

Original Article

## Emerging Dairy Value Chain and Challenges in Global Economic Era

Shiv Raj Singh\*, K. K. Datta\*\*, Arijit Mukherje\*\*\*

### Abstract

Policies in 1990s calls towards liberalisation and globalization make a dramatic shift towards structural transformation. Under such situation, how we can make strategy, preferring a short-term reactive approach over a more coherent long term sustainable approach towards inclusive growth which was emphasized during the existing Plan periods. Dairy sector has the capacity to reduce poverty and to reduce income inequality at the household level. Indian dairy sector has shown tremendous growth in terms of milk production, from 17 million tones (1950-51) to 132.4 million tones (2012-13). To enhance the dairy sector profitability, there is need to put more stress on value addition. To augment value addition in Indian dairy sector policy makers undertaken different policy changes in the post-liberalized era. But MMPO-1992 was introduced in post liberalised era to protect the interest of the cooperative as well as domestic small and medium size dairy plants. This amendment was one of the major policy changes to protect the interest of different stakeholders. Overall growth of dairy sector during the last two decades has been impressive. To restore the value addition in product and to harnessing the consumer market the involvement of organized sector is very much important. As per the finding of study value added products namely butter, cream, *ghee*, cheese and curd were found to dominate the value chain apart from the manufacture of pasteurized liquid milk in organised dairy sector. The mechanics of the organized sector penetration could be agency-specific as also area-specific. Need of the day is to provide quality input and output support services as provided by the co-operatives (Amul model at Gujarat, Nandani Milk Federation at Karnataka Model), private sector (Nestlé) and contract dairy farming. The scale up or success of each of these models depends upon the value added process which has the potential to satisfy dairy's inherent complementary nature of farm inputs, resources and institutional components.

### Author Affiliation

\*Assistant Professor, Shri G.N. Patel Dairy Science & Food Technology College, SDAU, S.K.Nagar, Gujarat.

\*\*Head and Principal Scientist, Dairy Economics, Statistics and Management Division, National Dairy Research Institute, Karnal-132 001, Haryana. \*\*\*M.Sc student from NDRI, ERS, Kalyani, West Bengal.

### Reprint Request

K. K. Datta

Head and Principal Scientist, Dairy Economics, Statistics and Management Division, National Dairy Research Institute, Karnal-132 001, Haryana.

E-Mail:  
kkdatta2007@gmail.com.

### Introduction

Dairying is an important activity in Indian economy contributing about 27 per cent of the agricultural gross domestic product (GDP) and around 4.35 per cent of the national GDP (CSO, 2007-08). The total milk production has increased from 48.40 million tonnes in 1988-89 to 132.4 million tonnes in 2012-13 (DAHDF, 2013-14). This transition from deficiency to sufficiency has been achieved by a series of policy interventions by the government. It has been found that in the first phase of 'operation flood', growth rate of value-added products was 0.93

per cent per annum, but in the third phase, it became 9.10 per cent per annum (Singh & Datta, 2010). Milk processing in India is around 35 per cent, of which the organized dairy industry accounts for only 13 per cent of the milk produced, the remaining 22 per cent is processed in the unorganized sector. At production front around 70 per cent of dairy animals were reared by the smallholders and they owned about 52 per cent of landholdings (NSSO, 2003). To augment value addition in Indian dairy sector policy makers undertaken different policy changes in the post-liberalized era. Policy changes was due to the growing pressure of competition from global players

in the dairy sector, the tightening of the WTO Agreements as well as the anomalies in the license structure, the government made an amendment (in the year 1999) in the MMPO in 1992. The amendment allowed the dairy players to setup dairy processing units wherever and whenever they want to. MMPO-1992 was actually introduced in India to protect the interest of the cooperative as well as domestic small and medium size dairy plants. So, this amendment is one of the major policy amendments in the Indian dairy sector from government front in the post liberalized period. Overall growth of dairy sector during the last two decades has been impressive. A set of government policy which created suitable price environment for domestic milk production, is believed to be the key behind this impressive growth.

In this background this paper addresses the following issues: What are the opportunities and challenges for smallholder producers in dairy value chain? Whether organised supply chain and institutional arrangement play important role to shape the value chain system? What are the different alternative policy options to scale-up the sustainable supply chain system? What kind of policy and institutional changes are necessary, so that it may scale up the dairy value chain in FDI era?

