TITLE

A STUDY ON STRENGTHENING THE DISTRIBUTION NETWORK OF DAIRY SUPPLY CHAIN IN INDIA

Author:

SandeepShivane
Assistant Professor,
Department of Management Sciences,
Sree Dattha Institute of Engineering & Sciences,
Ibrahimpatnam,Hyderabad,India

Abstract

India is the world's largest producer and consumer of milk and has the world's largest dairy herd, comprised of water buffalo and indigenous and crossbred cattle. Annual growth in milk production and consumption has been a robust 4.2 percent since 2000, and India has also emerged as a small net exporter of dairy products. Water buffalo and crossbred cattle account for all of the growth in the dairy herd and milk production, but average milk yields remain well below both international standards and those achieved under domestic best practices. Future production prospects depend heavily on productivity gains, primarily through improved breeding and feeding practices, and demand for feeds and improved genetics may offer opportunities for increased trade. India's dairy cooperatives have played a key role in expanding milk and milk-product marketing, and private-sector processors may play an increasingly important role in catalyzing more production of both milk and milk products. India's future role as a trader in dairy products is certain because there is significant scope for future growth in both production and consumption. Recent trade behavior indicates that domestic dairy price stability is a key priority, with policy facilitating either imports or exports depending on domestic market conditions. Most dairy products imported into India are currently subject to certification that source animals have never been fed materials of ruminant origin.

Keywords: Cooperative,credit financingdairy, diary processors,demand –supply,India, private sector, demand –supply,value chain

Introduction

I selected India as a study country. India offers a unique and challenging case study in dairying as it holds the world's second largest population and is the world's largest milk-producing country.

India is the world's largest producer and consumer of milk and has, by far, the world's largest milking herd. Available data indicate that milk production has been expanding at about 4.2 percent annually since 2000, matching growth in demand as higher incomes spur more consumption of fluid milk and dairy products. The dairy sector plays a prominent role in agricultural and food policy because it accounts for about a fifth of the value of India's farm output, and dairy products are a traditional and nutritionally important component of average diets. So far, trade in dairy products has been small relative to production and consumption, with India transitioning from a net importer of milk powder and butter oil up until the early 1990s to a net exporter, primarily of milk powder and casein products, since the early 2000s. With a large but low-yielding milking herd and a large and expanding domestic market, India's dairy sector has the potential for a more significant role as a dairy product exporter and importer. Future prospects for India's role in world dairy markets likely hinge on its ability to improve the low productivity of its milking herd, and on the growth and competitiveness of its emerging dairy product sectors. Key to productivity gains will be the continued expansion of India's relatively high-yielding crossbred dairy herd, along with continued growth in buffalo milk production—now the largest share of milk output. In both cases, output gains are likely to be increasingly dependent on improving now-deficient supplies of feeds and enhancing genetics, both of which may provide opportunities for trade. India's cooperative and private-sector dairy processors have, so far, been successful in meeting growing domestic demand for dairy products. But there is limited information with which to assess the future growth and competitiveness of India's dairy processors, and particularly the relatively nascent private dairy sector. Other factors in the outlook will be the extent to which India's expanding cooperative and private-sector milk-processing enterprises become active in facilitating changes in the current small-scale structure of dairy production, improved animal feeding practices, and gains in productivity and marketing

The Indian dairy industry comprises of two sectors i.e. organized sector comprising of cooperative, private and government milk plants and un-organized sector comprising of milk vendors, halwais, creameries etc. To the much surprise, the organized sector is still processing

less than a quarter of milk production in India, whereas in developed countries this figure is as high as 90%. The states with large proportion of organized processing are Gujarat (49.1%), Maharashtra (40.5%), Karnataka (39.5%) and Tamil Nadu (30.6%). Punjab state having highest milk productivity and highest per capita milk availability, ranks 10th with 10.1 % in organized milk processing. Considering ever increasing demand for quality milk products emanating from increasing urbanization, increasing income levels, changing food habits and increasing health awareness, the level of organized processing of milk need to be enhanced to meet the demand. Dairy in India was once a largely subsistence-oriented occupation intended to produce milk for home consumption. In 1919, a dairy animal census was conducted for the first time by British colonial officials. A report authored in 1937 indicated a sub-optimal rate of milk consumption in the country. It estimated a per capita intake of 7 ounces (200 g) per day (inclusive of all dairy products), which was the lowest among all large dairy countries. Low productivity of dairy animals and widespread poverty were the challenges in increasing dairy production and consumption. Consumption varied by geographic and economic conditions, but was on the whole quite low.

In the 1920s, modern milk processing and marketing technologies were introduced in India. The National Dairy Development Board (NDDB) was founded in 1965. It launched Operation Flood in 1969–70, a programme aimed at modernising and developing the dairy sector using co-operatives. During this period, dairy co-operatives emerged as a dominant force, as a result of the exploitative nature of private milk plants and vendors. Co-operatives were based on the "Anand model" – a three-tier organisational structure comprising (i) village-level co-operative societies (the primary producers), (ii) district-level co-operative producers' unions which collected the milk and operated processing plants, and (iii) state-level federations for marketing. This model was evolved in Anand, Gujarat, having begun there in 1946, and came to be adopted all over the country.

