

MILK MARKETING SYSTEM IN IRRIGATED AND BARANI AREAS OF THE PUNJAB

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ABSTRACT

Milk marketing is an important activity that regulates demand and supply of milk. Existing milk marketing system in Punjab, Pakistan is functioning without much attention of planners and policy makers. The conventional milk trades supplies the highly unsatisfactory commodity to the consumers. The present study was planned to look into existing milk marketing system to provide proper information and feedback to policy makers and planners for improving the milk marketing. This study is based on primary data collected through farm level survey of milk producers, milk carriers and retailers from irrigated and barani areas of the Punjab during 2004. Overall 80 milk producers, milk carriers and 50 retailers from both irrigated and barani areas were interviewed from Faisalabad and Rawalpindi districts. The data indicate that percent share of milk producers in consumers rupees is almost 75. Second high share is of retailers (17 %). Cost of milk borne by milk producers is higher i.e. more than 8 rupees per litre. The net profit margins of milk producers are more than other market agencies. Retailers followed by milk carriers earned high percent profit margins while producers earned low percent profit margins. For improvement of milk marketing soft conditioned loans may be advanced for small milk chilling plants and pickup vans. More milk collection centers may be established and milk may be converted into dried form.

KEYWORDS: Milk; marketing channels; consumer prices; Punjab; Pakistan.

INTRODUCTION

The annual milk production has been recorded as 34.593 million tonnes (4) and Pakistan is ranked 5th among the milk producing countries. Out of total milk production only 23.538 million tonnes is available to the consumers (4). Therefore, dried milk and milk products have to be imported to meet the increasing demand of urban population, particularly in lean season of milk production. The per capita availability of milk is 150.8 litres per annum in

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Pakistan (5). Bulk of milk is produced in rural areas while consumption lies in urban areas. As urbanization is increasing, the demand for milk will go up further which will reduce the quality of raw milk if viewed on the basis of nutritional as well as public health standards.

Processed milk is considered free from pathogenic organisms and contains fat and solids, as per requirement of pure food laws of standardized milk whereas a number of studies reveal that raw milk is adulterated and is a main carrier of dangerous pathogens causing TB, polio, typhoid, etc. This danger can be checked through clean milking, prompt chilling and processing of raw milk by boiling, pasteurizing at UHT before consumption and implementation of pure food laws for quality assurance.

At present only 17 milk plants are in operation and not more than 3 percent of total milk production is processed. The processing capacity of these plants is around 0.65 million litres per day against which 0.43 million litres milk is used per day for producing UHT milk, butter, yogurt and ghee. It means that 97 percent of the total milk produced is traded as raw milk and 50 percent of which is used as fresh or boiled milk, one sixth as yogurt and rest is converted into various indigenous milk products such as khoya, sweet meats, ice cream, butter, rubri, kheer, cheese and other milk based products (7).

Marketing is an important activity that regulates demand and supply of a commodity. It is not a single process but involves series of activities. These activities include collection of produce, grading, packaging, transportation, storage, processing, distribution and financing of transactions at all stages. No formal milk market exists for milk, as in case of most of other commodities. being highly perishable commodity, milk demands prompt collection and quick distribution. A large number of milk traders are engaged in transfer of surplus milk from rural producing areas to urban consuming and processing centers.

Existing milk marketing system in Punjab is functioning without much attention of planners and policy makers. The conventional milk trader supplies the highly unsatisfactory commodity to the consumers. Poor market infrastructure in rural areas has resulted in higher costs of milk collection and marketing, more spoilage and remaining of large supplies untapped.

Improvement in milk marketing would only be possible when policy makers and planners are better informed about milk marketing system.

The present survey was planned to look into existing milk marketing system, channels and margins and to formulate the recommendations for improving milk marketing, keeping in view the rapidly growing milk requirements of urban population.

