

Supply Chain Management: A Case of Dairy Industry in Gujarat

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Abstract

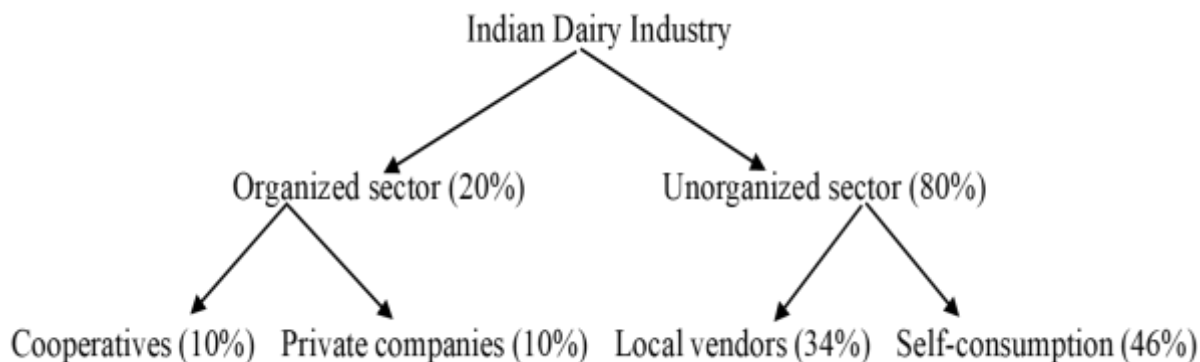
The dairy industry in India is gaining much attention because India is the largest producer and consumer of milk. Gujarat is the fourth largest state in India in milk production (127.8 thousand tonnes). The paper tries to explore the role of supply chain management in the dairy industry. Supply Chain Management (SCM) includes planning and controlling of material flow and information flow among farmers, cooperative societies, dairy cooperatives, distributor, retailer and finally to end-consumers. In this paper, the dairy supply chain framework has been developed where the emphasis is given more on the role of different actors in the dairy supply chain in Gujarat. The data has been gathered from secondary literature in the area of supply chain management in the dairy industry.

Keywords: Dairy industry, Supply Chain Management, Gujarat.

1. Introduction

India is one of the first milk producing country in the world as of 2018, sharing a ~19% of the milk in the global market. Between Financial Year 2018-2023, milk producing industry in India will expand at a compound annual growth rate (CAGR) of ~14% and will reach around INR 2,460 billion in Financial Year 2023. The part of unorganized sector which produce milk in unhygienic environment is around ~81.1% in Indian dairy and milk processing market as of 2018. As per The Dairy Times (2019), this reduces the overall quality and nutrition levels of the milk produced.

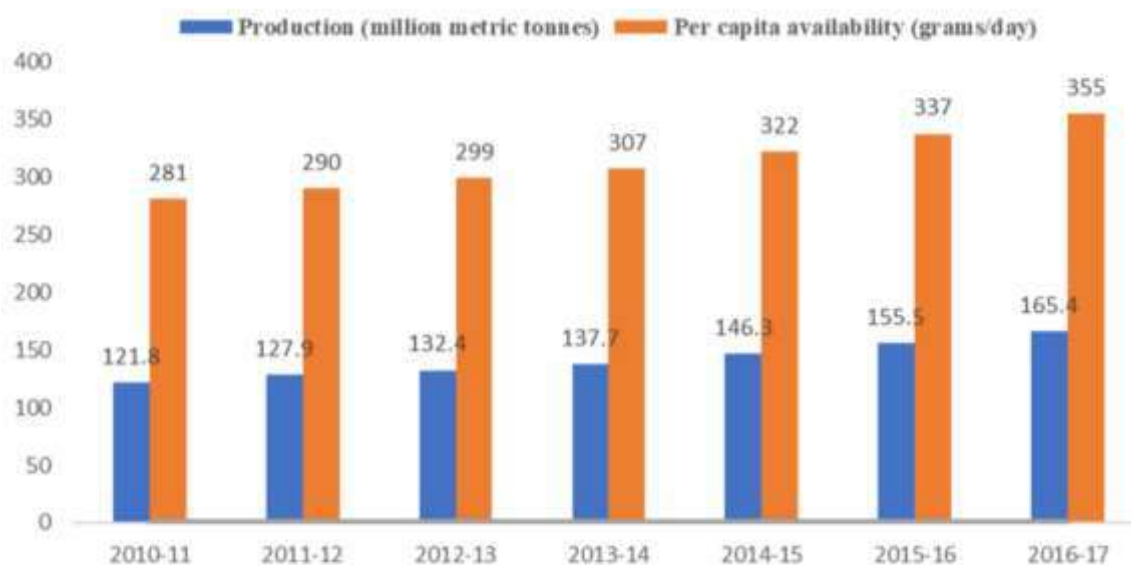
The Indian dairy industry is divided in two sectors; organized and unorganized but most of the milk is procured by unorganized sector such as local vendors and for self-consumption.



