

Agricultural Economics Research Review
Vol. 21 July-December 2008 pp 235-242

Marketing Efficiency of Dairy Products for Co-operative and Private Dairy Plants in Tamil Nadu — A Comparative Analysis

N. Rangasamy* and J.P. Dhaka

Division of Dairy Economics, Statistics and Management, National Dairy Research Institute,
Karnal-132 001, Haryana

Abstract

The marketing of milk and milk products by dairy plants of co-operative and private sectors in Tamil Nadu has been compared. The study is based on the data collected for toned milk, standardized milk, full cream milk, flavoured milk, butter and ghee from the selected co-operative and private dairy plants of the Coimbatore district for the financial year 2001-2002. It has been found that the marketing cost for toned milk is same in both the dairy plants, whereas it is higher for standardized milk, full cream milk and flavoured milk in the co-operative dairy plant. The marketing cost has been found less in the co-operative plant for products like butter and ghee. All the dairy products earn more marketing margins in the private than co-operative dairy plant, except for toned milk. The marketing efficiency of co-operative dairy plant for all dairy products has been observed relatively less than that of private dairy plant, except toned milk. The study has suggested the development of co-operative dairy industry in a sustainable manner, the co-operative dairy plants should formulate long-term vision and strategy. The study has observed that value addition in dairy products should be done without compromising the quality and consumer-oriented market research and development should be accorded greater attention.

Introduction

The economic efficiency and success of a dairy plant largely depends on the effective management of operations like milk procurement, processing and distribution of dairy products. An efficient marketing system is one, which minimizes the cost of marketing services to ensure the largest share of producer in the consumer rupee. On the other hand, the consumers should be provided with quality dairy products at a reasonable price. Thus, marketing of

dairy products is an imperative component of dairy development and has drawn attention of planners, policymakers, researchers and trading communities.

In India, the marketing of milk and milk products is dominated by the unorganized sector, and the organized sector handles only about 14 per cent of total milk production (GoI, 2004). The dairy co-operatives are considered as one of the vital channels to improve milk production and reduce the cost of procurement, processing and marketing of dairy products through economy of scale approach. After liberalization, the co-operative dairy plants are facing cut-throat competition from the private players for market share. Pawar and Sawant (1979) have confirmed that the private dairy plants use their resources efficiently and reduce their total operational costs as compared to those by the co-operative dairy plants. Thus, any increase in operational cost in the

* Author for correspondence; Email: rangs23@gmail.com;
Present Address: National Institute of Agricultural Marketing, Pratap Nagar, Jaipur-302 033

The paper is based on the Ph.D. thesis entitled "Economic Analysis of Milk and Milk Products Marketing by Co-operative and Private Sector Dairy Plants in Tamil Nadu", of N. Rangasamy, submitted to National Dairy Research Institute (ICAR), Karnal in 2006.

value-addition chain leads to a decrease in the marketing efficiency of co-operative dairy plants.

A number of parameters like marketing cost, marketing margin, marketing efficiency, etc. depend on the structure of milk and milk products market. Marketing costs and margins of a particular commodity reflect the efficiency of a system to a great extent. The analysis of marketing costs and margins of dairy plants would help in reducing the unwarranted costs in marketing of dairy products.

Anand (1979) had worked out the marketing cost for different dairy products in a co-operative dairy plant. Pawar and Sawant (1979), Chahal (1991), Saha (1996), and Devaraja (2001) have also reported the marketing cost of liquid milk in different dairy plants. However, no study seems to have been conducted in which the marketing of milk and milk products by co-operative and private dairy plants has been compared in a comprehensive manner in the value addition chain. In this endeavour, the present study was conducted to compare the marketing cost, marketing margins and marketing efficiency of dairy products by co-operative and private sector dairy plants in Tamil Nadu.