MATERIALS AND METHODS

1. Sampling procedure and sample size

This study was conducted at Technology Transfer Institute, (PARC), AARI, Faisalabad during 2004 is based on primary data collected through farm level survey of milk producers, milk carriers and retailers from irrigated and barani areas of the Punjab during 2004. With a view to draw an adequate and representative sample of livestock holders, a three stage stratified random sample design was employed to select the sample respondents. In the first stage one district from irrigated area i.e. Faisalabad and other from barani area i.e. Rawalpindi was selected. These two districts were representative for livestock rearing in both areas due to huge urban markets for milk. At second stage two tehsils were selected in each district. At third stage 20 livestock holders were randomly interviewed from each tehsil. Keeping in view the time and financial constraints, 80 milk producers and 50 milk carriers and 50 retailers from both irrigated and barani areas were interviewed. For milk marketing study, three different questionnaires were used to collect data from milk producers, milk carriers and retailers.

2. Market margin analysis

Marketing margins are the differences between prices at two market levels. Marketing margins were examined on the basis of data obtained on prices at different stages of marketing chain. Marketing margins were calculated through computing the absolute cash margins or price spread, which is essentially the same as the difference between the prices, paid and received by each specific marketing agency. The following formula was used to compute

percent-marketing margins as earned by each, market intermediary in the marketing of milk.

$$Mm = (Ps \times 100) / Sp$$

'Mm' indicates the marketing margins earned by a specific agency, 'Ps' stands for price spread available by that agency and 'Sp' represents sale price of the same agency for the same commodity.

3. Breakdown of consumer's rupee

Breakdown of consumer's rupee is a phrase applied to the manner in which a consumer's one rupee spent on a particular commodity is divided among the producer and marketing agencies. It represents the portion of a consumer's rupee that goes to the producer, or is earned by marketing agencies. This was calculated by expressing the absolute cash margins of a specific agency as proportion of the retail price. The following formula was used to determine the breakdown of consumer's rupee.

$$Bdcr = Ps/Rp$$

'Bdcr' stands for break down of consumer's rupee spent on specific commodity, 'Ps' indicates price spread and 'Rp' represents retail price.

4. Marketing costs

Marketing costs are the expenditure incurred by various market intermediaries from the time when commodity leaves the farm until it reaches the consumers. Marketing costs indicate the actual expenses of a marketing agency including fixed and variable costs. These costs were incurred by the producers and other marketing intermediaries and have impact on prices as well as on the margins of market intermediaries. The cost of each agency was calculated by using the following formula.

$$Mc = As/Qm$$

'Mc' stands for marketing cost of a specific unit quantity, 'As' for actual amount spent and 'Qm' represents quantity marketed. All marketing costs were calculated in this way.

5. Net profit margins

The net profit margins of a specific agency are the net earnings, which it earns after paying all marketing costs. Net earnings of various market agencies involved in the marketing of milk were computed with the following formula.

$$Npm = Ps - Mc$$

'Npm' stands for net profit margins, 'Ps' indicates the price spread availed by the specific agency and 'Mc' represents marketing costs incurred by the same agency.

6. Percent profit margins

Percent profit margins are calculated for each intermediary as the net profit margins divided by the absolute cash margins expressed as a percent. Percent profit margins are computed with the following formula.

$$Ppm = Npm * 100 / AcM$$

Here 'Ppm' stands for percent profit margins, 'Npm' indicates net profit margins and 'AcM' stands for absolute cash margins.

RESULTS AND DISCUSSION

In case of milk, the usual concept of markets is not applicable as such. Moreover, there is no concept of primary or secondary milk markets like in other agricultural commodity markets. Although a lot of development in roads and transport facilities has taken place, but still milk marketing is mainly in the hands of private milkmen. These private milkmen collect milk from their own/nearby villages and bring it to urban centers without any special treatment. The amount of milk daily traded by these milkmen varies between 60 to 160 litres, which they either sell as raw at consumer's doorstep or to

vendors. Currently two companies Nestle and Halla have started some milk collection and distribution using refrigerated vans/trucks. However, their collection range is not wide enough. Both these companies have established milk collection centers in the villages (6). Mostly Halla collects milk from irrigated area where milk is produced in abundant and less in Lahore, Rawalpindi and Islamabad cities. This milk is then pasteurized and sold in loose form through milk shops having refrigerators. In barani area Nestle and Halla companies have not established milk collection centers as milk production is less in barani rural areas.

