats. On receipt at the processing plant, the samples from each batch are tested before unloading. The milk then undergoes the processes of standardization, homogenization and pasteurization. The standardization is based on fat content. Homogenization is done in order to keep the cream from rising to the surface. Pasteurization is done in order to destroy any possible pathogenic bacteria and extend the length of time it can be kept. The quality checks are undertaken at each stage. Finally the Logistics and Supply Chain Management also plays a role in the Quality of milk received
at the customer end. Transportations by refrigerated vehicles maintaining the desired
temperatures are another important step in maintaining milk quality.

1.6 Milk Industry Contribution to GDP

India has vast resources of livestock and they play an important role in the
national economy and also contribute largely to the socio-economic development of
millions of households in the rural parts of the country. The cattle population in India is
one of the largest in the world. India has more than 50% of the world’s buffaloes and
20% of its cattle. Though the contribution of agriculture sector to the GDP of the country
has declined during the past three decades, the contribution of the livestock sector has
increased from 5% in the 1980s to over 8% in the 21st century.

Till the 1960s, India was one of the largest importers of dairy products. The
policy makers viewed it as a great concern and a decision was made to achieve self
sufficiency in milk production. In the mid-sixties, National Dairy Development Board
“NDDB” was setup to oversee dairy development in the country. The Operation Flood
programme, launched in 1970 turned out to be one of the world’s largest and successful
dairy development programmes. The main thrust of this programme was to organize
farmer’s cooperatives in rural areas and link them with the urban consumers. Operation
Flood led to the modernization of the dairy sector in India and created a strong network
for procurement, processing and distribution of milk by the cooperative sector. The total
milk economy is estimated at Rs 1300 billion and the dairy cooperatives account for the
major share of processed liquid milk. India’s 100,000 dairy cooperatives collect 16.5
million litres of milk from 12 million farmer members every day. The average GDP growth rate of crops and livestock sector increased from 2.7% in the 1950s and 1960s to over 5% in 2006-07.

1.7 White Revolution in India

The important place milk occupies in our diet has been recognized since Vedic Times and all the latest research all over the world has only reinforced and strengthened this fact. Milk is now considered not only desirable but an essential intake from the moment the child is born. The National Institution of Nutrition has recommended a minimum of 300 grams intake of milk for children between 1 to 3 years of age. Milk has high nutritive value. It supplies proteins, bone forming minerals, health giving vitamins and fats.

Many of us have watched the Hindi feature film Manthan (The Churning), a commentary on the dairy movement in Gujarat. The film was produced and directed by the renowned film maker Shyam Benegal in the year 1976. The idea mooted by Dr. Verghese Kurien that each farmer contribute Rs 2 worked very well. The film was funded by the members of the cooperatives. This film acted as an impetus to persuade milk farmers to create more cooperatives all over the country. Indian dairying emerged as a Sunrise Industry. Amul (Anand Milk Union Limited) is one of the earliest dairy cooperatives in India and is based at Anand in the state of Gujarat. The cooperative was formed in 1946 and today managed by the Gujarat Cooperative Milk Marketing Federation Limited (GCMMF) which is jointly owned by 3.03 million milk producers in
Gujarat. The revenue in 2010-2011 was U.S$ 2.15 billion. Dr Verghese Kurien, founder chairman of the GCMMF for more than 3 decades is responsible for the success of Amul and is also popularly known as the father of White Revolution in India.

The agricultural scenario in India has undergone major changes in the last six decades. In the early 1960s, high yielding varieties of crops were introduced in Indian agriculture. Lot of investments were made in irrigation infrastructure and processing facilities. Availability of credit and modern marketing led to the agricultural producers to supply the various agricultural products in the different markets. The agricultural productivity increased substantially and gave birth to the “Green Revolution”. After the Green Revolution, came the White Revolution. Increase in the Production, Productivity and Quality of milk and milk products was termed the White Revolution. Milk production in the country was stagnant during the 1950s and 1960s and the annual production growth rate was negative in many years. The annual compounded growth rate in milk production during the first decade after independence was about 1.64 percent and declined to 1.15 percent during the 1960s.

The National Dairy Development Board (NDDB) initiated major policy changes in the dairy sector to achieve self sufficiency in milk production. NDDB was the first organization to encourage and develop the concept of cooperative participation in India. Producing milk in rural areas through producer cooperatives and transporting the processed milk to urban demand centers became the cornerstone of government dairy development policy. This policy initiative gave a boost to dairy development and initiated the process of establishing the much needed linkages between rural producers and urban consumers. This also necessitated ensuring proper logistics at various stages.
Some of the main objectives behind the White Revolution were identified as:

- Ensuring availability of milk at all times i.e. on 24/7 basis.
- Providing livelihood opportunities for rural farm families.
- Promoting consumption of local milk.
- Putting efforts to reduce poverty and malnutrition in Indian families.

