

MILK MARKETING AND CONSUMPTION PATTERN IN DAERAH ISTIMEWA YOGYAKARTA PROVINCE, INDONESIA

Endang SULASTRI

Visiting Researcher, Graduate School for International Development and Cooperation Hiroshima University,
1-5-1 Kagamiyama, Higashi-Hiroshima-shi 739-8529, Japan
Lecturer, Faculty of Animal Science Gadjah Mada University, Jl. Agro Karangmalang, Yogyakarta 55281, Indonesia
E-mail: endang.sulastril@lycos.com

Keshav Lall MAHARJAN

Associate Professor, Graduate School for International Development and Cooperation Hiroshima University,
1-5-1 Kagamiyama, Higashi-Hiroshima-shi 739-8529, Japan
E-mail: mkeshav@hiroshima-u.ac.jp

Abstract

Milk being highly perishable, the availability of a good market to sell milk is critical to the success of dairying. A good market may be defined as one where prices paid to milk producers are high enough to provide the opportunity for a reasonable level of profit and secure enough to provide assurance of a continuing outlet for the milk.

The purposes of this study are to analyze the milk marketing channel and to analyze the milk consumption pattern and its relation with the household income and housewife education level. The research about milk marketing was done by interviewing of 88 milk producers. To know the milk consumption pattern, a study of households' milk consumption was also done by interviewing of 270 housewives. Structured questionnaires were used during the interview. Information about the types of milk that are available in the market and their price were collected from some sources, such as farmers, cooperative, agents, milk processing plant, supermarkets and shops.

The milk producers in the study regions tend to sell their milk through cooperative although some also sell the milk directly to consumers and local agents. The cooperative supplies the milk to the milk processing plant on the contract basis. The milk processing plant processes the milk and distributes it to the consumers as milk products. Cooperative also distributes a part of milk to the local agent and consumers directly, and a part is processed as ultra heat temperature milk and distributed to the consumers directly. Selling milk in urban and sub urban areas depend on the possibility to sell milk to the consumers directly. Milk producers tend to sell milk to the consumers directly because they get the higher price than the cooperative price. Selling milk in rural areas depend much on the cooperative.

There are a large number of people in the study areas who do not consume any type of milk. Many also consume milk infrequently. In general, awareness of importance and using of milk increases with

the household income and housewife's education level. The household income also influence in the choosing of milk types. Consumption of sweetened condensed milk decreases with the increasing of household income. Other milk types (ultra heat temperature milk, milk powder and fresh milk) consumption increase with the increasing of household income.

The majority of people still regarded milk as luxurious beverage. The share of milk in monthly per capita food expenditure was 16.3% and 14.8% in urban and sub urban areas, respectively, for the people who consume milk everyday. It was 5.0% and 4.1% in urban and sub urban areas, respectively, for the people who consume milk infrequently.

With the fact that the milk consumption was very low, it is recommended that in Daerah Istimewa Yogyakarta (DIY) Province, the drinking milk campaign is still needed in order to make the people aware of the importance of milk, especially for the growing children.

1. Introduction

The availability of a good market is critical to the success of any dairying. According to Etgen and Reaves (1987), a good market may be defined as one where prices paid to milk producers are high enough to provide the opportunity for a reasonable level of profit and secure enough to provide assurance of a continuing outlet of milk. These two factors are essential as the opportunity for a reasonable profit is necessary to continue the business and as milk is high perishable, assurance of continuing daily market is necessary.

The objective of the marketing program for any individual milk producer is to receive a fair price for his milk on a continuing basis or with market security. Collectively, this means supplying consumers with the high quality dairy product desired, when they are desired, as efficiently, economically and profitably as possible. To effectively achieve these collective objectives, an adequate supply of milk as needed must be assured, it must be of high quality, fair price must be assured for both producers and consumers, and the milk must be efficiently handled from the producer to consumer.

Most dairy products consumed by Indonesian people were produced from imported products. In the meantime, an increasing number of Indonesian consumers, who were traditionally not milk consumers, began to realize the nutritional value of milk. The increase in demand for milk became quite evident since 1991. Even though the demand for milk was increasing, local milk production comprised only about 25% of the total consumption (Directorate General of Livestock, 2002); the rest had to be imported.

