
Marketing Efficiency of Milk Marketing Channels in Middle Gujarat and Scope for Its Improvement[#]

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ABSTRACT

Based on an aggregative analysis, the paper demonstrates marketing efficiency of milk marketing channels of dairy farmers in Middle Gujarat during the year 2018-19 based mainly on primary data using tabular analysis. The results indicated that the highest price spread was found in case of Channel-III followed by Channel-IV, Channel-II and Channel-I respectively. Among all the marketing channels, the highest marketing efficiency was found in Channel II. Channel I was found to be most efficient when analysed from view point of producers' share in consumers' rupee. The study also brought to the fore that higher the price spread, lower the efficiency in marketing of milk.

Keywords: Marketing channels, Producer's share in consumer's rupee.

JEL.: D40, M31, M38

I

INTRODUCTION

Dairying plays a vital role in the economy of many developing countries including India. It contributes about 28.4 per cent in the agricultural gross domestic product in India and also provides gainful employment all-round the year to 16.44 million people. India is the global leader in milk production since 1998 and has the largest bovine population in the world (Government of India, 2020), with 21.32 per cent of the global production during the year 2017 (www.fao.org). India is the only nation that has achieved and continues to maintain national self-sufficiency in milk.

Milk production is a seasonal phenomenon which increases during winter and decreases during summer. India has achieved an annual output of 187.7 million tonnes during the year 2018-19 (www.indiastat.com). For the purpose of doubling the income of the farmers, the target of milk production has been kept at 254.5 million metric tonnes by the year 2021-22 (Government of India, 2019). Unleashing the maximum potential of the livestock sector is one of the key measures of doubling farmer's income by 2022.

In India, out of total milk production, nearly 46 per cent of milk is either consumed at the producer level or sold to non-producers in the rural area. The remaining 54 per cent of the milk is sold to consumers in the urban areas. Out of the marketable surplus, it is estimated that about 40 per cent of the milk sold is handled by the organised sector

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(i.e., 20 per cent each by co-operative and private dairies) and the remaining 60 per cent by the unorganised sector. Up to December 2019, about 17.01 million farmers were covered from 222 dairy co-operative milk unions within the ambit of 1,94,007 village level dairy co-operative societies. The dairy co-operative milk unions had procured daily average of 464.34 lakh kg per day of milk during the year 2019-20 as compared to 494.27 lakh kg per day during the year 2018-19 recording a decline of 6.1 per cent (due to COVID 19's short term impact). The sale of liquid milk by co-operative dairies reached 370.04 lakh litres per day during the year 2019-20 as compared to 353.05 lakh litres per day registering an increase of 4.8 per cent over 2018-19 (Government of India, 2020). Through dairy development schemes like National Programme for Dairy Development, National Dairy Plan (Phase-I), Dairy Entrepreneurship Development Scheme, Support to Dairy Co-operatives and Dairy Processing and Infrastructure Development Fund, Government of India has been making efforts for strengthening the infrastructure for production of quality milk, procurement, processing and marketing of milk and milk products (Government of India, 2019). Gujarat has historically been the front runner in milk production activities. The milk production of the state in the year 2018-19 was 14492000 tonnes (www.indiastat.com). Gujarat enjoys fifth rank in milk production among all the states and union territories of the country. The per capita consumption of milk in Gujarat is higher than that of national average.

Marketing is important as production and forms an integral part of production. Marketing of milk is a specialised activity by itself involving handling, packing, movement, grading and quality tests etc. As compared to other perishable commodities, milk has to pass through various intermediary agencies, as milk has to traverse through a long route before reaching the end user. Dairy farmers have now been searching for profitable disposal of their milk to meet the growing demand. Hence, on the basis of analysis of different marketing channels, the study attempts to generate useful insights for the milk producers to choose the most appropriate distribution channel to increase net profit and to understand the significance of organisation like Amul, mainly in marketing of milk. Constraint analysis will help the farmers and policy makers to understand the challenges and find most appropriate solutions for making dairy enterprise a better paying proposition by framing appropriate policy to make dairy farming more attractive and adequate income and employment generating activity. Therefore, keeping these facts in view, the present paper attempts to study the marketing efficiency of milk marketing channels and marketing constraints in dairy farming across different herd size categories and suggest the measures to overcome them.

