International Journal of Livestock Research, Vol. 10 (9) Sep' 2020
http://www.ijlr.org
eISSN: 2277-1964
NAAS Rating 2020 – 5.36

Original Research

Marketing Efficiency of Value-Added Milk Products Produced at Farm Level in Punjab State

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How to cite this paper: Kaur, H., Kaur, I., Singh, V., & Wakchaure, N. (2020). Marketing Efficiency of Value-Added Milk products produced at the farm level in Punjab State. *International Journal of Livestock Research*, 10(9), 54-61. doi: http://dx.doi.org/10.5455/ijlr.20200602030842

Received : Jun 02, 2020
Accepted : Jul 19, 2020
Published : Sep 30, 2020

Abstract

The research study was carried out to determine marketing efficiency of milk products that would help the farmers to choose the most efficient marketing channel for increasing their profitability. The study was conducted by selecting 50 farmers by random sampling method from 8 districts of Punjab state. The marketing of milk products were done through two channels; channel-I (Producer-Consumer) and Channel-II (Producer-Sweetshops/Creameries-Consumers). The marketing efficiency was calculated by Acharya's method. The marketing efficiency for producing one kg of Ghee, Milk Cake and Paneer were 147.97, 72.14 and 65.56 respectively, in channel-I whereas 38.75, 5.42 and 8.81 respectively, in channel-II. The marketing efficiency was highest for the products marketed through channel-I than channel-II. Hence, channel-I (Producer-Consumer) is the most efficient channel from producer's point of view.

Keywords: Consumer, Marketing Efficiency, Milk Products, Producer, Punjab

Introduction

In India, the current milk production is 187.75 million tonnes, out of which 6.7 per cent of share is contributed by Punjab with highest per capita availability of milk i.e. 1181 grams per day which is higher than average national availability of milk i.e. 394 gram per day (Anonymous, 2018). The annual growth rate of milk production in India during 2018-19 is 6.5 per cent while 6.3 per cent was observed in Punjab state (Anonymous, 2019). Dairy development in country have played a major role in increasing milk production, improving nutritional standards, improving income level, generating employment opportunities especially for the small and medium farmers.The demand for milk and milk products is ever growing but farmers are not able to produce and receive remunerative prices due to high cost of input supplies and poor existence of marketing network, poor infrastructure and delivery system.

In dairy processing sector, the profitability of the dairy farmers-producers can be increased by value addition of milk products with greater marketing efficiency. The value-added products can help farmers for greater returns and allow the farm to remain profitable without expanding herd size. Promoting on-farm value addition to milk and milk products is believed to be useful for poverty reduction through creating income generating opportunities to the rural poor farmers. The marketing efficiency mainly depends upon the effective management of various activities such as resource use efficiency, higher price realization through market reforms and efficient market linkages. Thus, the marketing of dairy products plays a very important role in the development of dairy sector and to draw attention of policymakers, planners and researchers (Vykhaneswari and Devi, 2019).

It is crucial to restrain the role of middlemen to prevent exploitation during marketing of milk products so that there will be maximum share to the farmers in consumer's rupee. If the farmers sell their produce directly to the consumers without the middlemen, they would get better returns for their products and will not have to be dependent on them for sale. Middlemen are responsible for farmer's low share in the consumer rupee and are exploiting the farmers. Therefore, the analysis of milk marketing channels, marketing costs and the margins of middleman are essential for dairy development at the micro level. It helps in formulating plans for improvements in the dairy sector through higher value addition of milk products and increase in employment generation. The number of intermediaries involved in the marketing channel will determine its efficiency. An efficient marketing system also helps bring quality product to the consumers at the lowest possible cost (Debnarayan and Ghosh, 2010). So, the choice of marketing channel is very much important because it will ultimately decide the profitability of selling milk products.

Material and Methods

The study was conducted in farm selected by simple random sampling method throughout the Punjab state, as there were no specific districts where farmers were doing value addition of milk. In present study, 50 farmers were selected from 8 districts of Punjab state. All sample dairy farmers were classified into three categories as small, medium and large by using Cumulative cube root frequency method proposed by Singh (1975). Daily milk production was taken as the base criteria of the categorization of dairy farmers. On categorization, it constituted 16, 19 and 15 numbers of small, medium and large farmers respectively. The average herd size of animals kept at small, medium and large farms were 09, 15 and 19 respectively. The field data on fixed investments, working capital, milk products and price of inputs and outputs for summer and winter of the year 2018 were collected from the respondent dairy farmers by personal interview method using a specially designed and pre-tested questionnaire. In order to accomplish the objective of the study, appropriate statistical tools and techniques like averages, percentages etc. were used to draw relevant inferences of the study. Tabular analysis was adopted to analyze the cost and returns associated with different value-added products and the price spread of different marketing channels. Advanced models like marketing efficiency index and margin per litre of milk were used to analyze the data. The data analysis was carried out in Statistical Package for the Social Sciences (SPSS) Software version 21.0.