### Data and Methodology

The study is based on secondary data collected from different reports of National Sample Survey Organization (NSSO). Secondary data also collected from different dairy companies and Annual Survey

of Industries (2010-11). To answer the different policy issues related to dairy supply chain primary data was collected from different parts of India. In this paper other studies (carried out at DESM Division of NDRI) also refer to look at the modern supply chains in dairy sector. Tabular and Gini coefficient analysis was used for data analysis.

### Results and Discussion

This section examines a range of different successful value chain models that have emerged and developed in India. They include government, cooperative and private business initiatives with special focus on dairy value chain. Using the different primary and secondary data this section examines modern and traditional value chains with respect to the questions poised above.

*Descriptive analysis of the dairy sector focuses on opportunities and challenges for the smallholder producers*

Secondary data collected from Situation Assessment Survey of Farmers, NSSO 59<sup>th</sup> round, Ministry of Statistics and Programme Implementation, New Delhi, and NSSO 62<sup>nd</sup> round were assessed. It was found that marginal and small category of farmers in dairy farming formed 58% of all holdings, but accounted for as much as 71% of the in-milk bovine stock in 2002-03. The marginal category in the in-milk bovine population increased from 20% in 1971-72 to 31% in 1981-82, then to 44% in 1991-92, and finally to 52% in 2002-03 (Table-1). Changes in the stock of in-milk buffaloes per 100 households by category of

**Table 1:** Structural Changes in the operational holdings and *in-milk* bovine from 1971-72 to 2002-03 in India (No. in Millions)

Category	Distribution of in-milk bovine*				Distribution of operational holdings			
	1971-72	1981-82	1991-92	2002-03	1971-72	1981-82	1991-92	2002-03
Landless	2.49 (8.10)	1.27 (4.94)	1.22 (2.90)	0.32 (0.88)	15.59 (27.41)	18.11 (26.10)	20.35 (21.79)	32.46 (31.90)
Marginal	6.18 (20.08)	7.99 (31.15)	18.50 (43.91)	19.19 (52.03)	18.73 (32.93)	28.53 (41.11)	45.11 (48.30)	47.98 (47.15)
Small	5.99 (19.46)	4.83 (18.83)	9.15 (21.72)	7.21 (19.56)	9.36 (16.46)	10.06 (14.50)	13.26 (14.20)	11.45 (11.25)
Semi-medium	6.75 (21.94)	5.45 (21.24)	7.25 (17.21)	5.37 (14.55)	7.34 (12.90)	7.36 (10.61)	9.06 (9.70)	6.39 (6.28)
Medium	6.55 (21.27)	4.63 (18.06)	4.67 (11.09)	3.73 (10.11)	4.61 (8.10)	4.37 (6.30)	4.58 (4.90)	2.96 (2.91)
Large	2.81 (9.14)	1.48 (5.79)	1.34 (3.18)	1.06 (2.88)	1.25 (2.20)	0.97 (1.40)	1.03 (1.10)	0.51 (0.50)
All	30.78	25.65	42.12	36.89	56.88	69.4	93.39	101.75

Source: Singh & Datta (2013);

Note: Figures in Parenthesis is the percentage of all; \*Bovine= Cattle and Buffalo

household operational holdings and the percentage of “in-milk” cattle and buffaloes to respective total stocks was studied from 1971 onwards and it was found that there has been an increase in the use of buffaloes in dairy farming (Singh & Datta, 2013). Distribution of land, dairy animals and farmers in different regions (northern, southern, eastern and western) of India was also studied and it was found that the eastern and northern regions together constitute over fifty percent of land, dairy animals, as well as farmers. The percentage distribution of land, dairy animals and farmers among different categories of farmers across different regions was also studied. The landless and marginal dairy farmers, constituting over seventy percent of all dairy farmers in the country, were found to own over sixty percent of all dairy animals (NSSO, 2003).