II

MATERIAL AND METHODS

The study was conducted in Middle Gujarat region which comprises nine districts. In the first stage, on the basis of highest milk production, three districts namely Anand, Kheda and Panchmahal were selected (Table 1). At the second stage, two talukas were

randomly selected from each selected district. In the third stage, four villages were selected purposively ensuring that these villages have buffaloes as well as crossbred cows in the selected talukas. In the fourth stage, from a set of four villages chosen, falling under each taluka, 40 households, 20 each having buffaloes and 20 crossbred cows, were selected in such a way that from each selected category of marginal (1-2), small (3-5), medium (6-10) and large (above 10 milch animals) farmers, 5 households with buffaloes only and 5 households with crossbred cows only were ensured (Lal and Chandel, 2016). The classification of categories was done according to possession of milch animals. Thus, in all, 240 respondents (59 marginal, 60 small, 59 medium and 62 large) spread over 24 villages of three districts comprised as the ultimate sample size. For the study of marketing aspects of milk, 10 functionaries at each stage of marketing channel in each selected district were chosen. Due to limited time as a major constraint, marketing aspects only for the buffalo milk were studied. Thus, 30 functionaries were chosen from each category of functionaries extending over the three selected districts (different agencies like co-operatives and private agencies).

TABLE 1. DISTRICT WISE MILK PRODUCTION IN MIDDLE GUJARAT

Name of the Districts (1)	('000 tonnes)				
	2014-15 (2)	2015-16 (3)	2016-17 (4)	Average (5)	Per cent to total (6)
Ahmedabad	404.38	425.48	435.83	421.89	14.05
Anand*	523.38	550.88	579.15	551.13	18.35
Dahod	290.34	304.00	298.39	297.57	9.91
Kheda*	622.90	683.58	705.67	670.71	22.34
Panchmahal*	554.93	608.31	644.01	602.41	20.06
Vadodara	451.68	441.16	482.47	458.43	15.27
Total	2847.61	3013.41	3145.52	3002.18	100

Source: Government of Gujarat, 2017.

*Considered for the study

The classification of farmers according to herd size categories is presented in Table 2 for buffaloes and crossbred cows.

TABLE 2. CLASSIFICATION OF FARMERS ACCORDING TO HERD SIZE CATEGORIES

Herd Size Categories (1)	Number of Farmers	
	Buffaloes (2)	Crossbred Cows (3)
Marginal (1-2 milch animals)	32	27
Small (3-4 milch animals)	29	31
Medium (6-10 milch animals)	29	30
Large (above 10 milch animals)	30	32
Total	120	120

Source: Field survey.

III

DATA

The primary data were collected for the agricultural year 2018-19. The data on marketing cost and prices at various stages of marketing of milk were compiled by

personally interviewing the selected marketing intermediaries through a pre-tested structured schedule. Tabular analysis was used to analyse the marketing constraints faced by the dairy farmers through close-ended questions. Based on the frequency and percentage of the respondents, intensity of marketing problems was assessed by assigning the ranks to them.

Analysis of Data

Calculation of Marketing Costs

Total marketing costs incurred by the producer/seller and various intermediaries (middlemen) were worked out by using following formula:

Producer's share in consumer's rupee

$$P_S = \frac{P_F}{P_C} \times 100$$

where,

P_S = Producer's share in consumer's rupee,

P_F = Price of the produce received by the farmer, and

P_C = Price of the produce paid by the consumer.

Total marketing cost = cost incurred by farmer + cost incurred by middle man

$$C = C_F + C_{m1} + C_{m2} + \dots + C_{mn}$$

where,

C = Total cost of marketing

C_F = Cost incurred by the producer in marketing of milk, and

C_{mn} = Cost incurred by the i-th middleman in marketing of milk.]