Level of Value Addition

Quantity of milk used for converting into value added milk and milk products represents level of value addition.

$$Level\ of\ value\ addition\ (\%) = \frac{Quantity\ of\ value\ added\ milk\ and\ milk\ products\ produced}{Quantity\ of\ milk\ used\ for\ production} \times 100$$

Marketing Efficiency Index

Marketing efficiency is the ratio of market output to market input (cost of resources). An increase in this ratio represents improved efficiency and a decrease denotes reduced efficiency. The marketing efficiency index was developed by Acharya's method (Acharya and Agarwal, 2001)-

$$MME = [FP \div (MC+MM)]$$

Acharya's measure of marketing efficiency can also be stated as -

$$MME = [RP \div (MC + MM) - 1]$$

Where,

RP = FP + MC + MM
MME = Marketing efficiency, FP = Price received by farmer, MC = Total marketing costs
MM = Net marketing margins of intermediaries, RP = Price paid by the consumer

Margin per Litre of Milk

To ensure comparability of products with different milk content and size of the sales unit, we divided the margin per unit by the liters of milk in each unit, obtaining the ML which indicates the value added per liter of milk (Alvarez *et al*., 2018). The margin per litre of milk is the ratio of difference between per unit price and variable cost per unit of the product to litres of milk used per unit of product.

$$Margin\ per\ litre\ of\ milk\ (ML) = \frac{Price\ per\ unit\ of\ product - Variable\ Cost\ per\ unit\ of\ product}{Litres\ of\ milk\ used\ per\ unit\ of\ product}$$

Results and Discussion

According to farm size, milk production on large, medium and small size farm was 70.76, 46.45 and 24.05 litres/day/farm respectively (Table 1). It clearly indicates, highest milk production per day recorded on large dairy farms. It was noted that all small, medium and large size dairy farmers were preparing different types of value-added milk products at farm level such as Milk Cake, Dahi Plain, Lassi Plain, Paneer, Ghee, Khoya, Pasteurized Flavored Milk (PFM) and Sterilized Flavored Milk (SFM). The Pasteurized Flavored Milk and Sterilized Flavored Milk were prepared only at medium farm. Quantity of milk used for converting into value added milk and milk products represents level of value addition. The level of value addition varies on categories of farms, it was highest on large farm (19.95 per cent) followed by at medium farm (17.87 per cent) and on small farm (13.89 per cent).

Table 1: Total milk production at selected small, medium and large size farm in Punjab state

Category of farm	Small	Medium	Large
Total milk production (litres/day/farm)	24.05	46.45	70.76
Herd Size (Avg. no. of animals)	9	15	19
Product manufactured	Milk Cake, Dahi Plain, Lassi Plain, Paneer, Ghee and Khoya	Milk Cake, Dahi Plain, Lassi Plain, Paneer, Ghee, Khoya, Pasteurized Flavoured Milk (PFM) and Sterilized Flavoured Milk (SFM)	Milk Cake, Dahi Plain, Lassi Plain, Paneer, Ghee and Khoya
Level of value addition (%)	13.89	17.87	19.95

Marketing Channels adopted by Sample Farms in Punjab

The milk products produced at sample farms were either sold direct to the consumer or sold to sweet shops. So,

these milk products were marketed through two channels such as Channel I (Producer-Consumer) and Channel II (Producer-Sweet Shops/Creameries-Consumers) as mentioned by Brar, 2017 (Table 2).

Table 2: Marketing channels adopted by farmers for sell of value-added milk and milk products

Marketing Channel	Description of Channel
Channel I	Producer→Consumer
Channel II	Producer→Sweet Shops/Creameries→Consumers

