

Cattle and Buffalo Milk Production and Marketing : A Study in Punjab State, India

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Received : June 2023

Accepted : July 2023

ABSTRACT

The study on economic analysis of cattle and buffalo milk production and marketing in Punjab state of India, revealed that the average daily milk production, consumption and marketed surplus of milk was 9433 litres, 1575.5 litres and 7857.5 litres, respectively. A small proportion of the local cow milk produced was retained for domestic consumption. A large volume of the crossbred cow milk produced was marketed. Around four-fifth of the buffalo milk produced was marketed and one-fifth was retained for domestic consumption. The most preferred marketing channel for disposing off the surplus quantity of milk was the direct sale of milk to the consumers. The average price of a cow and buffalo milk was Rs.29 and Rs.35 per litre, respectively. Milk producers received the highest average price for cow milk from consumers and the highest average price of buffalo milk was paid by cooperative dairies.

Keywords : Cooperative Dairies, Domestic consumption, Marketed surplus, Milk production

DAIRYING is an important sub-sector of the farming system of the Indian economy. Operation Flood is one of India's highly successful rural developmental programmes. The basic concept behind the project was to increase the rate of commercialisation of milk production by providing on one hand an assured market for milk to the rural producers by linking rural milk sheds with urban milk markets and on the other side extending to them inputs like artificial insemination for cross-breeding and upgrading, compound cattle feed, veterinary care, etc, for enhancing the productivity of milch animals (Nair, 1985). There are found changes in livestock composition, expanding network of dairy cooperatives and increased participation of private players in milk marketing and processing (Kumar *et al.*, 2013). Punjab is currently producing 13347 thousand tonnes of milk in 2019-20 (GoP, 2020). Out of the total milk produced in the state, buffalo milk is nearly more than half of the total milk produced in the state (Toor and Kaur, 2021).

Different market players provide different sets of choices to dairy farmers. The unorganised sector includes wholesalers, sweet shops, milk vendors and producers themselves and the organised sector includes private and cooperative dairies. In India, the milk processing and marketing sector witnessed significant expansion in the 2000s. The number of cooperative milk processing plants has increased from 212 in 2002 to 263 in 2011, almost revealing an increase of 24 per cent in this number (Sharma, 2015). Dairy cooperatives are an important component of the organised milk marketing chain in India. But still, milk procurement from these cooperatives remains low, especially for smallholder milk producers (Bardhan *et al.*, 2012). The Punjab State Co-operative Milk Producer's Federation Limited (MILKFED) has intended to give momentum to milk production in the state of Punjab on a continued basis. The present study aims to carry out an economic analysis of milk marketing in rural Punjab, India.

Hypothesis

H_0 : There is no relationship between milk production and the proportion of milk used for domestic consumption

H_a : There is a negative relationship between milk production and the proportion of milk used for domestic consumption

METHODOLOGY

The present study is based on primary data, collected through a detailed schedule from 420 dairy farmers belonging to different farm size categories from 21 villages situated in three different agro-climatic zones (Shivalik-Foothills, Central Plains and South-West Dry zones) of Punjab state. A multi-stage sampling technique has been used to select the villages and dairy farmers in the study area. Descriptive statistics are used for analysis.

RESULTS AND DISCUSSION

Average Daily Milk Production, Consumption and Marketed Surplus

The total milk produced by all milch animals in a day in a household is taken as milk daily production per household. The quantity of milk retained at home for domestic consumption of fluid milk or conversion into milk products in a day is taken as per day consumption of households. The actual quantity of

milk sold by milk producers in a day is considered as per day marketed surplus of milk per household. An increase in domestic consumption of milk leads to a decrease in the quantity of marketed surplus milk. The marketed surplus of milk is computed as:

$$MS = Q - C$$

where,

Q is the quantity of milk produced and C is the quantity of milk consumed and MS is the marketed surplus of milk by households. Altogether, 9433 litres per day of milk are produced by all milk producers. Out of these, 1575.5 litres per day (16.70 per cent) of milk are retained for domestic consumption and 7857.5 litres per day (83.30 per cent) is marketed through different available marketing channels. Similar findings are found by Kashish *et al.* (2014) where more than four-fifth of the produced milk is marketed to different marketing channels in Punjab in 2013-14. The highly marketed surplus indicates that households are used to consuming little quantities of milk and sell most of the daily milk production.

