

Marketing Channel Efficiency of Dairy Cow Milk in Bogor Livestock Business Area

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ABSTRACT

Livestock Business Area in Bogor District was built to increase volume of dairy cow milk production. Efficient milk distribution also needed to improve the performance of dairy farming business. The research aimed to analyse the marketing channel and efficiency of milk distribution in Bogor Livestock Business Area. The measurement used in this study were the farmer's share, marketing margin, and B/C ratio. There were 47 respondents of dairy farmers involved in this research. The results of this study indicated that there were four marketing channels of fresh dairy products. The most used channel was the first channel (Dairy Farmer – Cooperative – Milk Processing Industry). The cooperative and farmers has a strategic role in maintaining the quality and volume of dairy cow milk distributed. Dairy farmers should maintain the quality of the milk produced to increase the price in dairy farmer level. Excellent quality of milk from the dairy farmer will improve the cooperative bargaining position when dealing price with the milk processing industry. The highest farmer's share occurred when dairy farmers sold fresh milk directly to the end consumers. Marketing institutions should maximize online platform and social media to create new customer.

Keywords: *cooperative, milk, marketing efficiency, marketing channel*

1. INTRODUCTION

Milk has the potential to be developed in Indonesia. In terms of demand, Indonesia still imports milk in large quantities to meet national milk demand. In 2020, Indonesia imported 3.392.000 tons of milk or 78% of domestic milk consumption [1]. However, dairy cow production in Indonesia has increased from year 2019 amount 944.537 tons become 947.685 tons in year 2020 [2]. Java Island is the largest producer of dairy cow milk in Indonesia. There are several milk-producing provinces on the island of Java, such as East Java and West Java. West Java was the second largest dairy milk production in Indonesia. In 2020, West Java Province contributed 30% to the total national milk production.

In West Java, most dairy cattle breeding businesses are cooperative-based. The farmers joined in the Joint Milk Cooperative Indonesia (GKSI) West Java. In Bogor, the farmers are incorporated into Milk Production Cooperative (KPS) Bogor. KPS Bogor produces 14,000 liters of milk per day. The milk is then distributed to PT Indolakto, Cimory, Nutrifood, and Unifarm as industrial raw materials. In addition to fresh milk delivered to industry and traders, KPS Bogor also

processes its own milk products, namely pasteurized milk and yoghurt. KPS Bogor also facilitates farmers (members) with selling some various types of feed.

KPS Bogor farmer can be categorized based on farm location. There are farmers inside and outside business livestock area in Bogor. The inside area is also called KUNAK (Kawasan Usaha Peternakan). KUNAK is located in Pamijahan District, Bogor District. KUNAK is the first integrated area for dairy cow business and was built in 1997. There are 200

lots in KUNAK, each plot has an area of 4.250 m² consists of the owner's house and the worker, the cow shed, and the grass land for cattle feed. The purposes of this construction are to help the improvement of their dairy farm business and hopefully become a national model for the dairy farm business development in other area in Indonesia.

Dairy cow milk is a perishable product. Therefore, it needs good handling so that milk quality remains fresh along marketing chain. The safety of milk against germ contamination during the distribution process also very important. So that the milk distribution process needs to be done efficiently.

2. LITERATURE REVIEW

Research of dairy cow milk distribution has been carried out by [3], [4] and [5]. Previous research discusses the distribution of dairy cow in production centres. There is no research that discusses marketing efficiency on integrated livestock business area. The benefits of analysing marketing channels are to help dairy farmers achieve marketing efficiency, then to assist dairy farmers in knowing which channels provide the highest profits and which channels produce the lowest marketing expenses [6]. KUNAK was built to increase volume of dairy cow milk production. Efficient milk distribution also needed to improve the performance of dairy farming business.

3. METHOD

The data used in this study were primary data and secondary data. In this study, the primary data source acquired by distributing questionnaires to respondents, namely members of MPC Bogor. The involved respondents were members in the Bogor District Dairy Farm Business Area. Secondary data sources were the previous research data, journals from the Ministry of Agriculture, data from the Central Statistics Agency, and MPC Bogor operational reports.