Operation Flood proceeded in three phases. Phase I (1970–1981) focussed on developing dairy production in areas surrounding New Delhi, Mumbai, Kolkata, and Chennai. Phase II (beginning 1986), a larger phase of the project, expanded investment to 147 urban centres across the country Phase III, which continued to the mid-1990s, expanded investment still further, to a number of smaller towns. In addition to investments by the government of India, several phases of Operation Flood were funded in part by the World Bank and European Economic Community.

India has been the world's largest milk producer since 1997, when it surpassed the United States.

(Exhibit 3 about here)

(Table 3 about here)

Milk production amounted to about 187 million metric tons in fiscal year 2019, up from the previous year's 176.3 million metric tons. The milk production in the country had an increase of 6.5 percent over the previous year.

Motivation and Objectives

India's milk production is growing by 35.61% during the last six years to 198.4 million tonnes in 2019-20, says the Economic Survey.

"Milk production in the country has increased from 146.3 million tonnes in 2014-15 to 198.4 million tonnes in 2019-20," the survey said. Compared to 2018-19, it has increased by 5.70 percent according to the government data.

It also added that as per a study on the demand for milk conducted by the National Dairy Development Board (NDDB), the estimated demand for 2030 at an all India level is 266.5 million metric tonnes for milk and milk products.This I believe is a strong motivation to increase the distribution efficiencies of the dairy producers.

When it comes to agricultural value chains that can simultaneously deliver on multiple development goals, few agri-products can rival dairy, which improves farmer livelihoods, creates jobs, supports agricultural industrialization and commercialization, and enhances nutrition for the masses.

One of the four strategies for Creating and Sustaining Value in Dairy is through nailing upstream supply management**.** Perhaps more than any other food product, dairy products' quality depends on upstream factors, from the very first input (the feed given to dairy cows) to supply variability to cold-chain management to shelf life. Yogurt and cheese, as bacteria-based products, are especially sensitive to quality control. When quality slips or fails outright, the impacts are severe and can hurt both consumers and the brand.

The melamine contamination of China's milk supply in 2008 caused six deaths and sickened 300,000 babies. That year, China's leading providers of milk formula saw market share plummet

by as much as 40%. The contamination was largely a result of the country's fragmented and unreliable milk supply. In fact, supply inadequacy plagues many emerging markets. Currently, Southeast Asia must import approximately 60% of its dairy products. Meeting growing demand in the region, as well as in China and India (where demand is projected to outpace supply through 2020), is a major concern.

Sound upstream supply management thus calls for securing a reliable, high-quality supply cost effectively (a special challenge for processors not part of a cooperative).

Dairy companies catering to domestic market primarily

Table 1 about here

Figure 1 about here

The Present Situation in the Dairy Industry

Dairy market in India reached a value of INR 11,357 Billion in 2020.

The launch of operation flood which has made India the largest producer of milk in the world.

Dairy activities form an essential part of the rural Indian economy, serving as an important source of employment and income. India also has the largest bovine population in the world. However, the milk production per animal is significantly low as compared to the other major dairy producers.

Moreover, nearly all of the dairy produce in India is consumed domestically, with the majority of it being sold as fluid milk. On account of this, the Indian dairy industry holds tremendous potential for value-addition and overall development.

Along with offering profitable business opportunities, the dairy industry in India serves as a tool of socio-economic development. Keeping this in view, the Government of India has introduced various schemes and initiatives aimed at the development of the dairy sector in the country.

For instance, the "National Dairy Programme (Phase-I)" aims to improve cattle productivity and increase the production of milk expanding and strengthening and expanding the rural milk procurement infrastructure and provide greater market access to the farmers. On the other hand, the private participation in the Indian dairy sector has also increased over the past few years.

Both national and international players are entering the dairy industry, attracted by the size and potential of the Indian market.

The focus is being given to value-added products such as cheese, yogurt, probiotic drinks, etc. They are also introducing innovative products keeping in mind the specific requirements of the Indian consumers. These players are also improving their milk procurement network which is further facilitating the development of the dairy industry in India. Looking forward, the Indian dairy market is expected to exhibit strong growth during the next five years.

Dairy sector plays a critical role in providing livelihood opportunities to millions of people, largely women, in rural areas. It has an important role to play if the target of doubling farmer's income has to be achieved in near future.

Importance of dairy sector in India

Dairy farming is an important way for farmers to increase their earnings and access to more nutritious food for their families. While subsistence dairy farming provides not only fresh milk and a source of basic income, value-added products, such as yogurt and cheese provide a higher source of revenue. Dairying is an important source of subsidiary income to small/marginal farmers and agricultural labourers. The manure from animals provides a good source of organic matter for improving soil fertility and crop yields. Dairy farming is now taken up as a main occupation around big urban centres where the demand for milk is high.