Source: Dept. of Animal Husbandry, dairying & fisheries, Ministry of Agriculture & Farmers Welfare, GOI, Annual report (2016-17)

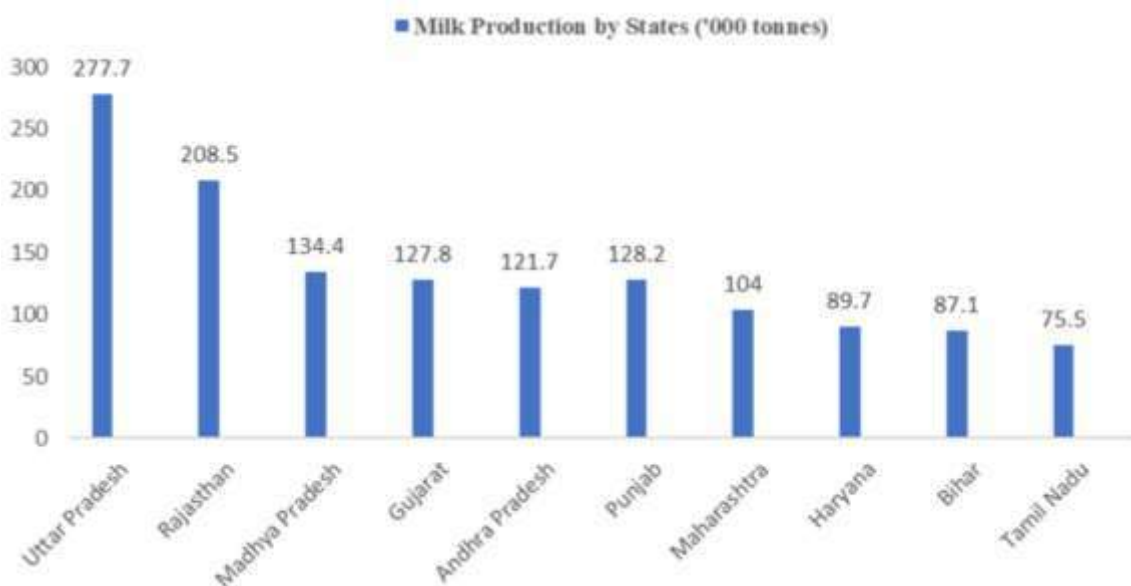
From figure 1 and figure 2. It is clearly visible that milk production and per capita availability is rising per year and Uttar Pradesh, Rajasthan, M.P., Gujarat, Andhra Pradesh are among the top ten states in milk production.

Figure 1. Milk production and per capita availability (year 2010-17)



Source: Dept. of Animal Husbandry, Dairies and Fisheries, Ministry of Agriculture, GoI, 2016-17

Figure 2. Top 10 states in milk production ('000 tonnes).



Source: Dept. of Animal Husbandry, Dairies and Fisheries, Ministry of Agriculture, GoI, 2016-17

In an inauguration of quality milk production workshop, to improve the productivity technologies are adopted under Rashtriya Gokul Mission. Technologies includes embryo transfer technology, creation of facility for sex sorted semen production and genomics selection. A new scheme to strengthen the laboratories in the country for detecting the adulteration in milk has been already approved in 313 dairy plants and a central laboratory for 18 states in cooperative sector. To create trust amongst farmers and consumers, testing for contaminants would be considered at Village level cooperative societies during the next stage of National Programme for Dairy Development. About 80 million rural Indian households are engaged in milk production with very high proportion being landless, small and marginal farmers (The Hindu Business Line, 2019).