In this study, primary data collected by interviews with 47 dairy farmers in KUNAK area, and 3 retailer dairy milk. The sampling method carried out using a purposive sampling method, which is a careful sample selection and purposive sampling with specific considerations [7]. Other interviews were also conducted with the Bogor MPC management regarding marketing channels implemented by the cooperative.

Analysis of marketing channels done to find out the marketing institutions involved from producers until the products reached the consumers. As well as what marketing functions are carried out by the involved marketing institutions [8]. Marketing costs in a marketing channel can be calculated using the following formula [9]:

$$BP = Bp1 + Bp2 + Bp3 + Bp4 + \dots + Bpn$$

Where Bp = Marketing Cost, 1,2,3 ..., n = Institution n

Marketing profits in a marketing channel can be calculated using the following formula (Dahl & Hammond, 1977):

$$KP = Kp1 + Kp2 + Kp3 + Kp4 + \dots + Kpn$$

Where Kp = Marketing Benefits, 1,2,3 ..., n = Institution.

Marketing margin is the price difference at the consumer level and at the producer level. The lower the

marketing margin, the more efficient it will be. The greater the marketing margin is the more inefficient it will be. The marketing margin formula is as follows [10]:

$$MP = Pr - Pf$$

Where MP = Marketing margin (Rp/litter), Pr = Price at the consumer level (Rp/litter), Pf = Price received by the producer (Rp/litter).

Farmer's share is the portion received by producers from prices at the producer level to prices at the consumer level. If the farmer's share > 50% then marketing is said to be efficient, if the farmer's share < 50% then marketing is not efficient. The formula of farmer's share is [11]:

$$Fs = Pf/Pr \times 100\%$$

Where Pf = Prices at producer level, Pr = Price at the consumer level

The benefit and cost ratio of marketing institutions is according to the following formula:

$$B/C \text{ Ratio} = Li/Ci$$

Where Li = Benefit of Marketing Institution, Ci = Marketing Cost.

If the value of the benefit and cost ratio is equal to one, it indicates that the profit generated is equal to the costs incurred in the business, and if greater than one it indicates that the benefits obtained are greater than the costs incurred [11].

4. RESULT

Marketing institutions have marketing functions to facilitate the flow of products from producers to consumers. In general, the marketing function performed by marketing institutions is divided into the exchange function, physical function, and facility function. The exchange functions consist of buying and selling functions. Physical functions consist of transportation, packaging or processing, and storage functions. Furthermore, the facility functions consist of standardization functions, cost or financial functions, risk-bearing functions, and market information functions [12]. Marketing institutions involved in the distribution of milk in KUNAK area consist of Dairy Farmer, Cooperative, Retailer and Milk Processing Industry.

The number of lots used by cattle farmers in the kunak area are 181 lot. Everyday dairy farmers harvest the milk. Distribution of milk was done every morning and evening. The price received by each dairy farmer depended on the quality of milk which was assessed

based on the number of bacteria in each milk. The measurement of the number of bacteria was carried out by cooperative management.

The cooperative performed the marketing function of buying and selling for physical functions. The cooperative bought milk from dairy farmers at a price of Rp 4,700 to Rp 5,200 per liter. Then the cooperative sold to the Milk Processing Industry at a price of Rp 5,400 to Rp 6,000 per liter. The next function was the transportation function using trucks from cooperatives to the Milk Processing Industry. The sorting function carried out was to measure the number of bacteria to match the milk quality standards desired by the industry. Furthermore, in marketing, the cooperative incurred transportation costs in the form of gasoline money, and risk-bearing was also borne by the cooperative in the event of damage to the milk when it arrived at MPI. The market information by the cooperative was to do milk price agreement with the industry and to distribute price information to dairy The MPIs involved in marketing activities with the farmers.

Bogor Dairy Production Cooperative were PT. Indolakto, PT. Cisarua Mountain Dairy, PT. Unifam, and PT. Nutrifood. These industries bought milk in KUNAK because they did not produce milk themselves. This activity was also done to reduce the amount of milk imports even though the amount of milk production in MPC itself had not been able to meet the full needs of industrial milk. The next marketing function was the market information function in which the milk processing industry determined the price of milk for cooperatives based on quality standards.