Marketing margin of the middle man = $\frac{\text{[sale price per unit - (purchase price per unit + cost incurred on marketing)]}}{\text{sale price per unit}} \times 100$

Absolute margin of i-th middleman = $P_{Ri} - (P_{Pi} + C_{mi})$

Percentage margin of i-th middleman = $\frac{P_{Ri} - (P_{Pi} + C_{mi})}{P_{Ri}} \times 100$

where,

P_{Ri} = Sale price of the i-th middleman,

P_{Pi} = Purchase price of the i-th middleman, and

C_{mi} = Cost incurred on marketing by the i-th middleman.

Marketing efficiency = $\frac{\text{[price paid by consumer/(total marketing cost + net marketing margin)]}}{\text{[price paid by consumer/(total marketing cost + net marketing margin)]}} - 1$

$$ME = [RP / (MC + MM)] - 1$$

where,

ME = Marketing efficiency,
 RP = Prices paid by the consumer,
 MC = Total marketing costs, and
 MM = Net marketing margins.

IV

RESULTS AND DISCUSSION

Price Spread, Marketing Cost and Marketing Margin of Milk

Marketing is the process that involves cost and margins at different levels of marketing and therefore, the price spread from producer to consumer. The extent of price spread helps policy makers in devising suitable policies for increasing marketing efficiency either by way of reducing costs or eliminating unwanted middlemen from the marketing process or by both. The understanding of these concepts is necessary to choose the channels in marketing of agricultural products and thereby the profitability depends upon how marketing is undertaken by producers.

Different milk marketing channels operating in the study area are presented below. There were four marketing channels of which two channels existed under private system of marketing whereas two channels were prevalent under co-operative system of marketing.

The channels identified in the study area are as given below:

Channel I: Producer – Consumer

Channel II: Producer – Milk Vendor – Consumer

Channel III: Producer – Village Level Co-operative Society – District Level Co-operative Dairy – Dealer – Retailer (Non-Amul Outlet / Pan Parlours) – Consumer

Channel IV: Producer – Village Level Co-operative Society – District Level Co-operative Dairy – Dealer – Retailer (Amul Outlet) – Consumer.

A perusal of Table 3 reveals that in channel I, net price received by the farmers and price paid by the consumers remained the same (Rs.58.33 per litre of milk) and producers' share in consumers' rupee was found to be 100.00 per cent as there were no any other intermediaries in the channel.

TABLE 3. COSTS, MARGINS AND PRICE SPREAD IN CHANNEL I

Sr. No. (1)	Particulars (2)	Cost (Rs./litre) (3)	Per cent to consumer's price (4)
1.	Net price received by the farmers	58.33	100.00
2.	Price paid by the consumers	58.33	100.00
3.	Price spread (cost + margin)	0.00	0.00

Source: Market Survey.

A perusal of Table 4 reveals that in channel II, producers' share in consumers' rupee was 93.82 per cent. Marketing cost and marketing margin incurred by milk vendor was Rs.1.50 and Rs.2.34 per litre of milk, respectively. Price paid by the consumers was Rs.62.17 per litre of milk while price spread was found to be Rs.3.84 per litre of milk. Here, the village milk vendor purchase the milk from the producers in and around the villages and deliver the collected milk at the door step of the needy consumers. It has been observed that the milk vendors played an important role in supplying the milk to the consumers.

TABLE 4. COSTS, MARGINS AND PRICE SPREAD IN CHANNEL II

Sr. No. (1)	Particulars (2)	Cost (Rs./litre) (3)	Per cent to consumers' price (4)
1.	Net price received by the farmers	58.33	93.82
2.	Marketing cost incurred by farmers	0	0.00
3.	Purchase price of milk vendor	58.33	93.82
4.	Marketing cost incurred by milk vendor	1.50	2.41
5.	Marketing margin of milk vendor	2.34	3.76
6.	Total marketing cost (2+4)	1.50	2.41
7.	Total marketing margin (5)	2.34	3.76
8.	Price paid by the consumers	62.17	100.00
9.	Price spread (cost + margin)	3.84	6.17

Source: Market Survey.