Milk Consumption

Milk consumption levels are not uniformly distributed across India. The people of northwest India are significant consumers; northeasterners consume less. States with higher consumption of meat and eggs are noted to have lesser consumption of milk, as dairy products are one of the few sources of protein for vegetarians. Milk has an income elasticity of demand greater than unity: consumption increases as income levels rise.

Per capita consumption of milk over 30 days was 4.333 liters (1.145 US gal) for rural households and 5.422 liters (1.432 US gal) for urban households as of 2011–12.The corresponding monthly expenditure was ₹116.33 for rural and ₹186.47 for urban consumers respectively.

As of 2018, fluid milk consumption was projected at 67.7 million tonnes, and was growing at a rate of 6–7 million tonnes annually. Ghee is the most consumed among value-added dairy products. Demand for non-fat dried milk (NFDM) and butter was projected to be 600,000 tonnes

and 5.6 million tonnes respectively. Demand for pasteurised milk produced in the formal (organised) sector has been increasing, probably due to its perceived safety over the milk produced in the unorganised sector.

Packaged milk

According to estimates, about 25% of the total milk produced undergoes commercial processing, of which about 70% is sold as packaged milk while the remaining 30% is used for preparation of dairy products. Packaged milk is typically pasteurised milk, and is usually a mixture of cow milk and buffalo milk since most dairies do not have separate collection systems for them. It is sold in variants on the basis of the fat content.

(Table 2 about here)

Companies Mentioned

- Gujarat Co-operative Milk Marketing Federation Ltd
- Mother Dairy Fruits & Vegetables Pvt Limited
- Karnataka Co-operative Milk Producers Federation Limited
- Rajasthan Cooperative Dairy Federation Ltd (RCDF)
- Tamil Nadu Cooperative Milk Producers Federation Ltd (TCMPF)
- Punjab State Cooperative Milk Producers Federation Ltd (MILKFED)
- Orissa State Cooperative Milk Producers Federation Ltd (OMFED)
- Maharashtra Rajya Sahakari Dudh Mahasangh Maraydit (Mahasangh)
- Bihar State Co-operative Milk Producers Federation Ltd. (COMFED)
- Haryana Dairy Development Cooperative Federation Ltd. (HDDCF)
- Madhya Pradesh State Cooperative Dairy Federation Ltd. (MPCDF)
- Pradeshik Cooperative Dairy Federation Ltd (PCDF)
- Nestle India Limited
- Hatsun Agro Product Limited
- Tirumala Milk Products Pvt Ltd.
- Milk Food Limited
- Heritage Foods India Limited
- VRS Foods Limited
- Bhole Baba Dairy Industries Ltd.
- Kwality Ltd.

- Sterling Agro Industries Limited
- Parag Milk Foods Limited
- SMC Foods Limited

Key Facts of Indian Dairy

- Ranks 1st in world milk production (115 million metric tons)
- Value of milk output from livestock (at current price) is around INR 2400 Billion
- Value of dairy products market is around INR 4000 Billion
- Only 5 per cent of the milk is sold through retail chains
- 65 - 70 per cent is delivered to the homes by milk agents
- Carton milk or packaged milk has been growing at 24 per cent annually

Supply chain of Indian Dairy Industry

Steps are:

1. Supply of inputs for dairying in form of fodder, animal feed plant, vetenery aids for the animal (cattle and buffalos).
2. Milk is taken out from the mulching animal on the daily basis by the dairy farmers (large, medium and small scale farmers).
3. Collection of milk by collection centres (various milk cooperatives societies).
4. Milk collected by the cooperative societies 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 retails outlets, supermarkets, and to retails markets from where the processed milk and milk products finally reaches to their end customers.

Issues and challenges in value chain of dairy industry

Issues and Challenges at the Procurement stage

1. Meeting seasonal spikes in demand and ability to measure the quality of procured milk at the source.

2. Complex logic of payments to producers based on fat, solid non-fat (SNF) and quality of milk received.
3. Keeping track of truck and tanker routes, as well as capabilities for viewing, monitoring and payment based on route or distance.
4. Visibility into the shelf life and stock-outs of raw material.

Issues and challenges at the Storage and Logistics stage Level

1. Lack of cold storage facilities
2. Gap in the cold chain and transport facilities.

SWOT Analysis of the value chain in Dairy industry

Strengths

· Enhanced milk production with consequently increased availability of milk processing.
· Improved purchasing power of the consumer.
· Improved transportation facilities for movement of milk and milk products. Increased availability of indigenously manufactured equipment.
· Large number of dairy plants in the country.
· Vast pool of highly trained and qualified manpower available to the industry.
· Country's vast natural resources offer immense potential for growth and development of dairying.

