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MILK MARKETING UNDER COOPERATIVE AND NON-COOPERATIVE MARKETING CHANNELS: EVIDENCE FROM WEST BENGAL

ABSTRACT: *The present study is an attempt to empirically investigate the price spread, marketing costs, marketing margins, marketing efficiency, and profit efficiency among market middlemen under cooperative and non-cooperative marketing channels in the domestic trade market of liquid milk in West Bengal. One of the important findings of this study is that, although the inter-market (and intra-market) price variation for liquid milk under the cooperative marketing agency in not far from uniformity, and all marketing agencies under cooperative channels receive much lower abnormal profit per unit of milk as compared with non-cooperative channels, the former fails to provide much economic benefit, either to the producer or to the consumer, because of the burden of much higher fixed cost per unit of liquid milk.*

KEY WORDS: *Primary Milk Producers' Co-operative Society, Milk vendor, Price spread, Marketing cost, Measure of marketing efficiency, profit efficiency.*

JEL CLASSIFICATION: Q12, Q13, Q16

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1. INTRODUCTION

The dairy sector is a very important productive activity in Indian agriculture, as milk is the second largest agricultural commodity contributing to GNP, next only to rice, and generates a regular flow of income to the farmer's family throughout the year. It is recognized as an important activity suitable for employment generation and value addition in the agricultural sector in the Indian economy in general and for rural families especially, small and marginal farmers and landless agricultural laborers in particular. But the success of dairy farms (or plants) largely depends on the effective management of operations like milk marketing, because marketing provides a stimulus to greater production and thereby increases demand, which provides its own incentive to increase supply. An efficient marketing system results in a higher proportion of producer profit in the consumer rupee, which influences the producer's decision to invest resources in a particular economic activity in a particular time period. An efficient marketing system also helps bring quality product to the consumers at the lowest possible cost.

Therefore the analysis of milk marketing channels, marketing costs, and the margins of market middleman are essential for dairy development at the micro level, and in formulating plans for improvements in the dairy sector through higher value addition and increased employment generation in agriculture, based on sound economic principles, at the macro level. The present study is an attempt in this direction in the micro perspective, in the Indian context of the area of West Bengal.

In India dairy plants have different systems of milk marketing, namely non-cooperative and cooperative. But the marketing of milk and milk products in India is dominated by the unorganized sector, and the organized sector handles only about 14 % of total milk production (GoI, 2004). The dairy cooperatives are considered a vital channel for the improvement of production and the reduction of the cost of procurement, processing, and marketing of dairy products through the economy of scale approach, together with the provision of quality milk to the consumer at the lowest cost. It is also important to mention that dairy cooperatives accounted for the major share of processed milk in the country during 2007-08 (NDDB: 2007-08). Operation Flood (currently White Flood), launched in 1970 by the National Development Dairy Board and the world's largest dairy development programme, has been acclaimed as one of the most successful

development cooperative programmes[1]. In spite of the significant contribution to milk production and marketing by cooperatives in India, many non-cooperative dairy farms have simultaneously been producing and marketing milk. But the study of milk marketing is less in relation to the study of milk production under both cooperative and non-cooperative system.

However there have been several studies of the marketing of liquid milk in both cooperative and non-cooperative Indian dairy plants (Rangaswamy and Dhaka, 2008; Pawar and Sawant, 1979; Devaraja, 2001; Rajendran and Mohanty, 2004; Sharma et al, 2007; Kanmony and Gnanadhas, 2004; Sujatha et al, 2004; Duhan et al, 2004; Singh and Dayal, 2004; Naik and Dalwai, 1998, Koshta and Chandrakar, 1998; Beohar, 1998; Singh and Rai; 1998). These studies show that there is great variation in the marketing efficiency of different cooperative and non-cooperative milk producing firms in different resource situations, due to variations in marketing costs and marketing margins. Keeping this in view, the present study is an attempt to examine empirically the price spread, marketing costs, marketing margins, marketing efficiency, and profit efficiency among market middlemen in cooperative and non-cooperative marketing channels in the domestic trade market of liquid milk in West Bengal.

This study in West Bengal is important because the growth of the dairying cooperative in states such as Gujarat, Maharastra, Tamilnadu, and Karnataka has resulted in the economic betterment and well-being of the rural population compared with other states (Benni, 2005:3). However the West Bengal Co-operative Milk Producers Federation Limited (WBCMPFL) started its journey later, in 1983, under the aegis of the government of West Bengal. It follows the three-tier structure of the Anand pattern of milk cooperatives: WBCMPFL at the state level, District Milk Union (DMU) at the district level, and Primary Milk Producers' Co-operative Societies (PMPCS) at the village level. But it is worth mentioning that non-cooperative or private dairying, which is the original form of dairying in West Bengal, has been also functioning along with the recent expansion of cooperative dairying.

As compared with the all-India figure, West Bengal places 12th in production (in tonnes), contributing only 3.90% of total production in 2007-08. West Bengal has established 12,678 organized district cooperative societies(cumulative), 2.08% of

1 See the mission statement from the NDDB Operation Flood, website: *http://www.nddb.org/aboutnddb/operationflood.html*

the all-India figure, and has marketed 673 TLPD[2], 3.56% of the all-India figure, by incorporating 66,000 farmers(about 0.5% of India's total farmers) as their members during 2007-08(NDDB:2007-08). But per capita availability of milk (128 gr./day) for West Bengal is much lower than the all-India figure (252 gr./day). Thus the analysis of marketing of liquid milk under both cooperative and non-cooperative dairying in West Bengal is expected to provide a synoptic view of the economics of the dairy marketing industry, and thereby contribute to higher employment potential and greater value addition in agriculture, and also help provide quality milk to the consumer at the lowest possible cost.