This marketing institution made purchases from dairy farmers and sold fresh milk products to consumers that consisted of the end consumers and household scale industries to be processed into yogurt and pasteurized milk products. Retailers on this channel were small shops located in Leuwiliang, Bogor City, and South Tangerang District. In physical function, retailers only carried out product storage activities. Furthermore, in the the facility function, retailers handled electricity payment of product storage.

There were 3 types of fresh milk trading systems that were formed in KUNAK, consists of:

1. Dairy Farmer – Union – Milk Processing Industry (MPI)
2. Dairy Farmer – End Consumer
3. Dairy Farmer – Retailer – End Consumer

Trade channels and institutions involved in the distribution of fresh milk in the KUNAK area of Bogor District can be seen in the picture below.

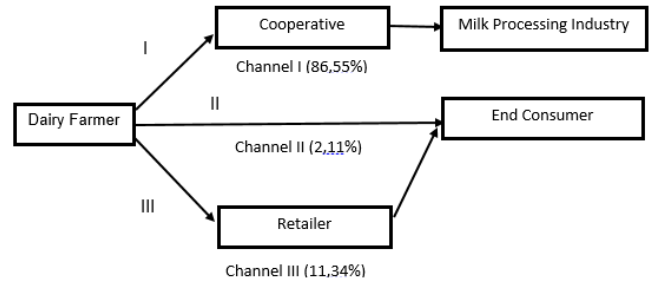


Figure 1. Market Share and Fresh Milk Trade Channels in KUNAK Bogor District

The trade channel I consisted of Dairy Farmers, Cooperatives, and Milk Processing Industry. The amount of milk sold by dairy farmers to cooperatives was 146,695 liters per month or 86.55% of the total milk production of dairy farmers in KUNAK, Bogor District. Therefore, channel I was the channel most widely used by dairy farmers to sell fresh milk. This fact shows that the cooperative is an important element for milk distribution in Bogor, so its role needs to be maintained the average price received by farmers was Rp 5,127/liter. All milk collected by the cooperative was sold to the Milk Processing Industry. Companies that were consumers of MPC Bogor fresh milk were PT. Indolakto, PT. Cisarua Mountain Dairy, PT. Unifam, and PT. Nutrifood.

The channel II composed of Dairy Farmers and the end consumers. Fresh milk sold by dairy farmers directly to the end consumers is 3,575 liters per month or 2.11% of the total milk produced. Most consumers who bought milk directly lived around KUNAK, Bogor District. The price of fresh milk received by consumers was Rp 8,625 per liter. The consumers’ motivation to buy milk directly was because of the guaranteed quality of the milk. Consumers could see the milking process directly when purchasing milk, so they would feel confident about the quality of milk purchased.

The channel III comprised of Dairy Farmers, Retailers, and End Customers. The average price of milk received by consumers was Rp 7,000 per liter. Total milk sold using this trading system was 19,230 liters per month or 11.35%. Retailers obtained fresh milk by picking up products from dairy farmers in the KUNAK area and there were also dairy farmers who delivered milk to retailers. The retailer sold milk to the end consumers at a price of Rp 10,375. Prices received by end consumers on channel III are higher compare to price on channel II. This case happens because of a longer distribution chain in Channel III.

Based on the information on figure 1, cooperative has strategic role to distribute the milk produced by dairy farmers in KUNAK. The cooperative has the

capacity to distribute the milk up to 11.000 liters per day. However, the average milk distributed per day is still below the carrying capacity, which is 8.647 liters per day. The capacity of milk distribution fleet used has only reached 78.6% and needs to be increased again. The cooperative also has not been able to fulfil the order from Milk Processing Industry. Therefore, cooperatives need to work together with farmers so that the volume of milk produced by farmers can increase. Based on the results of interviews with farmers, average milk yield in KUNAK area is 10,09 liters/day. The highest yield obtained by farmers in kunak is 12.5 liters/day. Therefore, it is necessary to conduct training, technical support and monitoring by cooperative extension staff so that the yield obtained by farmers is maximized [13]. If the yield of milk for dairy cows increases, the volume of milk produced by farmers will be greater and the efficiency of milk distribution transportation fleet can also increase.

