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Value Chains of Milk and Milk Products in Organised Sector of Tamil Nadu — A Comparative Analysis[§]

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Abstract

The study has analysed the value chains of milk and milk products in the co-operative and private dairy plants in the Salem district of Tamil Nadu based on the data collected from one co-operative plant, one private plant, five milk transportation routes, ten co-operative societies, ten private milk collection centres and six chilling centres for the year 2007-08. The overall average procurement cost per litre of milk has been found higher for the co-operative dairy plant than the private plant due to increased cost on milk transportation, chilling and reception. The co-operative plant has been revealed more efficient in the manufacture of toned milk, standardized milk, full cream milk and ghee whereas the private plant has an edge over co-operative dairy plant in the manufacture of butter and SMP (skimmed milk powder). The marketing cost of toned milk, standardized milk, full cream milk and SMP has been found lower for private dairy plant and of butter and ghee for the co-operative dairy plant. The products which could earn a higher value after passing through the value chain are milk peda, khoa and SMP in the co-operative plant; and ice cream, Mysorepa and ghee in the private plant. The marketing margins and marketing efficiency have been found higher in toned milk, standardized milk and butter for the private plant and in full cream milk, ghee and SMP for the co-operative plant.

Introduction

Dairy development has assumed significant importance in the rural economy of India due to its immense potential for supplementing income and employment generation for the rural people. According to the 17th Livestock Census, 2003, India possessed the largest livestock population in the world, after Brazil. It accounts for 56 per cent of world's buffalo population (9.8 crore buffaloes) and 14 per cent of total cattle population (18.5 crore cattle) (GoI, 2006; Gupta, 2007).

Today, India ranks first in the world in milk production, which has risen from 17 million tonnes (Mt) in 1950-51 to about 108.5 million tonnes by 2008-09

(GoI, 2009). Whereas world's milk production is increasing at the rate of 1-1.5 per cent per annum, in India, it is increasing at the rate of 4 per cent (Gupta, 2007). Consequently, the per capita availability of milk has also increased from 124 grams/day in 1950-51 to 258 grams/day in 2008-09 (GoI, 2009-10).

In India, about 46 per cent of the produced milk is retained for home consumption, while 54 per cent is disposed off to various agencies (Gupta, 2007). About 80 per cent of milk produced in the country is handled by the unorganised sector and the remaining 20 per cent is shared equally by co-operative and private sectors for processing with varying degree of product-mix (GoI, 2009). About 35 per cent of milk produced in India is processed. The organised sector (large-scale dairy plants) processes about 13 Mt milk annually, while the unorganized sector (halwais and vendors) processes about 22 Mt per annum. Milk processing capacity has grown at a compound annual growth rate (CAGR) of 4 per cent over the past six years in India (Gupta, 2007).

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Tamil Nadu is endowed with a large livestock population of 91.41 lakh cattle and 16.58 lakh buffaloes. The state has a well-developed dairy infrastructure constituting 8,949 milk co-operative societies, 17 co-operative milk producers unions having 22.60 lakh producer members. The average procurement of milk by co-operative dairy plants is around 26.10 lakh litres/day. The handling capacity of co-operative union dairy plants is around 19.42 lakh litres/day (GoTN, 2007). But, the co-operative dairy plants in Tamil Nadu are handling milk much below their installed capacity and face severe competition from the private milk vendors and private dairy plants for marketing of milk and milk products. Due to low handling capacity of co-operative dairy plants, the cost of procurement, processing and distribution has increased enormously. In this endeavour, a comparative analysis of cost of milk procurement, processing, manufacturing and marketing of dairy products in co-operative and private sector dairy plants in Tamil Nadu was considered useful to reduce the total costs and improve the marketing efficiency and value chain of the co-operative dairy plant. Accordingly, a study was carried out with the following specific objectives :

- To estimate the cost of milk procurement of co-operative and private dairy plants,
- To study the processing and manufacturing costs of dairy products by the co-operative and private sector plants, and
- To work out the marketing costs and marketing efficiency of organised marketing channels.

Methodology

Tamil Nadu state was purposively selected for the present study as it had the largest number of co-operative dairy plants (17) in southern India (Gupta, 2007). Tamil Nadu also had the largest number of crossbred milch cows (2.35 million) in India in the year 2003 (Gupta, 2007). The district of Salem was purposively selected as a large dairy plant in the co-operative set-up co-exists here with a large-sized dairy plant in the private sector. One plant from co-operative sector and another plant from the private sector in Salem district were selected purposively based on largest average milk procurement in the state to compare the procurement, processing and marketing aspects of both the co-operative and private dairy plants. Five milk transportation routes of each plant, two societies from each route in both the set-ups were selected purposively. Thus, there was a sample of 10 co-operative societies and 10 private collection centres. All the three chilling

centres attached to each plant were also included in the study.