Marketing Pattern of Value-Added Milk and Milk Products at Farm

The marketing cost and marketing margins of Channel-I and Channel-II for value added of milk products are shown in Table 4 and Table 5 respectively. In channel-I, the value-added products such as milk cake, dahi plain, lassi plain, paneer, ghee, khoya, pasteurized flavoured milk and sterilized flavoured milk manufactured on farm were sold directly to consumer at the price of Rs. 300.00 per kg, Rs. 50.00 per kg, Rs. 50.00 per kg, Rs. 290.00 per kg, Rs. 490.00 per kg, Rs. 240.00 per kg, Rs. 100.00 per litre and Rs. 100.00 per litre, respectively. The net price received on milk cake, dahi plain, lassi plain, paneer, ghee, khoya, pasteurized flavoured milk and sterilized flavoured milk by the farmers were noted as Rs. 295.90 per kg, Rs. 47.28 per kg, Rs. 47.62 per litre, Rs. 285.64 per kg, Rs. 486.71 per kg, Rs. 234.60 per kg, Rs. 88.79 per litre and Rs. 89.02 per litre, respectively which occupied 98.63 per cent, 94.56 per cent, 95.24 per cent, 98.50 per cent, 99.33 per cent, 97.75 per cent, 88.79 per cent and 89.02 per cent share in consumer's purchase price respectively.

In channel- II, the farmer sold the value-added products such as milk cake, dahi plain, lassi plain, paneer, ghee, khoya, pasteurized flavoured milk and sterilized flavoured milk to the sweet shopkeeper at the rate of Rs. 300.00 per kg, Rs. 50.00 per kg, Rs. 50.00 per kg, Rs. 290.00 per kg, Rs. 490.00 per kg, Rs. 240.00 per kg, Rs. 100.00 per litre and Rs. 100.00 per litre, respectively. The net price received on milk cake, dahi plain, lassi plain, paneer, ghee, khoya, pasteurized flavoured milk and sterilized flavoured milk by the farmers were noted as Rs. 295.51 per kg, Rs. 46.70 per kg, Rs. 48.04 per litre, Rs. 287.37 per kg, Rs. 487.42 per kg, Rs. 235.74 per kg, Rs. 76.28 per litre and Rs. 76.52 per litre, respectively which has 84.43 per cent, 77.83 per cent, 80.07 per cent, 89.80 per cent, 97.48 per cent, 90.67 per cent, 76.28 per cent and 76.52 per cent share in the consumer's purchase price. The farmers who primarily sell their products through direct retailing are more likely to attain high income levels compared to those who do not utilize this marketing option (Govindasamy *et al.*, 1999). This is in agreement with the results of the current study that most of the dairy products marketed through channel-I (Producer to Consumer) get higher returns as compared to marketing channel-II.

The productivity and quality are becoming more important for dairy farmers to compete in an increasingly competitive market (Kuma, 2012). This is in agreement with results of the study that the farmer should adopt right marketing channel meaning minimize marketing linkage and direct supply to consumer through producer in order to improve the market efficiency level. The marketing cost of flavored milk for private dairy plant (Rs. 20.62 per litre) was lower than that of co-operative plant (Rs. 40.90 per litre) due to its higher costs of procurement, processing and distribution (Rangasamy and Dhaka, 2008) but the results of the study showed that pasteurized and sterilized flavored milk have marketing cost of about Rs. 11.21 per litre and Rs. 10.98 per litre, respectively which is less that private dairy plant and co-operative plant. The producers share in consumer's rupee was highest in marketing channel-I (Singh and Dubey, 2016) which is in agreement with the present study as market channel-I is more efficient due to direct sell of products to the consumers.

Table 4: Marketing cost of value-added milk products in Marketing Channel-I at farm level in Punjab state

S. No.	Particulars	Milk Cake Rs. /kg	Producer share in consumer rupee (%)	Plain Dahi Rs. /litre	Producer share in consumer rupee (%)	Plain Lassi Rs. /litre	Producer share in consumer rupee (%)	Paneer Rs. /kg	Producer share in consumer rupee (%)	Ghee Rs. /litre	Producer share in consumer rupee (%)	Khoya Rs. /kg	Producer share in consumer rupee (%)	PFM Rs. /litre	Producer share in consumer rupee (%)	SFM Rs. /litre	Producer share in consumer rupee (%)
Channel-I (Producer→Consumer)																	
1	Cost of packaging	0.93	0.31	0.52	1.04	0.93	1.86	0.5	0.17	0.51	0.1	0.51	0.21	5	5	5	5
2	Labour cost	0.91	0.3	1.04	2.08	0.51	1.02	0.5	0.17	0.53	0.11	0.6	0.25	0.57	0.57	0.53	0.53
3	Electricity charges	-	-	0.54	1.08	0.43	0.86	1.6	0.55	1.05	0.21	1.43	0.6	3.08	3.08	2.67	2.67
4	Other miscellaneous charges	2.26	0.75	0.62	1.24	0.5	1	1.75	0.6	1.21	0.25	2.86	1.19	2.56	2.56	2.78	2.78
A	Total marketing cost (1+2+3+4)	4.1	1.37	2.72	5.44	2.38	4.76	4.36	1.5	3.29	0.67	5.4	2.25	11.21	11.21	10.98	10.98
B	Net price received by farmer (C-A)	295.9	98.63	47.28	94.56	47.62	95.24	285.64	98.5	486.71	99.33	234.6	97.75	88.79	88.79	89.02	89.02
C	Farmer's sale price/consumer's purchase price	300	100	50	100	50	100	290	100	490	100	240	100	100	100	100	100

