CHAPTER 2

REVIEW OF LITERATURE

2.1 INTRODUCTION

In this chapter, an attempt is made to review the existing literature in the supply chain management, supply chain sustainability, design, execution and milk transportation network construction of the study. Though there is a dearth of document evidence in the field of dairy industry, the following literature is worth mentioning.

2.2 LITERATURE

Kay (1946), who studied the various conditions of dairy education in India, suggested the establishment of a National Dairy Research Institute.

Vyas and Chaudhri (1971) have shown in their study on “Economics of Dairy farming in Mahasana District”, that high yield of production and low cost productivity occurred in dairy farming of co-operative sector. The results were observed based on the comparative study of co-operative and non co-operative dairy farming.

Narayanan (1971), emphasized in his study on “the impact of co-operative milk union on rural industry”, that the spread effects of dairy farming by way of external economies, creation of demand for dairy input services, demonstration effect, and infrastructural facilities are essential for rural industrialization of dairy units.
Hogle (1972), in his study on “The Influence of Agricultural Extension in Selected Villages of Kaira District”, observed that those villages which had favorable agricultural conditions and good access to inputs, credit and marketing facilities had a considerable success in the dairy innovations. Further, he concluded that the institute of agriculture would help to put the dairy activities on a successful track.

Somjee and Somjee (1974), in their study entitled “Co-operative Dairying and the profiles of Social Change in India”, made a comparison of 3 different villages, (Asoda, Ode and Khadgodhra in Kaira District) and concluded that the social and economic perceptions, ethnic reshuffles of the stratum of the society and the democratic pattern of managerial efficiency through managerial shift in the villages.

Patel and Pandey (1976), in their study on “Economic Impact of Kaira District Co-operative Milk Producers Union”, highlighted that the dairy co-operative had a positive impact on milk prices, adoption of modern dairy practices, milk yield per animal, household dairy income and per capita milk consumption. These results were accrued by comparing 100 respondents of controlled villages selected in the sample area.

Nalini Singh and Nalinichand and et al (1976) studied the women’s participation in modern dairy development in Kaira district. On the basis of field data of ten villages, it was found that women’s participation was not satisfactory. The study observed that the female membership in dairy co-operative ranged between just two percent and ten percent. The authors further observed that majority of women members were found to have little involvement in the management or money disbursement of co-operatives. Moreover, there was no indication of attitudinal changes towards caste, family planning and hygiene.
National Development Board’s study (1977) on “The Socioeconomic, Productivity and Production Practices of Milk Producers of Sabarkanth of Gujarat and Rothak District of Haryana” shows that the cooperative are the most effective organization in canalizing the dairy developments inputs, and milk marketing. A good association with every technical and material change reflects a corresponding change in the attitudes, values and behavior of the people.

Chinnaiyan et al (1980) in their study “Marketing of Milk in Erode Taluk in Tamilnadu” covered the market functionaries, market channel and price structure. Market structure was identified as oligopolistic at the assembling level as well as in distribution level. Further it was found that the unorganized sector held a large share of milk market and even sent milk outside Tamilnadu to places like Bangalore and Mangalore.

Patel and Prabaharan (1980) randomly selected 300 households for their study on “Consumers Awareness and Preference of Milk in Madras city”. The study concluded that it would be beneficial to the Tamilnadu Dairy Development Corporation if active steps were taken to infuse knowledge about various important dairy processing and services to the consumer. A suggestion was also made to explore the possibilities of supplying pure cow milk to the consumers in the city as the preference for cow milk was more compared to buffalo milk. It was also suggested that a small package of milk (250ml) might be useful to cater to the needs of the poor and low market segments.

Sunder (1981) interviewed the female members of the all women’s Co-operative Societies of Khadgodhra in Kaira district. According to the author, the society had increased the income of the village in general village in general and of the women in particular. The major economic benefit that the women perceive to confer on them was the fact they can now get credit from the shops.
National Dairy development Board (1981), in its “Study on Rural Households Participation Survey In all milk sheds of Operation flood program”, made a unique contribution by comparing the 17 operation flood milk sheds of the nation. It is observed from the study that more households kept milch animals in more developed and medium developed milk sheds than in the less developed milk sheds. Similarly the less developed milk sheds had very low input utilization.