The underlying hypotheses of this paper are as follows. The inter-market (and intra-market) price variation for liquid milk under the cooperative marketing agency in not far from uniformity, and all marketing agencies receive a much lower abnormal profit per unit of milk in relation to the non-cooperative channel. However the former fails to provide much economic benefit, either to the producer or to the consumer, because of the burden of the much higher fixed cost per unit of liquid milk. The economic benefit from sale and purchase per unit of milk, for producers and consumers respectively, in all markets under cooperative and non-cooperative marketing channels, does not differ much.

The paper is organized as follows. Sampling design and methodology appear in Section 2. Important results of this paper are contained in Section 3. Section 4 concludes.

2. SAMPLING DESIGN AND METHODOLOGY

2.1 The data set

Primary data was collected at the village level from milk producer households operating in both the cooperative and non-cooperative dairying systems. The sampling design followed in this study is a stratified random sampling design.

The three- tier structure of the dairy cooperatives in West Bengal is WBCMPFL at the state level (an apex body of milk co-operatives in the state of West Bengal), DMU (District Milk Union) at the district level (a representative body of village societies), and PMPCS (Primary Milk Producers' Co-operative Societies) at the village level. In order to select four PMPCSs the following procedure was

2 The acronym TLPD stays for 'Thousand Litres Per Day'.

used. Under the WBCMPFL, there are 14 DMUs. Out of these, two DMUs were selected (both established for over 15 years), one the the highest and the other the lowest performing, based on the simple arithmetic mean of daily average milk production (in kg.) and daily average milk marketing (in kg.). From each of these two selected DMUs we selected the highest performing and the lowest performing PMPCS, using the same procedure we adopted for selecting the two DMUs [simple arithmetic mean of daily average milk production (in kg.) and daily average milk marketing (in kg.)]. Thus the four PMPCSs selected for the final survey were Rukunpur-Balarampara Primary Milk Producers' Co-operative Society Ltd. (RPMPCS), Farashdanga Primary Milk Producers' Co-operative Society Ltd. (FPMPCS), Khar-Radhakrishnapur Primary Milk Producers' Co-operative Society Ltd. (KPMPCS), and Sonepur Primary Milk Producers' Co-operative Society Ltd. (SPMPCS). At the final level, 40 milk-producer member-households of each PMPCS were selected, based on simple random sampling without replacement (SRSWOR). To make a comparative study with the PMPCSs an equal number of non-cooperative milk producer households (40 in number) at the village level were also randomly selected (SRSWOR), based on the proximity of nearest in distance (in km.) from each sample PMPCS. However the total number of milk-producer households was 320, 160 from PMPCS (40*4) and 160 from non-cooperative societies (40*4). It is worth mentioning that while examining the comparative analysis in cooperative/non-cooperative dairy farms, good (bad) cooperative/non-cooperative dairy farms were selected on the basis of the quantitative magnitude of milk production (simple arithmetic mean of daily average milk production (in kg.) and daily average milk marketing (in kg.).

In addition to 320 (160+160) milk-producer households, 96 market middlemen (80 middlemen from non-cooperatives, 16 middlemen from cooperatives),who purchased the significant major portion (in quantity) of liquid milk annually from the 320 milk-producer households selected for the sample survey, were also selected for field study. The 80 middlemen selected from the non-cooperative system purchase about 82% of the liquid milk (on annual average) purchased from all households in this study under the non-cooperative system (i.e., 160 households). Similarly the 16 middlemen (marketing agency) selected from the cooperative marketing system purchased about 89% of liquid milk (on annual average) from all households under the cooperative system (i.e., 160 households). Out of the 80 middlemen under the non-cooperative system, 40 middlemen are milk vendors (taking 10 milk vendors from each market), and 40 middlemen are retailers (taking 10 retailers from each market) in the four selected markets under study. Out of 16 middlemen (marketing agency) under the cooperative system, 4 marketing agencies are primary milk producers' cooperative societies (RPMPCS,

KPMPCS, FPMPCS and SPMPCS), 2 marketing agencies are district milk unions (Medinipur DMU and Murshidabad DMU) in our study and 10 middlemen are retailers who sell packaged milk. The results of this study are therefore based on a field survey of 320 milk-producers' households and 96 market middlemen, using a specially-designed questionnaire, during the year 2007-08.

2.2 Methodology

In order to study the marketing of liquid milk for this paper, proportions, simple percentage analysis, averages, etc. have been used in tabular analysis. To this end the following measures were introduced.

Price spread over different markets

Price spread over different markets and over different marketing agents depends on efficiency analysis. Efficiency in quantitative term is measured as a ratio of output to input. Markets are efficient when the ratio of the value of output to the value of input throughout the marketing system is maximized. One of the forms of marketing efficiency is pricing efficiency. The goal of pricing efficiency is efficient resource allocation. Activities that may improve pricing efficiency are improvements in market news, information, and competition. Competition plays a key role in fostering pricing efficiency. It is said that most of the conditions of efficiency in marketing are best satisfied by perfectly competitive conditions. The closer the actual conditions to perfect competition, the stronger the possibilities for minimizing waste and exploitation and the greater the tendency for a uniform price to prevail over the entire market area.