To earn extra money in leisure time, the dairy industry plays an important role in agro-based economy of the country and great scope to the rural people. Performing various interim processes such as collection, chilling, transportation, pasteurization, distribution and much more, industry extends from rural area's milk producers to the urban area's consumers. Urban and suburban areas are the main sources of supply of milk which are scattered, low capacitated and independent in the approach. They have no limits to supply the milk continuously for specific time. They can start and stop at any point in the system which later affects the procurement and other procedures. This will be a concern matter in developing and underdeveloped countries which depend on this system of procurement.

SCM literature says "The need of collaboration among successive stakeholders of the supply chain from the producer or grower to end consumers in order to superior satisfaction of consumer demand at the lowest cost (Scott and Westbrook, 1991) (Towill, 1996)".

This study explained the dairy supply chain, especially in developing countries, who defined dairy as comprised the individual or firms which participate in milk production, transportation, processing (packaging & storage) and delivery of milk products to the consumer by adding maximum value at the lowest possible cost.

In the world, the demand of milk has risen, new methods and solutions should be developed to improve the value of milk and its production. Storing milk is the most challenging issue for producer and other trading member in the milk supply chain management. It is said by the researchers that storage circumstances of raw milk can affect the quality, yield, sensory values and shelf life derived dairy products (Ma et al. 2000; Barbano et al. 2006). Kinds of significant changes in the dairy production stages like milk storage during collection on farm side improvement means to extension of shelf life and improve safety which occur due to microbial growth (Hotchkiss, 2006).

2. Review of Literature

The co-operative and private dairy plants in the Salem district of Tamil Nadu has been analysed, based on the primary data of milk and milk products they collected records are collected from one cooperative, one private dairy plant, five transport routes and six chilling plants.

Due to increase in transportation, chilling and reception cost, co-operative dairy plant procurement cost per litre of milk was higher than private plant. According to value chain analysis, products such as peda, khoa and SMP could earn a higher value in the co-operative plant than ice-cream, Mysore and Ghee in the private plant. In toned milk, standardized milk and butter in private plant and in full cream milk, ghee and SMP in co-operative plant marketing margins and marketing efficiency was found higher (Babua,2010).

In 2008, Rangasamy did a study to analyse the efficiency of marketing of co-operative and private dairy plants of Tamil Nadu. To evaluate, Data of 20 of each milk producers, milk collection centres and from transportation routes of cooperative and private sectors. Except toned milk, the marketing efficiency of others products has been down compared to private plants.

The effectiveness of SC practices w.r.t dairy products in Dakshina Kannada dairy were highlighted by Khadar and Sandesha (2016) and observed milk quality, brand image and its loyalty with customer demand.

SLR presented by De Steur, Wesana, Dora, Pearce, and Gellynck (2016) shows the value stream mapping to identify and decrease the waste of food. Authors were coming to an end that a multi-stakeholder collaboration in FSC will be significant for successful action of lean. Investigation done by Bhardwaj, Chandana and Sharma (2017) shows different indicators of performance with factors involved in green inventory network management. Gautam, Virmani, and Singh (2016) found the

effect of marketing activities on Amul's success in Indian dairy industry and found the marketing strategies as critical for firm's success.

Gautham, Virmani, and Singh (2016) found the impact of marketing activities on the success of Amul in the Indian dairy industry and considered that marketing strategies are important for the success of the firm. Due to food traceability and innovation through a contextual study of Sulawesi in Indonesia Parenreng, Pujawan, Karningsih, and Engelseth (2016) investigated the RM issues. In 2016, Deshpande et al. explored the dairy product's market in India. He found that about 50% of dairy products in India are retained for self-consumption, 40% is procured and distributed by unorganized milkmen, and 10% form the organized sector. Further, the international companies and local cooperative organizations consume 55% and 45% of milk produce respectively. Mor et al. (2017) developed a framework for the evaluation of procurement performance in dairy supply chain practices in the context of Indian dairy industry.

Subburaj, Babu, and Subramonian (2015) identified five areas that needs to be focused on improving the operational efficiency of DSC in Tamil Nadu through SWOT analysis:

- The creation of the special dairy zone,
- Implementing dynamic milk procurement process,
- Reinforcing the cooperative societies,
- Creation of feed bank and increasing fodder productivity,
- Integrated animal health plan and information technology.