To study the production system and supply chain, *Haripal block of Hooghly district* of West Bengal was selected as it has the highest cross bred cattle density. Dairy farmers are generally keeping crossbred cattle and this area is producing significant amount of milk per day. They are selling the milk in different points (Table-2). Main proportion of milk is sold to *sweet making* shop on daily basis. In organised sector, milk collection centre of AMUL is one of milk marketing channel in the study area. *Sweet making* shops are giving money to the dairy farmers generally on weekly basis whether AMUL is paying cash on spot. Still they prefer *sweet making* shops for selling their milk for several reasons: on the occasions and festivals when demand of milk become higher, those shops are giving them more price; there is the myth working within them from their ancestors to sell the

milk generally to households on the nearby towns or to sell them to sweet making shops; semiliterate dairy farmers are still not habituated with the system of *two axis pricing* of milk on the basis of *fat* and *SNF* percentage rather pricing system on the basis of quantity. Each dairy farmer is also keeping a certain portion buffalo within its herd. They are getting marginal higher price from AMUL by selling buffalo milk there. But there is the trend of keeping only *in-milk* buffalo as the maintenance cost of dry buffalo is quite higher as compared to cattle. When milking period of the buffaloes are over, those are sold to the agents on an average of Rs. 8000-10000 less than the price of buying.

To study the supply chain of respective state, data was collected from 24 Parganas District (North) of West Bengal, there are 4 main milk processing plants, namely *Metro Dairy*, Barasat (maximum capacity-5 lakhs litre/day); *Medow Food Product Pvt. Ltd.*, Bamungachi, Barasat; *Ichhamati milk producers Union Ltd.*, Berachapa, 24 PGS (N) (Maximum capacity 45000-50000 liters/day) and *Nest Dairy Farm*, Kathalberia, Barrackpore (maximum capacity 50000-60000 liters/day) in this district. There are also 3 major milk chilling plants which are: *Ichhamati*, *Red Cow* and *Amrit Fresh* in this district. Besides this, 50-60 *small chilling plants* are also located in this district. These major and minor chilling plants are always maintaining the balance sheet of demand-supply by charging different rates as per their controlling mechanism of milk producers and also dictating their terms and condition by diluting the cooperative norms. Within the cooperatives this direction was continuing as no professional players are involved to follow the cooperative norms.

**Table 2:** Milk Disposal Pattern in West Bengal (2013)

Type of Farmers	To whom the milk is sold (in Kg/day)			Total
	Sweet Making Shops	Middlemen	Agency (Amul/Mother Dairy)	
Large Farmers	626 (71.51)	213 (22.14)	65 (6.34)	899 (100)
Medium Farmers	204 (44.46)	208 (40.65)	68 (14.88)	480 (100)
Small Farmers	95 (36.82)	116 (44.96)	47 (18.22)	258 (100)

Source: Socio- economic survey data (2013); Large- more than 20 milch animals, Medium- Up to 20 milch animals, Small- up to 10 milch animals;

Note: Figures in parentheses indicate percentage to total.

*An overview of dominant dairy value chains and institutions in selected regions of India*

Annual Survey of Industries (2010-11) data was used to identify the dominant supply chain in organised dairy industry. For this purpose all

industrial units were classified in to the four parts i.e. public, private, cooperatives and other enterprises. As per the recent data (Table-3) it is clearly reflected that co-operative sector is one of the major supply chain (50.80 % GVA i.e., Gross Value Addition) in

terms of operational ownership. Whereas, second largest supply chain is private sector (21.01 % GVA). Third largest supply chain is under the public sector enterprises (19.37 % GVA). If we look at the dominance in terms of fixed asset (33.58 %) formation then also cooperative sector is one of the major supply chains. Similarly, public and private owned dairy organizations have 32.49 and 25.93 per cent fixed capital formation of organised dairy industry. So, fixed capital formation has been more or less same in these dairy organizations. If we look percentage share of each organization within the organised dairy industry then it shows that cooperative sector (53.04 %) is the major organization among all other organizations. Whereas, the finding of study private sector owned organizations are handling around 22.31% of milk used in organised sector. At the same time public sector organizations are dealing with 16.62% of milk. Moreover, cooperative organisations overall one of the major organization in terms of GVA, fixed capital formation and milk handling in organised supply chain. As these are the major determining factors for any supply chain

management. So, dairy supply chain in organised sector is dominated by cooperative organizations. Gini coefficient of the milk used in the organised dairy industry shows that in cooperative organization there is more inequality (0.789) in comparison of private (0.763), public (0.709) and other (0.669) organizations. As within cooperative sector "AMUL" is one of major organization in Gujarat. In AMUL model famers are getting around 80% shares of consumer rupees. Similarly, in other state cooperative also famers are getting relatively higher share in consumer rupees. But, there penetration in northern and central part of India is not satisfactory. Therefore, it is provide a lot of scope for private and public sector. Therefore, in smallholder dairy farming system cooperative organization is one of the good propositions but where their penetration is not good especially in terms of milk collection from farmer's private and public sector organizations should take a lead. As in post-liberalised era private sector transform dairy processing sector by creating efficient supply chains management.