Following Ashok Rudra (1992: 62) we calculated price spread over the different markets and different marketing agents in our study. The symbols $\theta \pm \delta$ means the following: The midpoint of the milk prices to the different marketing agents in a given market is θ, the highest observed value is $\theta+\delta$ and the lowest observed is $\theta-\delta$. $\pm\delta$ has given an idea about the intra market price variation. Comparison of the values of θ for different middlemen in the same market and for different markets for the same middlemen gives some idea about the inter-market and intra-market price variations. The hypothesis of Rudra's (1992) calculation of price spread over different markets and over different marketing agents is that if the range of price variation for the homogenous product under different markets (excluding marketing costs) in any particular marketing agent as well as inter-marketing agents for the same period is not far from uniformity, the market of the particular homogeneous product becomes closer to perfect competition .As

data related to agricultural inputs and outputs are usually short term in nature in developing economies like India, Rudra's (1992) estimate seems to be more pertinent in determining the competitiveness of such agricultural inputs and outputs among different agricultural farms.

Share of middlemen's profit (Marketing Margin) in consumer price (in percentage) = (MM/Pc)*100, where MM is the marketing margin. The higher (lower) the middleman's profit in the consumer price (in percentage), the lower (higher) the marketing efficiency.

Measure of Marketing efficiency (MME)**:** MME indicates the movements of goods from producer to consumer at the lowest possible cost with the maximum satisfaction of the consumer. Marketing efficiency of individual liquid milk is calculated with the measure of marketing efficiency (MME) indicator (Acharya, 2004) as MME = FP/ (MC+MM), FP means price received by farmer. MC is marketing margin of the middlemen. The higher the value of MME, the higher the efficiency, and vice versa.

The general expression for estimating the margin for intermediaries is given below.

Intermediaries' margin (Margin of Market Middlemen) = Gross Price (selling price) – Price Paid (buying price) – Cost of Marketing

Profit of Market Middlemen (Marketing Agents)

The expression between opportunity cost and supernormal profit of the market middlemen appears in the following: in neoclassical economics, economic profit, or profit, is the difference between a firm's total revenue and its opportunity costs. Normal profit is a component of the firm's opportunity costs. Normal profits are a kind of opportunity cost. It is the rate of return on the next best alternative investment of equivalent risk. Opportunity cost can be defined as the highest valued alternative foregone in the pursuit of an activity. But, importantly, the supernormal profit is the profit in excess of all opportunity costs (Gravelle and Rees, 1988 , P 292).

DEA analysis for profit efficiency:

The method of data envelopment analysis introduced by Charnes, Cooper and Rhodes (CCR) (1978) and further extended to non-constant returns technologies

by Banker, Charness and Cooper (BCC) (1984) provides a way to construct the production possibility set from an observed data set of input-output bundles.

Suppose that (X^j, Y^j) is the input-output bundle observed for firm j (j=1,2,…….,N). Clearly, these input-output bundles are all feasible. Then the smallest production possibility set satisfying the assumption of convexity and free disposability that includes these observed bundles is

$$S = \{(X,Y) : X \geq \sum_{j=1}^{N} lj X^j ; Y \leq \sum_{j=1}^{N} lj Y^j ; \sum_{j=1}^{N} lj = 1; lj \geq 0; (j = 1,2,\ldots\ldots N)\}. \quad (1)$$

The set S is also known as the free disposal convex hull of the observed input-output bundles. One can obtain various measures of efficiency of a firm using the set S as the reference technology.

For a commercial firm, both inputs and outputs will be choice variables and the only constraint the feasibility of the input-output bundle chosen. For such a firm, the criterion of efficiency is profit maximization. At input and output prices w and p, respectively, the actual profit of the firm producing the output bundle Y^o from the input bundle X^o is $\Pi^o = p^/ Y^o - w^/ X^o$. The maximum profit feasible for the firm is:

$$\Pi(w,p) = \max p^/ Y - w^/ X : (X,Y) \hat{I} T. \quad (2)$$

In any empirical application, the maximum profit may be obtained as

$$\Pi^* = \max p^/ Y - w^/ X \text{ s.t.} \quad (3)$$

$$\sum_{j=1}^{N} lj Yj \geq Y ; \sum_{j=1}^{N} lj Xj \leq X; \sum_{j=1}^{N} lj = 1; lj \geq 0; (j = 1,2,\ldots\ldots N)\} \quad (4)$$

The profit efficiency of the firm is measured as $d = \Pi^o / \Pi^*$. This measure is also bounded between 0 and 1 except in the case where the actual profit is negative, while the maximum profit is positive. In that case d is less than 0. If the maximum profit is negative as well, d exceeds unity (Das et al, 2005).

3. RESULTS AND DISCUSSION

The prevalent marketing channels in our sample are portrayed in Figure 1. It shows that there are eight marketing channels (two cooperative and six non-cooperative) in the area we surveyed. This study concentrates on those marketing agents that are directly related to milk-producer households for their marketing transactions, in four important local markets – Rukunpur, Farashdanga, Khar-Radhakrishnapur, and Sonepur. As regards the non-cooperative system, we selected marketing channels 3 and 4 for our study because these channels execute their business with about 82% of liquid milk (on annual average) purchased from all 160 sample households under this system. Similarly, for the cooperative system, we selected channels 1 and 2, because they execute their marketing business with about 89% of liquid milk (on annual average) purchased from all 160 sample households under this system.