The milk producers cannot consume the entire quantity of milk produced by their milch animals. They dispose off the surplus quantity of milk to different available marketing channels. They consider dairying as a subsidiary occupation. They get income from dairying regularly, which helps in managing their daily expenses. That is why the proportion of marketed



Fig. 1 : Flow chart of the selection of sampled households

TABLE 1
Milk production, consumption and marketed surplus (litres per day)

Category	Production	Consumption	Marketed Surplus	Percentage of consumption to production	Percentage of marketed surplus to production
Large Farm Hhs	3017.5	417.5	2600	13.84	86.16
Medium Farm Hhs	1812.5	340.5	1472	18.79	81.21
Small Farm Hhs	1801	329	1472	18.27	81.73
Marginal Farm Hhs	1469	271	1198	18.45	81.55
Landless Hhs	1333	217.5	1115.5	16.32	83.68
Punjab	9433	1575.5	7857.5	16.70	83.30

Source: Field Survey, 2019

surplus per household milk production is always higher than the proportion of consumption per household milk production.

Local Cow Milk Production, Consumption and Marketed Surplus

Table 2 reveals that the milk production, consumption and marketed surplus of local cow is 700 litres, 147 litres and 553 litres per day. The percentage of consumption to milk production is 21 per cent and the percentage of marketed surplus to milk production is 79 per cent.

Crossbred Cow Milk Production, Consumption and Marketed Surplus

Table 3 throws light on the average daily milk production, consumption and marketed surplus of

crossbred cow stands at 3442.5 litres, 345.5 litres and 3097 litres per day. The percentage of consumption to crossbred cow milk production is found to be 10.04 per cent and the percentage of marketed surplus to milk production is worked out to be 89.96 per cent. The maximum proportion of marketed surplus of crossbred cow milk to milk production (94.11 per cent) is reported among large farm size category households and a minimum (82.57 per cent) of the same is worked out among landless category households.

Buffalo Milk Production, Consumption and Marketed Surplus

The average buffalo milk production, consumption and marketed surplus of milk is worked out to be 5290.5 litres, 1083 litres and 4207.5 litres per day (Table 4). The percentage of consumption to

TABLE 2
Local cow milk production, consumption and marketed surplus (litres per day)

Category	Production	Consumption	Marketed Surplus	Percentage of consumption to production	Percentage of marketed surplus to production
Large Farm Hhs	70	13	57	18.57	81.43
Medium Farm Hhs	138.5	12	126.5	8.66	91.34
Small Farm Hhs	147.5	32	115.5	21.69	78.31
Marginal Farm Hhs	152	42	110	27.63	72.37
Landless Hhs	192	48	144	25.00	75.00
Punjab	700	147	553	21.00	79.00

Source: Field Survey, 2019

TABLE 3
Crossbred cow milk production, consumption and marketed surplus (litres per day)

Category	Production	Consumption	Marketed Surplus	Percentage of consumption to production	Percentage of marketed surplus to production
Large Farm Hhs	1376	81	1295	5.89	94.11
Medium Farm Hhs	629	96.5	532.5	15.34	84.66
Small Farm Hhs	673	66.5	606.5	9.88	90.12
Marginal Farm Hhs	558	65.5	492.5	11.74	88.26
Landless Hhs	206.5	36	170.5	17.43	82.57
Punjab	3442.5	345.5	3097	10.04	89.96

Source: Field Survey, 2019

production and marketed surplus to production is reported as 20.47 per cent and 79.53 per cent respectively.