Materials and Methods

To compare the marketing aspects of co-operative and private dairy plants, one milk plant each from the co-operative and private sectors were selected purposively in the Coimbatore district of Tamil Nadu. The installed capacity of each of these plants was 2 lakh litres per day. The average daily milk procurement of the co-operative dairy plant was 1,25,000 litres. On an average, the plant processed 90,000-1,00,000 litres per day of market milk, namely toned milk, standardised milk and full cream milk. The surplus milk was converted into various dairy products, namely, 'Butter', 'Ghee', 'Flavoured milk', and 'Milk peda'. The milk and milk products of the co-operative dairy were sold through booths, parlours, wholesalers, retailers and clearing and forwarding agents. On the other hand, the average milk procurement of the private dairy plant was 1,50,000 litres per day. It processed around 95,000 – 1,05,000 litres of market milk per day in three types of milk, namely toned milk, standardized milk and full-cream

milk. The excess milk was converted into several products like butter, ghee, flavoured milk and paneer and the dairy products were sold through wholesalers, retailers and commission agents for the private dairy.

Methodology

The cost of milk procurement was ascertained by taking into account the costs on collection, transportation, chilling and delivery of milk at the reception dock. For working out cost of milk collection for the co-operative and private dairy plants, 20 milk producer co-operative societies and 20 milk collection centres were selected by the probability proportion to sample size method, based on quantity of milk collected. For finding transportation cost, 20 routes from co-operative plant and 20 routes from private plant were selected by the probability proportion to sample size method, based on the quantity of milk transported. To work out the chilling cost, all the chilling centres which were attached to the co-operative and the private dairy plants were selected.

To work out the processing and distribution costs, the major dairy products, viz. toned milk, standardized milk, full-cream milk, flavoured milk, butter, ghee, milk peda and paneer were taken in this study from both the plants. The data were collected for the financial year 2001-02 from the different sections (viz. procurement, processing, manufacturing, and distribution) of the selected dairy plants. The collected data were analyzed to ascertain marketing cost, marketing margin and marketing efficiency of different dairy products using tabular analysis. Marketing efficiency was worked out through Shepherd's formula.

Costing Methodology

(a) Marketing Cost

In a dairy plant, the total marketing cost comprises costs on milk procurement, its processing and distribution of dairy products.

Milk Procurement Cost

Cost of milk procurement included costs on collection, transportation, chilling and delivery of milk

at the reception dock by following the methodology outlined in Rangasamy and Dhaka (2007a).

Manufacturing Cost of Milk Products

The manufacturing cost comprises cost of raw material and total processing cost of dairy products. The total processing cost of dairy products comprises expenditures on electricity, water, steam, refrigeration, maintenance and repairs, stationery and stores, labour, packing materials, detergents, besides quality control expenditure, salaries and administrative expenses, depreciation on buildings, equipments and machinery, interest on investment in buildings, plant equipment and machinery, losses in milk and milk solids and miscellaneous costs. The interest was calculated at the rate of 6.25 per cent per annum on the value of equipments and machinery and electric installations in all the sections of dairy plant. The depreciation values of equipments, machineries and all sections of dairy plant buildings were taken either from the account books or accounts section of the respective dairy plants.

The raw material cost was apportioned based on fat and SNF contents of milk. The costs on electricity, water, steam, refrigeration, detergents were apportioned to different products based on their consumption in different product manufacturing sections. The maintenance charges were apportioned on milk input basis. The stationery and stores cost was apportioned on the basis of value of items used directly for the particular product. Direct labour wages were apportioned to specific operations on man-hour basis. Direct allocation was done for the cost of packing material. The total quality control expenditure was apportioned to different products on the basis of number of their samples tested. Salary of staff of product manufacturing section was allocated based on quantity and value of product produced. Depreciation and interest on investment on buildings was proportionately allocated to different products on the basis of space occupied by the machinery used for their manufacturing.