First we examine the relative importance of the incidence of transaction of liquid milk between marketing agents and the sample households under all marketing channels (Figure 1) in our study. As may be seen in Table-1, the prevalent marketing agent of liquid milk consists of the following four: PMPCSs, milk vendors, retailer, and local small collector. Indeed, for the cooperative channel, PMPCSs serve as the most important marketing agent under both the good and bad cooperative system for the overwhelming majority of milk-producer households (75% in the case of households belonging to the bad cooperative and 91.25% for the good cooperative). For the non-cooperative channel, milk vendors serve as the most important marketing agent serving the overwhelming majority of households under both the good non-cooperative and bad non-cooperative systems. It is important to mention that milk vendors purchase liquid milk from milk producers mainly to prepare milk products. But compared with milk vendors the roles of retailers and local small collectors are less important for the overwhelming majority of households in the prevalent four local markets - Rukunpur, Farashdanga, Khar-Radhakrishnapur, Sonepur – in our study. This study, however, suggests that under the non-cooperative marketing system, milk vendors are not merely important marketing agents for the sample households but are also the most important marketing channel for them. This is also true for PMPCSs which are the most important marketing channel under the cooperative marketing system. This study, however, confirms that channels 1 and 2 and channels 3 and 4 are the most important marketing channels for cooperative and non-cooperative marketing systems respectively.

We now examine whether prices vary over different markets and over different marketing agents (or market middlemen) in a way which is different from uniformity during the lean and peak seasons of the year we surveyed (Table-2). Some important features that appear in Table-2 are:

1) The inter-market (and intra-market) price variation for liquid milk is not far from uniformity when PMPCSs act as marketing agents, because the percentage change of price lies between 7.03 and 9.13. On the contrary, the inter-market (and intra-market) price variation for liquid milk is far from uniformity when milk vendors, local small collectors, and retailers act as marketing agents, because the percentage change of price lies between 12.41 and 21.54. However within these three types of marketing agents for non-cooperative households the highest percentage change of price is retained by milk vendors, followed by local small collectors and retailers. These results also imply that the abnormal profit received by market middlemen (agency) in the cooperative marketing channel is much lower than the abnormal profit received by market middlemen in the non-cooperative marketing channel.
2) Not only does the inter-market (and intra-market) price variation for liquid milk become the lowest for PMPCSs, but the PMPCSs also charge the lowest price per unit of liquid milk in the case of inter-market as well as intra-market seasonal price.
3) The price per unit of liquid milk is usually somewhat higher during the lean season than during the peak season for all types of marketing agents and for all markets. The higher price per unit of milk during the lean season as compared to the peak season may be judged by the fact that during the lean season the supply of liquid milk is lower than the consumer demand for liquid milk.

In order to look into the extent of the marketing margin of different market middlemen, the relative importance of cost components of the marketing producers' share of the consumer price and the marketing efficiency based on the market study of four important local markets in the area we surveyed, we now examine average price spread and marketing margin of liquid milk for the cooperative marketing channel (channels 1 and 2) and non-cooperative marketing channel (channels 3 and 4) in our study.

The key results of Table 3 (non-cooperative marketing channels) and Table 4 (cooperative marketing channels) are:

1) As regards the different components of marketing costs the labour cost is the most important, followed by the transport cost at the milk vendor's level and

storage cost at the retailer level in all markets in the non-cooperative marketing channel (Table 3); whereas the staff salary cost is the most important marketing cost in the cooperative marketing channel (Table 4). It is worth mentioning that staff salaries are also the labour cost in the cooperative model, although such labour costs are usually incorporated in the fixed cost of the cooperative societies, as the cooperative society employees are usually employed on a much more long-term basis compared to in the non-cooperative system. However it is said that in both marketing systems – cooperative and non-cooperative – the major cost of liquid milk marketing is the labour cost. More importantly, the per unit cost of marketing for liquid milk in the cooperative marketing channel is much higher than that in the non-cooperative channel in all markets. This is mainly due to the fact that all the marketing agents in the cooperative marketing channel except the retailer (PMPCSs, DMU, and WBCMPFL) have to bear fixed costs including the labour cost, which constitutes the highest proportion of the marketing cost in the cooperative marketing channels (Table 4); whereas such a fixed cost barely exists in the non-cooperative marketing channel (Table 3).

2) Interestingly, the consumer price per unit of liquid milk in both the cooperative (Table 4) and non-cooperative marketing channels (Table 3) is very similar in all markets.
3) As far as the profit margin received by different market middlemen is concerned, the milk vendor has the highest profit margin for all markets, followed by retailers in the non-cooperative marketing channel (Table3), whereas in the cooperative marketing channel (Table 4) the retailer receives the highest profit margin in all markets, followed by DMU's, PMPCSs and WBCMPFL. Significantly, in the case of the non-cooperative marketing channel (Table 3), out of the total price spread of marketing (marketing margin of middlemen plus marketing cost), the vendor's profit margin, which occupies the highest profit margin in the non-cooperative marketing channel, varies between 44.27% and 46.77 % in the four markets (the vendors profit margins in the price spread in Rukunepur, Khar-Radhakrishnapur, Farashdanga and Sonepur are 46.77%, 45.45%, 45.11% and 44.27% respectively). On the contrary, for the cooperative marketing channel (Table 4), out of the total marketing price spread, the retailer's highest profit margin in the cooperative marketing channel varies between 6.96% and 8.02 % in the four markets (retailer's profit margins in the price spread in Rukunepur, Khar-Radhakrishnapur, Farashdanga and Sonepur are 7.89%, 8.02%, 7.23% and 6.96% respectively.). This result (Tables 3 and 4) also confirm the findings of Table 2, which shows that the inter-market (and intra-market) price variation for liquid milk is not far from uniformity in the

cooperative marketing channel, whereas for the non-cooperative marketing channel such a price variation is far from uniformity.