Weaknesses

· Lack of appropriate technologies for tropical climate conditions.
· Erratic power supply.
· Lack of awareness for clean milk production.
· Underdeveloped raw milk collection systems in certain parts of the country.
· Seasonal fluctuations in milk production pattern.
· Regional imbalance of milk supply.
· Species-wise variation in milk quality received by dairy plants.
· Poor productivity of cattle and arable land.
· Scarce capital for investment in the dairy development programmes on a priority basis.
· Absence of proper data records which is essential for preparing development programmes.
· Dairy development programmes have not been fully implemented as per the needs of the region in different agro-climatic zones.

- Lack of marketing avenues for the dairy produce.
- Non-availability of software for preparing needed dairy schemes/projects.
- Lack of infrastructure for offering Dairy Business Management programmes to train dairy personnel.

Opportunities

- Greatly improved export potential for milk products of western as well as traditional types.
- Expanding market for traditional dairy products.
- Increasing demand for fluid milk as well as value added products.
- Byproduct utilization for import substitution.
- Employment generation.
- Growing demand for milk and milk products.
- Liberalized polices in dairy sector.
- Availability of large resources of unconventional feeds and fodders.
- Availability of diverse germ plasm with unique features like heat tolerance, disease resistance, draftability and ability to survive and produce under stress conditions.
- Availability of animal production technologies for faster development and effective implementation.
- Integrated structure of marketing for milk and milk products.
- Integrated structure of livestock marketing through regulated markets.
- Improved collection of data on contract basis through agencies.
- Market information intelligence system for milk and milk products.
- Development of software for project formulation for dairy enterprise.

Threats

- Introduction of foreign products in Indian market.
- Increasing chemical contaminants and residual antibiotics in milk.
- Poor microbiological quality of milk.
- Export of quality feed ingredients particularly cakes under the liberalization policy.
- Deficiency of molasses, a rich source of energy and binding agent in feed industry and constituent of urea molasses mineral lick.
- Excessive grazing pressure on marginal and small community lands resulting in complete degradation of land.

· Extinction of the indigenous breeds of cattle due to indiscriminate use of crossbreeding programme to enhance milk production.

· The liberalization of the dairy industry is likely to be exploited by multinationals. They will be interested in manufacturing value added products. It will create milk shortage in the country adversely affecting the consumers.

Data Collection

Figure 2 about here

Figure 3 about here

Figure 4 about here

Recommendations for enhancing the efficiencies of value chain:

1. Finance should be made more widely available. More than half of the farmers borrow credit both from within and outside the chain for da irying related activities. Chain-based financing is restricted to only one-fourth of the borrowers and mostly to those associated with informal value chains.
2. Financing by commercial banks and other financial institutions is limited to only 9 percen t of the borrowers, mainly larger farmers. The socially-disadvantaged and smallholder farmers are often neglected in institutional lending becaus e of their lack of physical assets to use as collateral against loans.
   (Exhibit 1 About here)
3. The role of MNCs should be enhanced .A considerable proportion of the dairy farmers sell milk to the formal sector and are associated with formal value chains. Within the formal sector, cooperatives emerge as the most preferred channel in terms of both sales and suppliers. Private domestic processors stand next to cooperatives. MNCs have a smaller share in the marketed surplus; only a minor percent households sell milk to MNCs. In the informal sector, vendors and consumers share the rest of the marketed surplus almost in equal proportion.
   (Exhibit 3 about here)

4. It is often argued that formal value chains exclude small producers because of the higher cost of contracting with a large number of them. Research results indicate that a majority of the dairy farmers, irrespective of the scale of production, are associated with the formal value chains, although the proportion of such farmers is less among smallholders. A majority percent of the milk sales of small dairy farmers are accounted for by the formal sector buyers as compared to a larger percentage by the large dairy farmers. Cooperatives remain the most important channel for all categories of dairy farmers. For small dairy farmers, informal buyers—that is, vendors and consumers—are next important, in that order. More percent of the households selling milk to consumers, and a high percent of the households selling milk to vendors, are small dairy producers. However, they do not seem to be excluded from the formal value chains, as more than half of the dairy farmers associated with cooperatives, private domestic processors, and MNCs have a herd size of five animals or fewer. This is contrary to the perception that formal value chains, particularly those driven by private domestic processors and MNCs tend to exclude small-scale producers. Note that by involving smallholders in their value chains, formal sector buyers spread procurement risk that otherwise could be higher if they were to depend solely on a few larger farmers.

   Therefore a greater participation by the small farmers is recommended

Future of Dairy Industry in India & Conlusion:

The future of dairy in India hinges on modernizing infrastructure, and giving the sector a technological face-lift

Crises also present opportunities for reform. The Central Government has, through a series of initiatives, ushered in reforms in various sectors, including agriculture. The backdrop of Covid-19 has provided stakeholders an opportunity to reorient the thinking on dairy. For this to happen, there will be changes required, definitive action, and a different growth trajectory for the industry, notwithstanding the fact that, today, India is the largest milk producer in the world.