Distribution Cost

Distribution cost included expenses on advertisement, sales promotion, rent of booths and

parlours, salary of marketing and sales personnel, stationery, telephone, conveyance, sales commission to wholesalers, retailers and commission agents, transportation of milk and milk products to booths, parlours and sales outlets, storage of milk and milk products under refrigerated condition, loading and unloading of milk and milk products in the dairy plant, sales tax, and depreciation, interest and other miscellaneous costs. Depreciation on transport vehicles were taken from the books and accounts section of the respective dairy plants. The interest was calculated at the rate of 6.25 per cent per annum on the value of transport vehicles. Total distribution cost was apportioned to milk and milk products based on their total sales value.

(b) Marketing Margin

Marketing margin of a dairy plant was taken as the difference between the selling price of a product per unit and the total cost of its manufacturing and distribution.

(c) Marketing Efficiency

Marketing efficiency is the ratio of value addition for the goods to their marketing cost (Shepherd, 1965), where the value added is the difference between the costs of goods purchased by a firm and price for which it sells those goods (Khol and Uhl, 1967).

In the present study,

$$\text{Value added (V)} = \text{Selling price of the product} - \text{Raw material cost}$$

where, raw material cost is the cost of total solids (fat and SNF) utilized for manufacturing different dairy products ; and the total marketing cost (I) comprised milk procurement cost, processing cost and distribution cost of dairy products. Thus,

$$\text{Index of marketing efficiency (ME)} = (V-I)/I$$

Results and Discussion

The marketing cost, marketing margin and marketing efficiency for co-operative and private dairy plants for various dairy products have been presented in Tables 1 and 2, respectively and have been discussed under two sub-sections, viz. (a) liquid/processed milk varieties, and (b) milk products.

Table 1. Marketing cost, marketing margin and marketing efficiency of dairy products in a co-operative dairy plant

Dairy products	Raw material cost (Rs/kg) (i)	Procurement cost of raw material /unit (Rs/kg) (ii)	Processing cost/ unit (Rs/litre) or (Rs/kg) (iii)	Distribution cost/unit (Rs/litre) or (Rs/kg) (iv)	Production cost/unit (Rs/litre) or (Rs/kg) (V)=(i+ii+iii)	Total costs/unit (Rs/litre) or (Rs/kg) (vi)=(iv+v)
Toned milk	8.60 (72.15)	1.36 (11.41)	1.10 (9.23)	0.86 (7.21)	11.06 (92.79)	11.92 (100.00)
Standardized milk	10.23 (74.62)	1.54 (11.23)	1.09 (7.95)	0.85 (6.20)	12.86 (93.80)	13.71 (100.00)
Full-cream milk	11.19 (73.09)	1.70 (11.10)	1.17 (7.64)	1.25 (8.16)	14.06 (91.84)	15.31 (100.00)
Flavoured milk	9.15 (18.28)	1.26 (2.52)	32.94 (65.81)	6.70 (13.39)	43.35 (86.61)	50.05 (100.00)
Butter	68.51 (71.24)	1.83 (1.90)	11.32 (11.77)	14.51 (15.09)	81.66 (84.91)	96.17 (100.00)
Ghee	86.60 (66.88)	2.05 (1.58)	9.88 (7.63)	30.96 (23.91)	98.53 (76.09)	129.49 (100.00)
Milk peda	43.92 (43.00)	1.19 (1.17)	34.84 (34.11)	22.18 (21.72)	79.95 (78.28)	102.13 (100.00)

Dairy products	Selling price/unit (Rs/litre) or (Rs/kg) (vii)	Marketing margin (Rs/litre) or (Rs/kg) (viii)=(vii-vi)	Total marketing cost (Rs/litre) or (Rs/kg) (ix)=(ii+iii+iv)	Marketing cost and margin (Value added) (Rs/litre) or (Rs/kg) (x)=(viii+ix)	Marketing efficiency $xi = [(x/ix) - 1] = [(V/I) - 1]$
Toned milk	12.50	0.58 (4.87)	3.32 (27.85)	3.90	0.1747
Standardized milk	14.50	0.79 (5.76)	3.48 (25.38)	4.27	0.2270
Full-cream milk	16.00	0.69 (4.51)	4.12 (26.91)	4.81	0.1675
Flavoured milk	50.00	-0.05 (0.10)	40.90 (81.72)	40.85	-0.0012
Butter	110.00	13.83 (14.38)	27.66 (28.76)	41.49	0.5000
Ghee	145.00	15.51 (11.98)	42.89 (33.12)	58.40	0.3616
Milk peda	100.00	-2.13 (2.09)	58.21 (57.00)	56.08	-0.0366

Note: *Figures within the brackets show percentages to the total cost.