Jairath (1981) selected mandi Milk supply scheme of Himachal Pradesh state for the study. The study reveals that the milk procurement has lean and flush seasons. The index of arrivals declined. Regression co-efficient was employed for analysis purpose in the study.

Mehta (1981) made a nutritional survey among 155 young children in two co-operative villages of Kaira district. He surveyed households belonged to the class of the small farmers and landless agricultural laborers and both villages had more than 15 years involvement in milk co-operatives. The main aim of the study was to determine the effect of milch animal ownership on the nutritional status of young children. The study generally revealed that there was a high incidence of malnutrition among children. The study observed that this might be due to the sale of all the milk to the societies with a view to get more income.

Murali Manohar and Sudarshan (1982) in their study on “Dairying as a Household Industry” analyzed the role of dairy development and other agencies in the development of dairy units, employment opportunities and the livelihood of the weaker sections of the selected sample society in their study area.

Singh and Dhash (1982) focused on the impact of Operation Flood -I at the village level with the help of simple statistical tools like arithmetic mean, frequency distribution table and Lorenz curve. Their main findings were the
average milk yield per animal in both the landed and landless households in the co-operative villages was 12.58% higher than control villages; the milk yield per animal was higher in the co-operative villages than the control villages. Lastly the study opined that the average employment in dairying, the average per capital protein intake and receptivity to various innovations introduced under the programme were higher in co-operative villages than in villages.

Chakravarthy and Reddy (1982) studied the functioning of co-operative dairy societies in drought prone area program. It is noted that 10 out of 12 presidents were of the opinion that the performance of the M.P.C.S. was on the decline and indicated that the main reasons was the low and remunerative price by the dairy co-operative.

Rajaram (1983) made an analysis of the structural linkages underlying a crisis in a Milk Co-operative in a medium sized village of Balasinor Taluk of Gujarat. Field data for these studies were collected during the period 1982-83. The conclusion of the study was that fractional tussles in the villages affected the milk co-operative society severely.

Koli (1985), in his study on “The Functioning of M.P.C.S. in Gujarat With Special Reference to Kaira District” viewed that the selected sample societies were functioning well and collected a good quantum of milk per society - nearly 3,25,000 litres p.a. Further, it is noted that the societies are rendering a good service to the community development like forming roads in remote villages, hospitals assistance, drinking water and donation to schools, etc. The study also pointed out that the members felt that the price of milk was low and needs enhancements.

Vithal (1986), in his study on “Factors Affecting M.P.C.S. in Ananthapur District of Andhra Pradesh”, found that the main factors affecting the procurement of the M.P.C.S. were factions in the villages, caste
dominance, acute water and folder problem, lack of proper transport facilities, menace of vendors and lack of adequate trained staff.

Vimal’s (1986) study highlights that dairy co-operative movement had not yet succeeded in a significant manner in the larger goal of including landless weaker sections to take up productions and sale of milk.

Vimal Shah (1986) in his “Study on The Working of Sumul”, opined that the financial performance in the initial period and capital output ratio were high due to stagnant output. However, during the later period it became lower. The overall performance of the dairy was quite positive and wage policy adopted by the plant was based on productivity.

Meera (1986) studied the performance of dairy development in tribal Surat under the Integrated Rural Development Programme .According to the author, the high rate mortality of buffaloes, lengthy laction cycle, low productivity of animals due to disease, lack of proper feeding and care would make the tribal dependents on continuous subsides and loans instead of making them self-reliant . The author cautioned that the mismanagement of affairs of many societies, the corruption associated with the bureaucracy at all levels of the programme and over loading of ecological resources with a large number of imported buffaloes may affect the tribal economy as a whole.

Ranade et al (1988) studied the performance of integrated of milk co-operative in the strata of backward and forward integrated. It is observed that co-operative societies not only assisted small farmers in improving their income from their milk operation substantially but also have helped landless laborers to undertake milk production as primary occupation. The authors further viewed that the Gujarat dairies generate considerable large surplus as compared to Maharastra due to the combined effect of better marketing of
milk due to forward integration and better supply of inputs and services due to backward integration.

Sinha and Ramamoorthy (1988), in their study on “The Impact of Modernization of Dairy Co-operative”, expressed the view that members with longer membership benefited more through acquiring the knowledge on scientific dairying, whereas the new entrants needed more quantum of training to develop their knowledge in scientific dairying.

