CHAPTER II

AN OVERVIEW OF THEORETICAL BACKGROUND, REVIEW OF LITERATURE AND CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION

This chapter deals with the theoretical background of the Value Chain in Dairy Co-operatives, reviews of existing literatures related to value chain and dairy industry and development of framework of the study. This will enable to get a clear view about the research gap and how the topic was finalised to fill these gaps.

2.2 BASIC MODEL OF VALUE CHAIN

Value Chain –The concept

A value chain is a chain of activities that a firm operates in a specific industry performs in order to deliver a valuable product or service for the market. The concept comes from business management and was first described and popularized by Michael Porter in his 1985 best-seller, Competitive Advantage: Creating and Sustaining Superior Performance.

The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs. Inputs, transformation processes, and outputs involve the acquisition and consumption of resources - money, labour, materials, equipment, buildings, land, administration and management. How value chain activities are carried out determines costs and affects profits.

The concept of value chains of any organisations include Inbound Logistics, Operations, Outbound Logistics, Marketing and Sales and Service are categorized as primary activities. Secondary activities include Procurement, Human Resource management, Technological Development and Infrastructure.
Primary activities

The primary activities involved in Value Chain are:

- **Inbound Logistics**: arranging the inbound movement of materials, parts, and/or finished inventory from suppliers to manufacturing or assembly plants, warehouses, or retail stores.

- **Operations**: concerned with managing the process that converts inputs (in the forms of raw materials, labor, and energy) into outputs (in the form of goods and/or services).

- **Outbound Logistics**: is the process related to the storage and movement of the final product and the related information flows from the end of the production line to the end user.

- **Marketing and Sales**: selling a product or service and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large.

- **Service**: includes all the activities required to keep the product/service working effectively for the buyer after it is sold and delivered.
Support activities

Value chain also includes support activities:

- **Procurement**: the acquisition of goods, services or works from an outside external source
- **Human Resource Management**: consists of all activities involved in recruiting, hiring, training, developing, compensating and (if necessary) dismissing or laying off personnel.
- **Technological Development**: pertains to the equipment, hardware, software, procedures and technical knowledge brought to bear in the firm's transformation of inputs into outputs.
- **Infrastructure**: consists of activities such as accounting, legal, finance, control, public relations, quality assurance, general management.

All these activities contribute directly and indirectly to the effectiveness of the operations of an organisation.

### 2.3 VALUE CHAIN IN DAIRY

The value chain in Dairy industry is very important because the seasonal change in milk supply and milk composition in terms of fat, casein, whey protein and lactose concentration determine the type and value of dairy products that can be manufactured by a dairy processing plant over the season. Milk composition could be manipulated on farms by: selection and breeding (conventional animal breeding or genetic manipulation); feeding; environmental or management factors such as altering calving patterns; interference in physiological pathways; and other means such as manipulation of rumen micro-organisms. \(^1\) (Montes de Oca, et al. 2002).

At the same time, manufacturing decisions need to be made carefully considering market price and demand for each product, manufacturing capacity, and processing restrictions, amongst others.

The dairy value chain consists of Dairy farming, dairy processing, distribution and final consumption. Supply Chain Management is a major issue in dairy industry as

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the milk co-operatives begin to appreciate the criticality of creating an integrated relationship with their suppliers and customers as well as stakeholders. Managing Supply Chain has become a way of improving competitiveness by reducing uncertainty and enhancing customer service. The concept of Value Chain Management is thus becoming prevalent in this industry.

The key players in the value chain are the Input suppliers, farmers of various sizes, milk collection centers, processors and retail outlets. Each of the players in the value chain carry out various value adding services. The input suppliers for instance provide various veterinary drugs, milking equipments, feed and other services. The primary producer in the dairy value chain – The farmers carries various animal husbandry measures such as disease control measures, provision of feed to in-calf and lactating cows to ensure that the raw milk produced meets standard requirements and are traded through the formal marketing channels.

The farmers adopt different feeding regimes, provide water to enhance the milk production by dairy cows. It has been established that the larger the scope of operations of the farmer, the lower the cost of production hence economies of scale.

The milk collection centres play an intermediary role for small holder farmers to enable them enter the commercial selling of milk through the processors to the market. Milk collection centres will bulk the milk, test the milk for quality and chill the milk to the approved temperature by the processor.

The processor plays an important role of promoting the growth of the dairy subsector and offering the market to the milk collection centres and the farmers to buy their milk. They buy raw milk and produce various milk and milk products. Some of the products are pasteurised fresh milk, long life milk, lacto, butter, ghee, yogurt, flavoured milk and others. The processors also enter into supply agreements with various retail outlets and supermarkets.

The need to connect producers to markets has led to an understanding that it is necessary to verify and analyze markets before engaging in upgrading activities with value chain operators. Thus Value Chain approach starts from an understanding of the consumer demand and works its ways back through distribution channels to different stages of production, processing and marketing.
Supply Chain of Indian Dairy Industry

Inputs for Dairying
- Large Scale Farmers
- Medium Scale Farmers
- Small Farmers

Milk Production
- Chilling Center at Village Level
- Bulk Cooling at District Level

Milk Collection

Chilling and Bulk Cooling
- Cooperative Plant
- Private Plant
- Govt. Plant

Transport action of chilled milk
- Refrigerated Vans
- Insulated Milk Tankers

Processing & Packaging
- Cooperative Societies
- Milk Aggregators

Marketing and distribution
- Own Retail Outlets
- Supermarkets
- Any retail outlets

Consumer

Unorganized Sector:
- Local Milkman
- Confectionaries' Restaurants

Value Added Products

Source: www.slideshare.net/chandnisahgal/overview-of-indian-dairy-industry
2.4 REVIEW OF LITERATURE

Reviewing the existing research studies is an important aspect which guides the researcher in identifying the gap in the related field of knowledge. The researcher has conducted an extensive literature review which has enabled her to understand the research problem and develop the focus point of the research. The findings of the significant studies are also helpful in developing factors for the study.

This chapter therefore tries to bring out the salient findings of earlier studies which throw light on various concepts in the related field. The reviews consist of various research work carried out by other Researchers, articles published in Journals and magazines and newspapers and PhD Thesis of other researchers.

This section gives a brief account on the review of existing literature in the field of Dairy cooperatives and value chain aspects in particular. The review has been organised under the following headings.