For the study, both primary and secondary data were collected for the financial year 2007-2008. To study seasonal variations in the procurement cost of milk, the data were collected for all the four seasons, viz. flush season (April-July), transitory season 1 (August-October), lean season (November-January) and transitory season 2 (February-March) from the records of the plants.

Analytical Framework

Milk Procurement Cost

$$\begin{aligned} \text{Cost of Milk Procurement} = & \text{Cost of Collection} + \text{Cost} \\ & \text{of Transportation} + \text{Cost of Chilling} + \\ & \text{Cost of Milk Reception} \end{aligned} \quad \dots(1)$$

For analytical purpose, the cost parameters were estimated as:

$$\begin{aligned} \text{Cost of operations per litre of milk} \\ = & \frac{\text{Total cost involved in respective operations}}{\text{Total quantity of milk handled for that operation}} \end{aligned} \quad \dots(2)$$

The procurement cost of milk in co-operative and private sector milk plants was worked out using tabular analysis.

Processing and Manufacturing Cost of Milk Products

Total processing and manufacturing cost of dairy products comprised the following cost components: Raw material, electricity, water, steam, refrigeration, repairs and maintenance, stores and stationery, packing material, house keeping, depreciation on buildings, depreciation on equipment and machinery, expenditure on manpower, quality control, interest on plant equipment and machinery, milk and milk solids losses and miscellaneous costs.

Electricity Consumption

$$\text{Electric load} = \frac{\text{Hours} \times \text{Watts}}{1000} = \text{Kilowatt hours} \quad \dots(3)$$

Electricity Power Estimated under Single-Phase System

$$\frac{V_L \times I_L \times \text{Cos}\phi}{1000} = \text{Kilowatt} \times \text{Running hours} \dots(4)$$

Electricity Power Estimated under Three-Phase System

$$\frac{\sqrt{3} \times V_L \times I_L \times \text{Cos}\phi}{1000} = \text{Kilowatt} \times \text{Running hours} \dots(5)$$

where,

- V_L = Line voltage
- I_L = Line current
- $\text{Cos } \phi$ = Power factor assumed (0.8) (Theraja, 1992)

Steam Requirement

$$\text{Steam requirement}(kg) = \frac{M \times S \times T}{L} \dots(6)$$

where,

- M = Quantity of the product to be heated (kg),
- S = Specific heat of product,
- T = Temperature difference (T_1-T_2 , initial and final temperature of the product ($^{\circ}\text{C}$), and
- L = Latent heat of steam (Ahmed, 1997)

Refrigeration Load

$$\text{Refrigeration load in kilocalories} = M \times S \times T \dots(7)$$

where,

- M = Quantity of product to be cooled (kg),
- S = Specific heat of the product, and
- T = Temperature difference (T_1-T_2) ($^{\circ}\text{C}$)

This cost group included those items of expenditure, which were not identifiable and allocable to the above-mentioned cost components (e.g., insurance, bank charges, etc.). The total milk solids in different products were used to apportion this cost group.

Cost on Distribution and Promotional Activities

Distribution cost consisted of activities involved in moving the product from producer to consumer and

cost on promotional activities included cost on advertisement, personal selling, sales promotion and publicity.

Marketing Cost

The total cost incurred on marketing by producer-seller and by the various intermediaries involved in the sale and purchase of the commodity till the commodity reaches the ultimate consumer was taken under this head (Acharya and Agarwal, 2006).

$$C = C_f + C_{m_1} + C_{m_2} + C_{m_3} + \dots + C_{m_i} \dots(7)$$

where

- C = Total cost of marketing of the commodity,
- C_f = Cost incurred by the producer from the time the product leaves the dairy plant, and
- C_{m_i} = Cost incurred by the i^{th} middleman in the process of buying and selling the product.