The livestock sector—within it, dairy—needs to play a larger role in the prime minister’s goal to double farmer’s income by FY23. Further, promoting dairy will also lead to a more equitable income, and this aspect needs to be appreciated. Milch animal holding is far more equitable than

land holding. About 85% of the total farmers are small and marginal. While they together own about 47% of farmland, they own about 75% of milch animals. The productivity of milch animals in India is around one-eighth of the global average. Land prices in India are very high, which makes running large dairy farms unviable. So, dairy farming in India will continue to be dominated by small and marginal farmers.

Tables, Exhibits and Figures

Dairy companies catering to domestic market primarily

Table 1

Name Of Organization	Email	Tel. No. / Fax
National Dairy Development Board, PB No. 40, Anand 388 001, Gujarat	rs@nddb.coop abhijit@nddb.coop anand@nddb.coop	(+91) 2692- 260148 /260149 /260160 Fax: (02692) 260157
Nestle India Ltd. Nestlé House Jacaranda Marg, M Block DLF City Phase II Gurgaon, Haryana 122 002 Mr. Mayank Trivedi, Sr. Vice President	mayank.trivedi@in.nestle.com	(+91)-124 238 93 00 Fax: (+91)-124 238 94 11/ 238 9399
Rajasthan Co-Operative Dairy Federation Limited, Saras Sankul, Jawahar Lal Nehru Marg, JAIPUR, Rajasthan	rcdfho_jp1@sancharnet.in	(+91) 141-2702501-8, Fax: (+91)-141-2702537

The Punjab State Cooperative Milk Producers' Federation Ltd. SCO 153-55, Sector 34-A Chandigarh -160022	milk-hod@chd.nic.in, rti-milkfed@chd.nic.in	(+91)-172-5041812-813-814-815 Fax: +91-172-2604302/ 5041856
Tamilnadu Co-operative milk producers' Federation Ltd., Aavin Illam, Madhavaram Milk Colony, Chennai 600051	mdaavin@satyam.net.in, info@aavinmilk.com	(+91) 44-23464500-501-502 Marketing: (+91) 44-23464508 Fax: (+91) 44 23464505
Andhra Pradesh Dairy Development Cooperative Federation Ltd. Lalapet, Hyderabad 500017	apddcf@hd1.vsnl.net.in	Ph: (+91) 40 27019097-851-171-671, Chairman – (+91) 40 27019402/ 27019414 MD - (+91) 40 27019233 Fax: (+91) 40-27019938

Name Of Organization	Email	Tel. No. / Fax
Heritage Foods (India) Limited. 6-3-541/C, Panjagutta Hyderabad - 500 082 Mr. J. Sambamurthy (Head Sales & Marketing)	hfil@heritagefoods.co.in jsmurthy@heritagefoods.co.in	(+91) 40-23391221/222 Fax: (+91) 40 - 23318090 (+91) 9392645999 (Mobile)
Lotus Dairy Products Pvt. Ltd. 1, District Shopping Centre, 3rd Floor, Madhav Plaza, Opp. J. P. Phatak, Sahakar Marg, Jaipur 302015 Mr. D.D. Verma is Director	lotusdairy@yahoo.com lotus.dairy@yahoo.co.in	(+91)-141-2741373 (+91) 9829258060/61 (Mobile) Fax: (+91)-141-2742307

Source: HS&SL

Note: The above list is not exhaustive.

The Kerala Co-operative Milk Marketing Federation Ltd. "Milma Bhawan", Pattom Palace P.O., Thiruvananthapuram – 695004, Kerela	md@milma.com milma@milma.com kcmmf@milma.com milma@md2.vsnl.net.in	(+91) 471 – 2555981 to 2555985 Fax: (+91) 471 - 2555992
Maharashtra Rajya Sahakari Dudh Mahasangh Maryadit NKMM International House, 3rd Floor, 178 Backbay Reclamation, B M Chinai Marg, Mumbai 400020	mahafed@bom3.vsnl.net.in	(+91) 22 26856360/ 61, 65962685 GM (Mktg) - (+91) 22-26856379 Fax: (+91) 22-26856780, 26858375
M.P. State Cooperative Dairy Federation Limited, Dugdha Marg, Dugdha Bhavan, Habibganj, Bhopal: 462024 Ms. Shikha Dubey – MD Mr. R.P. Bilung – GM (Mktg)	mpcdf@sancharnet.in	(+91)-755- 4253972-5 MD - (+91)-755-2602145 GM (Mktg) - (+91)-755-2680400-3 (PBX – 312) Fax (+91)-755-2583149

Pradeshik Cooperative Dairy Federation Ltd. 29 Park Rd, Lucknow 226001	pcdf1@satyam.net.in	(+91) 522 2236466/ 75, Fax: (+91) 522-2266472
The Orissa State Cooperative Milk Producers' Federation ltd. D-2, Saheed Nagar Bhubaneswar-751007 Mr. Basant Kumar Mishra – DGM(Mktg)	omfed@yahoo.com	(+91) 674-2544576, 2546030, 2546121, 2540417, 2540273 Fax- (+91) 674-2540974