Producer's milk sale to market agencies

Overall half of milk is sold to milk carriers and one forth direct to consumer (Table 1) . In irrigated area more than 80 percent milk is sold to milk carriers. In barani area slightly less than half milk is sold direct to consumers, almost one third to sweet/khoya makers. In irrigated areas there is more trend of milk sale to milk carriers while in barani areas more milk is sold direct to consumers.

Table 1. Producer's milk sale to market agencies(%).

Market intermediaries	Irrigated area	Barani area	Overall milk sale
Milk carriers	82.7	21.8	51.9
Direct to consumers	9.8	43.6	26.9
Sweet/khoya makers	1.0	30.2	15.8
Retail shops	1.0	4.3	2.7
Milk collection centres	5.4	0	2.7

2. Milk marketing channels

Usual channels followed for milk marketing are as follows:-

- Producers - milk carriers - retailers/sweet makers - consumers
- Producers - milk carries - consumers
- Producers - consumers
- Producers - milk collection centers - milk processing plants.

3. Milk pricing

In rural areas, liquid milk demands are met mainly by local production whereas in urban areas, the supplies from peri-urban and rural areas fulfill a major part of total milk demand. There is no public intervention in settling the milk prices and it mostly depends on the interaction of market forces. Currently, in big cities, pasteurized milk and UHT treated milk is facing competition with raw liquid milk supplied by milkmen or 'dodhies'. Moreover, various prices prevail for raw milk.

The milk pricing systems also vary by location and type of intermediary involved. In big cities, milk prices are relatively high as compared with small cities. The milk prices are relatively high in villages well connected with urban centers as compared with those situated in the remote areas. In those rural areas where milk marketing system is not well developed, milk processing for making butter, khoya and desi ghee is relatively more common. At Halla and Nestle milk procurement centers, milk is purchased from farmers on the basis of fat contents. In urban areas price levels of milk-based products like butter, desi ghee and sweets are directly associated with milk price.

There is some seasonality in the production of milk. In winter, milk supply increases because of calving pattern of buffaloes and cows, leading to decrease milk prices in rural areas. However, middlemen or "dodhies" harvest this benefit and urban consumers rarely get the due benefit (11).

The price of milk sold direct to consumers is the highest (Rs. 18.3/litre). The price of milk paid by sweet/khoya makers, retailer shops and milk collection centers is less (Table 2). The milk price paid by milk carriers is the lowest (Rs. 13.6/litre). Overall price of milk sold to all market agencies was higher in barani area than in irrigated areas.

Table 2. Producer's milk sale price (Rs./litre).

Market intermediaries	Overall sale price	Irrigated area	Barani area	Significance
Consumers	18.3	16.9	19.1	0.079
Sweet/khoya makers	16.9	13.5	17.6	0.014
Retail shops	15.8	13.5	18.0	--
Milk collection centers	14.8	14.8	--	--
Milk carriers	13.6	13.0	14.5	0.001

4. Milk transportation

The physical transportation of milk begins from producer at village level where local milk traders collect milk from the milk producers located in different places. They use various types of utensils like metallic buckets, cans and containers depending upon the volume of milk and mode of transportation. Bicycles, motorbikes and animal driven carts are used for transportation of milk from remote areas to small towns/main roads. From small towns/highways the milk is transported to big cities through buses, vans and minitrucks. The transported cost of milk through buses is lower as compared to other transported by vans, pickups and mini-trucks.