Saroja (1988) studied the satisfaction of members of dairy co-operatives in Erode district. For analysis 150 respondents from 10 societies were selected at random. The study revealed that out of 150 samples members, only 14 members were women. The study concluded that member satisfaction of dairy co-operatives was not influenced by the sex of the member producers. Statistical analysis revealed that irrespective of the sex of the members, the satisfaction derived by the members of the milk producers’ societies was the same.

Singh (1989), in his study on “The Modernisation of Dairy Farming”, analyzed the milk yield per year in 3 periods- summer, rainy seasons and winter. He reveals that the rainy and summer seasons show positive and significant impact of milk production for buffaloes and cows respectively. He further indicates that the yield of milk is affected due to concentrated (cattle feed), Green fodder, labour and stage of lactation.

Mahak Malik (1989) studied the milk unions of Ambal, Karnal and Jind of Haryana. The study was based on the secondary data collected from the milk unions and the records of head office located at chandigarh. Data analysis included the tabular analysis and production function analysis. According to the study, milk procurement was the lifeline of a dairying plant. It also pointed out that proper utilization of the installed capacities of the
dairy plants for processing milk and manufacturing various milk products were heavily dependent on the total quantity of milk procured by it. Moreover, the dairy plants found it very difficult to utilize the given capacity during lean seasons. The study concluded that there was plenty of scope in all the milk unions covered in the study to increase the volume of milk collected per society and per member effectively by linking the milk procurement programme of the union with the volume of milk procured by each member.

Aruna Kumari (1989) investigated the functioning of 165 women dairy co-operative in the Chittoor, Krishna, and Nalgonda Districts of Andhra Pradesh. All these societies have women as members and are run solely by women under elected managing committees and women presidents. These societies are running on profits, which have helped the poor rural women to improve their economic lot. Some problems and constrains experienced were: political hindrance, illiteracy, lack of veterinary services and artificial insemination, lack of financial aid, management of societies and non-availability of fodder. To overcome this, the author suggests the following steps:

1. Extensive training programme on co-operative awareness, restructure of by-laws, rights and duties of members in order to strengthen the process of accountability.

2. Organization of regular village level camps for the women milk producers to increase the awareness, and

3. Whenever loans were given to landless women, inputs like feed, fodder, calf feed, etc., should be provided at subsidized rates till the loans were repaid.
Krishnaraj and Dubey (1990), in their study on “Analysis of Organizational Efficiency of M.P.C.S”, focused on two main areas specially economic and psychological impact for the effective organization. For this purpose economic efficiency of the society was analyzed with the help of five factors namely financial stability, income, milk collection, performance, investment and productivity of milch animal.

Kamalaveni (1989) studied the utilization by the members of the Erode districts milk producers’ co-operative societies. For the purpose of the study utilization index was calculated and personal factors like age, caste, sex, etc., and institutional factors like knowledge of own society, members satisfaction democratic participation were used. The study concluded that if the milk producers fail to use the societies as an outlet for selling milk the very purpose of forming the M.P.C.S gets jeopardized. The study stressed the need for the expulsion of member supplying milk to the traders. But in reality such measures are not taken.

Mattigatti et al (1989), in their study on “The Dairy Co-operative in Dharward District, Karnataka”, concluded that there was a direct positive relation between the performance with higher volume of business of societies and their milk productivity.

Shiyyani and Singh (1992) on the “Performance of Dairy Co-operative in Saurastra, Gujarat an Econometric Analysis” emphasized the results with the help of econometric tools. Further, rating technique was employed for analyzing the relative performance of the societies. Financial performance was also analyzed with the help of the main financial indicators like total turnover, net income, and salary paid to the staff, value of milk procured as well as sold, dividend and bonus paid of animals treated by veterinary doctors. Further, the study concluded that the introduction of
scientific methods for classification of societies of societies would help in rational allocation of financial assistance to the societies.

Chalal and Gill (1993) in their “Study on Comparative Economies of Milk Processing” have highlighted that most of the milk plants in co-operative sector were working under capacity while those in the private sector were working on an average of above the installed capacity. This is due to the conversion of milk into milk products by private milk plants, while the co-operative milk plants sell plants sell directly in liquid form after standardization which affects the profit margin. Further, it is observed that due to political interference the co-operative plants were forced to employ more personnel than required, which overburdened the budget of milk plants.