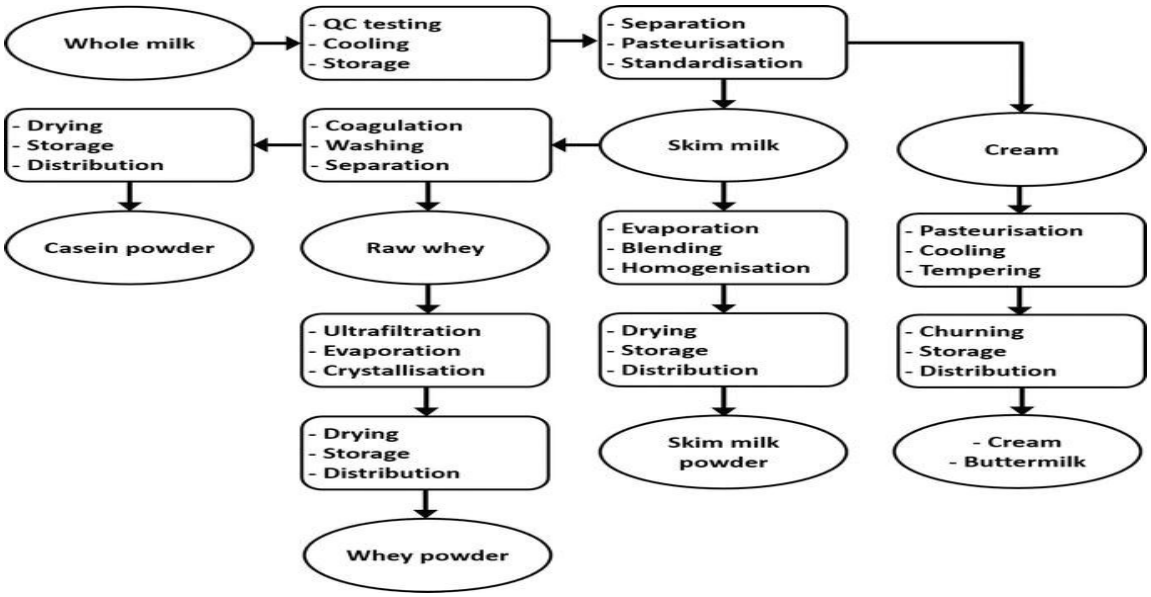


Figure 1

Variant	% fat	% solid-not-fat (SNF)
Full cream milk	6%	9%
Standardised milk	4.50%	8.50%
Toned milk	3.00%	8.50%
Double toned milk	1.50%	9%
Skimmed milk	0.50%	8.70%

Table 2

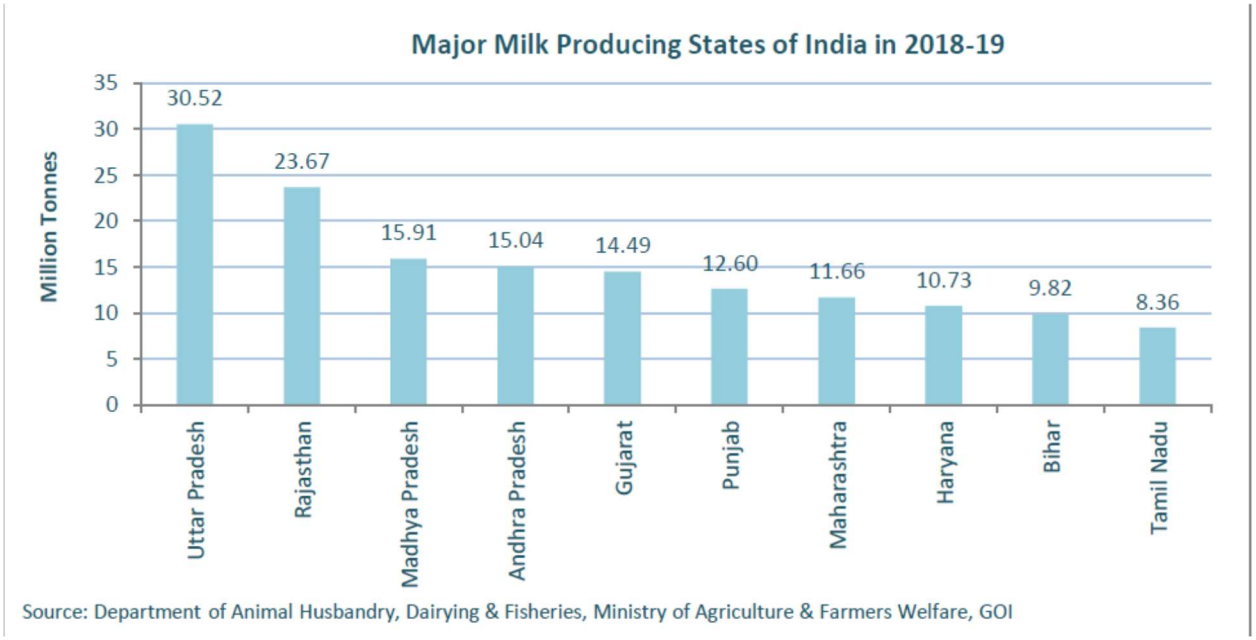


Figure 2

No of the dairy cooperative societies:

Regions	1980-81	1990-91	2000-2001	2010-11	2018-19
North	2696	22,126	31,977	52,911	66,795
East / North-east	702	4364	7113	16,328	34,154
West	5957	18,580	32,446	42,697	50,951
South	3949	18,345	24,670	31,190	38,616
Total	13,284	63,415	96,206	1,43,126	1,90,516

Producer Members

Regions	1980-81	1990-91	2000-2001	2010-11	2018-19
North	163,000	1239,000	1666,000	2376,000	3114,000
East / North-east	23,000	223,000	422,000	946,000	1756,000
West	852,000	2,614,000	3,805,000	5,109,000	5,799,000
South	709,000	3406,000	4851,000	6033,000	6261,000
Total	1,747,000	7,482,000	10,738,000	14,464,000	16,929,000

Figure 3

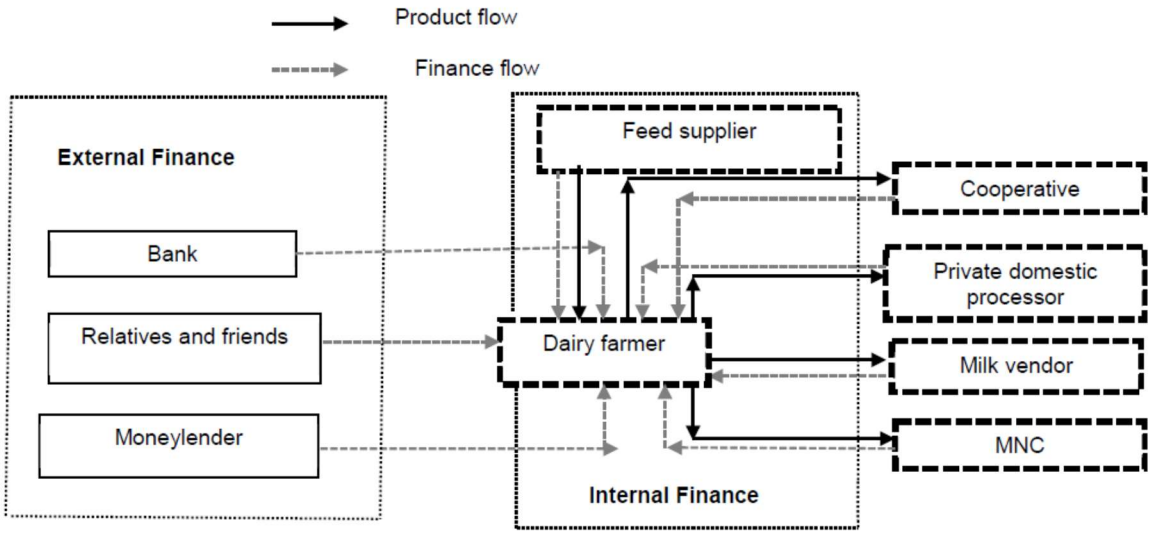
Milk Procurement (in kg/per day)

Regions	1980-81	1990-91	2000-2001	2010-11	2018-19
North	310,000	1,259,000	2,890,000	3,741,000	5,624,000
East / North-east	34,000	200,000	642,000	1,666,000	2,871,000
West	1577,000	5,246,000	7,897,000	12,862,000	28,098,000
South	641,000	2,997,000	5,075,000	7,932,000	14,175,000
Total	2562,000	9,702,000	16,504,000	26,202,000	50,769,000

Top five states in terms of procurement – (kg per day / 2018-19)

State	Procurement in Kg/Day
Gujarat	22,920,000
Karnataka	74,75,000
Maharashtra	3,998,000
Tamil Nadu	3,381,000
Rajasthan	2,791,000
Total	40,565,000