Table 5: Marketing cost of value-added milk products in Marketing Channel-II at farm level in Punjab state

S. No.	Particulars	Milk Cake Rs./kg	Producer share in consumer rupee (%)	Plain Dahi Rs./lit	Producer share in consumer rupee (%)	Plain Lassi Rs./lit	Producer share in consumer rupee (%)	Paneer Rs./kg	Producer share in consumer rupee (%)	Ghee Rs./lit	Producer share in consumer rupee (%)	Khoya Rs./kg	Producer share in consumer rupee (%)	PFM Rs./lit	Producer share in consumer rupee (%)	SFM Rs./lit	Producer share in consumer rupee (%)
Channel-II (Producer→Sweet Shops/Creameries→Consumers)																	
1	Cost of packaging	0.93	0.27	0.52	0.87	0.81	1.35	0.5	0.16	0.51	0.1	0.51	0.2	5	5	5	5
2	Labour cost	0.92	0.26	0.78	1.3	0.41	0.68	0.39	0.12	0.39	0.08	0.41	0.16	0.54	0.54	0.53	0.53
3	Transportation	-	-	1.36	2.27	0.46	0.77	0.45	0.14	0.46	0.09	0.46	0.18	2.5	2.5	2.5	2.5
4	Electricity charges	-	-	0.23	0.38	0.05	0.08	0.4	0.13	0.45	0.09	0.61	0.23	3.1	3.1	2.67	2.67
5	Other miscellaneous charges	2.64	0.75	0.41	0.68	0.23	0.38	0.87	0.27	0.78	0.16	2.27	0.87	2.58	2.58	2.78	2.78
A	Total marketing cost (1+2+3+4+5)	4.49	1.28	3.3	5.5	1.96	3.27	2.63	0.82	2.58	0.52	4.26	1.64	13.72	13.72	13.48	13.48
B	Net price received by producer (C-A)	295.51	84.43	46.7	77.83	48.04	80.07	287.37	89.8	487.42	97.48	235.74	90.67	76.28	76.28	76.52	76.52
C	Producer's sale/shopkeeper purchase price	300	85.71	50	83.33	50	83.33	290	90.63	490	98	240	92.31	90	90	90	90
6	Cost of Polythene bag	-	-	0.42	0.7	0.41	0.68	0.4	0.13	0.41	0.08	0.41	0.16	0.5	0.5	0.5	0.5
7	Freezer cost	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1.1	1.1
8	Cost of packaging	4.6	1.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Labour cost	1.5	0.43	0.52	0.87	0.24	0.4	0.26	0.08	0.13	0.03	0.28	0.11	-	-	-	-
10	Shop rent	5.15	1.47	0.5	0.83	0.25	0.42	1.07	0.33	0.4	0.08	1.63	0.63	-	-	-	-
11	Electricity charges	0.83	0.24	0.26	0.43	0.22	0.37	0.92	0.29	0.35	0.07	1.4	0.54	0.5	0.5	0.5	0.5
	other misc.	3.09	0.88	0.22	0.37	0.16	0.27	0.92	0.29	0.44	0.09	1.75	0.67	0.5	0.5	0.5	0.5
D	Total marketing cost (7+8+9+10+11)	15.18	4.34	1.92	3.2	1.29	2.15	3.57	1.12	1.72	0.34	5.48	2.11	2.5	2.5	2.6	2.6
E	Sale price of sweet shopkeeper/purchase price of consumer	350	100	60	100	60	100	320	100	500	100	260	100	100	100	100	100
F	Net margin of sweet shopkeeper (E-C+D)	34.82	9.95	8.08	13.47	8.71	14.52	26.43	8.26	8.28	1.66	14.52	5.58	7.5	7.5	7.4	7.4

Marketing Efficiency of Value-Added Milk and Milk Products in Channel-I and Channel-II

Marketing efficiency is the ratio of market output to market input (cost of resources). An increase in this ratio represents improved efficiency and a decrease denotes reduced efficiency. The marketing efficiency of different value-added milk and milk products marketed through channel-I and channel-II are depicted in Table 3. The marketing efficiency index in Channel I for milk cake, dahi plain, lassi plain, paneer, ghee, khoya, pasteurized flavoured milk and sterilized flavoured milk were reported as 72.14, 17.36, 20.05, 65.56, 147.97, 43.48, 8.92 and 8.92, respectively, whereas 5.42, 3.51, 4.02, 8.81, 38.75, 9.72, 3.79 and 3.26, respectively in channel-II.