A perusal of Table 5 reveals that in channel III, producers' share in consumers' rupee was 68.72 per cent. The marketing cost incurred was highest in case of district level co-operative dairy which was found to be Rs.2.65. Out of total marketing cost incurred by district level co-operative dairy, the highest share was of transportation cost of milk (Rs.2 per litre of milk), followed by processing of milk (Rs.0.50 per litre of milk) and packing of milk (Rs.0.15 per litre of milk). The marketing margin earned by district level co-operative dairy (Rs.9.76 per litre of milk) was found to be highest as compared to village level co-operative society (Rs.0.55 per litre of milk), dealer (Rs.0.28 per litre of milk) and retailer (Rs.3.65 per litre of milk). The price spread was Rs.16.89 per litre of milk which was 31.27 per cent of consumers' purchase price. It was observed that non-Amul outlets or pan parlours were found to charge Re.1 to Rs.2 per litre of milk from the consumers as compared to Amul outlets to cover their refrigeration costs.

A perusal of Table 6 reveals that in channel IV, producers' share in consumers' rupee was 71.37 per cent. The price spread was Rs.14.89 per litre of milk which was 28.63 per cent of consumer's purchase price. In channel IV, as compared to channel III, producers' share in consumers' rupee was found to be high and price spread was found to be low as Amul outlets were not exploiting the consumers and hence defining itself the importance of co-operatives.

TABLE 5. COSTS, MARGINS AND PRICE SPREAD IN CHANNEL III

Sr. No. (1)	Particulars (2)	Cost (Rs./litre) (3)	Per cent to consumers' price (4)
1.	Net price received by the farmers	37.11	68.72
2.	Marketing cost incurred by farmers	0	0.00
3.	Purchase price of village level co-operative society	37.11	68.72
4.	Marketing cost incurred by VLC's	0	0.00
5.	Marketing margin of VLC's	0.55	1.02
6.	Purchase price of district level co-operative dairy	37.66	69.74
7.	Marketing cost incurred by district level co-operative dairy	2.65	4.91
(i)	Processing of milk	0.50	0.93
(ii)	Packing of milk	0.15	0.28
(iii)	Transportation cost of milk	2	3.70
8.	Marketing margin of district level co-operative dairy	9.76	18.07
9.	Purchase price of dealer	50.07	92.72
10.	Marketing cost incurred by dealer	0	0.00
11.	Marketing margin of dealer	0.28	0.52
12.	Purchase price of retailer (non-Amul outlet / pan parlours)	50.35	93.24
13.	Marketing cost incurred by retailer	0	0.00
14.	Marketing margin of retailer (non-Amul outlet / pan parlours)	3.65	6.76
15.	Total marketing cost (2+4+7+10+13)	2.65	4.91
16.	Total marketing margin (5+8+11+14)	14.24	26.37
17.	Price paid by the consumers	54	100.00
18.	Price spread (cost + margin)	16.89	31.27

Source: Market Survey.

TABLE 6. COSTS, MARGINS AND PRICE SPREAD IN CHANNEL IV

Sr. No. (1)	Particulars (2)	Cost (Rs./litre) (3)	Per cent to consumers' price (4)
1.	Net price received by the farmers	37.11	71.37
2.	Marketing cost incurred by farmers	0	0.00
3.	Purchase price of village level co-operative society	37.11	71.37
4.	Marketing cost incurred by VLC's	0	0.00
5.	Marketing margin of VLC's	0.55	1.06
6.	Purchase price of district level co-operative dairy	37.66	72.42
7.	Marketing cost incurred by district level co-operative dairy	2.65	5.10
(i)	Processing of milk	0.50	0.96
(ii)	Packing of milk	0.15	0.29
(iii)	Transportation cost of milk	2	3.85
8.	Marketing margin of district level co-operative dairy	9.76	18.77
9.	Purchase price of dealer	50.07	96.29
10.	Marketing cost incurred by dealer	0	0.00
11.	Marketing margin of dealer	0.28	0.54
12.	Purchase price of retailer (Amul outlet)	50.35	96.83
13.	Marketing cost incurred by retailer	0	0.00
14.	Marketing margin of retailer (Amul outlet)	1.65	3.17
15.	Total marketing cost (2+4+7+10+13)	2.65	5.10
16.	Total marketing margin (5+8+11+14)	12.24	23.54
17.	Price paid by the consumers	52	100.00
18.	Price spread (cost + margin)	14.89	28.63

Source: Market survey.