Table 2. .Marketing cost, marketing margin and marketing efficiency of dairy products in a private dairy plant

Dairy products	Raw material cost (Rs/kg) (i)	Procurement cost of raw material /unit (Rs/kg) (ii)	Processing cost/ unit (Rs/litre) or (Rs/kg) (iii)	Distribution cost/unit (Rs/litre) or (Rs/kg) (iv)	Production cost/unit (Rs/litre) or (Rs/kg) (V)=(i+ii+iii)	Total costs/unit (Rs/litre) or (Rs/kg) (vi)=(iv+v)
Toned milk	8.93 (72.90)	1.35 (11.02)	0.82 (6.69)	1.15 (9.39)	11.10 (90.61)	12.25 (100.00)
Standardized milk	9.91 (74.79)	1.46 (11.02)	0.83 (6.26)	1.05 (7.92)	12.20 (92.08)	13.25 (100.00)
Full-cream milk	11.22 (74.30)	1.62 (10.73)	0.75 (4.97)	1.51 (10.00)	13.59 (90.00)	15.10 (100.00)
Flavoured milk	8.52 (29.23)	1.20 (4.11)	14.32 (49.14)	5.10 (17.50)	24.04 (82.49)	29.14 (100.00)
Butter	56.93 (67.11)	4.26 (5.02)	6.25 (7.37)	17.39 (20.50)	67.44 (79.50)	84.83 (100.00)
Ghee	83.99 (64.66)	2.38 (1.83)	10.79 (8.31)	32.73 (25.20)	97.16 (74.80)	129.89 (100.00)
Paneer	48.90 (59.32)	1.66 (2.01)	11.44 (13.88)	20.43 (24.78)	62.00 (75.22)	82.43 (100.00)

Dairy products	Selling price/unit (Rs/litre) or (Rs/kg) (vii)	Marketing margin (Rs/litre) or (Rs/kg) (viii)=(vii-vi)	Total marketing cost (Rs/litre) or (Rs/kg) (ix)=(ii+iii+iv)	Marketing cost and margin (Value added) (Rs/litre) or (Rs/kg) (x)=(viii+ix)	Marketing efficiency $xi=[(x/ix)-1]=[(V/I)-1]$
Toned milk	12.50	0.25 (2.04)	3.32 (27.10)	3.57	0.08
Standardized milk	14.50	1.25 (9.43)	3.34 (25.21)	4.59	0.37
Full-cream milk	16.00	0.90 (5.96)	3.88 (25.70)	4.78	0.23
Flavoured milk	52.50	23.36 (80.16)	20.62 (70.76)	43.98	1.13
Butter	120.00	35.17 (41.46)	27.90 (32.89)	63.07	1.26
Ghee	150.00	20.11 (15.48)	45.90 (35.34)	66.01	0.44
Paneer	110.00	27.57 (33.45)	33.53 (40.68)	61.10	0.82

Note: *Figures within the brackets show percentages to the total cost.

Liquid/Processed Milk Varieties

Toned Milk: The marketing cost of toned milk for co-operative and private dairy plants was found almost same and its different components showed minor variations in the marketing process. This analysis indicated that marketing margin was higher of co-operative (Re 0.58 per litre) than private (Re 0.25 per litre) dairy plant. Consequently, the marketing efficiency was more for co-operative (0.17) dairy than private (0.08) dairy plant. The study revealed that toned milk production was more profitable for co-operative than private dairy plant.