2.4.1. Performance evaluation of cooperatives in general and dairy o-operatives in particular

2.4.2 Impact of dairy cooperatives

2.4.3 Risks and uncertainties in dairy co-operatives

2.4.4 Value chain in Dairy Cooperatives

2.4.1. PERFORMANCE EVALUATION OF COOPERATIVES IN GENERAL AND DAIRY CO-OPERATIVES IN PARTICULAR

The theory of cooperative organization provides several reasons why farmers join the cooperatives. According to Schroeder\(^2\), cooperatives provide quality supplies and service to the farmers at a reasonable cost. By purchasing supplies as a group, the farmers offset the market power advantage of other private firms providing those supplies. The farmers can gain access to volume discounts and negotiate from a position of greater strength for better delivery terms, credit terms, and other arrangements. Suppliers will also be more willing to discuss customizing

products and services to meet farmers’ specifications if the cooperative provides them sufficient volume to justify the extra time and expense.

The farmers’ increased bargaining power in the market places is the other advantage of the cooperative. Marketing on a cooperative basis permits farmers to combine their strength and gain more income. The farmers can lower distribution costs, conduct joint product promotion, and develop the ability to deliver their products in the amounts and types that will attract better offers from purchasers.

According to Folsom\(^3\), having a business, owned and controlled on a cooperative basis helps the farmers’ entire community. Cooperatives generate jobs and business earnings for local residents. They pay more taxes that help to finance schools, hospitals, and other community services.

According to Koopmans\(^4\), farmers may have several specific reasons for starting an agricultural cooperative: to mobilize more resources than they can individually supply, to create attractive alternatives for purchasing goods and services, to operate a business more efficiently. They recognize that the benefits outweigh the duties of membership and because they recognize that as members of a cooperative they are partial owners and not only clients. By becoming a member of a cooperative, each farmer can make use of the advantages of the cooperative: a good market price for their product and access to other goods, services, markets and credit.

Many scientists and economists have evaluated the performance of different cooperative societies and a very few studies have been made on the performance evaluation of dairy cooperatives.

Nikam\(^5\), made an attempt to study the financial strength of four cooperative sugar factories situated in Aurangabad district. Two important ratios viz., current ratio and acid test ratio were employed to locate financial strength of three units

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(short term) and two ratios viz., debt equity ratio and net fixed assets to net worth ratio were used for assessing the long term financial strength of the societies.

Chidambaram\(^6\), analyzed the growth and development of Amaravati Sugar Mill, Tamil Nadu, with respect to 13 identified indicators such as (1) area under sugar cane production (2) membership (3) recovery (4) equity capital (5) debt capital (6) net working capital (7) cane price (8) cost of production of sugar (9) machinery utilization (10) sale price (11) income (12) expenditure and (13) profit, compound growth rate was calculated for each indicator to study the growth.

Sriramalu et al\(^7\), in assessing the performance of 58 Farmers Service Cooperative Societies (F.S.C.S) in Andhra Pradesh concluded that out of the total volume of non credit services, input supply constituted 91.36 percent, consumer goods accounted for 5.18 percent and customer services 0.04 percent. This indicated that the non-credit services were mainly confined to supply of agricultural inputs and the marketing of agriculture produce was completely neglected by all the F.S.C.S.

The farmers’ milk marketing groups are conceptualized and framed to operate as profitable milk units where small holders organize themselves in collecting, processing and marketing of milk and value-added milk products. This approach aims at maintaining and enhancing the groups so that they become independent entities at the community level.

According to Tsehay\(^8\), a milk marketing group can be viewed as a group of smallholder farmers who individually produce at least one liter of saleable milk/ a day, and are willing to form a group in order to collectively process and market their milk. The milk marketing groups are named following their locality’s or peasant association’s name. According to her, the idea of group work and formation of a group is not new to Ethiopia. Different traditional local groups can be identified.

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Edir is another kind of grouping in rural and urban communities where individuals organize themselves and build up common savings through periodic contribution. Understanding of the rural set-up in terms of social fabric and the farming system practiced are key factors to long lasting formation of farmers’ group in the peasant sector.

According to Jain et al.⁹, studied the growth of milk producers cooperatives in Mehsana district of Gujarat. The sample villages in the milk shed area were selected and were studied for the growth of cooperative societies, membership, share capital, volume of milk handled, price paid by different agencies. The data was scored under the benchmark and repeated surveys carried out by the “Indian Agricultural Statistics Research Institute” during 1968-69 and 1973-74 respectively. It was observed that there was a sizable increase in the number of village level milk producer’s cooperatives viz., from 230 to 380 between the two occasions, the membership of those cooperatives also increased from an average of 157 members per cooperatives on the first occasion to 240 on the second occasion and the share capital of the cooperatives increased from an average of Rs 3448 per milk cooperative on the first occasion to Rs 18842 on the second occasion. They also noticed that there was an overall increase in the number of persons employed by the milk cooperatives to assist in their functioning and the daily milk collection of milk cooperatives increased in second occasion during all three seasons.

Kulkarni¹⁰ opined that the lack of sufficient milk collection of cooperatives in the rural areas, malpractices in weighment and quality testing, inconvenient timings of milk collection, spoilage during the rains, and warm seasons and inadequate extension services were some of the lacunae in milk collection from the producers.

Baviskar¹¹ based on data collected during field work in two villages of Surat district. The report traced the increase in the number of cooperative milk producer

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societies and their impact on dairy development in the tribal area of Gujarat. It focused upon milk cooperatives managed by Jesuit missionaries in the region presenting a detailed description of their internal organization. The main reason for the success of the Jesuit seen cooperative was found to lie with the loyalty of its members and integrity of its leaders. The secretary of dairy cooperative was found to be key functionary in the success of the project.

Hirevenkana Gouda et al\textsuperscript{12}, studied the impact of dairy development on the weaker sections of Bangalore north and Doddaballapur taluk of Karnataka. The small, marginal farmers and agricultural laborers were selected from the villages having SFDA programmes. They were classified as Karnataka Dairy Development Corporation (KDDC) farmers and non-KDDC farmers who were not availing facilities of cooperatives. They found that more than 56 percent KDDC farmers getting only 25 percent of family income from dairy enterprises more than 64 percent of KDDC farmers had repaid 75 to 100 percent of dairy loan, where as only 10 to 25 percent of non KDDC farmers had repaid 75 to 100 percent of dairy loan.

Jawan Ram\textsuperscript{13} made an attempt to analyze the organization and working of Jaipur District Milk Producers Cooperative Union Limited, Jaipur. The study was conducted through personal interview with management and other employees of the union. It was found that the organizational structure and functions performed such as (i) milk collection (ii) supply of technical inputs (iii) farmers induction programmes and (iv) supervision etc., were analyzed. Some drawbacks were found out and appropriate suggestions were made.