**Table 3:** Fixed Capital, Quantity of Milk used and Gross Value Addition (GVA) across the Organised Dairy Industry (2010-11)

Type of Organization	Fixed Capital (%)	Quantity of Milk used (%)	Gini Coefficient of quantity of milk used	GVA (%)	Fixed Capital (%)
Public Limited Company	25.93	16.62	0.709	19.37	25.93
Private Limited Company	32.49	22.31	0.763	21.01	32.49
Co-operative Society	33.58	53.04	0.789	50.80	33.58
Others	8.00	8.03	0.669	8.81	8.00

Source: Authors' estimates based on unit level data of ASI (2010-11).

Others: Individual Proprietorship, Joint family, Partnership, Govt. Departmental Enterprise, Public Corporation by Special act of Parliament/ legislator/PSU, Khadi & village industries commission, Handlooms and Others (incl Trusts, wakf board, etc).

To access the performance and challenges of different dairy supply chain under the ownership of cooperatives and private sector primary data and secondary was collected from Karnataka Milk Federation (KMF), GCMMF (AMUL), Nestle and Mother Dairy, New Delhi. Finding of study is helpful for us to know the management of supply chain in respective ownership.

The most important supply chain in Southern region was Karnataka Milk Federation (KMF). It has been supporting the livelihood of about 2.06 million milk producer members including 4.5 lakh women, covering 20,497 villages. About 11,836 Dairy cooperative Societies in the state promoting clean milk supply as "cows to consumer". Providing Rs. 2 per

liter of milk procured by Dairy Cooperative Societies. Providing emergency veterinary services giving fillip to green fodder production and provide about 2.4 lakhs tons of cattle feed annually to support balance feed requirements. It's supplying the exotic Bull Semen for genetic improvement of milch cows. *Nandini Milk* in different varieties and *Nandini milk* products as a whole has caught the consumers test. About 96% of the DCSs are in profit as it is producer empowerment. Karnataka is one of the few states to have converted Dairying into an Industry.

The Mother Dairy model mainly guided on the principals on farmers depends substantially on the efficiency and the effectiveness of the co-operatives since it does not connect with the farmers directly. It

assists the farmer bodies to market the milk in the vast markets of the major urban areas—a capability many of them lack. Mother Dairy is facing competition from other organized retailers and maintaining quality is also a major challenge. It also undertakes the necessary investments for processing and distribution which is difficult for some of the farmer bodies to make.

Similarly, *Nestle* operates a network of 1,100 agents, who receive a 2.3 per cent commission on the value of the milk supplied to the dairy. The job of sourcing milk from farmers is done not by a co-operative society, but a private commission agent appointed by the company. Both the agent as well as the farmers is paid on a consolidated fortnightly basis, unlike the system of daily milk payments to farmers followed by *AMUL*. On an average, *Nestle* farmer pours about 7.25 kg of milk per day, whereas the corresponding figure for *AMUL* is around 2 kg per day, indicating that *AMUL* set up encompasses more number of small/ marginal farmers and landless farm laborers having only 1–2 milch animals.

Conventional distribution channels consist of one or more independent channel members. But due to lack leadership and power, often result in poor performance which has been visualized from the case study of West Bengal. In contrast individualistic say or power makes isolation of milk producers from Northern India especially from Mother dairy milk Co operative which is dominated in the Northern part as well as in the eastern part significantly.

Whereas in the vertical Marketing Systems, it always consists of members acting as a unified system, use contracts, ownership or power or professionalism which is very much and to certain extent prevalent in the Southern and Western part of India.