4) The Measure of Marketing efficiency (MME) in all markets for both channels (cooperative and non-cooperative) does not differ much. It shows that the inter-market (and intra-market) marketing efficiency for both cooperative and non-cooperative marketing channels is not far from uniformity. This is due to the fact that despite all types of market middlemen receiving much lower abnormal profits per unit of milk in the cooperative marketing channel (Table 4) as compared with the non-cooperative one (Table 3), the per unit marketing cost of liquid milk incurred by market middlemen (agency) in the cooperative marketing channel is much higher than in the non-cooperative channel, because the market middlemen (agency) in the cooperative marketing channel have to bear large fixed costs, including staff salaries. It also implies that the producer's gain from the disposal of liquid milk in both cooperative and non-cooperative marketing channels does not differ much.

We now examine the extent of profit efficiency of different market middlemen in the cooperative and non-cooperative marketing channels in our study (Table 5). Table 5 shows that the extent of profit efficiency is much higher for all types of market middlemen in the non-cooperative marketing channel (between 0.56 and 0.90) in relation to the cooperative marketing channel (between 0.27 and 0.45). This clearly indicates that all types of market middlemen in the non-cooperative marketing channel receive much higher abnormal profit per unit of liquid milk as compared with cooperative marketing channel. These results are in conformity with the findings of Tables 2, 3, and 4.

4. CONCLUSIONS

The results of this study lend credence to some important findings in keeping with the underlying hypotheses of this study. First, both producers' price and consumers' liquid milk price in all markets in both cooperative and non-cooperative marketing channels are not far from uniformity. This implies that the economic benefit from sale and purchase per unit of milk for producers and consumers respectively, in all markets, under both cooperative and non-cooperative marketing channels, do not differ much. Second, all types of market middlemen in the non-cooperative marketing channel receive much higher abnormal profits per unit of milk, and receive higher profit efficiency as compared with in the cooperative channel. This is an indication that, unlike in the non-cooperative marketing channel, the inter-market (and intra-market)

price variation for liquid milk in the cooperative marketing channel is not far from uniformity. Third, the marketing cost per unit of milk is much higher in the cooperative marketing channel than in the non-cooperative channel. Fourth, much higher abnormal profits per unit of liquid milk in the non-cooperative marketing channel as compared with the cooperative one, and much higher cost per unit of liquid milk in the cooperative marketing channel in relation to the non-cooperative channel, lead to the fact that marketing efficiency in all markets in both marketing channels does not differ much. It also implies that the producer's gain from the disposal of liquid milk in both cooperative and non-cooperative marketing channels does not differ much.

But despite the fact that the inter-market (and intra-market) price variation for liquid milk under the cooperative marketing agency in not far from uniformity, and all marketing agencies in the cooperative channel receive a much lower abnormal profit percent of milk as compared with the non-cooperative channel, the former fail to provide much economic benefit either to the producer or to the consumer because of the burden of much higher fixed cost per unit of liquid milk. In this perspective the fixed cost per unit of liquid milk needs to be reduced significantly either by reducing the number of market middlemen (agency) or by expanding other business along with liquid milk under the same market middlemen (agency) business, or by a combination of both, in order to reduce fixed cost per unit, and thereby total cost per unit of milk.

Thus if the fixed cost per unit of liquid milk in the cooperative marketing system can be reduced significantly it is only the cooperative marketing system which can increase marketing efficiency on the one hand and also supply consumers with better quality liquid milk at the least possible cost. Mini and small assembling centres can also be established under the cooperative system, which can save on the cost of transportation in the assembling, labour, and distribution phases.

The study also reveals that the producer's liquid milk price during peak season is lower than its price during the lean season. The milk producer need not receive a lower price for their product during peak season if the government introduced a better storage system for milk. This could increase the producer's profit in milk marketing. So, a better storage structure is necessary for the efficient marketing of milk, which would result in a higher share of producer profit in the consumers' rupee, and thereby influence the producers' decision concerning investment of their resources in liquid milk production throughout the year.

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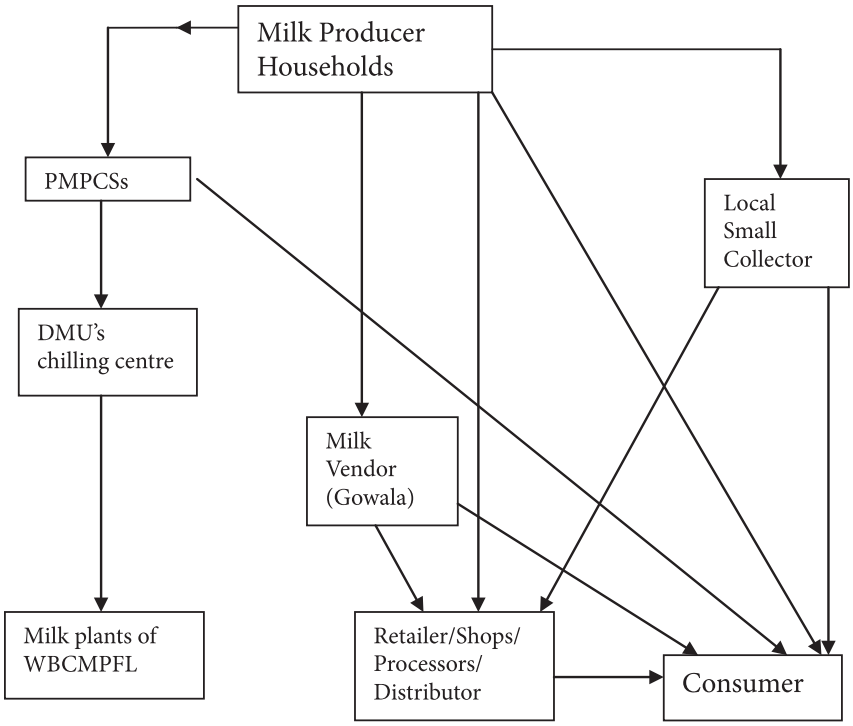
ANNEX