Mattigatti\textsuperscript{14} studied the performance of Milk Producers Cooperative Societies and their impact on dairy farming in Dharwad district. The author selected a number of physical and financial indicators to evaluate the performance. The

secondary data required was collected from the various annual reports of Milk Producers Cooperative Societies for the period 1986-88. He opined that both the physical and financial indicators of the societies showed significant growth in their values. The above average societies have already progressed with higher values for the indicators compared to below average societies, while below average societies were shown a greater rate of growth, hence, he concluded that over the period of time all these societies would contribute to the overall development of the societies.

**Jithendra Kumar**\(^\text{15}\) studied the performance of dairy cooperatives and their impact on milk production, income and employment in Chittoor district of Andhra Pradesh. The study revealed that the societies which were above the average level has shown better performance with an increase in membership and milk procurement, and profits of societies showed an increasing rate except some specific area.

**Kale et al**\(^\text{16}\) studied the financial position working and operational efficiency of 23 dairy cooperatives in Raigad district of Maharashtra. They studied the economic efficiency through income expenditure ratio, expenditure income ratio, rate of return on capital and rate of turn over. They concluded that (i) the societies had low owned capital and were dependent on borrowing from financial institutions (ii) even though the working capital of the dairy cooperatives was low, their turnover was high because dairy cooperative did not make payment to milk producers from their own funds. Therefore, dairy cooperatives were able to carry on business with limited capital and (iii) majority of the societies were trading Profit. It is difficult to explain many aspects of small-scale farmers’ household behaviour in respect to livestock, purely from an economic and rational point of view. Consequently, treating the livestock production system as a pure input– output type of economic system often misrepresents the Indian reality.

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According to Kurup\textsuperscript{17} traditionally, small farmers keep livestock in proportion to the free crop residues and family labour available in their own household production systems and convert these into food, fuel and farm power, making each farm household a virtually self-contained production system with no purchased inputs and few marketed outputs. This age-old trend has undergone rapid change in recent decades. Although the organization of livestock production in small units persists, household production systems are increasingly becoming integrated into input as well as output markets. As a result of a gradual transition from subsistence to the market system, the economic dimensions of livestock keeping have assumed increasing significance in farm household behaviour.

Field surveys\textsuperscript{18} have shown that many potential liquid milk-marketing households are hours distant away from any milk group. Setting up new groups would clearly reduce the travel time to group, and the actual number of households that would benefit depends on local population densities. It is also important to keep newly emerging milk groups small and geographically limited to ensure proximity and avoid large groups that would tend to increase average travel times.

Another study\textsuperscript{19} showed that the creation of new market outlet for fluid milk brought major improvements in the production, marketing and consumption behavior of smallholder households. The new marketing outlet may also promote involvement in more intensive dairying.

As per Jaffee\textsuperscript{20}, Co-operatives, by providing bulking and bargaining services, increase outlet market access and help farmers avoid the hazard of being encumbered with a perishable product with no rural demand. In short, participatory

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\item \textsuperscript{17} Kurup, M .P.G., “Smallholder dairy production and marketing: constraints & opportunities” 2001.
\item \textsuperscript{18} GOI. “National livestock policy perspectives: report of the steering group (NLP). New Delhi”, 1996.
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co-operatives are very helpful in overcoming access barriers to assets, information, services, and the markets within which small-holders wish to produce high-value items.

According to Nicholson\textsuperscript{21} Like contract farming, producer co-operatives can offer processors/marketers the advantage of an assured supply of the commodity at known intervals at a fixed price and controlled quality. They can also provide the option of making collateralised loans to farmers. The schemes also provides better relations with local communities than large scale farms, avoiding the expense and risk of investing in such enterprises, sharing production risk with the farmer, and helping ensure that farmers provide produce of a consistent quality.

Dairy development along the cooperative lines was considered to be the most effective strategy for helping the rural poor without altering the village social structure and providing guaranteed market for milk at fixed prices, supply of cattle feed at a reasonable cost and efficient veterinary and extension services.

\textbf{2.4.2 IMPACT OF DAIRY CO-OPERATIVES}

\textbf{Kumar and Rout}\textsuperscript{22}, in their study on economic response to feed on milk production for different types of feeds of dairy cows in Hariyana, found that feed was the most significant factor influencing milk yield. Feed cost accounted for 60-70 percent of the total cost of production.

\textbf{Chhikara et al}\textsuperscript{23}, studied the relative efficiency of the different types of Milch animals in area of Jind milk plant of Gujarat. They fitted cobb-douglas production function to estimate marginal value productivities and milk production


(input output details of Milch animals). They concluded that the use of green fodder, dry fodder, concentrates and human labour had explained about 45, 93 and 90 percent of variation in the milk output of cow, murrah buffalo and cross bred cow respectively. The net return over the variable cost was highest for the crossbred cow, followed by murrah buffalo and cow. The total cost of milk production in lactation was Rs 1795, Rs 3340 and Rs 2687 for the cow, murrah buffalo and crossbred cow in that order.

Madhava Swamy24, studied the comparative economics of production of local and graded research buffaloes in Kurnool district of Andhra Pradesh. He estimated the relative share of crop and livestock production in total gross farm income of small and marginal farmers. Costs and returns of crops besides the cost of dairying, feed, concentrates, and milk yield pertaining to animal maintained were gathered. Tabular analysis was employed to draw results. He concluded that the graded murrah buffaloes yielded higher net returns by Rs 258 than local breed. The cost of production per liter of milk of local buffalo was Rs 1.50 as against Rs 1.3 in graded murrah buffalo. It was revealed that out of the total gross farms income, 48 percent of higher net returns were contributed due to livestock production compared to crop production.

Sambasiva Rao25, studied the factors affecting milk production, marginal value productivity of different resources at their respective geometric mean levels in Nagarajuna sagar project command area of Andhra Pradesh. Cobb-douglas type of production function was used to express relationship between the average milk yield per day and value of dry fodder, green fodder, concentrates per animal per day, number of lactations completed, labour hours used per animal per day, value of animal (in rupees) and age of animal. He observed that the inputs like green fodder and concentrates were the principal factors affecting milk production in all the size groups of farmers and estimated marginal value products of green fodder and concentrates were greater than factor cost implying that all the farmers were underutilizing these two inputs. He concluded that the use of green fodder and

concentrates increased the milk yield and regarding labour, only marginal farmers were utilizing in an efficient manner.