*The organised value chain and institutional arrangement to shape the modern and traditional value chain system*

The milk market in India is fragmented, having both formal and informal segment, but the bulk of milk trade flows through informal supply chain. Recent study (V. Singh, 2011) from predetermined 100 farm households survey on 'Economic analysis of traditional milk marketing chain in Karnal district of Haryana' revealed that farm households had preference to informal sector to dispose off their milk. The disposal pattern of milk showed that about 92 per cent marketed surplus disposed off through traditional marketing chain consisting of milk vendors, creameries/private dairies and contractors,

while only about 8 per cent by modern milk marketing chain comprising of milk cooperative societies.

Rising disposable incomes, changing dietary pattern, rapidly growing middle class and increasing awareness among Indian consumer has led to the diversification of the dairy category as consumers are looking beyond pouched milk and the occasional butter and cheese spreads. This gives rise to value addition in dairy products and developing of functional dairy industry in India. Indian functional dairy sector is dominated by pro-biotic foods. Indian pro-biotic market is valued at \$2 million as per 2010 estimates and is poised to quadruple by 2015. At present, India contributes less than 1 per cent of global pro-biotic foods market. *Amul* is the leader in Indian pro-biotic market sharing 70 percent of market share.

Market survey research (Govindrao, H. P., 2013) from Maharashtra region shows that among all income groups, highest consumption expenditure was on pro-biotic drinks while lowest consumption expenditure on pro-biotic *lassi*. On average, each household consumes *Yakult* about 0.77 kg/month while fortified *dahi* was consumed about 0.36 kg/month. Low fat *dahi* consumption in each household was found to be 0.32 kg/month. About 51 per cent of consumers would like to consume conventional dairy foods as daily basis while functional dairy foods were like to consume conventional dairy foods as daily basis while functional dairy foods were like to consume as monthly. Among the pro-biotic drinks *Yakult* was the most preferred brand while Mother Dairy's b-active pro-biotic *dahi* was most preferred among the pro-biotic *dahi*. *Danone* low fat *dahi* was the most preferred brand among the low fat *dahi* categories.

In order to identify alternative policy options, the status of production, consumption, prices, and farmers' income across different categories of dairy farmers in the selected zones was studied. Primary data was collected from 200 households in the 24 Parganas (N) district of West Bengal, 50 member dairy farmers of Kolar Milk Union, Mallur, Karnataka, and 100 households from the milk-shed area of Mother Dairy in Shamli district, Uttar Pradesh.

Eighty-six per cent of the total surveyed households in WB were found to be belonging to the small and marginal category of dairy farmers. The average milk production per household across all categories was about 7 percent and about 90 per cent constituted the marketed surplus. The surveyed households were found to be selling their milk (for Rs. 16 to Rs. 22 per litre) to any one of the four identified milk agencies in the region: the local

milkman or *Gwala/Dudhiya*, *Ichhamati* Milk Producers' Union Ltd., *Pipli* dairy, and Red Cow Dairy Pvt. Ltd. Of these, the backward linkage of *Pipli* was found to be the strongest.

The Kolar Milk Union, Mallur, Karnataka has 1600 DCS and they procure 7 lakh lts/day. The average number of dairy animals per household was found to be 2-3, and HF crossbred constituted 80 percent of the bovine population. The average price of milk was found to be Rs. 19.40 per litre. Its product mix included UHT milk, Toned milk, followed by curd, *peda* and *ghee*, among other products. Only 12 per cent of the total annual income of the marginal farmers was found to be coming from dairy, while dairy contributed 72 percent to the total annual income of the small category of dairy farmers in the region. All the surveyed farmers were provided with AI services by the Union, while 98 percent of the farmers said that they also received veterinary facilities, feed subsidy and mineral mixture by the Union, which shows a strong backward linkage.

From the 100 households surveyed in the Shamli district, data was collected on number of dairy animals, milk production, quantity of milk consumed and sold, and price of milk. 53 households belonged to the landless, marginal and small categories, with 2 to 3 animals per household. The average milk produced per household was found to be about 11 liters/day, while the average price/liter was found to be Rs. 26.95. The average marketed surplus across all categories of households was found to be 7.24 liters/day. The average number of milch animals was calculated to be 0.71, 1.14 and 1.43 for cross-bred, local cow and buffalo, respectively.