Figure 1: Milk Marketing Channels in West Bengal



<u>Milk marketing channels in West Bengal (Cooperative):</u>

Channel-1: Milk producer → Village level cooperative society (PMPCSs) → District level milk union (DMU) → Milk plants under WBCMPFL → Retailer/ processor/ distributor → Consumer.

Channel-2: Milk producer → Village level cooperative society (PMPCSs) → Consumer.

<u>Milk marketing channels in West Bengal (Non-cooperative):</u>

Channel-3: Milk producer → Milk vendors (Gowala) → Retailer/ Shops/ processor → Consumer.

Channel-4: Milk producer → Milk vendors (Gowala) → Consumer.

Channel-5: Milk producer → Local Small Collector → Retailer/ Shops/ processor → Consumer.

Channel-6: Milk producer → Local Small Collector → Consumer.

Channel-7: Milk producer → Retailer/ Shops/ processor → Consumer.

Channel-8: Milk producer → Consumer.

Table 1: Proportion of households (under good/bad cooperative/non-cooperative area) where different marketing agents occur with different degrees of importance for the disposal of liquid milk in four local markets*

Marketing Agents		No. of Households (n=320)	Percentage of households where agent serves		
			As most important channel	As second most important channel	As least important channel
PMPCSs	Under GC	80	91.2575.00	3.75	0.00
	Under BC	80		12.50	5.00
Milk Vendor	Under GNC	66	89.39	4.55	1.51
	Under BC	71	90.14	4.23	2.82
Retailer	Under GNC	02	0.00	35.5	25.0
	Under GNC	03	0.00	33.33	33.33
Local small collector	Under GNC	12	25.0	41.70	8.30
	Under GNC	06	16.25	33.33	16.25

Source: Field Survey. 2007-08.

Note: GC stands for Good Cooperative and BC stands for Bad Cooperative, GNC stands for Good Non-Cooperative and BNC stands for Bad Non-Cooperative.

Per PMPCS milk marketed 100 lt.- 1800 lt./day on average (under GC/BC area)

Per Milk Vendor milk marketed 50 lt.- 500 lt./day on average (under GC/BC area)

Per Local Small Collector milk marketed 10 lt.- 50 lt./day on average (under GC/BC area)

*The four important local markets are Rukunepur, Khar-Radhakrishnapur, Farashdanga and Sonepur.

Table 2: Inter/Intra market, Inter/Intra marketing agents' variation in peak season & lean season prices of milk offered for milk producers' during 2007-08.

Rs. per lit.
(mid value and range)

Name of the Local Market	Peak Season			
	PMPCS	Milk Vendor	Local Small Collector	Retailer
	(CM)	(NCM)	(NCM)	(NCM)
Rukunepur (GC/GNC)	12.25±1.00 (8.16)	14.00±2.25 (16.07)	13.50±1.70 (12.59)	13.75±2.00 (14.55)
Khar-Radhakrihsnapur (GC/GNC)	12.40±0.90 (7.26)	14.50±2.50 (17.24)	14.10±1.75 (12.41)	14.00±1.85 (13.21)
Farashdanga (BC/BNC)	12.05±1.10 (9.13)	14.25±3.00 (21.05)	13.90±2.00 (14.39)	13.50±1.90 (14.07)
Sonepur (BC/BNC)	12.00±1.00 (8.33)	12.80±2.75 (21.48)	13.00±1.85 (14.29)	13.10±2.00 (15.27)
	Lean Season			
	PMPCS	Milk Vendor	Local Small Collector	Retailer
	(CM)	(NCM)	(NCM)	(NCM)
Rukunepur (GC/GNC)	13.30±0.90 (6.77)	14.25±2.50 (17.54)	13.70±1.90 (13.87)	14.00±1.75 (12.50)
Khar-Radhakrihsnapur (GC/GNC)	13.50±0.95 (7.03)	14.65±2.40 (16.39)	14.10±2.10 (14.89)	14.10±2.00 (14.18)
Farashdanga (BC/BNC)	13.15±0.95 (7.22)	14.75±2.90 (19.66)	14.00±2.20 (15.71)	13.70±1.90 (13.87)
Sonepur (BC/BNC)	13.10±1.00 (7.65)	13.00±2.80 (21.54)	13.05±2.00 (15.32)	13.50±1.95 (14.44)

Source: Field Survey 2007-08.

Note: Price for standard milk (Fat 4.5%, SNF 8.5% and CLR 27.74) in lean season by PMPCS was Rs.13 and peak season it was Rs.12.10 during 2007-08.