Quality of milk

Milk produced in villages contribute more toward milk supply to big cities and towns. Thus, a large bulk of milk changes several hands before it reaches the consumers. The more the number of intermediates, the higher would be the chances of milk contamination. The marketing of raw liquid milk, chiefly produced by a large number of small livestock holders, is a difficult and time-consuming task, especially due to poor infrastructure, unfavourable climatic conditions during a major part of a year and low technology level. The quality of milk supplied to the consumers and many of the dairy processors is often very poor due to skimming, dilution and addition of dirty ice or chemical agents. At critical points in the milk marketing chain (e.g. where the rural collectors sell to the highway collectors), chilling facilities are rarely available.

The milk handling is often unhygienic. Containers and cans are not well cleaned. Despite the addition of ice or preservatives, bacterial activity can increase considerably. Under Pure Food Ordinance and pure food rules milk is required to be hygienic. The food inspectors report high rates of adulteration. Severe penalties can be enacted but only meager fines are imposed with minimal impact on malpractices.

Main problems of milk collection include; unhygienic conditions under which the animals are milked, small quantity of milk delivered by individual producer, long distance between production and market areas, poor transportation, insufficient or non-availability of milk cooling/chilling system

and high ambient temperature. These problems lead to a considerable reduction in shelf life of milk, which results in its souring. Overall 5.3 percent of consumer household consume pasteurized milk (3).

6. Milk carriers sale

Milk carrier sells two-third milk direct to consumers while one-third to retail shops. In irrigated area, less than half milk is sold to consumers while half to retail shops. In barani area, more than three fourth milk is sold to consumers while only 15 percent milk is sold to retail shops. This represents that marketing chain is relatively short in barani areas than in irrigated areas. In barani areas, purchase price of milk is high, so milk carriers prefer to sell milk direct to consumers rather than to retail shops.

Table 3. Milk carriers milk sale to market agency (% milk).

Market intermediaries	Overall sale	Irrigated areas	Barani areas	Significance
Milk sold to consumers	60	44	77	0.007
Milk sold to retailers/tea shops	33	50	15	0.002
Milk sold to milk collection centers	3	6	0	0.193
Milk sold to sweet/khoya makers.	4	0	8	0.322

7. Market margins of market agencies

(a) Sale price

The data (Table 4) indicate that sale price of milk producers and other market intermediaries are high in barani areas than in irrigated areas.

Table 4. Sale price of milk producers and market agencies (Rs./litre)

Market agencies	Over all sale price	Irrigated areas	Barani areas
Producers	13.59	12.97	14.50
Milk carriers	15.42	14.66	18.50
Retailers	18.62	17.60	19.75

(b) Absolute cash margins

Absolute cash margins are difference between price paid and received by each specific market intermediary. Absolute cash margins of producers are high as compared to milk carriers and retailers (Table 5). The reason is that major cost on milk production is incurred by milk producers. The investment of milk producers is very high than other market agencies.

Table 5. Absolute cash margins of milk producers and market agencies (Rs./litre)

Market agencies	Over all cash margin	Irrigated areas	Barani areas
Producers	13.59	12.97	14.50
Milk carriers	1.83	1.69	4.00
Retailers	3.20	2.94	1.25

(c) Percent share in consumer's rupee

The consumer's one rupee spent on milk is divided among the producers and other market intermediaries. This indicator shows that portion of a consumer's rupee which goes to the producer and other market intermediaries. It is calculated by expressing the absolute cash margin of the agency, as a proportion of retail price of milk. Share of milk producers in consumers rupee is almost 73 percent (Table 6). Second high share is of retailers (17.2%).

Table 6. Percent share of producers and market agencies in consumers rupee.

Market agencies	Over all share	Irrigated areas	Barani areas
Producers	73.0	73.7	73.4
Milk carriers	9.8	9.6	20.2
Retailers	17.2	16.7	6.3

(d) Cost of milk

Marketing costs comprise total costs incurred on marketing of produce by each agency. The most important factors which influence marketing costs are distance between production and consumption market, condition of the roads,

seasonality, perishability, storage and processing (10). For this study marketing costs of milk were computed at each stage of the marketing chain based on the actual expenses incurred.