Standardized Milk: The marketing cost of standardised milk has been found more for co-operative (Rs 3.48 per litre) than private dairy (Rs 3.34 per litre) plant due to higher procurement and processing costs by the co-operative plant. Consequently, marketing margins have been recorded more on private (Rs 1.25 per litre) than co-operative (Rs 0.79 per litre) dairy plant. The marketing efficiency was observed more for private (0.37) than co-operative (0.23) dairy plant. It was due to lower marketing costs and more marketing margin for private than co-operative dairy plants. Thus, the study has revealed that standardized milk production is more profitable for private than co-operative dairy plant.

Full-Cream Milk: The marketing cost of full-cream milk was recorded more for co-operative (Rs 4.12 per litre) than private dairy (Rs 3.88 per litre) plant due to higher procurement and processing costs for co-operative plant. The marketing margin per litre of full-cream milk was found higher for private (Re 0.90) than co-operative (Re 0.69) dairy plant . The marketing efficiency was lower for co-operative (0.17) than private (0.23) dairy. This decrease for co-operative dairy was attributed to higher marketing cost and less marketing margin. It could be concluded that production of full-cream milk was more profitable on private than co-operative dairy plant.

Flavoured Milk: The marketing cost of flavoured milk for private (Rs 20.62 per litre) dairy plant was lower than that of co-operative (Rs 40.90 per litre) plant due to its higher costs of procurement, processing and distribution. The marketing margin of private dairy (Rs 23.36 per litre) was much higher than the negative margin of Rs -0.05 for co-operative

dairy. The marketing efficiency was -0.0012 for co-operative dairy and 1.13 for private dairy .The study has shown that flavoured milk production was profitable for the private dairy due to its higher marketing margin and marketing efficiency.

To sum up, the study has revealed that a private dairy plant earns more marketing margins and achieves higher marketing efficiency than a co-operative dairy plant, except in the case of toned milk .

Milk Products

Butter: The marketing cost for butter was found almost same in the two dairy plants, it being Rs 27.66 per kg for co-operative dairy and Rs 27.90 per kg for private dairy plant. The marketing margin was higher for private (Rs 35.17 per kg) than co-operative (Rs 13.83 per kg) dairy plants. The marketing efficiency was also higher at 1.26 for private dairy than of 0.50 for co-operative dairy. The analysis revealed that butter production was more profitable to the private than co-operative dairy plant.

Ghee: The marketing cost of ghee was higher for private (Rs 45.90 per kg) than co-operative (Rs 42.89 per kg) dairy plant on account of higher costs on procurement and processing by the private dairy. The marketing margin and marketing efficiency were higher for private than co-operative dairy plant and therefore, it was concluded that production of ghee was more profitable for private than co-operative dairy plant .

To sum up, it could be inferred that a private dairy plant earns higher marketing margins and attains higher marketing efficiency than of co-operative dairy plant in the marketing of value-added milk products.

Milk Peda: The data on marketing of milk peda (Table 1) revealed that it was causing a loss to the co-operative dairy and contributed negative marketing margin and negative marketing efficiency.

Paneer: A perusal of Table 2 revealed that paneer provided a high profit to private dairy plant; the marketing cost, marketing margin and marketing efficiency being Rs 33.53 per kg, Rs 27.57 per kg and 0.82 per kg, respectively.

The results obtained in the present study were in agreement with the findings of Anand (1979). Pawar and Sawant (1979), Chahal (1991), Saha (1996), and Devaraja (2001) have also worked out the marketing cost of liquid milk in different dairy plants and have concluded that a private dairy plant is more efficient in marketing of dairy products than a co-operative dairy plant.

It could be inferred from this study that absolute and relative profitabilities of dairy products are determined by factors like raw material cost, procurement cost, processing and manufacturing cost, distribution cost, selling price of product and quantity of dairy products manufactured and sold, besides various constraints faced by dairy plants at three important value-addition stages, viz. procurement, processing and distribution of dairy products.