Based on the analyses of primary data collected from West Bengal, Karnataka, and UP, on various parameters, the identified alternative policy options to make small and marginal dairy farmers' dairy business more lucrative are: Value addition is a mechanism to accelerate the earning from milk by presenting innovative and desirable products which meet the customer demand and requirement. Milk is a basic raw material for all dairy products and earning per unit of milk is increased through value addition. This also helps to provide remunerative price to milk producers.

#### *Ways and means to integrate the dairy supply chain in FDI era*

After lot of discussions and protests, Government of India passed FDI bill in the parliament subject to state role is important one. With some conditionality's foreign firms can operate in Indian

food and retail market. Some good feature incorporated in the revised FDI bill like 30 per cent local outsourcing from small and medium size industries, backward infrastructural investment to strengthen the supply chain and others obligations. These two obligations are very much important for dairy value chain. Indian dairy industry may observe three broad changes after FDI in multi-retail sector.

- (i) The first important change that the multinational retailers are likely to introduce is state of the art storage technology that the multinational retailers possess and which is not known to big domestic retailers. This technology is expected to improve the supply chain and prevent wastage in a big way. Estimates of wastage of food grains, fruits and vegetables in the country vary between 20-40% of the total produce. It is argued that a significant part of this wastage would be avoided if foreign investors bring in state of the art technology. The primary case being made for FDI in retail is that it will increase efficiency. One source of this is improvements in the supply chain. In particular, this argument is applied to perishable agricultural produce. The claim is that increased investment will reduce wastage. Efficiency gains can potentially lead to gains for producers, intermediaries and consumers. Turning to the recent Indian experience, Walmart and other foreign firms have been involved in the wholesale trade for some years. For example, the Bharti Walmart joint venture works with over 6,000 small farmers across six states. Indian corporations have tried to create retail chains without foreign help. What do these experiences teach us about the potential for transformation? In neither case has there been a huge change in the supply chain. Logically, either FDI in wholesale or domestic retail chains could have made investments to improve the efficiency of the supply chain. There have been small improvements, but no great transformation.
- (ii) The second big change that the multinational retailers are likely to bring about is more international trade. A little reflection will convince that the magnitude of international trade depends on the extent to which arbitrage possibilities across countries can be made use of. Making use of arbitrage possibilities, one can buy a commodity in a country where it is cheaper and sell it in another country where it is dear. A company job is to identify the international arbitrage possibilities and trade accordingly to make profits. It stands to reason that a giant multinational trader, with its more elaborate

procurement and distribution networks, will do the job more efficiently and extensively than a relatively small domestic retailer. But if that is so, entry of multinational retailers into the Indian market is likely to increase the volume of Indian international trade. In the recent year's different countries like Australia, New Zealand and EU interested to sign the Free Trade Agreement (FTA) with India and in near future India will do it because of international obligations. But this kind of trade arrangement will affect very much to the Indian dairy sector. As we know that New Zealand, Australia and EU countries producing milk in large quantity (with huge subsidies) that not demanded in the country. Therefore in the name of FTA these countries will dump their agriculture produce especially dairy product in Indian market. As Indian dairy industry is mainly dominated by the cooperative sector which connect million of resource poor farmers to the market and still this sector in nascent stage of development. It is important that government keep dairy sector away from FTA otherwise this kind of smart moves by the developed countries increases the arbitrage possible for dairy business for foreign big retailers. But as per FDI bill retailers would have to source 30% of their domestic sales from the domestic market. This would imply that they would have to market some Indian manufactures also, but the bulk of their sales should consist of foreign country primary agricultural goods or processed food products.

- (iii) The third change refers to the scale of operation of big retail in India. The giant multinationals along with the domestic retailers with whom they are going to form joint ventures are going to have much greater financial power than the domestic big retailers alone. Therefore, in the new set-up, big organized retail is likely to cover a much larger portion of the market than before. There is concern in food and retail sector that some MNCs might use their monopsony power, their ability to access cheap products from domestic and foreign market, and use that monopsony power to give competition to domestic food companies. That's not a good basis for growth. It will definitely affect the domestic cooperative and private player of Indian dairy sector.