CM stands for Cooperative middlemen (Marketing Agency), NCM stands for Non-Cooperative middlemen, GC stands for Good Cooperative and BC stands for Bad Cooperative, GNC stands for Good Non-Cooperative and BNC stands for Bad Non-Cooperative.

Figures within brackets represent percentage variation of price in peak season and lean season.

Table 3: Average price spread, average marketing margin, and marketing efficiency of liquid milk in Channels 3 and 4 (Non-Cooperative Channels)

(Rs. per lit.)

Marketing Costs and Marketing Margin	Name of the markets				
	Rukunepur (under GNC)	Khar-Radha-krishnapur (under GNC)	Farashdanga (under BNC)	Sonepur (under BNC)	Overall non-cooperative
1) Milk producer's level					
a) Cost of Production (variable + fixed costs)	9.20	9.35	9.25	9.15	9.24
b) Profits	2.60	2.75	2.00	1.90	2.31
c) Price Received (a+b)	**11.80**	**12.10**	**11.25**	**11.05**	**11.55**
2) Milk Vendor's level					
a) Cost of Marketing (i+ii+iii+iv)	1.32	1.45	1.35	1.55	1.42
i) Labour	0.75	0.80	0.75	0.78	0.77
ii) Transport	0.30	0.35	0.32	0.41	0.35
iii) Storage	0.15	0.18	0.16	0.24	0.18
iv) Marketing tax & others	0.12	0.12	0.12	0.12	0.12
b) Profits	2.90(46.77)	2.75(45.45)	3.00(45.11)	2.90(44.27)	2.89(45.44)
c) Price received (a+b)	**16.02**	**16.30**	**15.60**	**15.50**	**15.86**
3) Retailer' level					
a) Cost of marketing (i+ii+iii+iv)	0.93	0.85	0.90	0.95	0.91
i) Labour	0.45	0.43	0.48	0.48	0.46
ii) Transport	0.10	0.12	0.14	0.18	0.13
iii) Storage	0.21	0.18	0.18	0.19	0.19
iv) Marketing tax & others	0.17	0.12	0.10	0.10	0.12
b) Profits	1.05 (16.93)	1.00(16.53)	1.40(21.05)	1.15 (17.56)	1.15(18.08)
c) Price received (a+b)	18.00	18.15	17.90	17.60	17.91
4) Price paid by consumer	**18.00**	**18.15**	**17.90**	**17.60**	**17.91**
5) Marketing cost	2.25	2.30	2.25	2.50	2.32
6) Marketing margin (MM)	3.95	3.75	4.40	4.05	4.04
7) Price spread	**6.20 (100)**	**6.05 (100)**	**6.65 (100)**	**6.55 (100)**	**6.36 (100)**
8) Producer's share in consumer price	66%	67%	63%	63%	64%
9) MM in consumer price	21.94%	20.66%	24.58%	23.01%	22.56%
10) Marketing Efficiency (MME)	**1.90**	**2.00**	**1.69**	**1.68**	**1.82**

Source: Field Survey, 2007-08.

Note: Figures in brackets represent the percentage of profit margin of different middlemen's price spread.

Table 4: Average price spread, average marketing margin, and marketing efficiency of liquid milk in Channels 1 and 2 (Cooperative Channels)

(Rs. per lit.)

Marketing Costs and Marketing Margin	Name of market				
	Rukunepur (under GC)	Khar-Rad-hakrishnapur (under GC)	Farashdanga (under BC)	Sonepur (under BC)	Overall cooperative
1) Milk producer's level					
A) Cost of Production (variable + fixed costs)	9.27	9.38	9.18	9.11	9.24
B) Profits	3.28	3.26	2.87	2.31	2.93
C) Price received (A+B)	**12.55**	**12.64**	**12.05**	**11.82**	**12.27**
2) PMPCS's level					
A) Cost of Marketing (a + b)	1.01	1.03	1.34	1.40	1.20
a) Fixed cost (i+ii)	0.50	0.54	0.65	0.68	0.59
i) Interest + Depreciation	0.17	0.18	0.21	0.23	0.20
ii) Salary of Staff	0.34	0.36	0.44	0.45	0.40
b) Variable cost (i+ii+iii+iv)	0.50	0.49	0.69	0.72	0.60
i) Milk tester agents	0.09	0.11	0.13	0.14	0.12
ii) Detergents	0.07	0.08	0.12	0.12	0.10
iii) Head loader charges	0.16	0.14	0.23	0.24	0.19
iv) Marketing tax & Misc.	0.18	0.16	0.21	0.22	0.19
B) Profits	0.26 (4.77)	0.28 (5.22)	0.25 (4.20)	0.23 (3.72)	0.25 (4.36)
C) Price received (A+B)	**13.82**	**13.95**	**13.64**	**13.45**	**13.72**
3) DMU's level					
A) Cost of Marketing (a + b)	1.75	1.63	1.85	1.82	1.76
a) Fixed cost (i+ii)	1.13	1.05	1.13	1.05	1.09
i) Interest + Depreciation	0.22	0.24	0.22	0.24	0.23
ii) Salary of Staff	0.91	0.81	0.91	0.81	0.86
b) Variable cost (i+ii+iii+iv)	0.62	0.58	0.72	0.77	0.67
i) Transport charges	0.21	0.19	0.29	0.34	0.26
ii) Head loader charges	0.10	0.10	0.12	0.14	0.12
iii) Testing and Chilling	0.12	0.15	0.12	0.15	0.13
iv) Marketing tax & Misc.	0.19	0.14	0.19	0.14	0.17
B) Profits	0.33 (6.05)	0.28 (5.22)	0.41(6.89)	0.59(9.54)	0.40 (6.98)
C) Price received (A+B)	**15.90**	**15.86**	**15.90**	**15.86**	**15.88**
4) Milk Plant (WBCMPFL) level					
A) Cost of Marketing (a + b)	0.86	0.86	0.86	0.86	0.86
a) Fixed cost (i+ii)	0.37	0.37	0.37	0.37	0.37
i) Interest + Depreciation	0.09	0.09	0.09	0.09	0.09
ii) Salary of Staff	0.28	0.28	0.28	0.28	0.28