Shree Shylaja and Veerabhadraiah (1993) conducted a study in Devanhally Taluk of Bangalore district. The study concluded that many dairy women preferred training in the area of health care of animals, balancing feeding, taking care of pregnant animals an diagnosing the diseases. The study found that they preferred a combination of lecture with the group discussion and demonstration as the method of training. A great majority of women preferred participative training and 89% of them preferred April-May as the suitable months for undergoing training. They preferred three days training and their own villages as the venues for training.

Benhur Dayakar Rao and Singh (1993) in their study entitled “On the Impact of Operation Flood Programme in Guntur District of Andhra Pradesh”, analyzed the impact with the help of the factors, namely, the number of milk co-operative, their membership, milk procurement, technical inputs and prices paid to the milk producers. Simple statistical methods were used to arrive at the results of above said factors. A better price for the milk may be offered which could motivate the milk producers to supply the marketable surplus only to the dairy co-operatives.
Tom Davis (1993) in his study “Effective Supply chain management”, proposed, in a time of shortening product lifecycle, complex joint venture and stiffening requirements for customer service, it is necessary to consider the complete scope of supply chain management, from supplier of raw materials, through factories and warehouses, to demand in a store for a finished product. The author described several cases in which entire product families have been reevaluated in a supply chain context.

Ravikiran et al (1994) studied the milk production situation in the milk sheds of Krishna Districts of Andhra Pradesh. The study concluded that buffaloes formed the main stay for milk production in Krishna district. Under Krishna Kamadhenu scheme crossbreed cows were brought from Karnataka and supplied to farmers for better yield of milk, which resulted in more collection of milk to the society and union.

Hema Tripathi and Bist (1994) conducted a study in Barely district of Uttar Pradesh. The study concluded that risks orientation was the most important psychological attributes of rural women in augmenting the productivity of dairy animals. The study further concluded that there was also a need for a research system to develop technologies which are relatively less risky, vis-à-vis the physical and financial resources available to the rural dairy farmers. The inputs required for the continued adoption of the dairy technologies available or needed also to be assured to help the rural women to augment the products only of their rural dairy system.

Singh (1994), in his study on “The Production Performance of Different Types of Milch Animals in Rajouri Manjakot Blocks of Rajouri District”, highlights that the returns on investment was maximum from murrah buffaloes followed by cross bred cow, non descript buffalo and Haryana cow. While analyzing the costs of production he found that it was maximum for murrah buffalo and minimum for non descript cow.
Sanghu (1994) studied about “The Production Consumption and Marketed Surplus in Meerat District of Uttar Pradesh”. The study focused on 196 producers with 444 milch animals from different category of milk producers’ households. The households were classified into medium farmers, landless and small farmers. The highest contribution to the total milk production of the study area was by the buffaloes owned by medium farmers due to their population. Marketed surplus of milk was observed to be negatively associated with the land holding size.

Ranganathan and Singh (1995) observed that the majority of the respondent household, though both women and men jointly participate in making decisions regarding farming and dairying, generally men dominated the activities. The study indicated that rural women as compared to other male counterparts needed relatively more dairy processing and preparation of dairy products, while their men folk needed relatively more training than women folk in the areas of breeding, feeding health care, and management of dairy cattle.

Gupta and Devaraj (1995) conducted a study on Churu District of Rajasthan. The study revealed that the proportion of milk production retained for household consumption was as high as 73% and the marketed surplus was only 27% in the study area, the marketed surplus was the lowest in the case of landless labourers. Apart from its utilization in fluid form, a significant proportion of milk consumption was in the form of ghee. The study observed that major portion of the milk production was retained for family consumption and the marketed surplus was relatively low owing to inadequate marketing facilities in the study area.

Prabaharan and Sivaselvam (1996), in their study in Chengalpattu District of Tamil Nadu found that the quality of the milk produced by various size of farmers. Larger households produced more milk per day as compared
to the other three categories. However, milk production per animal per household was higher among landless household category. Moreover, the study concluded that there was a definite scope for improving milk yield by increasing the feeding level of concentrate, green fodder and roughage both in the case of cows and buffaloes.