Marketing Margin of a Middleman

Marketing margin was the difference between the receipts (sale price) of the middleman (i^{th} agency) and total payment (costs + purchase price) (Acharya and Agarwal, 2006)

Absolute margin of the i^{th} middleman was worked out as per Equation (8) (Acharya and Agarwal, 2006):

$$A_{mi} = P_{Ri} - (P_{Pi} + C_{mi}) \dots(8)$$

where,

- A_{mi} = Absolute margin of the i^{th} middleman,
- P_{Ri} = Total value of receipts per unit (sale price),
- P_{Pi} = Purchase value of goods per unit (purchase price), and
- C_{mi} = Cost incurred on marketing per unit.

Marketing Efficiency

Marketing efficiency indicated the ratio of the value added for the goods to the marketing cost (Shepherd, 1965) and was calculated using Equation (9):

$$ME = \frac{V}{I} - 1 \dots(9)$$

where,

- V = Value added for the milk products.
- I = Total marketing cost incurred.
- ME = Index of marketing efficiency.

Value Addition

It reflected the difference between price for which a firm sold its products and the cost incurred on the purchased inputs by it. This difference represented the value addition by the productive activities of the firm (Kohls and Uhl, 1967).

Value addition = Selling price of the product – Cost of the total inputs

Results and Discussion

Cost of Milk Procurement

The procurement cost comprises cost of milk collection, transportation, chilling and reception. Table 1 shows that the overall average procurement cost per litre was Rs 1.23 for the co-operative dairy plant. The procurement cost showed minor variations across seasons. During flush season, the cost of milk procurement was estimated to be Rs 1.24 per litre. It was maximum during transitory period 2 (Rs 1.26/L) and lowest during transitory period 1 (Rs 1.19/L). The component-wise cost of milk collection, transportation, chilling and reception was 35 paise, 40 paise, 28 paise and 20 paise per litre respectively in the procurement cost.

As against co-operative plant, the overall average procurement cost was Rs.1.09 per litre for the private dairy plant (Table 1). The overall procurement cost

remained almost same throughout the year, except a minor decline in transitory season 2 (Rs 1.07/L).

The component-wise cost of milk collection, transportation, chilling and reception was 38 paise, 34 paise, 24 paise and 12 paise per litre respectively for the private plant in the procurement cost. It can be concluded that the procurement cost was higher for co-operative dairy plant than private dairy plant. It could be attributed to the efficiency of private dairy plant in transportation, chilling and reception of milk. The co-operative dairy plant was efficient only in milk collection, and it has resulted in the increased milk procurement cost of the co-operative dairy plant.

Comparative Analysis of Value Chains of Various Dairy Products for Co-operative and Private Dairy Plants

In this section, various parameters, namely processing and manufacturing cost, marketing cost, marketing margin and marketing efficiency of dairy products for both the dairy plants have been analysed and results are presented in Table 2 for co-operative dairy plant and in Table 3 for private dairy plant. The product-wise analysis is given below.

Toned Milk

Tables 2 and 3 show the raw material cost, procurement cost, processing cost, production cost,

Table 1. Total milk procurement cost in Tamil Nadu: 2007-08

(Rs/litre)

Season	Cost of collection	Cost of transportation	Cost of chilling	Cost of reception	Total procurement cost
Co-operative milk societies					
Flush	0.35	0.41	0.28	0.20	1.24
Transitory 1	0.35	0.37	0.27	0.20	1.19
Lean	0.35	0.42	0.27	0.19	1.23
Transitory 2	0.35	0.42	0.30	0.19	1.26
Average	0.35	0.40	0.28	0.20	1.23
Private milk collection centres					
Flush	0.38	0.34	0.24	0.13	1.09
Transitory 1	0.38	0.35	0.24	0.12	1.09
Lean	0.38	0.35	0.24	0.12	1.09
Transitory 2	0.39	0.33	0.24	0.11	1.07
Average	0.38	0.34	0.24	0.12	1.09

Table 2. A comparative analysis of value chains of various dairy products for co-operative dairy plant (per litre or kg)