Marketing Efficiency of Milk in Different Marketing Channels

Efficiency of marketing for an agricultural produce in general is assessed by the size of share which producer (farmer) obtains in the price paid by the consumer. These results were further substantiated by working out marketing efficiency as suggested by Acharya and Agrawal (2003). The marketing efficiency of different channels for milk is presented in Table 7.

TABLE 7. MARKETING EFFICIENCY OF MILK IN DIFFERENT MARKETING CHANNELS

Sr. No. (1)	Particulars (2)	Channel I (3)	Channel II (4)	Channel III (5)	Channel IV (6)
1.	Consumers' price (Rs./litre)	58.33	62.17	54.00	52.00
2.	Producers' net price Rs./litre)	58.33	58.33	37.11	37.11
3.	Marketing cost (Rs./litre)	0	1.50	2.65	2.65
4.	Market margin (Rs./litre)	0	2.34	14.24	12.24
5.	Price spread (Rs./litre)	0	3.84	16.89	14.89
6.	Marketing efficiency	-	15.19	2.20	2.49

Source: Market survey.

It can be seen from Table 7 that the highest price spread was found in case of channel III (Rs.16.89 per litre of milk) followed by channel IV (Rs.14.89 per litre of milk), channel II (Rs.3.84 per litre of milk) and Rs 0 per litre of milk in channel I. The price spread in channel I was found to be 0 due to the fact that not a single intermediary was involved as consumers were directly procuring milk from the producers without any processing. The price spread in channel II had widened due to the fact that one intermediary was increased. The price spread in channel III and channel IV was found to be more as compared to channel II as the number of intermediaries were increased and the form of the milk being sold to the consumers was also processed milk. The study also brought to the fore that higher the price spread, lower the efficiency in marketing of milk and this was also found in line with studies by Brar *et al.*, (2017), Prusty and Tripathy (2016) and Tewari *et al.*, (2017).

Further, the table revealed that the highest marketing efficiency was found in channel II (15.19) followed by channel IV (2.49) and channel III (2.20). In case of milk marketing, channel I (Producer - Consumer) was found to be the most efficient when analysed from view point of producers' share in consumers' rupee and also in protecting the interests of the producers as well as the consumers thereby maximising the welfare of the society as a whole. The producer's enjoyed 100.00 per cent share in consumers' rupee. However, based on the value added approach, channel II (Producer - Milk Vendor - Consumer) appeared to be most efficient marketing channel followed by channel IV and channel III. The intermediaries in the marketing channel III and IV earned higher margins leading to lower marketing efficiency. These findings are in line with Arora and Bhogal (2013). Therefore steps may be taken by dairy co-operatives to consider the cost of milk production besides fat and Solid not Fat (SNF) percentage in fixing the procurement price of milk.

Marketing Constraints Faced by Dairy Farmers

All the marketing constraints were analysed based on just farmers' simple perceptions. As far as the marketing constraints were concerned, Table 8 reveals that fluctuation in milk prices was the most severe problem felt by all the dairy farmers (100.00 per cent) due to variations in quantity and quality of milk on most of the occasions, which not only caused inconvenience but also substantial loss too. Lack of availability of milk storage facilities and milk chilling facilities for milk preservation was the second major problem faced by 97.92 per cent of the dairy farmers. Low milk prices were reported by 90.83 per cent of the dairy farmers. The price of milk in village level milk co-operative societies should be increased by present inflation rates accordingly. Low price of milk was the most important constraint, as the dairy farmers got only Rs. 37 to 46 per litre of buffalo milk and Rs. 25 to 28 per litre of crossbred cow milk. Dairy farmers were unable to fetch high prices of their milk as bargaining power of milk producer is limited due to perishability and bulkiness of milk.