Gulay Barbarosoglu and Demet Ozgur (1999), in their study in Turkey, found “Tabu search Algorithm for the Vehicle Routing Problem for Well Known Distribution Company”, which transports electronic household commodities from various plants to large number of dealers. Thus, the emphasis is directed towards developing a methodology which will provide reliable and practical solutions

Kristine Kelly (1998) in his study “A systems approach to identifying decisive information for sustainable development” studied many governments are striving to implement sustainable development programs. While there are many definitions of ‘sustainability’, most agree that a more comprehensive information infrastructure including economic, social, environmental, and cultural measures is required to assess courses of action and evaluate progress. Also critical is the development of information about the structure and behavior of the systems in which decisions are made. Most of the effort toward the identification of information to support sustainable development decision making have focused on developing measures of progress toward sustainability. The Pressure-State-Response framework has been suggested as a method for capturing perceptions of causality.

Losada et al (2000) studied the historical development of the Mexico City milk supply system: local and global contradictions. The co-evolution of urban supply and demand factors with policy objectives is dealt with in three distinct periods. (1) The early 20th century in which milk production became an end in itself of cattle raising, with the introduction of
new forage crops and the concept of the and dairy basin’. (2) The period of the paternalist state is characterized by policy objectives to support Mexican dairy producers and ensure milk supply to the burgeoning urban population. To these ends, there was increasing government intervention in cattle breeding and production systems, distribution and processing of milk, and the importation of powdered milk from international stocks. (3) The neoliberal period included a retreat of the state from quality control enforcement, the inclusion of imported milk the industrialization process of products for national sale, and concentration of dairy enterprises into fewer hands. While earlier policy objectives have indeed been achieved, three contradictions pose a threat to the systems sustainability: the disarticulation of national supply and demand by means of the financial attractiveness of imported milk stocks; the now minimal contribution of the urban area to its own milk consumption, and the poor quality of industrialized milk products reaching the consumer.

Markham et al (2001) in their paper “Arcs of integration: an international study of supply chain strategies” investigated supplier and customer integration strategies in a global sample of 322 manufacturers. Scales were developed for measuring supply chain integration and five different strategies were identified in the sample. Each of these strategies is characterized by a different “arc of integration”, representing the direction and degree of integration activity. There was consistent evidence that the widest degree of arc of integration with both suppliers and customers had the strongest association with performance improvement.

Derk Loorbach and Jan Rotmans (2006) in their study “Managing Transitions for Sustainable Development”. The challenge of sustainable development presents our society with the need for long-term structural changes or transitions in sectors such as energy supply, mobility, agriculture and health-care. Transition framework can serve as a bridge between the
different disciplines studying partial aspects of transitions and system innovations.

Maria et al (2002) conducted study on “A vehicle routing system supporting milk collection in Uruguay National Co-operative of milk producers (Conaprole)”. The vehicle routing model contains three inter-communicating parts: a) a geographic information system, b) external and internal interfaces and c) a vehicle routing solver that includes heuristics inspired on the strategy of “cluster first, route second”

Sonesson and Berlin (2003) in their study “Environmental impact of future milk supply chains in Sweden”, the results show that any consideration of the environmental effects of the milk supply chain must consider the entire chain. The amount of packaging materials used is an important factor, as is the transportation of the dairy products to households.

Daniel et al (2003) emphasized in their study on “The Challenge of a closed loop supply chain” that closed-loop supply chains differ significantly from forward supply chains in many aspects. These differences are not well understood in many contexts, and the situation is complicated by many types of product returns. Progress is slow since closed

Suzanne de Treville et al (2004) in their study “From supply chain to demand chain: the role of lead time reduction in improving demand chain performance” observed, to improve demand chain performance, it is better for parties in a supply chain to focus first on lead time reduction, or instead concentrate on improving the transfer of demand information upstream in the chain. Even though the theory of supply and demand chain management suggests that lead time reduction is an antecedent to the use of market mediation. Finally, they proposed a framework for prioritizing lead time reduction in a demand chain improvement project, using a typology of
demand chains to identify and recommend trajectories to achieve desirable levels of market mediation performance.