To protect the small and medium producers, processors as well as the consumers needs effective regulations. Effectiveness of regulations is must which is mainly depends not only upon the regulations themselves, but also on the regulator and

the regulated and the environment in which they are implemented. Emergence of regulations can in turn be dependent upon these three. Will and wherewithal on part of the regulator on one hand and public pressure on the other are critical for successful implementation. Half-hearted negligent and poor implementation of regulations can benefit some at the cost of others who are less influential, less vocal or devoid of adequate resources. Equally importantly, if the regulator does not have the requisite information or is constrained by factors beyond his control, then again, the regulations may not achieve the desired objectives.

### Conclusions

Operation Flood Program emphasis on developing smallholder-based dairy sector in the pre-liberalised era is justified on the ground that it realised the needs of the production base by the masses. Value addition in milk is unavoidable if one has to enhance sector profitability; the same does not seem feasible unless the organized sector improves its penetration. Because, it is the involvement of the organized sector that will drive the growth by resorting to value addition in basic product and harnessing the consumer market. The mechanics of the organized sector penetration could be agency-specific as also area-specific.

Cooperative sector is one of the major sectors in organised supply chain in Indian dairy sector. Gini coefficient of the milk used in the organised dairy industry provides the evidence that the in cooperative sector there is more inequality (0.789) in comparison of private (0.763), public (0.709) and other (0.669) organizations. Therefore, it is provide a lot of scope for private and public sector to increase its penetration where cooperative sector is not having good base. Need of the day is to provide quality of efficient input and output support services as provided by the co-operatives (Amul model at Gujarat, Nandani Milk Federation at Karnataka Model), private sector (Nestlé) and contract dairy farming. In the liberalised economy, the replication and scaling up of these models largely depends on the governance, institutional support and market forces.

The needs of the day is to invite private sector to build back-end infrastructure for collecting, processing and marketing of the milk and milk products which is augmenting from rural area to be procured directly from farmer-producer organisations. This will create millions of 'off-farm'

rural jobs, save on post-harvest losses, and create more efficient value chains giving a better deal to farmers and consumers alike, as also making our dairy globally competitive. This will immediately bring down food inflation of high value products. The government, therefore, should announce capital subsidy to the private sector for building such back-end infrastructure and also restrict the private players not to encroaches or concentrate in the location/ areas/ clusters where already cooperatives are working and protecting the interest of the farmers.

It essential to transform traditional supply chains from linear, sequential processes into adaptive supply chain networks in which communities of customer-centric, demand-driven, intelligently adapt to changing market conditions, and proactively respond to shorter, less-predictable life cycles. In the last 15 years, the share of milk producers has declined from 52% to 38% in USA and from 56% to 36% in UK. As compared to that, Indian milk producers get more than 70% on an average and the milk producers affiliated to co-operatives get more than 80% share of consumers' rupee. Key question is whether the organized retail trade would be able to operate at low margins as practiced by Amul and other co-operatives, failing which they would not be able to maintain the farmer's share in consumer price. Neither do our farmers receive fair price for their produce, nor do consumers benefit from low prices. The issue is not just about converting our farmers from price-takers to price-makers, but to balance the need of different interest groups by addressing the root causes of anti-competitive practices, which are rampant all over the country.

## References

1. CSO (2007-08). "National Accounts Statistics", Ministry of Statistics and Program Implementation, Government of India, New Delhi.
2. Department of Animal Husbandry, Dairying and Fisheries, Annual Report (2013-14). Government of India, New Delhi.
3. Govindrao, H. P., (2013). A study on consumption pattern and consumer preferences for fermented functional Dairy foods in Metropolitan Maharashtra, M.V.Sc dissertation at NDRI, Karnal.
4. NSSO (National Sample Survey Organisation) (2003). Report of Livestock Ownership across Operational Landholding Classes in India, 2002-03, Ministry of Statistics and Programme Implementation, Government of India, New Delhi.
5. Singh, V. (2013). Economic Analysis of Traditional Milk Marketing Chain in Karnal District of Haryana, M.V.Sc. dissertation at NDRI, Karnal.
6. Singh, Shiv Raj & Datta, K.K. (2010). Understanding value addition in Indian dairy sector: some perspectives, *Agricultural Economics Research Review*, Vol. 23 (Conference Number) 2010.
7. Singh, Shiv Raj & Datta, K.K., (2013). Future of smallholders in the Indian dairy sector- Some anecdotal evidence. *Indian Journal of Agricultural Economics*. Vol. 68(2): pp. 182-194.