As far as the percentage of marketed surplus to buffalo milk production is concerned, the maximum percentage (85.71 per cent) is visible among landless category households and the minimum (76.49 per cent) of the same is worked out among small farm size category households.

Testing of Hypothesis

H_0 : There is no relationship between milk production and the proportion of milk used for domestic consumption

H_a : There is a negative relationship between milk production and the proportion of milk used for domestic consumption

Here, the objective is to check whether milk production and the proportion of milk used for domestic consumption are related to each other or not. In other words, does any increase or decrease in milk production has any impact on the proportion of milk used for domestic consumption? The correlation analysis is used to determine the relationship between milk production and the proportion of milk used for domestic consumption as the correlation coefficient shows the degree of association between two variables. The results of the Table 5 show that the

TABLE 4
Buffalo milk production, consumption and marketed surplus (litres per day)

Category	Production	Consumption	Marketed Surplus	Percentage of consumption to production	Percentage of marketed surplus to production
Large Farm Hhs	1571.5	323.5	1248	20.59	79.41
Medium Farm Hhs	1045	232	813	22.20	77.80
Small Farm Hhs	980.5	230.5	750	23.51	76.49
Marginal Farm Hhs	759	163.5	595.5	21.54	78.46
Landless Hhs	934.5	133.5	801	14.29	85.71
Punjab	5290.5	1083	4207.5	20.47	79.53

Source: Field Survey, 2019

TABLE 5
Results of Correlation Coefficient (r) between
Milk Production and Proportion of Milk
and respective t-test

r	Standard Error	t	p-value
-0.43	0.044	-9.83	0.001 *

*statistically significant at 1 per cent level of significance

value of the correlation coefficient is -0.43, revealing a moderate relationship between milk production and the proportion of milk used for domestic consumption. The negative sign of the correlation coefficient implies that there is a negative relationship between milk production and the proportion of milk used for domestic consumption. As milk production increases, the proportion of milk retained for domestic consumption decreases due to the reason that demand for milk is already being met. The p-value (0.001) is less than 0.05, implying that the correlation coefficient is statistically significant. This leads to the rejection of the null hypothesis. The analysis shows that there is a negative relationship between milk production and the proportion of milk used for domestic consumption.

Disposal Pattern of Milk

Milk, being perishable, requires quick disposal. The major players in the disposal of milk are milk vendors, cooperative dairies, private dairies and direct consumers. Out of all, 170 (40.48 per cent) milk producers sell the surplus quantity of milk directly to the consumers because it is one of the convenient marketing channels (Fig. 2). Consumers themselves

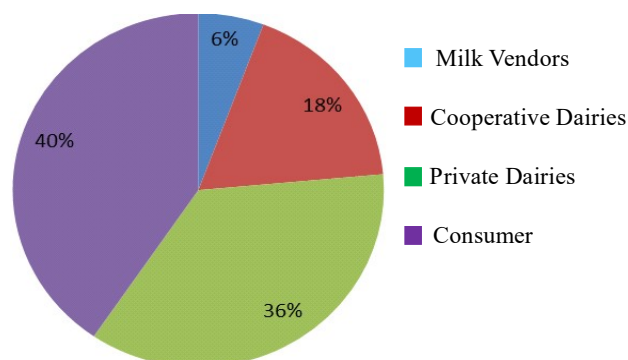


Fig. 2. Disposal pattern of milk

collect the milk from producer's places where they kept the milch animals. In this way, there are no transportation costs associated with this marketing channel. Other 151 (35.95 per cent) milk producers dispose off the surplus quantity of milk to private dairies, 75 (17.86 per cent) to cooperative dairies and the remaining 24 (5.71 per cent) to milk vendors. These findings are in line with the findings of Kumar *et al.* (2011) who found that 72 per cent of dairy farmers prefer to market the milk through traditional marketing channels in Bihar, whereas in Punjab, only 8.8 per cent of dairy farmers prefer to choose traditional marketing channels and remaining 91.2 per cent dairy farmers go for modern marketing channels for disposing the surplus quantity of milk. However, these findings are in contrast to the findings of Brar *et al.* (2017), in which they found that the number of dairy farmers (53.39 per cent) selling milk to organised milk marketing channels is higher than that of unorganised milk marketing channels (46.61 per cent).