Sl No.	Particulars	Dairy products							
		Toned milk	Standardised milk	Full cream milk	Butter	Ghee	SMP	Khoa	Milk peda
1.	Raw material cost (Rs)	11.24	14.01	15.08	112.03	125.22	98.63	94.50	39.93
2.	Procurement cost of raw material/unit (Rs)	1.38	1.52	1.64	2.04	2.12	1.86	1.64	1.92
3.	Processing cost/unit (Rs)	1.23	1.95	1.23	12.31	11.51	23.14	49.82	41.76
4.	Production cost/unit (1+2+3) (Rs)	13.85	17.48	17.95	126.38	138.85	123.63	145.96	83.61
5.	Distribution cost/unit (Rs)	1.36	1.80	1.48	18.21	37.06	27.76	23.45	24.98
6.	Total cost/unit (4+5) (Rs)	15.21	19.28	19.43	144.59	175.91	151.39	169.41	108.59
7.	Selling price/unit (Rs)	16.50	21.00	22.00	165.00	210.00	170.00	180.00	115.00
8.	Marketing margin (7-6) (Rs)	1.29	1.72	2.57	20.41	34.09	18.61	10.59	6.41
9.	Total marketing cost (2+3+5) (Rs)	3.97	5.27	4.35	32.56	50.69	52.76	74.91	68.66
10.	Marketing cost and margin (8+9)(Rs)	5.26	6.99	6.92	52.97	84.78	71.37	85.50	75.07
11.	Marketing efficiency [(10/9)-1]	0.32	0.33	0.59	0.63	0.67	0.35	0.14	0.09

distribution cost, total cost, selling price, marketing cost, marketing margin, value added and marketing efficiency for co-operative and private dairy plants for toned milk. A perusal of these tables revealed that marketing cost of toned milk for co-operative plant was Rs 3.97/L, which comprised of procurement cost of Rs 1.38, processing cost of Rs 1.23 and distribution cost of Rs 1.36. As a percentage of total cost, marketing cost worked out to be 26.10 per cent, procurement cost as 9.07 per cent, processing cost as 8.09 per cent and distribution cost as 8.94 per cent. The marketing cost for private plant was Rs 3.56/L comprising of procurement cost of Rs 1.51, processing cost of Rs 1.12 and distribution cost of Rs.0.93. As percentage of total cost, marketing cost worked out to be 22.94 per cent, procurement cost as 9.73 per cent, processing cost as 7.22 per cent and distribution cost as 5.99 per cent.

The analysis indicated that the marketing margin realised in toned milk was lower by cooperative plant (Rs 1.29/L) than by the private plant (Rs 1.98/L). The marketing efficiency for co-operative dairy plant (0.32) was also less than of private dairy plant (0.56). This may be due to the fact that the private dairy plant was earning a higher margin for a unit quantity of toned milk than co-operative dairy plant. Thus, it can be inferred that toned milk production is more profitable for private dairy plant than in the co-operative sector.

Standardized Milk

Tables 2 and 3 depict a detailed picture of marketing costs for standardized milk in co-operative plant and private plant, respectively; these were Rs 5.27/L and Rs 4.09/L. The marketing cost of co-operative plant included procurement cost of Rs 1.52 (7.88%), processing cost of Rs.1.95 (10.11%) and distribution cost of Rs.1.80 (9.34%). The marketing cost of private plant comprised of procurement cost of Rs.1.82 (9.35%), processing cost of Rs.1.23 (6.32%) and distribution cost of Rs 1.04 (5.34%).

The analysis revealed that in marketing of standardized milk, private plant retained a higher market margin (Rs 2.54/L) than co-operative plant (Rs 1.72/L). The marketing efficiency was more for the private dairy plant (0.62) than the co-operative dairy plant (0.33). It was due to lower marketing cost and higher marketing margin for the private dairy plant than co-operative dairy plant. It was quite apparent that standardized milk production was more profitable for private dairy plant.

Full Cream Milk

It is evident from Tables 2 and 3 that marketing cost for co-operative plant was Rs 4.35/L (22.39%) for full cream milk, which consisted of procurement cost of Rs 1.64 (8.44%), processing cost of Rs 1.23/L (6.33%) and distribution cost of Rs 1.48 (7.62%). The marketing cost for private dairy plant was Rs 4.20/L

Table 3. A comparative analysis of value chains of various dairy products for private dairy plant (per litre or kg)