Biradar\textsuperscript{26}, employed a break even analysis technique in dairy enterprise in Udyir taluk, Lathur district of Maharashtra. He observed that the break even milk production among beneficiaries was 1291 lts at the given price of milk i.e., Rs 7.23. Further, the average BEP price per ltr of milk Rs 7.55. He concluded that either milk producers should able to procure 1291 lts for BEP level or the price should be raised from Rs 7.23 to Rs 7.55. The prices paid to milk producers were not remunerative.

Jayachandra Reddy \textit{et al}\textsuperscript{27}, conducted a comparative study of economics of milk production in three states, viz., Chitoor district in Andhra Pradesh, Erode district in Tamil Nadu and Kolar district in Karnataka involving aspects related to existing cost structure of milk production, profitability of crossbred dairy cows in the three states under the changed socioeconomic-political scenario and also suggests methods to improve the viability and profitability of these enterprises.

The net profitability varied from 43 percent in Tamil Nadu, 70 percent in Andhra Pradesh and 83 percent in Karnataka. The study has further brought out the fact that higher fat content provides higher prices as milk is priced based on FAT and Solid-Not-Fat (SNF) content by dairies. Hence proper scientific breeding procedure is to be followed to improve fat content in the milk as well as milk production per animal.

Thakur and Singh\textsuperscript{28}, conducted surveys in the year 2002-03 to assess the energy and cost requirement for milk production in different commercial dairy farms in four locations, viz., Maharajpur, Imaliya, Pariyat and Mohaniya, around the Panagar block of Jabalpur district, representing the Kymore plateau and Satpura hills

zone of Madhya Pradesh. The locations for conducting the survey was selected at random without following any statistical method as there are enough number of commercial dairy farms to get a good comprehensive data on the different activities in milk production. It was inferred that cattle raising was not only an important occupation for supplying the nutritional diet to the people but also it has greater concern to uplift the socio-economic status of the people related to agricultural sector. Likewise raising goats, cows, buffaloes and birds as a supplementary occupation in the agricultural sector is apparently most economical for the development of socio economic status of rural people particularly in weaker sections, having small and marginal holdings or low investment capacity and tribal communities.

Dixit et al\textsuperscript{29}, studied the economics of milk production in five agro climatic zones of Kerala. The primary data with respect of farm inventory, production traits of Milch bovines, feeds and fodder fed, labour utilization, production and consumption of Milk, value of various inputs and outputs, expenditure on veterinary and other miscellaneous items etc. were collected from 750 households. The data pertained to the year 2002-03 the results of the analysis indicate that bovine husbandry forms an important component of the typical homestead-farming situation in Kerala. The crossbreeding of cattle has resulted in the spectacular performance of dairy sector in the state.

Singh and Rekha Dayal\textsuperscript{30}, studied the economics of production and marketing of milk in the state of Uttar Pradesh. Linear and log-linear functions were used to work out the estimates of factors affecting marketed surplus of milk both for the private and cooperative systems. The results of the study indicated that the feed and fodder cost was the most important item of the total maintenance cost accounting for 55 to 65 percent of the total cost in zone-I and 51 to 66 percent in zone-II. The net profit per day of a milch buffalo was very low due to the higher maintenance and low milk yield of milch buffalo on each herd size group in each


zone of the state. The net profit of milk production per buffalo per day was observed to be higher in the case of small size group due to higher milk yield of milch buffaloes in this size group as compared to medium and large herd size groups in both the zones. The establishment of milk cooperative societies in the rural areas had positive impact on the marketed surplus of milk. The study further showed that the milk vendor being an important intermediary in milk marketing made huge profits by adopting various types of malpractices. Lender utilization of plant capacity was the major factor for incurring losses by cooperative milk plant in fluid milk marketing.

Neeraj Rao et al\textsuperscript{31}, studied the economics of milk production in Kanpur (dehat) district of Uttar Pradesh Two blocks from the selected district and five villages from each selected blocks were selected randomly in proportion to the number of farmers categorized under three size groups of 0-1, 1-2 and above two hectares. The study revealed that the total maintenance cost of a milch animal per lactation increased as farm size increased. On an average the maintenance cost of milch animal during a lactation period came to Rs 10278. Amongst all labour charges accounted for the highest share followed by fodder and concentrates. The gross income from milk production was higher on large farmers because of excess utilization of concentrates by large farmers. Input output ratio was the highest on small farmers and it was 1:1.31. Elasticity of production for fodder was the highest followed by human labour and concentrates for all farms.

\textbf{2.4.3 RISK AND UNCERTAINTIES IN DAIRY COOPERATIVES}

Jain\textsuperscript{32}, in his study on dairy development, through cooperatives, discussed that dairy development in Rajasthan included various aspects, like evaluation of cooperative system and its pattern of establishment, methods of milk procurement, and processing; supply of technical inputs; animal breeding facilities, supply of cattle feed; training and extensions; supervision and the extent of cooperative programme.


Singh et al\textsuperscript{33} compared and analysed monthly fluctuations in the prices of cow and buffalo milk offered and quantity of milk procured by cooperatives, private and public sector organizations, operated in three villages adopted under operation flood of Kernal. They observed that private milk plant paid the lowest price per litre of milk during July to March and the highest during April to May. Public sector paid higher price in July. Cooperatives price remained constant and higher than public sector and equal to private plants during July 1980-1981. They concluded that public and private sector organization could attract only about 17 per cent of the total milk sellers and cooperatives procured milk from about 45 percent and the remaining milk sellers sold to milk vendors, tea shops etc.

Dorsten\textsuperscript{34}, the study related to the impact of the Kaira district cooperative milk producers union on milk production in Kheda district, Gujarat. From the study, an unmistakable trend was towards commercialization of the livestock by the year 2000 AD. Although India possessed an enormous cattle and buffalo population, annual milk production was very low. The average annual milk yield per cow was about 504 kg. One of the major constraints was supply and quality of feeds and fodder. By the year 2000 AD, There was expected to be a short fall of concentrates, 19.8 MT of green fodder and 16.2 MT of dry fodder. The shortage was expected despite the declining trends in the dairy cattle population.

The study proposed a number of suggestions for improving the feed and fodder situations and also the wealth and breeding of dairy animals.

Bhanja et al\textsuperscript{35}, examined the critical factors in organization of dairy cooperatives by selecting twenty one primary milk producers cooperative societies covering three milk production zones in Mahasana district of Gujarat. They observed that the societies were successful in the cases of members who joined a society besides economic reasons, and realization of social benefits. Milk producers

who were selling through milk vendors had came to know some malpractices made by vendors.