5. DISCUSSION

A trade system can be said to be efficient if the margins received by related institutions are fairly distributed along marketing chain [14]. In this condition, it is expected that all marketing institutions involved have fair profit and margin. Table 1 show The Costs of Trading, Marketing Cost, Profit and Trading Margin of Dairy Milk Marketing Channels in KUNAK Bogor.

Based on milk sales volume, channel I was the most widely used marketing channel by dairy farmers to sell fresh milk produced. The data in table 1 shows the sales price from dairy farmers to cooperatives were Rp 5,127/liter. Dairy farmers bore the cost of transportation from the production location to the cooperative in the amount of Rp 28/liter. In general, dairy farmers used motorcycles to deliver fresh milk to the cooperative.

The cooperative sold all fresh milk it received to the Milk Processing Industry (MPI). Companies that were the fresh milk customers of MPC Bogor processed fresh milk into processed products, such as UHT milk, milk powder, sweets, and yogurt. The price of milk received by MPI was Rp 5,730/liter. The cooperative bore the costs of sending milk from MPC Bogor to each MPI production location spread across Jabodetabek. The average shipping cost incurred by Bogor MPC was Rp 289/Liter. Shipping costs included depreciation of milk transportation trucks, salaries of shipping employees, tolls, fuel, and depreciation of milk storage tanks. The margin received by the cooperative was Rp 603/liter, while the profit earned after deducting marketing costs was Rp 314/liter.

The total marketing cost on channel I was Rp 317/Liter. The total margin obtained from this channel

was Rp 603/Liter. Thus, the total profit on channel I was Rp 314/Liter. The resulting profit value was the smallest compared to channel II and channel III. However, channel I was the largest channel for distributing fresh milk in MPC Bogor. This was due to the main customers of the cooperative consisted of MPI in Jabodetabek, made routine purchases and stable quantity orders. Therefore, although profit per liter was the smallest, it had the biggest volume compared to other marketing channels. In the end, the total profit gained from total volume multiplied by profit/liter for channel I was the biggest compared to channel II and channel III.

In channel II, dairy farmers sold fresh milk directly to consumers. The selling price received by consumers was Rp 8,625/liter. Most buyers visited the farm location to buy fresh milk directly. But there were some regular customers who asked dairy farmers to deliver milk to the buyers' residences. All buyers lived directly around the farm, making it easier for dairy farmers to deliver milk if requested by consumers. The motivation of consumers to buy milk directly was the guaranteed quality of milk purchased because it was directly obtained from dairy farmers, furthermore, the price.

Table 1. Margin Distribution, Total Profit, and Marketing Cost

Item	Dairy Milk Marketing Channels in KUNAK Bogor		
	Channel I Value (Rp/Litter)	Channel II Value (Rp/Litter)	Channel III Value (Rp/Litter)
Farmer			
Selling Price	5,127	8,625	7,000
Marketing Cost	28	12	57
Cooperative			
Selling Price	5,730	-	-
Buying Price	5,127	-	-
Marketing Cost	289	-	-
Margin	603	-	-
Profit	314	-	-
Retailer			
Selling Price	-	-	10,375
Buying Price	-	-	7,000
Marketing Cost	-	-	1,654
Margin	-	-	3,375
Profit	-	-	1,721
Profit			
Total Marketing Cost	317	12	1,711
Total Profit	314	5,031	1,721
Total Margin	603	5,019	3,375

From the total of 47 interviewed respondents, there were only 4 dairy farmers who sold milk directly. This condition showed that channel II had not been utilized by dairy farmers optimally even though it provided high profit. With the improvement of information technology, dairy farmers can promote fresh milk products so that more consumers buy fresh milk directly from dairy farmers. One way that dairy farmers can do is to promote fresh milk on social media such as Facebook, WhatsApp, Instagram and Twitter. By providing free shipping facilities for certain areas, more consumers will be interested in buying fresh milk product directly [15].