Sl No.	Particulars	Dairy products							
		Toned milk	Standard-ised milk	Full cream milk	Butter	Ghee	SMP	Ice cream	Myso-repa
1.	Raw material cost (Rs)	11.96	15.37	17.04	108.94	123.37	103.72	48.62	95.56
2.	Procurement cost of raw material/unit (Rs)	1.51	1.82	1.66	3.78	2.63	5.49	2.83	4.51
3.	Processing cost/unit (Rs)	1.12	1.23	1.17	8.36	13.19	12.54	31.30	44.31
4.	Production cost/unit (1+2+3) (Rs)	14.59	18.42	19.87	121.08	139.19	121.75	82.75	144.38
5.	Distribution cost/unit (Rs)	0.93	1.04	1.37	22.73	36.93	27.49	13.57	11.86
6.	Total cost/unit (4+5) (Rs)	15.52	19.46	21.24	143.81	176.12	149.24	96.32	156.24
7.	Selling price/unit (Rs)	17.50	22.00	23.50	170.00	205.00	163.00	110.00	172.00
8.	Marketing margin(7-6) (Rs)	1.98	2.54	2.26	26.19	28.88	13.76	13.68	15.76
9.	Total marketing cost (2+3+5) (Rs)	3.56	4.09	4.20	34.87	52.75	45.52	47.70	60.68
10.	Marketing cost and margin (8+9) (Rs)	5.54	6.63	6.46	61.06	81.63	59.28	61.38	76.44
11.	Marketing efficiency [(10/9)-1]	0.56	0.62	0.54	0.75	0.55	0.30	0.29	0.26

(19.77%) for full cream milk which consisted of procurement cost of Rs 1.66 (7.82%), processing cost of Rs 1.17 (5.51%) and distribution cost of Rs 1.37 (6.45%).

The marketing margin was higher of co-operative plant (Rs 2.57/L) than private dairy plant (Rs 2.26/L). The marketing efficiency for co-operative dairy plant was also higher (0.59) than of the private dairy plant (0.54). The increase in marketing efficiency of the co-operative plant was attributed to its higher marketing margin. Thus, it could be concluded that full cream milk production was more profitable to the co-operative dairy plant than private dairy plant.

Butter

A perusal of Tables 2 and 3 revealed that total marketing cost for butter in the case of co-operative dairy plant was Rs 32.56/kg which included procurement cost of Rs 2.04 (1.41%), processing cost of Rs 12.31 (8.51%) and distribution cost of Rs 18.21 (12.59%). The marketing cost of butter for private dairy plant was Rs 34.87/kg which included procurement cost of Rs 3.78 (2.63%), processing cost of Rs 8.36 (5.81%) and distribution cost of Rs 22.73 (15.81%).

The marketing margin of Rs 20.41/kg for co-operative dairy plant was higher than for the private

dairy plant (Rs 26.19/kg). The marketing efficiency of 0.63 for co-operative dairy plant was lower than of private plant (0.75). Thus, it can be inferred that butter production was more profitable to private plant as compared to co-operative plant.

Ghee

It was revealed from Tables 2 and 3 that the marketing cost for ghee was Rs 50.69/kg (28.82%) for co-operative dairy plant which included procurement cost of Rs 2.12 (1.21%), processing cost of Rs 11.51 (6.54%) and distribution cost of Rs 37.06 (21.07%). In the case of private dairy plant, marketing cost was Rs 52.75/kg (29.95%) comprising of procurement cost of Rs 2.63 (1.49%), processing cost of Rs 13.19 (7.49%) and distribution cost of Rs 36.93 (20.97%).

The marketing margin and marketing efficiency for co-operative dairy plant were Rs 34.09 and 0.67, respectively and of the private dairy plant were Rs 28.88 and 0.55, respectively. It could be concluded that ghee production was more profitable for co-operative dairy plant than private dairy plant.

SMP

It was observed from Tables 2 and 3 that total marketing cost for SMP (skimmed milk powder) in the case of co-operative dairy plant was Rs 52.76/kg

(34.85%) which included procurement cost of Rs 1.86 (1.23%), processing cost of Rs 23.14 (15.29%) and distribution cost of Rs 27.76 (18.34%).

The marketing cost of the SMP for private dairy plant was Rs 45.52/kg (30.50%) which included procurement cost of Rs 5.49 (3.68%), processing cost of Rs 12.54 (8.40%) and distribution cost of Rs 27.49 (18.42%).

The marketing margin was Rs 18.61/kg for co-operative dairy plant and Rs 13.76 for private dairy plant. The marketing efficiency was 0.35 for co-operative dairy plant and 0.30 for private dairy plant. Thus, from this analysis, it was observed that SMP production was highly profitable for co-operative dairy plant than private dairy plant.

Khoa

It was observed from Table 2 that the marketing cost, marketing margin and marketing efficiency for co-operative dairy plant were Rs 74.91/kg, Rs 10.59/kg and 0.14/kg, respectively. The components of marketing cost included procurement cost of Rs 1.64 (0.97%), processing cost of Rs 49.82 (29.41%) and distribution cost of Rs 23.45 (13.84%).