Patil\textsuperscript{36} studied the performance of the KMF (Karnataka Milk Federation) and its impact on dairy development in Karnataka. He observed that milk procured (in tonnes) increased by 26.95 percent during KDDC (Karnataka Dairy Development Cooperation) period and 190.41 percent during KMF. However, the overall percent increase was around 80.18 percent. Possible reason for such high increase in milk procurement were, viz the considerable rise in registration and DCS commissioned as well as the number of milk routes made operational, which had increased the DCS commissioned and milk routes operational by 25.45 and 7.21 per cent respectively.

Thakur\textsuperscript{37} studied the impact of dairy development through milk cooperatives in Gujarat which covered four milk unions which were at the different stages of development. Twenty-four village milk producers’ societies were selected randomly in four districts and 400 respondents, respectively. The primary data collected on survey method from respondents and secondary data from the sample milk unions and societies, progress was captured by tabular analysis. The farmers are categorized, as landless, small, medium, and large in order to examine the impact of milk cooperatives on economic conditions of the weaker sections. It was observed that the landless people earn as much as 65-70 percent and small farmers earn more than 25-30 percent of the total income from dairying. The cash income obtained continuously from the sale of milk can be used for better management of Milch animals and for the purchase of improved agricultural inputs to some extent which help the farmers in increasing their total income.

Reddy\textsuperscript{38}, studied the employment opportunities and the standard of living among the rural folk and compared between arable farming, mixed farming and

dairy farming laborers in milk shed area of Vijayawada and the dry land area of Chitoor. The data was collected by survey method from selected respondents.

The secondary data were collected, and analyzed. They found that mixed farming created 32 percent of extra work as compared to arable farming. The dairy farming created 45 percent of extra work as against mixed farming and 92 percent of extra work as compared to arable farming. They also estimated that an additional employment for 129 days as compared to mixed farming and 225 days as compared to arable farming were found by maintaining dairy farm.

Ramachandran\textsuperscript{39}, studied the income and employment potential of dairy farming in different stages in Kanyakumari district of Tamil Nadu. The primary data collected from 100 farmers engaged in farming activities of five selected villages of Kanyakumari district. The study revealed that the dairy farming is an activity with great potential and has offered considerable scope for employment and income generation in Kanyakumari district, the dairy farming gives employment opportunities in the form of collecting dung, cleaning shed, watering and feeding animals, grazing and cutting grass, milking, sale of milk, processing of milk and milk products. It may be concluded that dairy constitutes the major proportion of the cattle population in the sample households. Cattle rearing occupy a pivotal place among women folk of the rural areas. Thus, dairy farming plays the main source of employment and income generation in the study area.

Sidhu et al\textsuperscript{40}, studied the impact of dairy on income and employment in Punjab. The study revealed that the livestock economy especially dairy is considered to be an economically viable alternative for increasing income and employment in the farm sector of Punjab. It is clear that the contribution of livestock economy to the farm sector has increased over time whereas the contribution of crop sub-sector to the agricultural growth as well as NSDP has declined due to stagnation/fall in productivity of important crops, rise in fixed cost and degradation of soil and water resources. The importance of dairy especially on small and marginal farms has


increased and the proportion of dairy to the total farm business income on these farms has increased. The economic sustenance of these farmers is primarily dependent on dairy enterprise as it helps in utilizing their surplus family labour, requires less land and water resources and provides cash income to meet their daily consumption needs. The dairy sector has also helped in generating employment on small, marginal and semi-medium farms despite fall in employment in crop production.

Sharma et al\textsuperscript{41}, a study was carried out to estimate the contribution of dairy and crop enterprises towards income and employment in relation to different size of holdings in the semiarid region of Rajasthan. For this study data were collected from 60 farmers in the four adopted villages of Sikar tehsil of Sikar district during the agricultural year 2003-2004. The farmers were classified in to different size groups, namely, small (upto 2 ha), medium (2 to 4 ha) and large (4ha and above). From each village and each size group, 5 cultivators were randomly selected. Dairy enterprise provided maximum employment of 338 mandays and crop farming provided 219 man-days. Per worker employment from crop and dairy farming were 80 man-days and 123 man-days, respectively. Thus, dairy farming plays a key role in increasing employment and income in the semiarid tract of Rajasthan.

Sujatha et al\textsuperscript{42}, studied the market structure, price spread, marketing costs and marketing efficiency for milk in the cooperative and private sectors of Andhra Pradesh. It was found that price spread was less in private sector and hence the consumer price was also less. The major constraints identified in milk marketing were high feed cost, inadequate price for milk, poor credit facilities, disease outbreak, etc. Because of delay in the payment of fee for the milk sold to the cooperative society, the farmers approached the private firms. For enhancing the marketing efficiency of milk, infrastructure facilities like chilling plant, pasteurization and dairy products processing plants have to developed.


Vinod et al\textsuperscript{43}, Conducted a study with reference to 120 respondents scattered in six villages of two blocks in Rewari district of Haryana to analyze the nature of markets and role of cooperatives in marketing of milk. It was observed that on medium and large category of farms the milk sold through cooperative society was found to be higher than the disposal through milk vendors and directly to the consumers mainly due to more marketable surplus. While on small farms the disposal was found to be almost equal, i.e., 35 percent through milk vendors and directly to the consumers, and the disposal of milk through cooperative society was less due to lower marketable surplus owing to smaller heard size.

Usha Tuteja and Narinder Singh\textsuperscript{44}, conducted a study on employment and income generation through livestock based milk processing units in rural Haryana. The study revealed that the production of milk in Haryana grew at the rate of 4.07 per cent per annum during 1980-1981 to 200-2001. Therefore, milk processing on commercial scale has great potential in terms of enhancing the income of the farmers by selling milk products in the expanding domestic and international markets. The milk processing units on an average generated employment of 8.40 persons in Gurgaon and 5.86 persons in Jind district. The factories generated the highest employment of about 14 persons in the former and 11 persons in the latter district. The study highlighted that marketing of local products faced severe competition from the multinationals. Hence, promotional policies need to focus on the marketing bottlenecks and devise efficient marketing channels through public and private partnership. Special zones can be created in those areas where raw material/milk is easily available. The alternative way could be formation of cooperatives like Amul.

2.4.4 VALUE CHAIN IN DAIRY CO-OPERATIVES

Value chain and supply chain applications are becoming essential to manage the business efficiently in the dairy cooperatives. In the dairy cooperative sector there has been a long tradition of development assistance investments in public-

research systems. Yet there is growing recognition that while dairy cooperative research with usage of technology like computers and computer application is necessary. Fresh direction, however is coming from recent insights that recognize the value chain and its wide range of other activities, and the relationship associated with the various links in the value chain activities. As a framework for applying these insights, the concept of a value chain and the impact of various risks and uncertainties are reviewed in this section.