Sale of Milk to Different Marketing Channels

The volume of milk is sold to four different marketing channels. Table 6 throws light on the sale of milk (litres per day) to different marketing channels. The total sale of milk is 7857.5 litres per day out of which, 5730 litres (72.92 per cent) are marketed through organised marketing channels and the remaining 2127.5 litres (27.08 per cent) are handled through unorganised marketing channels. It is revealed from the above table that 53.81 per cent of the milk producers prefer organised milk marketing channels and are selling 72.92 per cent of the marketed surplus of milk through these channels.

As far as organised milk marketing channels are concerned, 1544 litres per day (19.65 per cent) are sold to cooperative dairies and 4186 (53.27 per cent) litres per day are sold to private dairies. Milk vendors handle 516 litres per day (6.57 per cent) of the total milk sold and 1611.5 litres per day (20.51 per cent) are sold directly to consumers.

TABLE 6
Sale of milk to different marketing channels (litres per day)

Category	Consumer		Milk Vendors		Cooperative Dairiess		Private Dairies		Total
	Volume	%	Volume	%	Volume	%	Volume	%	
Large Farm Hhs	262	10.08	124	4.77	614	23.62	1600	61.53	2600
Medium Farm Hhs	381.5	25.92	53	3.60	274.5	18.65	763	51.83	1472
Small Farm Hhs	247.5	16.81	137.5	9.35	410	27.85	677	45.99	1472
Marginal Farm Hhs	293.5	24.50	201.5	16.82	192.5	16.07	511	42.61	1198
Landless Hhs	427	38.28	0	0.00	53	4.75	636	56.97	1115.5
Punjab	1612	20.51	516	6.57	1544	19.65	4186	53.27	7857.5

Source: Field Survey, 2019

Sale of Local Cow Milk to Different Marketing Channels

Table 7 shows the sale of local cow milk (litres per day) to different organised and unorganised milk marketing channels. The total volume of local cow milk sold is 553 litres per day. Out of the total, 270.5 litres per day (48.92 per cent) are sold to unorganised marketing channels and the remaining 282.5 litres per day (51.08 per cent) are sold to organised milk marketing channels. Around 49 per cent (269 litres per day) of the total volume of local cow milk is sold directly to consumers, followed by 206 litres (37.25 per cent) sold to private dairies, 76.5 litres (13.83 per cent) to cooperative dairies and just 1.5 litres (0.28 per cent) to milk vendors.

The organised marketing channels dominate among large, medium and small farm size category milk producers for marketing local cow milk. However, unorganised milk marketing channels for marketing local cow milk are preferred by marginal and landless category households. The reason is that these households fail to participate in the organised milk marketing chain due to their weak financial position as compared with large and medium farm size category households.

Sale of Crossbred Cow Milk to Different Marketing Channels

Table 8 presents the data on the marketing pattern of crossbred cow milk (litres per day). Altogether 3097

TABLE 7
Sale of local cow milk to different marketing channels (litres per day)

Category	Consumer		Milk Vendors		Cooperative Dairies		Private Dairies		Total
	Volume	%	Volume	%	Volume	%	Volume	%	
Large Farm Hhs	15.5	27.19	1.5	2.63	5	8.77	35	61.41	57
Medium Farm Hhs	60	47.43	0	0.00	2.5	1.98	64	50.59	126.5
Small Farm Hhs	41	35.50	0	0.00	34.5	29.87	40	34.63	115.5
Marginal Farm Hhs	56.5	51.36	0	0.00	18.5	16.82	35	31.82	110
Landless Hhs	96	66.67	0	0.00	16	11.11	32	22.22	144
Punjab	269	48.64	1.5	0.28	76.5	13.83	206	37.25	553