The township of Anand in the Kheda District in Gujarat witnessed a small group of milk producers coming together to float a cooperative society. Dr. Verghese Kurien gave it the necessary impetus, transforming the society into a powerful instrument of socio-economic changes in the country. Dr. Kurien is rightly called as the “Milk Czar” of India. The “Milkman of India”, the “Father of White Revolution in India” and the Architect of NDDB. This one individual Dr. Verghese Kurien has impacted millions of lives in India and put the name of AMUL on the World Map of Milk Dairy Cooperatives. Dr. Kurien breathed his last in September 2012 at the age of 91. The author felt that this is perhaps the right moment to trace the history of milk production and the formation of milk dairy cooperatives across the world.

The ‘White Revolution’ gave birth to the ‘Operation Flood’. Thanks to the vision and foresight of Dr. Kurien, NDDB launched in 1970, ‘Operation Flood’ with the overriding objective of ending milk famine in the country and turning farmers’ co-operatives into a powerful catalyst for transforming India into a major milk producer in the World. ‘Operation Flood’ has helped knit more than ten million farmers spread
over 70000 villages into a catalyst of ‘White Revolution’ in the country. India is the largest producer of milk in the world today.

1.8. **Scope of Entrepreneurship in Dairy Industry.**

The government of India is now promoting the MSME sector and has instituted a separate Ministry in the government for MSME development. The dairy and food industry is a fast growing sector in response to growth in the economy and significant changes in the dietary habits of the people. But the growth of industry has not been able to keep pace with the growing demand both in quantity and quality. Inefficiency is reported both in production and processing sub-sectors. If the industry has to largely benefit from the growth potential of the sector, better organization, presentation and marketing are to be given priority attention. In other words enlightened entrepreneurship development is the key to success of dairy and food industry. There cannot be two opinions on the vast potential of Dairy and Food Sector, in terms of its ability to generate and encourage entrepreneurship. Further, the entrepreneurship in this sector would automatically lead to a significant shift in employment as well as income generation not only directly, but also across the different steps involved in it, viz. supply chain in production and procurement of raw materials, storage of the finished products, distribution of food/dairy products to the consumers. At the macro level, the sector can be successful only if its potential is maximized by trained human resources taking advantage of the opportunities thrown open in the liberalized era. The other foremost important component for any successful entrepreneurship is Quality. Quantity has its own significance to reduce the cost of production. But production without quality is a liability. The farmers whether in agriculture, dairy, fisheries or poultry, are facing the problem of
rising prices of inputs and controlled support price which is not commensurate with the cost of production or market price in most of the cases. This is a big constraint in producing quality product. In dairy farming, the vendors resort to unfair means of mixing water with milk thereby tarnishing the fair name of the trade. The situation is slowly changing now.

1.9. Introduction to KMF

The Karnataka Milk Federation, headquartered in Bangalore, has a Board comprising representatives of milk producers and the government nominees. The Federation is managed by a group of professional managers and executives reporting to the Managing Director. The federation was started in the year 1965 by Mr. M.V.Krishnappa. It is the biggest in South India and one of the oldest in India. Perhaps it is next only to Amul. Over the last decade, KMF has been laying greater emphasis on procuring quality milk from District Cooperative Societies under the concept of “Quality Excellence from Cow to Consumer”.

KMF have implemented Clean Milk Production (CMP) at all stages of procurement, processing and distribution. The milk from the farmers is collected in clean containers with proper quality check at that stage. The milk is then chilled directly in bulk milk coolers. This chilled raw milk, untouched and unadulterated by human hands, has very high microbiological quality, comparable to international standards. This high quality milk is utilized for manufacturing high quality value added milk products which are consumed within the country and also exported to other countries. The other aspects of CMP initiatives include:
a. Training of milk producers on modern dairy practices

b. Providing stainless steel utensils, antiseptic solutions for udder cleaning before and after milking of the cows to the farmers.

c. Providing training to the staff and offices of DCS and milk unions.

d. Awareness programmes on clean milk production through documentary films, booklets etc.

With the help of all the above measures, the 13 milk unions under KMF have been able to continuously improve on the quality of milk and hence Nandini enjoys the maximum market share in Karnataka. One of the most important functions of the Federation is marketing of milk and milk products. ‘Nandini’ today has become a household name for milk and milk products in Karnataka. Some of the major strengths of Karnataka Milk Federation are good knowledge of market situation, brand loyalty, automated plants and abundant availability of milk on 24/7 basis. Some of their weaknesses are not venturing in a big way in the neighboring states and lacking in mass media advertisement. The opportunities for KMF are very vast. The per capita consumption of milk in the country as well as in Karnataka is quite low but the good part is that people are getting aware of the usage of milk and milk products and there is a constant increase in the consumption of milk per head.