Conclusions and Policy Implications

This study on marketing efficiency of dairy products for co-operative and private plants has shown that the marketing cost for toned milk is same for both the dairy plants, whereas it has been found higher for standardized milk, full-cream milk and flavoured milk in the co-operative dairy plant. However, for butter and ghee, marketing cost has been observed less in the co-operative dairy. All dairy products, except toned milk of private dairy, have recorded higher marketing margins in private than co-operative plant. The marketing efficiency for all dairy products, except toned milk, has been found lower for co-operative than private dairy plant.

Based on the insights provided by the study, the following policy implications have been suggested to make the co-operative and private dairy plants more skilled at milk procurement, processing, manufacturing, and sales and distribution levels (Rangasamy and Dhaka, 2007b).

(a) Milk Procurement Level

- Development of efficient milk collection centres with proper cooling facilities and transportation networks at farmers level by co-operative and private dairy plants would help strengthen the linkages between dairy farmers and dairy industry.

- Co-operative dairy plants should make regular, and if possible, advance payments to milk producing members to avoid milk-selling to milk vendors.
- Educating /Imparting training to dairy farmers at Milk Producers' Co-operative Society / collection centres about hygiene in milk production will improve the quality of procured milk.

(b) Processing and Manufacturing Level

- The dairy plants should utilize the full plant capacity to reduce costs on processing and manufacturing of their products.
- The old machinery and equipments should be replaced to reduce cost on repairs and maintenance .
- Qualified and technical persons should be recruited.
- Quality control of dairy products should be evolved.
- The product mix should be reoriented as per the changing market environment and superfluous expenses should be avoided.

(c) Sales and Distribution Level

- Consumer-oriented market research and development should be accorded higher attention.
- The private dairy plants should lower the sales commission being paid to commission agents, wholesalers, retailers and other selling agents to reduce distribution cost.
- The quantity of dairy products distribution should be increased to bring down distribution cost.

Acknowledgments

The financial assistance provided by NDRI (ICAR), Karnal, for carrying out research work and the data provided by the co-operative and private dairy plants are gratefully acknowledged. The authors are thankful to the anonymous referee for his useful comments and suggestions.

References

- Anand, A. (1979) Marketing costs and consumers opinion for milk and milk products of milk plant in Ambala, *M.Sc. dissertation* (unpublished), Kurukshetra University, Kurukshetra, Haryana.
- Chahal, S.S. (1991) An economic analysis of milk marketing in Punjab, *Ph.D. Thesis* (unpublished), Punjab Agricultural University, Ludhiana, Punjab.
- Devaraja, T.S. (2001) Channels and price spreads in milk marketing in co-operative and private sectors of Karnataka. *Agricultural Marketing*, **28**:21-23.
- GoI (Government of India) (2004) *Statistical Abstracts*, Department of Statistics, Ministry of Statistics and Programme Implementation, New Delhi.
- Khols, R.L. and Uhls, J.N. (1967) *Marketing of Agricultural Products*, Macmillan Publishing Company, New York. 594 p.
- Pawar, J.R. and Sawant, S.K. (1979) Comparative efficiency of alternative milk marketing agencies in western Maharashtra, *Indian Journal of Agricultural Economics*, **34**(4):160-167.
- Rangasamy, N. and Dhaka, J.P. (2007a) Milk procurement cost for co-operative and private dairy plants in Tamil Nadu — A comparison, *Indian Journal of Agricultural Economics*, **62**(4): 679-693.
- Rangasamy, N. and Dhaka, J.P. (2007b) Constraints faced by co-operative and private dairy plants in Tamil Nadu - A comparative analysis, *Indian Journal of Dairy Science*, **60**(4): 300-306.
- Saha, A.K. (1996) Economic analysis of district co-operative milk producers union Ltd. and dairy plant in Orissa, *M.Sc. Dissertation* (unpublished), National Dairy Research Institute, Karnal, Haryana.
- Shepherd, G.S. (1965) *Marketing Farm Products - Economic Analysis*, Iowa State University Press, Ames, Iowa, USA, 254 p.