Based on information obtained from table 6, marketing institutions involved in channel III are dairy farmer and retailer. The price of milk received by retailer from dairy farmer was Rp. 7,000/liter. Marketing costs incurred by dairy farmer was Rp 57/liter. Marketing costs incurred included fuel costs, milk can depreciation, and motor vehicles depreciation. Retailers who bought fresh milk lived in the Districts of Bogor, Depok, Jakarta, and Tangerang.

Table 2. Fixed Costs of Dairy Farmer in KUNAK Bogor

Information	Amount
Worker Salary	2,850,638
Car Depreciation	471,158
Cowshed Depreciation	278,723
Electricity	113,511
Member Dues	107,327
Motorcycle Depreciation	42,465
Depreciation of 40 L Milk Can	22,429
Water Cost	14,872
Depreciation of 15 L Milk Can	6,959
Depreciation of 20 L Milk Can	5,519
Depreciation of 10 L Milk Can	2,287
Total	3,915,889

Retailers sold milk to end consumer and household-scale milk processing businesses. The selling price of fresh milk from retailers was Rp 10,375/liter. Marketing costs incurred by retailer was Rp 1,612/liter. Marketing

costs consisted of fuel costs, plastic cups, motorcycle depreciation, sealer machine, and freezer depreciation. The total margin obtained by retailer was Rp 3,375/liter and the total profit earned was Rp 1,763/liter. The total profit obtained by retailer was the biggest compared to the profit of existing fresh milk marketing institutions.

Dairy Milk trade transactions by all marketing institutions are carried out by offline system. Massive growth of internet users in Indonesia will generate opportunities trade transaction through online platform [16]. Currently, internet users in Indonesia reach 196.7 million or the equivalent of 73.7% of Indonesia's population. Smartphones are the most favorite tools used to access the internet [17]. West Java is the province of the largest internet users in Indonesia, with a total number of users as much as 36.1 million. In 2020, there was an increase as much as 29,6 in the transaction value of e-commerce [18]. This condition shows the large market opportunity for marketing institutions in West Java to conduct trade transactions through online system. Agricultural product marketing institutions also have the opportunity to sell their products through online system. Farmers in Bulukerto village, East java sell horticulture product using social media, such as Facebook and WhatsApp.

As a result farmers get additional sales at a higher price because the product is sold directly to the final consumer [19]. The advantage of promotion through social media can reduce marketing costs [20]. Therefore, every marketing institution for fresh milk in KUNAK area is expected to be able to take advantage of online platform and social media in promoting fresh milk products and to create new customers.

Costs incurred by dairy farmers in KUNAK Bogor District were grouped into 2 parts, namely fixed costs and variable costs. Fixed costs are costs which value is still incurred by dairy farmers in a certain period of time and do not depend on the volume of production. Variable costs are costs which value depends on the volume of milk produced.

The average total fixed cost incurred by each dairy farmer in KUNAK Bogor was Rp 3,915,889 every month. The biggest component of fixed costs was for Worker Salary, amounted to Rp 2,850,638. Car depreciation cost per month is Rp 471,158. The smallest fixed cost was allocated for the depreciation of 10-liter milk can, which was Rp 2,287. The types and details of fixed costs incurred by dairy farmers are presented in table 2.

The total fixed costs incurred by dairy farmers every month was Rp 3,915,889 and the total variable cost was Rp 9,043,340. Therefore the total cost incurred by dairy farmers to conduct dairy farming business was Rp 12,959,229. The average production of fresh milk every month was 3,606 liters. So the production cost for every liter of fresh milk produced was Rp 3,594.

Table 3. Variable Costs of Dairy Farmer in KUNAK Bogor

Information	Amount (Rp)
Tofu Dregs	4,499,787
Concentrate	3,871,787
Fuel	348,596
Vitamin	83,266
Medical	79,468
Forage	55,404
Drugs	51,819
Artificial Insemination	37,021
Vaseline	16,191
Total	9,043,340

The benefit and cost ratio are obtained by dividing the profits obtained by each trading agency with the costs incurred. In channel I, the price of milk received by farmers was Rp. 5,127. The profit gained by farmers for every liter of fresh milk was Rp 1,533. So, the profit and cost ratio for dairy farmers on channel I was 1.42. In channel II, the dairy farmers obtained the biggest benefit and cost ratio compared to other channels, namely 1.40. This was due to dairy farmers receiving the highest price of milk, because consumers who bought fresh milk were the end consumers. Therefore, dairy farmer needs to formulate a strategy so that direct milk sales to consumers can increase in volume.