Banasik et al. (2016) developed a scientific model of waste handling and expressed the energy loss as an environmental indicator in FSC. Sharma et al. (2017) ranked the key performance indicators responsible for implementation of GSCM in Indian dairy sector through extensive literature review and personal interviews.

Handayati, Simatupang, and Perdana (2015) surveyed the FSC practices to identify key coordination issues. Chen, Zhang, and Delaurentis (2014) developed a model to study the 'quality measures' in FSC via a case study and concluded that the decentralized SC lead to distortion in food quality. Behzadi, O'Sullivan, Olsen, Scrimgeour, and Zhang (2017) investigated the effectiveness of robust and resilient strategies along with the profit gain through optimal RM and SC planning decisions.

Mangla, Sharma, and Patil (2016) proposed that it is expected to focus on basic success factors to enhance the execution of FSCM practices. Zubair and Mufti (2015) assessed the Dairy Supply Chain (DSC) risks and found key risks of competition, quality of raw materials, and natural disasters etc.

3. Research Objectives

The aim of the paper is to find the role of supply chain management in the dairy industry and also to analyse the challenges faced by the dairy industry through perspective of supply chain management.

4. Research Questions

- a. What role does supply chain play in the dairy industry and who are the actors involved in the dairy supply chain in Gujarat?
- b. What are the challenges and problems that dairy industry face in applying supply chain management?

5. Research Methodology

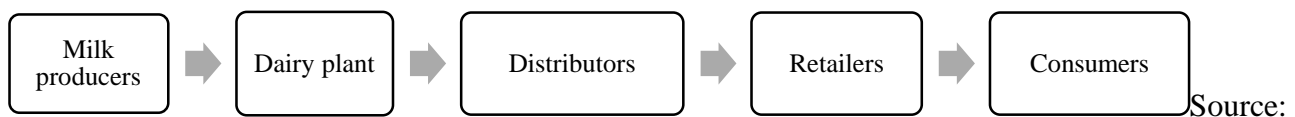
The research is based on secondary data sources. Study based on secondary sources have been collected through various national and international reports regarding dairy industry and supply chain management in India. The articles were searched on various scientific databases like Google Scholar, Open access Journal, Web of Science, Scopus etc. by using the title, abstract field and keyword. Others include government documents, journals, articles, books and various websites.

6. Supply Chain Management in Dairy Industry in Gujarat

Gujarat has numerous cooperative dairy milk unions, private dairy plants, and primary milk cooperative societies, which play crucial roles in the production of milk in the state (The Dairy Times, 2019).

According to figure 3. Supply chain includes mainly five actors where the information and material flow through them and they are milk producers, dairy plant, distributors, retailers and consumers.

Figure 3. Dairy Supply Chain Management in Gujarat



Adapted from different sources, 2019

Supply chain mainly provides materials for dairying such as silage to animals, animal feed plant, and veterinary aids for the animal.

1. Milk is taken out from the milching animal on the daily basis by the dairy farmers (large, medium and small scale farmers).
2. Collection of milk by collection centres.
4. Milk collected are sent to the dairy plants where chilling of milk, processing and packaging of milk and milk product, transportation of milk and milk product is carried out.
5. The transportation of chilled milk and milk products from one place to another is done through the means of refrigerated vans, or insulated milk tankers vans of private, government and cooperatives societies.
6. Final processed milk and milk products are transported to various retail outlets, supermarkets, from where the processed milk and milk products finally reaches to consumers.

Dairy supply chain consists of six activities i.e. production, transportation, processing, packaging, distribution, storage and consumption. It is suggested that dairy sector continuously strive for efficiency due to the price and volume competition in various countries. For this purpose there are five critical issues that might drive changes in dairy sector over next 50 years such as (potential cost of greenhouse gasses, opportunities for biotechnology driven breeding, development of specialized milk, continuous strive for efficiency as commodity value of milk decreases and cost of animal disease eradication) (Creamer, 2002).