Table 3: Marketing efficiency of milk products in Channel-I and Channel-II

Particulars	Milk Cake	Dahi Plain	Lassi Plain	Paneer	Ghee	Khoya	Pasteurized Flavoured Milk	Sterilized Flavoured Milk
Channel-I (Producer→Consumer)	72.14	17.36	20.05	65.56	147.97	43.48	8.92	8.11
Channel-II (Producer®Sweet Shops/Creameries®Consumers)	5.42	3.51	4.02	8.81	38.75	9.72	3.79	3.26

The marketing efficiency index was higher for all the value-added milk products marketed through channel-I as compared to channel-II.

Conclusion

The results of the study conclude that amongst all milk products produced at farm level, producer share in consumer's rupee was maximum for ghee (99.33 per cent), followed by milk cake (98.63 per cent), paneer (98.50 per cent) and khoya (97.75 per cent) in channel-I. The net price was highest for sale of one kg of ghee (Rs. 486.71), followed by milk cake (Rs. 295.90), paneer (Rs. 285.64) in channel-I. Also, the marketing efficiency was highest for producing one kg of ghee (147.97), followed by milk cake (72.14) and paneer (65.56) in channel-I. The channel-I is the most efficient channel from producer's point of view but the major part of the production was marketed through channel-II. The profitability measures indicated that net profit earned by the producers was higher with channel-I as compared to channel-II. The study will help the farmers/ producers to select right kind of marketing channel to sell their produce in order to get better returns. Also, the study promotes the level of value addition of milk into different value-added milk and milk products and to improve the marketing efficiency index at farm level.

Acknowledgement

The authors express their sincere thanks and gratitude to the Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana Punjab for the necessary facilities, help and support given during the research period.

Conflict of Interests

There is no conflict of interest.

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References

1. Acharya, S. S. and Agarwal, N. L. (2001). *Agricultural marketing in India*. New Delhi. Oxford and IBH.
2. Alvarez, A., García-Cornejo, B., Pérez-Méndez, J. A. and Roibás, D. (2018). The profitability of value-added products in dairy farm diversification initiatives. *Spanish Journal of Agriculture Research* 16(2).
3. Anonymous. (2018). *Statistical Abstract of Punjab 2018*. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, New Delhi.

4. Anonymous. (2019). *Basic Animal Husbandry Statistics 2019.* Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, New Delhi.
5. Brar, R. S., Kaur, I., Singh, V. P. and Chopra, S. (2017). Factors influencing choice of milk marketing channel among small and medium dairy farmers in Punjab. *Indian Journal of Dairy Science*. 71 (3), 299-305.
6. Debnarayan, S. and Ghosh, B. K. (2010). Marketing under cooperative and non-cooperative marketing channels evidence from West Bengal. *Economic Annals*. 4 (187), 87-108.
7. Govindasamy, R., Hossain, F. and Adelaja, A. (1999). Income of farmers who use direct marketing. *Agricultural Resource Economics Review*. 28, 76-83.
8. Kuma, B. (2012). *Market access and value chain analysis of dairy industry in Ethiopia: The case of Wolaita Zone*. Ph.D. Dissertation in Agriculture (Agricultural Economics). Haramaya, Ethiopia: Haramaya University.
9. Rangasamy, N. and Dhaka, J. P. (2008). Marketing efficiency of dairy products for co-operative and private dairy plants in Tamil Nadu - A comparative analysis. *Agricultural Economics Research Review*. 21, 235-242.
10. Singh, O. N. and Dubey, A. K. (2016). Price Spread and Marketing Efficiency of Buffalo Owners in Different Milk Marketing Channels in Allahabad District (Uttar Pradesh). *International Journal of Applied and Pure Science and Agriculture*. 2 (9), 54-59.
11. Singh, R. (1975). On Optimum stratification for proportional allocation. *Sankhya*. 37, 109-115.
12. Vykhaneswari, K. and Devi, K. U. (2019). Marketing Efficiency of Milk and Milk Products in Prakasam District of Andhra Pradesh, India. *Current Journal of Applied Science and Technology*. 37 (1), 1-8.

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