**Carley and Ling**\(^{45}\) in their research paper evaluated the perception of southern dairy farmers perception regarding their cooperative or proprietary handlers performance, level of satisfaction with the milk handlers and reasons for staying with the current milk handlers. For the purpose of study, the data was collected from a 1989 mail survey of southern dairy farmers. The study showed that the dairy farmers were concerned about price, deductions, assessments and price farmers received appeared to be a significant factor which affected farmer’s satisfactions level. The study also found a trade-off between price and deductions versus service and market and payment assurance. The study suggested that the dairy farmers needed a cooperative which provides an assured market for the members.

**Misra and Fletcher**\(^{46}\) in their study analysed the factors influencing farmer’s degree of satisfaction with the overall performance of milk marketing corporative. The data for the study were obtained from dairy farmers located in 12 southern states. They took a random sample of grade A dairy farmers and mail survey was conducted among 5,660 dairy farmers. An ordered probit model was formulated and used to estimate the probabilities of southern dairy farmer’s degree of satisfaction with the overall performance of their milk marketing cooperative. The analysis suggested that the southern dairy farmer’s perceived cooperative ability to hold down operating and marketing costs to provide higher prices and competent field service. The study found that there were significant .The computer systems

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concept emerged through policy debates in developed countries in the 1970s and 1980s. These debates centered on the nature of industrial production in the developed world and the analytical frameworks required to explain patterns of industrial growth. At the time, industrial production was becoming more knowledge intensive as investments in intangibles such as research and development, software, design, engineering, training, marketing, and management came to play a greater role in the production of goods and services and in organizational competitiveness. Such investments often created tacit rather than codified knowledge. Unlike codified knowledge, which is explicit and recorded, tacit knowledge is difficult to articulate or write down; it is often embedded in skills, beliefs, or ways of doing things. Mastering tacit knowledge requires a conscious effort at learning by doing, by using, and by interacting.

**Dhananjay Mandlik**47, analyzed the impact of ICT Implementation in Dairy Cooperatives. The literature has the ICT Implementation has enabled service for better use in Quality, Transport, Production, Marketing and Services. It can also facilitate the integration of locally generated revenue, manpower, recourses and facilities into the human empowerment grid. In short we can say that Implementation of Information and Communication Technologies in Dairy Cooperatives can become a climate change in cooperative management. ICT Implementation has a positive impact in rural also.

GCMMF (Amul), India's largest food products marketing organization, has approved a deal by the Board of GCMMF stating that IBM (NYSE: IBM) will help transform the Information Technology landscape of GCMMF and the Milk Unions to enable and support their accelerated growth plans. The 10-year strategic outsourcing deal is worth over Rs. 80 crores, and underscores GCMMF's rapid growth path and vision to ensure its Information Technology services are state-of-the-art.

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A study was conducted by **Manoharan et.al**\(^{48}\) to find out the constraints felt by farmers in rearing crossbred and local cows in Pondicherry Union Territory. The results showed that the foremost constraint is higher feed cost and the next constraint was found to be low price of milk. Infertility problem was also considered by them.

A study conducted by **Anjani kumar**\(^{49}\), has addressed issues associated with the alternative milk market chains and their implications on dairy farmers and traders in Bihar. The study suggested that though milk co-operatives have grown significantly, the traditional sector should be addressed in a constructive manner and allow the informal players to improve their quality control and integration with emerging modern milk supply chains.

The importance for the expansion in the supply chain network of the co-operative milk societies for enhancing the efficiency and profitability of the dairy sector is highlighted in the study conducted by **Surender Mor and Supran Sharma**\(^{50}\) in their study titled “technical efficiency and supply chain practices in dairying: The case of India”. The Study shows that milk producers in the supply chain are better crisis managers, and the possession of the crossbred livestock, schooling of the manager and the finance have found to be affecting the efficiency of the dairy farmers positively and significantly. These studies shows that the efficiency in milk supply chain is influenced by producers and their knowledge level and the expansion of the co-operative societies.

A study conducted by **Smita Sirohi et.al**\(^{51}\) titled “Formal Milk processing sector in Assam: Lessons to be learnt from the Institutional failure” explains that the poor performance of the processing plants has been attributed to inappropriate assessment of output demand and input supply and improper ascertainment of

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\(^{50}\) Surendar Mor and Supran Sharma, “Technical efficiency and supply chain practices in dairying: The Case in India” Agricultural Economics- Czech, 58, 2012, pp 85-91

economic viability of the plants. In addition the supporting institutional and infrastructural mechanism has not been put into place and a systematic business and management plan to run the system has not been formulated. The study was conducted in Assam, where the functional plants are operating at very low level of installed capacity with limited product profile and handling and curdling losses, low productivity of labour and capital and huge operating losses.

The existing status of milk marketing and dairy–co-operatives in India has been reviewed by the study conducted by Rajendran and Samarendu\(^2\). The results indicate that 80% of the milk produced by rural producer is handled by an unorganised sector and only remaining 20% is handled by organised sector. It was further found that dairy co-operatives play a vital role in alleviating rural poverty by augmenting rural milk production and marketing. The major constraints are found to lack of bargaining power of producers, lack of infrastructural facilities for collection, storage, transportation and processing which in turn affect the prices. The future challenges of Indian milk marketing are found to quality, product development, infrastructural support and global marketing.

The Information Technology used at Milk Collection centres in co-operative Dairies are described in the article by Rupak Chakravarty\(^3\). This article explains that two major reasons for the increase in milk production in India are the efficient collection of milk and higher profit for the producers, both of which have to some degree been influenced by information technology. The article helped to make information symmetric in the market, thereby minimizing the problems of adverse selection and corruption. The cheap and credible technology described in the article like electronic milko tester and the micro processor based milk collection system, illustrates how the delivery system has been improved by ensuring prompt payment to the farmers and instilling their confidence in the co-operatives setup.

A study titled “Supporting small-scale dairy farmers in increasing milk production: evidence from Morocco” was conducted by Mohamed Taher and

\(^{2}\) K.Rajendran and Samarendu Mohanty; “ Dairy co-operatives and milk marketing in India: Constraints and Opportunities; Journal of Food Distribution Research, 35(2) July 2004 pp 35-41

\(^{3}\) Rupak Chakravarty; “IT at milk collection centres in co-operative Dairies: The National Dairy Development Board Experience”
Abdessalam Saydi\textsuperscript{54} to evaluate the effects of technical support provided to small scale cattle farms in the Tadla irrigation scheme on their milk yield. Results showed that milk production could be rapidly improved by balanced dietary rations that enabled the average milk yield of lactating cows to be reached, while optimising feed costs and reducing the cost of milk production. This could be possible by involvement of farmers organisations such as milk collection co-operatives to replace the services provided by the State, which is currently withdrawing from the extension activities.