Per capita milk consumption in Indonesia has increased from 4.16 kg per capita in 1998 to 5.23 kg per capita in 1999 and 5.42 kg per capita in 2001 (Directorate General of Livestock, 2002). However, the average annual milk consumption of Indonesian people is relatively low as compared with that of Singaporeans (58 kg per capita) and Malaysians (46 kg per capita), which indicates that a substantial increase in per capita milk consumption is possible in Indonesia. In fact the government's milk drinking campaign aims at increasing per capita milk consumption to 8 kg per capita per year by 2005. In addition, there are many other indications that an increasing percentage of Indonesian people will become regular milk consumers, e.g. improving level of education, higher income, more efficient milk marketing and an increased awareness of health issues. Hence, the authors who have been studying dairying and milk production in Indonesia see the importance of the issues related to milk marketing and consumption pattern and undertook this study.

The study was done in DIY Province. The objectives of the study are, firstly to analyze the milk marketing channel, secondly to analyze the milk consumption pattern and its relation with the household income and housewife's education level.

DIY Province is divided into 4 regencies and one municipality (**Figure 1**). Study regions are Sleman a rural area, Bantul a sub urban area and Yogyakarta an urban area for milk marketing study and Bantul and Yogyakarta for milk consumption pattern study. The research on milk marketing was done by interviewing 76 of 1,133, 7 of 22 and 5 of 20 milk producers in rural, sub urban, and urban areas, respectively, in 2001 and 2003. A study of households' milk consumption was also done by interviewing 124 and 146 housewives in sub urban and urban areas, respectively, in 2003 in order to know the milk consumption pattern in this province. Structured questionnaires were used during the interview. Information about the types of milk that are available in the market and their prices were collected from milk producers, cooperative, milk agents, milk processing plant, supermarkets and retailing shops.

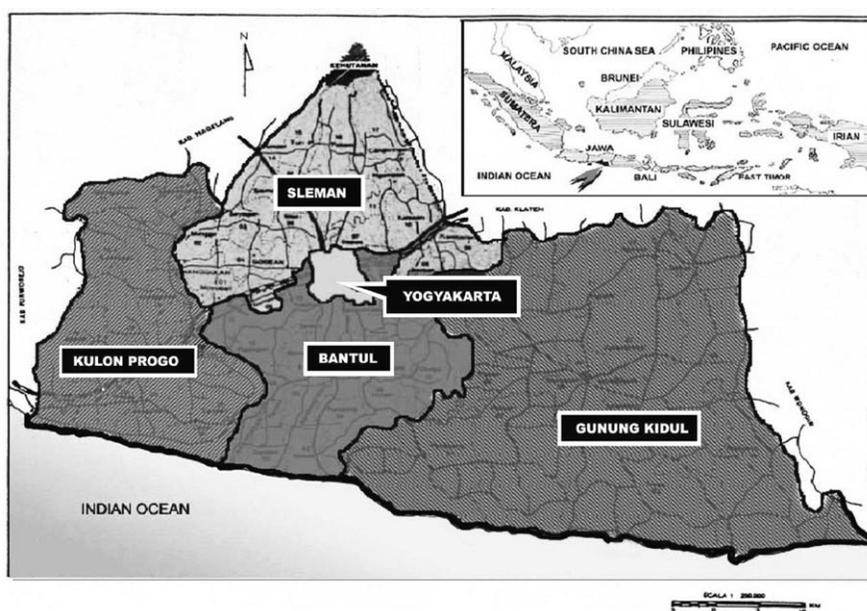


Figure 1. Map of Daerah Istimewa Yogyakarta Province

The collected data were both qualitative and quantitative. The statistical analysis was used to interpret the quantitative data. The data were tabulated according to the objectives of the study. Some secondary information was also collected from the official records such as statistical data of Central Bureau of Statistics, Directorate General of Livestock, books and publications.