7. Challenges and Problems Occur in Supply Chain in Dairy Industry in Gujarat

a. Challenges and problems at the Small Holder Level:

Small holders and marginal farmers are the base of the entire dairy industry in India. Land, labour and capital are deprived of minimum resource and are prime stakeholders in the chain value of milk. Other causes are as follows:

1. Insufficient supply of feed to animals: With the rising human population there is increasing pressure on land resources for cultivation of food crops and fodder crops are not preferred. Also small holders are not able to concentrate on their animals and feed them with a balanced diet of roughage due to lack of financial support.
 2. More disease incidence: Small holders who are not members of cooperatives are often denied good animal health care facilities in the context of routine immunization and prophylactic disease prevention measures. Financial constraints typically inhibit these farmers' access to organized veterinary services and they still rely on piles and traditional treatment methods.
 3. Low genetic potential of animals: Even if the percentage of foreign genes in cross-breed is low, animal reserves also reduce their milk production. Without proper record keeping, indiscriminate artificial insemination occurs which reduces inbreeding and animal production capacity repeatedly.
 4. Lack of chilling capacities: Farmers producing high yields of cattle and buffaloes have a different issue altogether. These farmers feed their animals 2-3 times a day and each time they have to take this milk to distant collection centers where there is a facility of freezing or if the milk goes to waste due to delay.
 5. Exploitation of farmers: Those farmers who do not conform to any of the cooperative societies get exploited at the hands of the contractors of the private dairies with regard to payment of exact dues as per the fat content of the milk.
 6. High production costs: Farmers don't get lucrative valuation because of down market and fluidity of milk prices in comparison of their efforts and maintenance cost.
 7. Delayed payment of dues: The farmers are not only paid less according to the quality of milk but also their payment gets delayed from time to time. This comes in line with the sick and non-performing milk cooperative unions which pass on the perils of mismanagement and marketing losses to these poor farmers.
 8. Lack of trained and skilled workers: There is a shortage of trained and skilled workers, who can hygienically and safely handle milk processing operations.
- b. Challenges and problems at the storage and logistics level:
1. Lack of cold storage facilities: Milk being an extremely putrefied product needs to be processed or cooled as shortly as doable when milking, thus to stop spoilage and contamination. But to confirm this there's a requirement of cold milk silos for storage that aren't given at the village levels.
 2. Gap in the cold chain and transport facilities: There square measure long distances to be covered to achieve bulk milk coolers from the gathering centre. There's a shortage of cold vans and insulated tankers for transportation of the chilled milk to the process plants.
- c. Challenges and problems at the co-operative level:
1. Less number of member farmers: The cooperative model although made has not been able to embrace all the farmers into the fold. There are still several potential farmers WHO use the informal channel of milk sale and delivery.
 2. Lower participation in the decision making process: There is immense govt. interference in several of the co-operative federation activities that ends up in lesser say of the farmers in any crucial problems.
 3. Losses: Poor management of the number of village cooperatives have junction rectifier to very large losses within the trade because of that farmers have lost religion in these entities.
 4. Less price of milk: The co-operatives declare low prices for procuring milk from the farmers that benchmarks the prices and forces totally different players to sell milk at constant prices.
 5. Inefficient services: The cooperatives have conjointly failing in several elements of the country in providing the fundamental inputs in terms of quality feed, exotic germplasm and veterinary services.

6. Insufficient Infrastructure: Some of the co-operatives are lacking the cooling and milk testing facility at the village level assortment centres.
- d. Challenges and problems faced by marketing:
 1. Majority of the Market is still unorganized: The milk market in India still faces the challenge of obtaining organized. The unorganized market makes it competes with the organized market in relevance costs.
 2. Acceptability of the Consumer base: A large fraction of the buyer base in India is nonetheless to just accept the clean and supple milk from organized dairies due higher prices. The mind-set of shopping for recent milk from the delivery boy continues to be current within the Indian customers.
 3. Less penetration to the rural Market: Most of the milk created by the farm co-operatives goes to the urban market. The agricultural shoppers' square measure still hooked in to the informal and unorganized market channels.
 4. Lack of transparent milk pricing System: There is no specific minimum support value of the milk within the system that makes it unprofitable for the farmers.

8. Conclusion and Future recommendations

The study addresses the performance of supply chain management in dairy industry in Gujarat. It is inferred from the study that each actor play an important role from farm till packaging and consumption in dairy supply chain. As consumer demand is high, dairy industries are focusing more on market availability of dairy products. Thus supply chain actors put their effort to make dairy business successful. In future more study should be emphasized on private dairies and their working environment through supply chain perspective.

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