TABLE 8. MARKETING CONSTRAINTS FACED DAIRY FARMERS

Rank (1)	Problems/Constraints (2)	Marginal (59) (3)	Small (60) (4)	Medium (59) (5)	Large (62) (6)	Overall (240) (7)
1.	Fluctuation in milk prices	59 (100.00)	60 (100.00)	59 (100.00)	62 (100.00)	240 (100.00)
2.	Lack of availability of milk storage facilities	59 (100.00)	60 (100.00)	59 (100.00)	57 (91.94)	235 (97.92)
3.	Lack of availability of chilling facilities for milk preservation	59 (100.00)	60 (100.00)	59 (100.00)	57 (91.94)	235 (97.92)
4.	Low prices of milk	56 (94.92)	55 (91.67)	54 (91.53)	53 (85.48)	218 (90.83)
5.	Non-availability of good co-operative society at village level	8 (13.56)	9 (15.00)	7 (11.86)	7 (11.29)	31 (12.92)
6.	Non-availability of cheap and efficient transportation facilities	5 (8.47)	6 (10.00)	4 (6.78)	5 (8.06)	20 (8.33)
7.	Uneven payment for selling of milk from different agencies	3 (5.08)	3 (5.00)	3 (5.08)	2 (3.23)	11 (4.58)
8.	Long distance of market	3 (5.08)	3 (5.00)	2 (3.39)	2 (3.23)	10 (4.17)

Source: Field survey.

Note: Figures in parentheses indicate the percentages to total number of respondents in each category of farm.

Some 13 per cent of the dairy farmers claimed that there was no good milk co-operative society at the village level. Some of the common form of malpractices included false measurement of fat content in milk by village level milk co-operative societies. The village level milk co-operative societies technically set their fat measuring machine in such a way that the fat measuring machine will automatically

show low level of fat content in dairy farmers' milk even if the dairy farmers' milk is full of high fat content. Due to these malpractices followed by village level milk co-operative societies, dairy farmers are unable to fetch remunerative prices for their milk because of false fat content measurement. This type of problem was observed in Kankuthambhla village of Godhra taluka in Panchmahal district. These kind of malpractices at milk collection centers need to be checked by periodical inspections to avoid exploitation of the dairy farmers. The officials and staff of co-operative societies should follow a friendly customer relationship with the member dairy farmers. This will also help to attract a greater number of new co-operative members. The dairy farmers should market their produce without any hassles. Only 4.5 per cent of the dairy farmers faced the problem of uneven payment for selling of milk from different agencies as mostly all the farmers were found selling milk in village level milk co-operative societies and regular payment was done by the village level milk co-operative societies to the dairy farmers on weekly basis or ten days interval. In the study area, none of the dairy farmers were found selling milk products.

Limitations of Milk Marketing

- 1) The long run average cost of milk production is not considered to provide reasonable mark up while fixing the procurement price of milk.
- 2) The dairy co-operative unions process milk in their dairy factories and differentiate milk by their type of fat and SNF percentages, and sell it as double toned milk, toned milk, standardised milk, whole milk etc. All these types of milk are priced accordingly based on their different fat and SNF percentages. The present analysis has however not considered uniform milk fat and SNF percentages across all channels given the heterogeneity in milk quality marketed through all four channels considered.

Scope for Improving Marketing Efficiency

- 1) To attract consumer preferences, customer oriented market research and development should be accorded higher attention by the co-operative sector.
- 2) To adopt proper marketing channel and price received through it can play an important role in the profitability and sustainability of dairy farming.
- 3) Co-operatives must improve their marketing skills, establish brand equity, strengthen distribution networks and lower the costs of transporting milk from producers to consumers.
- 4) Dairy farmers should try to produce good quality of milk having higher fat percentage to fetch best prices for their milk.
- 5) Dairy sector can play a pivotal role in alleviating rural poverty by generating higher incomes through adopting proper marketing channel.

V

CONCLUSIONS

Dairy farming is a profitable sector in India that has provided a significant source of employment and income generation till date. Among all the marketing channels, highest marketing efficiency was found in Channel-II (15.19) followed by Channel-IV (2.49) and Channel-III (2.20). In case of milk marketing, Channel-I (Producer - Consumer) was found to be most efficient when analysed from view point of producers' share in consumers' rupee. The producers' enjoyed 100.00 per cent share in the consumer's rupee. The study also brought to the fore that higher the price spread, lower the efficiency in marketing of the milk.

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