b) Variable cost (i+ii+iii+iv)	0.49	0.49	0.49	0.49	0.49
i) Transport charges	0.18	0.18	0.18	0.18	0.18
ii) Packaging charges	0.08	0.08	0.08	0.08	0.08
iii) Testing and Chilling	0.13	0.13	0.13	0.13	0.13
iv) Marketing tax & Misc.	0.10	0.10	0.10	0.10	0.10
B) Profits	0.22 (4.04)	0.26 (4.85)	0.22 (3.70)	0.26 (4.21)	0.24 (4.19)
C) Price received (A+B)	**16.98**	**16.98**	**16.98**	**16.98**	**16.98**
5) Retailer/Distributor/Shops level					
A) Cost of Marketing (i+ii+iii+iv)	0.59	0.59	0.59	0.59	0.59
i) Labour charges	0.28	0.28	0.28	0.28	0.28
ii) Transport charges	0.11	0.11	0.11	0.11	0.11
iii) Storage	0.10	0.10	0.10	0.10	0.10
iv) Marketing tax & Misc	0.10	0.10	0.10	0.10	0.10
B) Profits	0.43 (7.89)	0.43 (8.02)	0.43 (7.23)	0.43 (6.96)	0.43 (8.11)
C) Price received (A+B)	18.00	18.00	18.00	18.00	18.00
6) Price paid by consumer	**18.00**	**18.00**	**18.00**	**18.00**	**18.00**
7) Marketing cost	4.21	4.11	4.60	4.67	4.40
8) Marketing margin (MM)	1.24	1.25	1.35	1.51	1.34
9) Price spread	**5.45 (100)**	**5.36 (100)**	**5.95 (100)**	**6.18 (100)**	**5.73 (100)**
10) Producer's share in consumer	70%	70%	67%	66%	68%
price	6.88%	6.94%	7.50%	8.38%	7.44%
11) MM in consumer price	**2.30**	**2.36**	**2.03**	**1.91**	**2.14**
12) Marketing Efficiency (MME)					

Source: Field Survey, 2007.

Note: Figures within brackets represent the percentage of profit margin of different middlemen's price spread.

Table 5: Profit efficiency of marketing of different market middlemen under cooperative and non-cooperative milk marketing channels.

Non-cooperative middlemen					Cooperative middlemen	
Name of Middle-men	Efficiency of middlemen				Name of Middle-men	**Efficiency of middlemen**
	Rukunepur area	Khar-Rad-haKrishnapur area	Farash-danga area	Sonepur area		
MV_1	0.83	0.75	0.88	0.87	RPMPCS	0.32
MV_2	0.85	0.71	0.82	0.79	KPMPCS	0.40
MV_3	0.76	0.80	0.76	0.88	FPMPCS	0.33
MV_4	0.67	0.71	0.81	0.85	SPMPCS	0.27
MV_5	0.81	0.66	0.77	0.73	DMU_1	0.28
MV_6	0.73	0.63	0.80	0.90	DMU_2	0.30
MV_7	0.80	0.74	0.69	0.81	R/S_1	0.34
MV_8	0.85	0.59	0.63	0.74	R/S_2	0.29
MV_9	0.88	0.61	0.89	0.82	R/S_3	0.41
MV_{10}	0.87	0.76	0.87	0.89	R/S_4	0.37
R/P_1	0.84	0.87	0.72	0.67	R/S_5	0.39
R/P_2	0.70	0.81	0.65	0.62	R/S_6	0.30
R/P_3	0.83	0.77	0.77	0.76	R/S_7	0.42
R/P_4	0.68	0.82	0.83	0.66	R/S_8	0.35
R/P_5	0.81	0.70	0.70	0.75	R/S_9	0.45
R/P_6	0.77	0.71	0.62	0.70	R/S_{10}	0.33
R/P_7	0.79	0.64	0.71	0.56		
R/P_8	0.80	0.89	0.58	0.70		
R/P_9	0.78	0.61	0.66	0.68		
R/P_{10}	0.73	0.66	0.61	0.71		

Note: MV stands for milk vendors,

R/P stands for retailer/processor in non-cooperative channel,

RPMPCS stands for Rukunpur-Balarampara Primary Milk Producers' Co-operative Society Ltd,

KPMPCS stands for Khar-Radhakrishnapur Primary Milk Producers' Co-operative Society Ltd.,

FPMPCS stands for Farashdanga Primary Milk Producers' Co-operative Society Ltd.,

SPMPCS stands for Sonepur Primary Milk Producers' Co-operative Society Ltd.,

DMU_1 stands for Murshidabad District Milk Union,

DMU_2 stands for Medinipur District Milk Union and R/S stands for retailer/shops in cooperative channel.

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