2. Milk Production, Consumption and Marketing in Indonesia

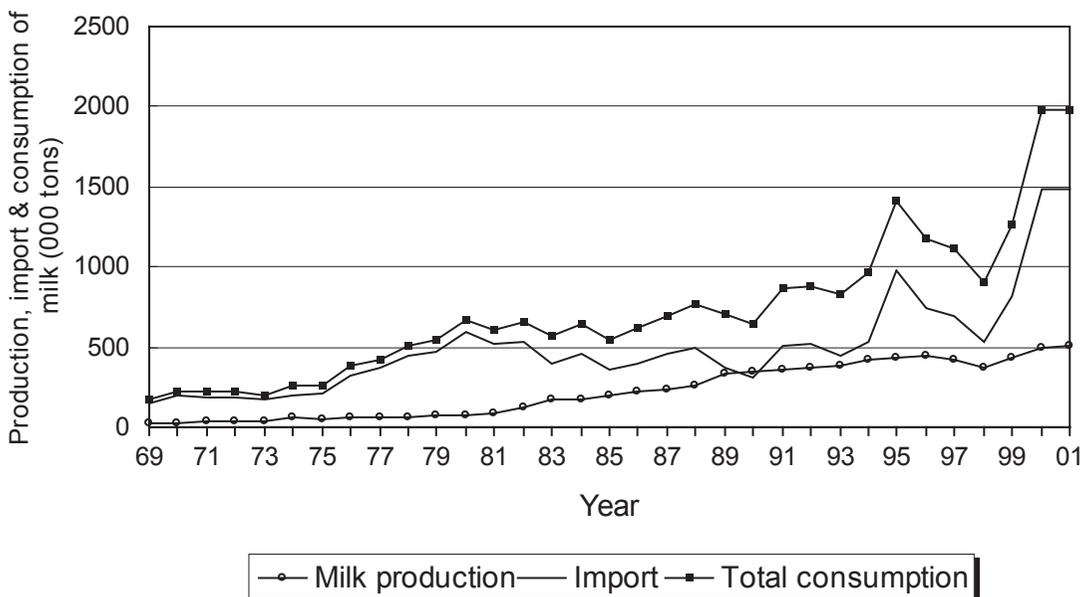
The demand for milk continues to rise with the improvement in people's awareness of the importance of nutritious food. This has resulted in the domestic consumption of milk growing more rapidly than production. Although the domestic milk production has also been growing, it has not been able to fulfill

the need of milk in the whole country (Alexander, 2003). To fulfill the domestic need of milk, Indonesia has continued to import milk from New Zealand, Australia, United State, Netherlands and Germany (Department of Industry and Trade, 2002). In 2000, Indonesia imported 1,479,800 tons of milk from these countries (Directorate General of Livestock Services, 2001).

2.1. Milk Production and Consumption in Indonesia

Figure 2 shows the milk production during 1969 to 2001. Importing of some 110,000 dairy cows from Australia and New Zealand between 1979-1990, resulted in the milk production increase from 72,200 tons in 1979 to 345,600 tons in 1990. Despite the increase in milk production, Central Bureau of Statistic (2002) describes that in 2001 only 25% of the milk came from domestic production, with the rest being imported. In 2001 the milk consumption was 1,984,800 tons and the domestic milk production was only 505,000 tons (Directorate General of Livestock, 2002).

One important reason for the low domestic milk production is the fact that the animal feed given to dairy cows is of poor quality. This has resulted in the dairy cows having low milk productivity. Another important reason for the low domestic milk production is the poor management skill. According to Riethmuller and Smith (1999) knowledge concerning dairy herd management such as reproduction and replacement techniques, feeding methods, waste management, calf feeding and care is lacking. This is reflected in the low milk production of each individual dairy cow.



Source of data: Directorate General of Livestock (2002).

Figure 2. Production, Import and Consumption of Milk in Indonesia, 1969-2001

Figure 2 also shows the import and milk consumption in Indonesia during 1969 to 2001. Milk consumption in Indonesia was only 177,900 tons in 1969. Due to the increase in the number of population, the number was relatively increasing until 1995 and decreased in 1996. The milk

consumption in 1995 was 1,353,900 tons. In 1996, consumption was 1,125,400 tons, down 16.9% from the previous year. In 1997, the milk consumption was 1,050,000 tons. In 1998 the milk consumption was not going up, the condition was worse than the previous year with the milk consumption only 843,700 tons. The bad condition of milk consumption in 1998 was strongly believed to have resulted from the economic crisis, which started in mid-1997. The exchange rate of US dollar to rupiah was very expensive at the time. Before crisis 1 US dollar was 2,300 to 2,400 rupiahs. The exchange rate was drastically increasing during the crisis; 1 US dollar became 15,800 rupiahs in June 1998. As a resulted