1.10. Statement of the Problem

In the present study the researcher has made a detailed study of “The Customer satisfaction of Nandini milk consumers in Karnataka State”. The researcher visualized that the market share enjoyed by Nandini is due to the Quality Initiatives undertaken by
the milk unions and hence the researcher conducted an exploratory study by interviewing the quality personnel in the milk unions to understand the quality system implemented in the milk unions.

1.11. Objectives of the Study

1. To review the macro scenario of the milk cooperatives.
2. To study the quality initiatives undertaken by the milk unions which are part of Karnataka Milk Federation.
3. To ascertain the customer satisfaction of Nandini milk consumers in Karnataka state.
4. To determine the relationship between Marketing mix and Overall Satisfaction of the milk.
5. To determine the significant difference between selected demographic variables on Marketing Mix element and Overall Satisfaction of the Nandini milk consumers in Karnataka state.
6. To suggest certain policy initiatives to improve the working of the milk unions.

1.12 Chapter Scheme

The research thesis is designed with the following chapters.

Chapter 1 Introduction

The first chapter is an introductory chapter. It starts with introduction to the research project, traces the history of milk production in the global scenario, connects the
economy and milk industry by detailing the contribution of milk industry to GDP, talks about the white revolution in India, defines the scope of entrepreneurship in dairy industry in India, includes a brief history about Karnataka Milk Federation where the study has been conducted. The problem statement has been identified and the objectives of the study have been stated. The chapter ends with a detailed chapter scheme for the research thesis.

Chapter 2 Review of Literature

The review of literature is divided into two parts. The first part contains theoretical concepts associated with the research study. It includes the marketing mix that affects consumer requirements, details of quality system and supply chain model for milk industry. Since the study covers the initiatives taken towards Quality Maintenance by the Milk Unions and also the Consumer Satisfaction in the cities served by the Milk Unions, the concepts on quality management and customer satisfaction have also been explained in detail. The second part deals with the literature survey including empirical studies. The Literature Review is covered in four sections viz milk cooperatives contribution to economy, milk quality, supply chain in milk industry and customer requirements.

Chapter 3 Database and Methodology

This chapter describes the methodology followed for defining the type of research, sample design, collection of data and the statistical techniques used in the study for analysis of the data. This chapter also deals with the selection of study area, selection of milk unions and details the hypotheses being tested.
Chapter 4 Macro View of Milk Industry

In this chapter an attempt is made to trace a Macro to Micro view of the milk industry starting with the Global scenario through the Indian scenario to the scenario in Karnataka. It also deals with the demand for milk, contribution of dairy sector and some statistics on milk production.

Chapter 5 Quality Management in Milk Unions

This chapter is based on the visit to the Karnataka Milk Federation, six milk unions which are part of KMF, the district cooperatives, the milk collection centers and the village cooperatives. The entire process from ‘Cow to Consumer through Cooperatives’ (the three Cs of milk industry) is described in this chapter. The various quality initiatives undertaken by the milk unions as well as the centralized activities of KMF to promote and maintain quality are also covered in this chapter.

Chapter 6 Profile of the Respondents

In this chapter, the researcher has analyzed the data collected by administering a questionnaire to over three thousand respondents who are consumers of milk spread across the cities covered by the milk unions described in the previous chapter. Various statistical tools and analysis are employed in this chapter to analyze the demographic profile of the respondents.

Chapter 7 Consumer Satisfaction

This chapter details what goes into customer satisfaction and also has analyzed the satisfaction of Nandini Milk Consumers based on the questionnaire administered to
the respondents. Various statistical tools like Factor Analysis, Chi Square Test, ANOVA, Correlation and Regression have been used in this chapter.

Chapter 8 Findings, Recommendations and Conclusion

The final chapter presents the summary of the findings of the study. Based on the findings, some suggestions are made for better working and better implementation of the quality initiatives undertaken by the milk unions. Concluding remarks are presented in the end.

1.13. Frontiers for future research

The dairy cooperative movement has taken shape in the developed countries as well as in India. Perhaps, it is time to study and gather the best practices adopted by the various dairies not only in the public sector but also the private dairies like Nestle etc and make a comparative chart and also come forward with a standard or ideal milk dairy plant mainly on their processes and quality measures so that all the dairies can take advantage of the strong points of the other dairies and effect improvements in their working to ultimately result in better contribution of the milk industry to the economy and also result in improved customer satisfaction.