Milk Peda

A perusal of Table 2 revealed that for the co-operative dairy plant, the marketing cost, marketing margin and marketing efficiency for milk peda were Rs 68.66/kg, Rs 6.41/kg and 0.09, respectively. The marketing cost included procurement cost of Rs 1.92

(1.77%), processing cost of Rs 41.76 (38.46%) and distribution cost of Rs 24.98 (23.00%).

Ice cream

It was observed from Table 3 that the marketing cost, marketing margin and marketing efficiency of ice cream for the private dairy plant were Rs 47.70, Rs 13.68 and 0.29, respectively. The components of marketing cost were procurement cost of Rs 2.83 (2.94%), processing cost of Rs 31.30 (32.50%) and distribution cost of Rs 13.57 (14.09%).

Mysorepa

A perusal of Table 3 revealed that for the private dairy plant, the marketing cost, marketing margin and marketing efficiency were Rs 60.68/kg, Rs 15.76/kg and 0.26, respectively for the product, Mysorepa. The marketing cost included procurement cost of Rs 4.51 (2.89%), processing cost of Rs 44.31 (28.36%) and distribution cost of Rs 11.86 (7.59%).

Value Addition

The value addition to dairy products given in Table 4, depicts that in the co-operative dairy plant the top three earners in terms of value addition were: milk peda (65.28%), khoa (47.50%) and skimmed milk powder (41.98%). All the dairy products had added more than 30 per cent of value after passing through the value chain. In money terms, it varied from Rs 5.26 in toned milk to Rs 85.50 in khoa. Full cream milk's contribution to the value addition was least among the co-operative dairy products.

Table 4. Value addition to dairy products of co-operative and private dairy plants

Dairy products	Co-operative dairy plant			Private dairy plant		
	Value added (Rs)	Selling Price/unit (Rs)	Per cent	Value added (Rs)	Selling Price/unit (Rs)	Per cent
Toned milk	5.26	16.50	31.88	5.54	17.50	31.66
Standardized milk	6.99	21.00	33.29	6.63	22.00	30.14
Full cream milk	6.92	22.00	31.45	6.46	23.50	27.49
Butter	52.97	165.00	32.10	61.06	170.00	35.92
Ghee	84.78	210.00	40.37	81.63	205.00	39.82
SMP	71.37	170.00	41.98	59.28	163.00	36.37
Khoa	85.50	180.00	47.50	—	—	—
Milk peda	75.07	115.00	65.28	—	—	—
Ice cream	—	—	—	61.38	110.00	55.80
Mysore pa	—	—	—	76.44	172.00	44.44

In the private dairy plant, ice cream (55.80%), Mysorepa (44.44%) and ghee (39.82%) secured the top three ranks in terms of value addition. Except full cream milk (27.49%), all other dairy products had added more than 30 per cent of the value to the product. In terms of money, the value addition ranged from Rs 5.54 in toned milk to Rs.81.63 in ghee.

Conclusions

The study has revealed that dairy industry in India has gone through a sea change, transforming itself from import-dependent industry to a self-reliant industry. The success of dairy industry revolves around a triangle, viz. procurement, processing and marketing of dairy products. Production is the base on which the edifice of dairy industry stands. Procurement, processing and marketing are the other aspects that need to be strengthened for the healthier growth of the dairy industry to serve the consumers so that economic multiplier effects of dairying are realized.

The study has observed that the procurement cost of co-operative dairy societies was higher than of the private milk collection centres due to increased costs of milk transportation, chilling and reception. The cost of production and manufacturing of dairy products has indicated that the co-operative plant is more efficient in the manufacturing of toned milk, standardized milk, full cream milk and ghee, whereas the private plant has an edge over co-operative dairy plant in the manufacturing of butter and SMP. The distribution cost has been found lower for the co-operative dairy plant for butter only, whereas for the private dairy plant it is lower for toned milk, standardized milk, full cream milk, ghee and skim milk powder.

The study has inferred that the marketing cost is lower for toned milk, standardized milk, full cream milk and SMP for private dairy plant and only of butter and ghee for the co-operative dairy plant. The marketing margins have been found higher for the private plant in toned milk, standardized milk and butter and in full cream milk, ghee and SMP for the co-operative plant, indicating their respective profitabilities. The products which could earn higher value after passing through the value chain are milk peda, khoa and SMP in the co-operative plant and ice cream, Mysorepa and ghee in

the private plant. The marketing efficiency has been found higher for the private plant in toned milk, standardized milk and butter and for the co-operative plant in full cream milk, ghee and SMP.

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