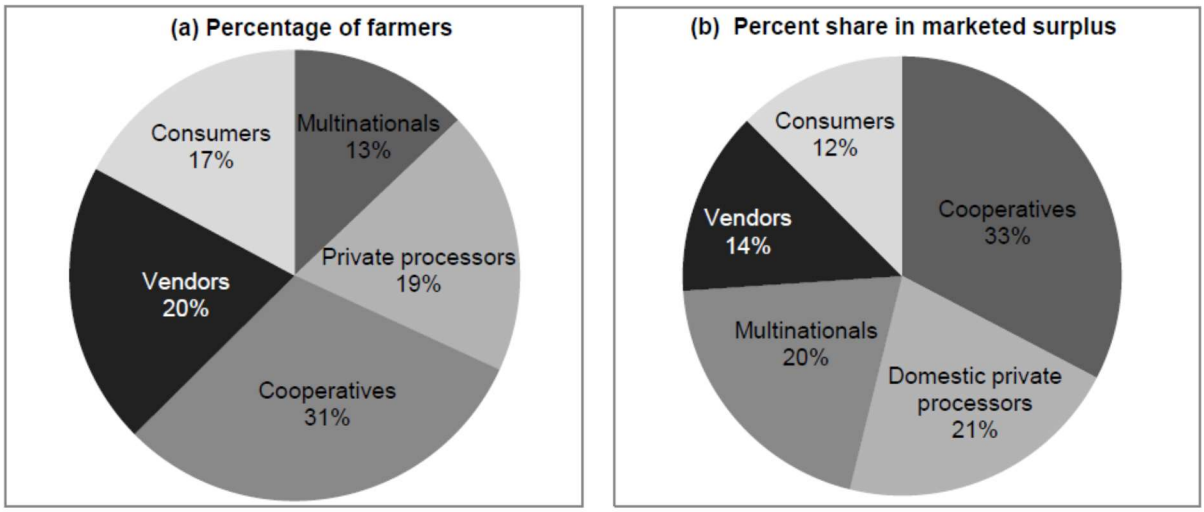
Figure 4



Source: Authors.
Note: MNC = multinational companies.

Product and FinanceFlow in Dairy Sector in Punjab-one of the States of India

Exhibit 1



Distribution of farmers and milk sales to different Value Chains

Exhibit 2

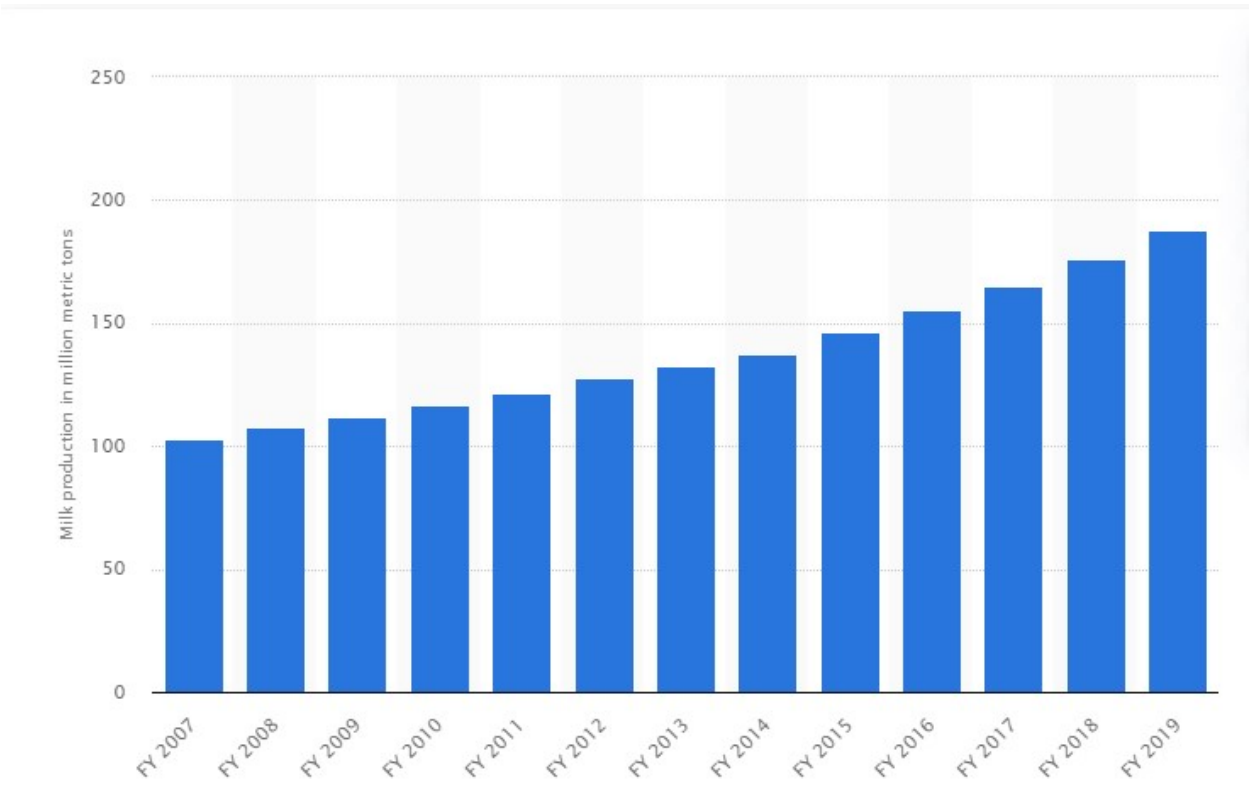


Exhibit 3

Financial Year	Million metric tons
2007	102.6
2008	103.9
2009	112.2
2010	116.4
2011	121.8
2012	127.9
2013	132.4
2014	137.7
2015	146.3
2016	155.5
2017	165.4
2018	176.3
2019	187.7

Table 3

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