In channel III the value of the ratio of profits and costs obtained by dairy farmer was 1.93. This value was higher than channel I and lower than channel II. While the value received by retailers was 1.04. This means that for every Rp 1 fee spent by a retailer, it would generate a profit of Rp. 1.04. These conditions indicate that the business activities of fresh milk retailers are interesting and profitable activities. Data on profit and cost ratio for each marketing institution in each marketing channel can be seen in table 4.

Dairy milk marketing institutions can improve the value of the benefit cost by doing cost efficiency and increasing the selling price of milk. Cost efficiency is done by maximizing the production input used. Better quality milk will increase the price received [21]. Farmers should maintain the quality of milk produced, so that prices received by dairy farmers become higher

[22]. If the cooperative gets good milk from farmers, the selling price in the next chain will also be higher [23].

Table 4. Benefit Cost Ratio Each Channel

Trade Institutions	Benefit Cost Ratio (%)		
	Channel I	Channel II	Channel III
Dairy Farmer	1,42	2,40	1,93
Cooperative	1,09	-	-
Retailer	-	-	1,04

Farmer's Share is a comparison of prices paid by consumers against the price of products received by dairy farmers. Based on the data in table 5, the highest farmer's share value was created in channel 2 with a value of 100%. This happened because dairy farmers sold fresh milk directly to the end consumers. Price received by consumers was the same as the price given by farmers. But the sales volume of fresh milk that occurred in table 2 was the smallest, namely 2.11%. While the farmer's share on channel 3 was the smallest, at 67.5. So the longer the distribution chain involved in the distribution of a product, the higher price will be charged to the end consumer [24].

Table 5. Farmer's Share on Each Marketing Channel

Information	Channel 1	Channel 2	Channel 3
<i>Farmer's Share</i>	89,5%	100,0%	67,5%

Greater marketing margins and profits occurred in channel 3, causing the price received by the end customer to be higher. This causes the farmer's share that occurred on channel 3 to be smaller than channel 1 and channel 2. The value of the farmer's share on channel 1 was 89.5%. One solution to increase farmer's share on channel 1 is to improve the quality of milk produced, so that farmers will get a higher price of fresh milk from the cooperative and will ultimately increase the value of the farmer's share and also increase the income of dairy farmers [25].

6. CONCLUSION

There were three marketing functions performed by fresh milk marketing institutions in KUNAK, Bogor District, which consisted of exchange function, physical function, and facility function. Fresh milk production cost incurred by dairy farmers in KUNAK Bogor District was Rp 3,594/liter.

There were 3 trade channels of fresh milk that were formed in KUNAK, Bogor District, namely: (I) Dairy

Farmer - Cooperative - Dairy Processing Industry (MPI), (II) Dairy Farmer - End Consumer, and (III) Dairy Farmer - Retailer - End Consumer. Fresh milk sales volume in the marketing channel I was the highest, amounted to 146,695 liters/month (86.55%), then the marketing channel III was 19,230 liters/month (11.35%), and the smallest was the marketing channel II by 3,575 liters/month (2.11%). The highest farmer's share occurred in marketing channel II, which was 100%, because farmers sold fresh milk directly to the end consumers. Marketing channel III produced the smallest farmer's share, which was 67.5%.

Farmers should maintain the milk quality so that they get a higher price. Excellent quality of milk from the dairy farmer will improve the cooperative bargaining position when dealing price with the milk processing industry. To increase the efficiency of milk distribution transportation fleet, cooperative should improve the yield of milk produced by dairy cow in KUNAK area. Marketing institutions in KUNAK area should maximize online platform and social media to create sales, promotion programmed and new customer.

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