Source: Field Survey, 2019

TABLE 8
Sale of crossbred cow milk to different marketing channels (litres per day)

Category	Consumer		Milk Vendors		Cooperative Dairies		Private Dairies		Total
	Volume	%	Volume	%	Volume	%	Volume	%	
Large Farm Hhs	69.5	5.37	73	5.64	270.5	20.89	882	68.10	1295
Medium Farm Hhs	119	22.35	9.5	1.78	111	20.85	293	55.02	532.5
Small Farm Hhs	95.5	15.75	86.5	14.26	128.5	21.19	296	48.80	606.5
Marginal Farm Hhs	76.5	15.53	90.5	18.38	86.5	17.56	239	48.53	492.5
Landless Hhs	130	76.25	0	0.00	12.5	7.33	28	16.42	170.5
Punjab	490.5	15.84	259.5	8.38	609	19.66	1738	56.12	3097

Source: Field Survey, 2019

litres per day of crossbred cow milk are marketed through available marketing channels.

The organised marketing channels handle 2347 litres per day (75.78 per cent) of the volume of crossbred cow milk. The remaining 750 litres (24.22 per cent) are sold through unorganised marketing channels. The private dairies are involved in marketing 1738 litres (56.12 per cent) of the total volume of crossbred cow milk sold and cooperative dairies handle 609 litres (19.66 per cent) of the volume of crossbred cow milk sold. Among the unorganised marketing channels, 490.5 litres (15.84 per cent) and 259 litres (8.38 per cent) of crossbred cow milk are sold directly to consumers and milk vendors respectively. Across categories also, the data on the marketing pattern of crossbred cow milk exhibits the state pattern except for landless category households.

Sale of Buffalo Milk to Different Marketing Channels

Table 9 provides information about the sale of buffalo milk to different marketing channels (litres per day). Out of 4207.5 litres of buffalo milk sold per day, 3100.5 litres (73.69 per cent) are sold through organised marketing channels and 1107 litres (26.31 per cent) are sold through unorganised milk marketing channels. Organised milk marketing channels dominate the marketing of buffalo milk as they pay a higher price per litre for buffalo milk as compared with unorganised milk marketing channels. As much as 2242 litres per day (53.29 per cent) of buffalo milk are sold to private dairies, followed by 858.5 litres (20.40 per cent) to cooperative dairies, 852 litres (22.25 per cent) to consumers and 255 litres (6.06 per cent) to milk vendors.

TABLE 9
Sale of buffalo milk to different marketing channels (litres per day)

Category	Consumer		Milk Vendors		Cooperative Dairies		Private Dairies		Total
	Volume	%	Volume	%	Volume	%	Volume	%	
Large Farm Hhs	177	14.18	49.5	3.97	338.5	27.12	683	54.73	1248
Medium Farm Hhs	202.5	24.91	43.5	5.35	161	19.80	406	49.94	813
Small Farm Hhs	111	14.80	51	6.80	247	32.93	341	45.47	750
Marginal Farm Hhs	160.5	26.95	111	18.64	87.5	14.69	236.5	39.72	595.5
Landless Hhs	201	25.09	0	0.00	24.5	3.06	575.5	71.85	801
Punjab	852	20.25	255	6.06	858.5	20.40	2242	53.29	4208

Source: Field Survey, 2019

TABLE 10
Basis for fixation of milk prices

Category	Per Litre		Fat Content		Fat & SNF content		Total
	No	%	No	%	No	%	
Large Farm Hhs	28	33.33	38	45.24	18	21.43	84
Medium Farm Hhs	38	45.24	31	36.90	15	17.86	84
Small Farm Hhs	38	45.24	28	33.33	18	21.43	84
Marginal Farm Hhs	50	59.52	20	23.81	14	16.67	84
Landless Hhs	63	75.00	13	15.48	8	9.52	84
Punjab	217	51.67	130	30.95	73	17.38	420