Cost of milk borne by milk producers is higher which is more than 8 rupees per litre (Table 7). This cost includes fodder, concentrate, medicine, spices and other miscellaneous costs incurred on milking animals for producing milk. Cost of market intermediaries includes transportation, handling and storage costs.

Table 7. Cost of producers and market agencies (Rs./litre).

Market agencies	Over all cost (Rs./litre)	Irrigated areas	Barani areas
Producers	8.58	8.01	9.16
Milk carriers	0.69	0.50	0.88
Retailers	0.53	0.42	0.67

Net profit margins

The net profit margins of a specific agency is the net earning that it gains after paying all marketing costs. The net profit margins of milk producers are calculated on per litre basis as the sale price less production costs of milk producers. The net profit margins of milk carriers and retailers are calculated as sale price of milk in the market minus purchase price and other marketing costs. Overall net profit margins of milk producers are quite high than other market agencies (Table 8). The net profit margins of milk producers and milk carriers are high in barani area than in irrigated area while net profit margins of retailers are high in irrigated area than in barani area.

Table 8. Net profit margins of milk producers and market agencies (Rs./litre).

Market agencies	Over all net profit margins	Irrigated areas	Barani areas
Producers	5.01	4.96	5.34
Milk carriers	1.14	1.19	3.22
Retailers	2.67	2.52	0.58

9. Percent profit margins

Percent profit margins are defined for each intermediary as net profit margins divided by the absolute cash margins expressed in percent. Retailers followed by milk carriers earned high profit margins while producers earn less profit margins.

Table 9. Percent profit margins of milk producers and other market agencies.

Market agencies	Over all profit margins	Irrigated areas	Barani areas
Producers	37	38	37
Milk carriers	62	70	80
Retailers	83	86	46

The results further show that at each stage in marketing chain, the reward to management by intermediary makes up a relatively large portion of marketing margin compared to other direct costs incurred. Given the size of their investment in the business and risks borne, proportion of profit margins received by producers are less than other market agencies.

CONCLUSIONS AND RECOMMENDATIONS

Absolute cash margins of producers are high as compared to milk carriers and retailers as the investment of milk producers is much higher than other market agencies. Share of milk producers in consumers rupee is almost 75 percent followed by retailers (17 %). Cost of milk borne by milk producers is higher which is more than 8 rupees per litre. Overall net profit margins of milk producers are higher than other market agencies. The net profit margins of milk producers and carriers are high in barani areas than in irrigated areas while the net profit margins of retailers are high in irrigated areas. Retailers followed by milk carriers earned high percent profit margins while producers earned less profit margins.

Most of the milk produced by subsistence farmers, in the absence of marketing opportunities, is consumed at home as fresh milk or converted to ghee. Small milk chilling units may be established in rural areas so that milk can be

marketable surplus of producers and will also ensure the milk supplies to the milk processing plants.

To reduce losses, milk may quickly be transported from producing to consuming areas. Milk carriers may be given loans to purchase pickup trucks for prompt milk transport. This will increase the volume of business and returns and will check adulteration.

Producers delivering milk directly to the milk collection centers of the processing plants receive higher price. More milk collection centers should be established in the remote areas by the processing plants.

During the flush season, when milk supply is abundant with low demand, excess milk may be converted into dry milk. This will help save precious foreign exchange by decreasing the import of dry milk. The locally produced powdered milk may be used to reconstitute milk during less supply period. The government should, therefore, encourage the installation of milk drying plants for powdered milk.

In view of existing excess capacity and low demand expansion for UHT milk, pasteurization plants may be established instead of UHT milk processing plants in future. Pasteurized milk, because of its low processing and packaging costs, can compete more effectively with unprocessed milk.

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