Paul-Marie Boulanger, Thierry Brechet (2005) analyzed “Models for policy-making in Sustainable development”. More and more frequently policy-makers are urged to assess the impact of their strategies and policies in terms of sustainable development. Several modeling approaches will be assessed in two stages: first with respect to general criteria closely related to sustainable development and then in relation to policy matters (energy and land use and transport policies) considered from a sustainable development perspective.

René Kemp and Saeed Parto (2005) “Governance for sustainable development: moving from theory to practice” examined and elaborated on the central elements of sustainable development and governance, considering their interrelations as over the past decade and a half. Sustainability is best viewed as a socially instituted process of adaptive change in which innovation is a necessary element. Key elements of governance for sustainability, which are integrated into the concept of transition management. The result is a conceptual framework for policy-making and action-taking aimed at progress towards sustainability.

Jong Han Park Jae Kyu Lee and Jung Soo Yoo (2005) in their paper “A framework for designing the balanced supply chain scorecard” studied supply chain management in the context of Balanced Scorecard. In the paper a framework for balanced supply chain scorecard was proposed that considers the literature on the BSC and SCM, SCM solutions and product characteristics.

Jonathan Linton (2007) in their study “Sustainable Supply chain: An introduction” analyzed the convergence of supply chains and
sustainability. In doing so, the focus on environmental management and operations is moved from local optimization of environmental factors to consideration of the entire supply during the production, consumption, customer service and post-disposal disposition of products. The analysis concluded that the sustainable development is a rich area for academic research that is still in its infancy and has the potential to affect future government policy, current production operations, and identify new business models.

Stefan Seuring and Martin Muller (2008) in their study “From a literature reviews to a conceptual framework for sustainable supply chain management”, the study offers two distinct views. First, it offers a literature review on sustainable supply chain management taking 191 papers published from 1994 to 2007 into account. Second, it offers a conceptual framework to summarize the research in this field comprising three parts. As starting point related triggers are identified. This allows putting forward two distinct strategies: (1) supplier management for risks and performance, and (2) supply chain management for sustainable products. It is evident that research is still dominated by green/environmental issues. Social aspects and also the integration of the three dimensions of sustainability are still rare.

Pramod and Raja Sekhar (2011) discussed about the various risks and uncertainties from a dairy industry perspective and their impact at various stages of the supply chain. The study concluded that the vulnerabilities in terms of risks and uncertainties get multiplied with the perishability nature of the raw material that is milk which the industry deals in.

Guan and Philpott (2011) in their study “A multistage stochastic programming model for the New Zealand dairy industry” presented an application of multistage stochastic programming to a production planning problem for Fonterra, a leading company in the New Zealand dairy industry,
taking into account uncertain milk supply, price–demand curves and contracting. Further, the study described a model for Fonterra’s supply chain, and a model for uncertain milk supply. Moreover, the study presents a multistage stochastic quadratic programming model and a decomposition algorithm to compute an optimal sales policy, which is tested in simulation against a deterministic policy.

Wognum (2011) studied the “Systems for sustainability and transparency of food supply chains – Current status and challenges”. The study identified that the Consumers increasingly wish to be informed about the safety of their food, its origin, and the sustainability of the processes that have produced and delivered it. The study explored the current status of information systems to support sustainability in food supply chains and communication towards essential stakeholders. In particular the study identified current technical and organizational solutions and developments that aim to retrieve and provide information to consumers as well as decision makers concerning sustainability and transparency issues.

Trienekens et al (2011) study “Transparency in complex dynamic food supply chains”, highlights food supply chains are increasingly complex and dynamic due to (1) increasing product proliferation to serve ever diversifying and globalizing markets as a form of mass customization with resulting global flows of raw materials, ingredients and products, and (2) the need to satisfy changing and variable consumer and governmental demands with respect to food safety, animal welfare, and environmental impact. Transparency in the food supply chain is essential to guarantee food quality and provenance to all users of food and food products. Intensified information exchange and integrated information systems involving all chain actors are needed to achieve transparency with respect to a multitude of food properties.
CONCLUSION

It is obvious that all these studies have attempted to examine the intricacies of co-operative dairy industries mounting in terms of their utility to society or their impact to the milk producers. None of the studies has; however, made any effort to evaluate the performance of milk supply chain, sustainability of the milk supply chain, analyze the construction of transportation network and transportation performance study. Therefore this research is focused on finding possible and plausible solutions to the above said shortcomings.