Source: Field Survey, 2019

Basis of Fixation of Milk Prices

Milk prices are considered an important factor for encouraging milk producers as it determines the level of profitability in dairying. The prices of milk should be fixed in a way that would attract inputs like labour, land for growing fodder, etc. required for milk production. Pricing of milk is generally done based on quantity, fat content and fat & SNF (solid not-fat) content. Pricing based on quantity or volume is known as a flat rate, but it encourages adulteration of milk. This is popular among unorganised market agents. Milk prices are also fixed based on fat content alone as this discourages adulteration. There is also a two-axis pricing of milk which is based on the fat and SNF content of the milk. According to Food Safety and Standard Rules (2011), the requirement of cow milk is 3-4 per cent fat and 8.5-9 per cent SNF content and for buffalo milk, the requirement is 5-6 per cent fat and 9 per cent SNF throughout the country.

Table 10 shows that more than half, *i.e.*, 217 (51.67 per cent) of the milk producers, consider quantity per litre as a basis for fixation of milk prices, followed by 130 (30.95 per cent) consider fat content as the basis and 17 (17 per cent) consider both fat and SNF content as a basis for the fixation of milk prices. The category-wise distribution of milk producers according to the basis for fixation of milk prices reveals a similar scenario with minor percentage changes here and there, except for large farm size categories and landless households.

Mode of Distribution of Milk

Milk, being perishable, is generally disposed off immediately after production. Some factors, such as maintaining the quality of milk, reducing chances of possible contamination and cost of distribution of milk, help in deciding the mode of distribution of milk. There are different modes of transport to sell and distribute milk to consumers and shops etc. In the study area, milk is distributed on foot, on bicycles, on motorcycles, on cars/vans as well as spot disposal immediately after production. Table 11 reveals that a big number, *i.e.*, 223 (53.10 per cent), of milk producers, sell milk on the spot from home (where milch animals are kept) because there is no transportation cost inherent with this marketing channel as consumers themselves collect milk from producer's place. As much as 89 (21.19 per cent) milk producers sell milk to nearby dairies transporting it on a bicycle, followed by 71 (16.90 per cent) using a motorcycle, 36 (8.57 per cent) on foot and just 1 (0.24 per cent) using a car/van. Most of the private and cooperative dairies are situated either in the village or in nearby villages. So, milk producers prefer to transport milk either on bicycle or on foot due to the low distance between the place of milk production and the place of milk collection by dairies and to avoid any sort of transportation cost.

TABLE 11
Mode of distribution of milk

Category	On foot		Bicycle		Motorcycle		Car		Spot Disposal		Total
	No	%	No	%	No	%	No	%	No	%	
Large Farm Hhs	0	0.00	19	22.62	31	36.90	1	1.19	33	39.29	84
Medium Farm Hhs	7	8.33	21	25.00	18	21.43	0	0.00	38	45.24	84
Small Farm Hhs	11	13.10	22	26.18	12	14.29	0	0.00	39	46.43	84
Marginal Farm Hhs	9	10.71	15	17.86	8	9.53	0	0.00	52	61.90	84
Landless Hhs	9	10.71	12	14.29	2	2.38	0	0.00	61	72.62	84
Punjab	36	8.57	89	21.19	71	16.90	1	0.24	223	53.10	420

Source: Field Survey, 2019

Average Milk Price Paid by Different Marketing Channels

Price is an important factor in deciding the profitability of dairying. An attractive price can encourage more efforts in this business by dairy farmers. Milk price should be such that it could cover at least the cost of milk production. Different marketing channels pay different prices for cow and buffalo milk. The average price of a cow and buffalo milk is Rs.29 and Rs.35 per litre respectively (Table 12). The differences in the average price of cow and buffalo milk arise due to differences in fat and SNF content of cow and buffalo milk. Buffalo milk is more profitable due to its high fat content as compared with cow milk.