An attempt has been made by Dr. Balbir Singh\textsuperscript{55} in his article “Milk procurement and Marketing system: A case study of Ludhiana District” to locate the weak links in the present milk marketing system and to identify the problems faced by milk marketing. The study found that the major problems faced by the producers are low price, lack of veterinary facilities, wrong reporting of fat and SNF fats, irregular and delayed payment and wastage of time. Other weak links found in the milk marketing and procurement system were wrong weights and measure, high price of milk leakage problem and less margin.

A survey study on dairy cattle milk production and milk quality problems in peri-urban areas in Burkina Faso has conducted by Milogo\textsuperscript{56} et al. to contribute to the understanding of the situation of local milk production and processing. Twenty two dairy farms and nine dairy processing units were selected for the study. The study showed that the main challenge is to increase milk yield per cow and this can be achieved by improving cow nutrition and milking routines and also by improving the production traits of local breed by cross breeding with other breeds that are adapted to the climate of the place. Promoting proper cooling systems will prevent the bacterial growth and will ensure food safety.


\textsuperscript{55} Balbir Singh; “Milk procurement and marketing system: A case study of Ludhiana District”, Journal of Business and Information management –ISSN No- (0976 0458) Vol 2 –May 2012. pp 1-6

A study on “Technological change in Milk Production – A review of some critical issues with reference to South Africa” conducted by Narayanan Nair 57, reveals that due attention was not given to the potential for augmenting the production through availability of feed and fodder and the neglect of indigenous cattle while formulating the breeding policy. Another major conclusion is that benefits of dairy production based on cross breeding, would go mostly to better-off sections of society. This would result in asset ownership concentration. The study also made suggestions relating to transfer of capital and technology from the developed country and other institutions and international institutions.

Transfer of technology is to be adopted to help the countries produce high yielding variety of cows without damaging the environment. The role played by International Lending agencies are also stressed here.

A study titled “Milk production function and resource use efficiency in Alwar District of Rajasthan” 58 examined the input output relationships and assess the resource use efficiency in milk production. The study covered co-operative members and non member milk producers. The results found that there is a positive and significant influence on returns from buffalo milk. Green fodder and dry fodder were also influenced the returns. The results also revealed that concentrate, green and dry fodder were the important determinants of buffalo milk production. And therefore these factors should be considered by policy makers and dairy co-operatives in order to increase the returns in their price only in the case of small category of members where there is over utilisation of labour. This calls for decrease in the use of labour in order to increase the return from milk.

A research paper titled “Measurement of Technical efficiency in dairy sector of India: A stochastic frontier production function Approach” carried on by

Surender Singh et al. incorporates a model for technical efficiency effects including innovativeness, economic status, age and schooling on the production of milk. The results indicate that the production of the milk can be increased by one third of the total without increasing the quantum of inputs. The technical efficiency of the milk producers is influenced positively by the innovativeness, economic status and schooling whereas negatively by age of the milk producers. The producers who are innovative and hailing from higher economic status have shown more ability in managing crisis. The study further suggests that strengthening the resource base of the milk producers by providing low cost or costless capital/finance for purchasing the modern breeds of the milking animals. This article clearly explains the deficiencies in the technical and demographic aspects of the milk production.

A study on the constraints of Milk production of co-operative and non co-operative dairy farms in west Bengal was undertaken by Debnarayan and Bikash kumar. The study shows that non co-operative farms face major constraints and high severity compared to co-operative farms in expanding the milk production. The constraints are also infrastructural in nature. The major constraints were divided as economic ,marketing , technical and socio-psychological. The findings of the study throw light on the various problems and risks faced by the dairy farms namely; problem of recovery of loans, unavailability and infrequent visits of veterinary medical practitioner , lack of proper management practices, lack of technical guidance,lack of time due to busy work in domestic and agricultural work and lack of co-ordination among members. This study has helped the researcher to identify the factors and the research gap for the present study. The study also provided suggestions based on the findings.

The chronological development of Bangladesh Milk Producers’ cooperative Union Limited and extension of its areas and activities towards dairy development in Bangladesh is explored in the study titled “Development of Dairy co-operative and its impact on Milk production and household income: A study on


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Bangladesh Milk producers’ co-operative Union Limited\textsuperscript{61}. The study shows that BMPCUL has increased drastically its milk collection capacity, improved dairy breeds, improvement in the price received by the milk producers in the villages and increase in the milk production per co-operative member. The expansion of milk sheds and number of co-operatives were also remarkable. This article shows about how co-operatives can develop themselves and their members.

The impact of increased dairy productivity on farmers use of feedstuffs were examined by Tushaar Shah\textsuperscript{62} et.al in their study. The authors explain that India’s milk production can be rapidly increased within the next few years using the limited feed resources available. A small portion on indigenous herd must be replaced by high yielding animals. The study distinguished ‘Scientific animal feeding rates’ and ‘economic feeding rates ‘and the latter must be considered for planning an increase in the country’s milk production.

The research studies reviewed above had laid down focus on one or other dimensions of Dairy Cooperatives. However, no worthwhile study has so far been made exclusively on the risks and uncertainties faced by dairy co-operatives and its impact. This study, therefore, concentrates on Aavin Dairy in Salem and the impact of the risks and uncertainties on the effectiveness of its Value chain.

2.5 GAP ANALYSIS

The reviews conducted by the researcher gives a detailed account of the various aspects of Dairy co-operatives and its effectiveness. The studies highlighted the importance of time, quality, quantity procurement issues, technical and marketing aspects and other problems associated with the dairy industry. Most of the studies conducted in dairy industry have focused mostly procurement, pricing and consumer behavior towards dairy products. Only

\textsuperscript{61} Ashok Kumar Ghosh and Kesahv Lall Maharajan; “Development of dairy co-operative and its impact on milk production and household income:A study on the Bangladesh Milk producers’ co-operative Union Limited”; Journal of International development and cooperation ,Vol 10, No 2,2004 pp 193-208

\textsuperscript{62} Tushaar Shah, A.K.Tripathi, Manik Desai; “Impact of Increased dairy productivity on farmers’ use of feedstuffs”, Economic and Political Weekly, August 1980, pp 1407 -1412
very few studies concentrate on co-operative societies and their risks and uncertainties.