On average, Milk vendors pay Rs.26 per litre and Rs.33 per litre for cow and buffalo milk, respectively.

Milk producers sell surplus quantities of cow and buffalo milk at an average price of Rs.27 and Rs.39 per litre respectively to cooperative dairies. The private dairies pay milk producers Rs.28 and Rs.36 per litre on average for cow and buffalo milk respectively. Consumers, on average, pay Rs.31 and Rs.33 per litre for cow and buffalo milk. These findings are in contrast with the finding of Kumar *et al.* (2011) and Kumar *et al.* (2018), in which traditional/unorganised marketing channels pay higher average milk prices than that modern/organised milk marketing channels in Punjab and India. Kumar *et al.* (2011) have found that traditional marketing channels pay Rs.11.7 per litre in Bihar, whereas modern marketing channels pay Rs.11.3 per litre. In Punjab, the findings revealed that Rs.15.1 and Rs.14.8 per litre are paid by traditional and modern marketing channels

TABLE 12
Average milk price paid by different marketing channels (Rs.per litre)

Category	Consumer		Milk Vendors		Cooperative Dairies		Private Dairies		Overall		
	Cow	Buffalo	Cow	Buffalo	Cow	Buffalo	Cow	Buffalo	Cow	Buffalo	
Large Farm Hhs		34	33	26	24	28	43	29	40	29	39
Medium Farm Hhs		29	40	40	44	28	39	27	35	28	38
Small Farm Hhs		32	32	24	35	28	42	28	34	29	35
Marginal Farm Hhs		31	33	25	35	25	30	27	34	28	33
Landless Hhs		31	31	0	0	26	32	29	34	30	31
Punjab		31	33	26	33	27	39	28	36	29	35

Source: Field Survey, 2019

respectively. As per the study of Kumar *et al.* (2018), consumers pay Rs.35.2 per litre of milk and milk cooperatives pay Rs.26.5 per litre in India in 2013.

The results of the study reveal that around two-fifth of milk producers dispose off the surplus quantity of milk directly to the consumers. Slightly more than one-fourth of the marketed milk is sold through unorganised milk marketing channels. Slightly more than a half of the local cow milk is sold to organised milk marketing channels. As far as marketing of crossbred cow milk is concerned, three-fourths of the volume of crossbred cow milk is sold through organised marketing channels. Slightly less than three-fourths of the buffalo milk is marketed through organised milk marketing channels. In rural Punjab, three bases, such as 'quantity', 'fat content' as well as 'fat & SNF content', are used for fixation of milk prices. Slightly more than a half of the milk producers consider quantity as a basis for the fixation of milk prices.

More than a half of the milk producers sell milk on the spot due to its perishable nature. The average price of local cow as well as crossbred cow and buffalo milk is Rs.29 and Rs.35 per litre respectively. Average daily milk production, consumption and marketed surplus of milk are 9433 litres, 1575.5 litres and 7857.5 litres respectively in Punjab. Around four-fifths of the milk production of local cows is marketed through various channels. Almost nine-tenth of the crossbred cow milk produced is marketed and around one-tenth of the milk produced is retained for domestic consumption. Around four-fifth of the buffalo milk produced is marketed and one-fifth of the buffalo milk is retained for domestic consumption. The results of the t-test reveal that there is a negative relationship between milk production and the proportion of milk used for domestic consumption.

The village-level dairy cooperatives should be strengthened to provide marketing services to the dairy farmers of rural Punjab. Dairy cooperatives should be encouraged to develop an efficient milk procurement system. The efficiency of these societies can be improved by recruiting qualified staff. Dairy

farmers should be made aware of the benefits of selecting organised marketing channels through extension networks. Moreover, the pricing policy of milk should be so devised to provide a profit margin to the dairy farmers, so that they could get incentives to increase the quantity and quality of milk.

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