Similarly, though much research has been done into the dairy product attributes and marketing, only few studies deal with the effect of these risks and uncertainties on the dairy value chain. In order to bridge this gap the present study titled “A Study on the risk and uncertainties faced by Aavin milk co-operative societies and its impact on the effectiveness of Aavin value chain in Salem District” was undertaken. This study throws light on the various aspects of effectiveness of the dairy value chain and also provides suggestions about how to improve the effectiveness based on the findings of the study.

2.6 RESEARCH CONCEPTUAL FRAMEWORK

The extensive review of literature has enabled the researcher to construct a proper research conceptual framework. Based on the reviews the researcher has zeroed in the various risks and uncertainty factors of Dairy co-operatives. They are:

1. Pricing and financing risks
2. Seasonal fluctuations
3. Transport and infrastructure
4. Demand and supply
5. Management and administration problems
6. Changes in lifestyle and preferences
7. Delayed payment of dues
8. Involvement of too many intermediaries

All these factors are considered to have impact of the effectiveness on the Value chain of the Aavin dairy co-operative system.
Conceptual Model designed by the Researcher based on the prime factors affecting the Aavin Co-operative Societies
Pricing and financing

The main risk associated with the dairy co-operative is the price being too low and also delay in the payment schedule. The payment to farmers and also to producers is not prompt due to several reasons. There is no particular system and measure to fix the rates is also another reason. Price fluctuations during shortages also pose a great risk for the farmers.

The financing facilities available to farmers to assist them in procuring cattle, fodder and also veterinary facilities is also very limited. The formalities for the process of financial facilities is very cumbersome and it takes a long time for the sanctioning of the same. The support from Government for the supply of information and subsidies is also another factor.

Seasonal fluctuations

Milk being a perishable commodity, the quality is highly associated with the timing of delivery. Variations in seasons affect the milching and in turn affect the supply of milk and its quality. The uncertainty in demand also sometimes results in loss. All these risks directly affect the milk processing and profits. Moreover the seasonal changes affect the reliability of the milk supplied by the society.

Transportation and infrastructure

Lack of transport and infrastructure create a great risk of perishability in dairy industry. The facilities for quality check also affects this. Transportation and processing is the riskiest and time consuming part in dairy production and supply. The technologies to protect the milk against perishability and deterioration in quality are also important. Lack of all these will result in difficulties in ensuring product safety and quality.

Quality aspects

Various processing and infrastructural shortcoming pose a threat on the quality issues of the dairy co-operatives. The labour and unavailability of skilled labour also is acting as a risk. At the same time sufficient guidelines regarding the diseases affecting the cattle and hints for quality improvement also is a matter concerning the quality of milk and its products. Lack of training to farmers and processors in improving the quality and productivity is also another risk.
Management and administration

The management and administration problems cropping up hinders the work. This also poses as threat in the form of competition from the private brands in terms of quality and branding and marketing efforts. The rules governing the management and administration is a great risk in the co-operatives.

Changes in lifestyle and preferences

The lifestyle changes in the consumers and their preferences are creating a major problem in predicting the demand for the milk. The branding and marketing are not given importance and this is major risk which co-operatives face from the private players. The uncertain consumer needs are also a great risk.

Involvement of too many intermediaries

The involvement of too many intermediaries creates regulatory barriers for the growth of dairy business. This also creates a hindrance in terms of adulteration and lack of remunerative prices. Dilution of authority and responsibility also is the result of this risk. Absence of screening system is another major risk in dairy co-operative system.

2.7 OPERATIONAL DEFINITIONS

Value chain

A value chain is a chain of activities that a firm operates in a specific industry performs in order to deliver a valuable product or service for the market. The concept comes from business management and was first described and popularized by Michael Porter in his 1985 best-seller, Compleitive Advantage: Creating and Sustaining Superior Performance.

Supply chain

A supply chain is a system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resources, raw materials, and components into a finished product that is delivered to the end customer. In sophisticated supply
chain systems used products may re-enter the supply chain at any point where residual value is recyclable. Supply chains link value chains.

Co-operative societies

A co-operative society is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. A co-operative society is another means for forming a legal entity to conduct business besides forming a company. It pools together human resources in the spirit of self and mutual help with the object of providing services and support to members.

Agile Manufacturing

Tools, techniques, and initiatives that enable a plant or company to thrive under conditions of unpredictable change. Agile manufacturing not only enables a plant to achieve rapid response to customer needs, but also includes the ability to quickly reconfigure operations and strategic alliances to respond rapidly to unforeseen shifts in the marketplace. In some instances, it also incorporates "mass customization" concepts to satisfy unique customer requirements. In dairy industry, dairy products that are in good demand are manufactured using this technique.

Capacity Planning

The process of determining the amount of capacity required to produce in the future. This process may be performed at an aggregate or product-line level (resource requirements planning), at the master-scheduling level (rough-cut capacity planning), and at the material requirements planning level (capacity requirements planning). Dairy units are constructed keeping the future needs in mind.

Channel management

The management of firms or individuals that participate in the flow of goods and services from the raw material supplier and producer to the final user or customer. Through dedicated channels the milk is transported from co-operatives to the dairy firms.
Demand Management

The function of recognizing all demands for goods and services to support the market place. It involves prioritizing demand when supply is lacking. Proper demand management facilitates the planning and use of resources for profitable business results. Since milk is a perishable commodity milk is supplied based on the need and the excess milk is sent to milk deficit places.

Logistics Management

Logistics management is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing. Logistics play a crucial role in the delivery of milk.

Packaging

Packaging has a significant impact on the cost and productivity of logistics. Inventory control depends upon the accuracy of manual or automatic identification systems keyed by product packaging. Order selection. All dairy products are packaged using good quality packaging materials.

Scheduling

Scheduling involves taking decisions regarding the allocation of available capacity or resources (equipment, labor and space) to jobs, activities, tasks or customers over time. Scheduling thus results in a time-phased. Usually scheduling is done in dairy sector to avoid wastage of milk.

Supply Chain Inventory Visibility

Software applications that permit monitoring events across a supply chain. These systems track and trace inventory globally on a line-item level and notify the user of significant deviations from plans. Companies are provided with realistic estimates of when material will arrive. Using this movement of milk is tracked and it helps to reduce wastage and ensures prompt delivery.
**Target Costing**

It is the process of designing a product to meet a specific cost objective. Target costing involves setting the planned selling price, subtracting the desired profit as well as marketing and distribution costs, thus leaving the required manufacturing or target cost. Target costing is used for pricing milk products.

**Total Cost of Ownership (TCO)**

In supply chain management, the total cost of ownership of the supply delivery system is the sum of all the costs associated with every activity of the supply stream. Each and every cost involved in the supply chain is measured.