Table 1. Per Capita Milk Consumption in Indonesia, 1969-2001

Year	National consumption (000 ton)	Per capita consumption (kg/year)	Growth (%)
1969	177.9	1.46	–
1970	227.8	1.82	24.66
1971	222.4	1.70	-6.59
1972	226.1	1.73	1.76
1973	203.9	1.64	-5.2
1974	249.9	1.96	19.51
1975	254.2	1.95	-0.51
1976	377.8	2.82	44.62
1977	418.8	3.06	8.51
1978	494.5	3.53	15.36
1979	532.7	3.72	5.38
1980	662.9	4.36	17.20
1981	596.2	3.08	-29.36
1982	638.1	4.17	35.39
1983	518.2	3.88	-6.95
1984	622.8	3.90	0.52
1985	541.7	3.31	-15.13
1986	571.9	3.43	3.63
1987	658.2	3.38	-1.46
1988	734.6	4.20	24.26
1989	661.1	3.72	-11.43
1990	621.4	3.44	-7.53
1991	807.0	4.46	29.65
1992	810.1	4.39	-1.57
1993	785.8	4.23	-3.64
1994	906.5	4.75	12.29
1995	1,353.9	6.99	47.16
1996	1,125.4	5.72	-18.17
1997	1,050.0	5.25	-8.22
1998	843.7	4.16	-20.76
1999	1,258.0	5.23	25.72
2000	1,975.4	5.42	3.63
2001	1,984.8	5.42	0

Sources: Directorate General of Livestock Services (2002).

the price of imported milk became more expensive and finally this pushed the price of domestic milk upwards.

Table 1 shows that the milk consumption per capita fluctuated widely. There was significant correlation among domestic milk, imported milk and milk consumption in Indonesia. If domestic and imported milk increase, then milk consumption will also increase. This is due to fact that the supply of milk in the market depends on the domestic and imported milk, mainly the imported milk.

Milk consumption in Indonesia was growing slowly during 1970s-1980 and more rapidly in 1990s. But during the economic crisis, which started in mid 1997, milk consumption decreased because milk price had become more expensive. Per capita milk consumption was only 4.16 kg in 1998 down by 20.76% from the previous years.

However, the Indonesian economic crisis in 1998 did not have a significant long term impact on the domestic milk consumption. Overall consumption has already returned to pre crisis levels by 2000. But remain constant there after.

2.2. Milk Marketing in Indonesia

Because of the various system of milk production in Indonesia and the task of supplying milk to the consumers, different marketing channels that involve various intermediaries have been developed. Cooperatives, agents, retailers and shops or supermarket are the intermediaries. In this case, milk processing plants are the producers of milk products. There are five milk processing plants, namely Sarihusada, Nestle Indonesia, Friesche Vlag Indonesia, Indomilk and Ultra Jaya.

In Indonesia, the milk processing plants started its operations only in the 1970s, following the issuance of the Act on Investment. In 1989, the Indonesian Government effected a policy on requiring milk processing plants intending to produce sweetened milk, milk powder, ultra heat temperature milk and other milk products to absorb locally produced milk.

All the milk processing plants are currently located in Java Island and operated by private commercial sector. Nestle Indonesia, the biggest plant, is operated in East Java. Sarihusada is the smallest plant and located in DIY Province and the other three milk processing plants are in western part of Java. According to Alexander (2003), because all the milk processing plants are in Java Island, distribution of products outside of this island is difficult, due to poor infrastructure such as refrigerator, transportation and road.

Milk marketing in Indonesia is dominated by sweetened condensed milk representing 526,821 ton (48.4%) of the total milk available in the market (**Table 2**). Sweetened condensed milk has a wider

Table 2. Domestically Produced Milk in Indonesia: Kind and Volume in 2001

Milk types	Volume (tons)
Sweetened condensed milk	526,821 (48.4)
Milk powder	273,799 (25.1)
Ultra heat temperature milk	241,055 (22.2)
Others	47,300 (4.3)
Total	1,088,975 (100)

Source: Department of Industry and Trade (2002).

Note: Others; Cheese, butter, ice cream, whey and yogurt.

Inside the () is percentage.

market because its price is cheapest among all types of processed milk. Syafradji (1988) mentioned that milk powder (25.1%) and ultra heat temperature milk (22.2%) are mainly consumed by the middle upper income population. According to Directorate General of Livestock (2003), other milk products such as cheese, butter, ice cream, whey and yogurt are domestically produced or imported in relatively small quantities. The lack of awareness for such products and poor cold chain infrastructure are key constraints in expanding the market of these products. The highest demand for these items is usually during the holiday season of Ramadan and Christmas, as people prepare delicacies for the festivities.

3. Milk Production and Marketing in DIY Province

Dairying in DIY Province was introduced in 1930s. First, dairy cows were introduced in Yogyakarta Municipality. Then after independence, in late 1940s dairy cows were introduced in Bantul Regency. In order to develop dairying in this province, the government promoted dairying in Sleman Regency in 1981 by giving 150 credit dairy cows to the farmers (Sulastri and Maharjan, 2002). Sleman Regency has a big potential for dairying, as there are plenty of upland forests needed for fodder of dairy cows. The local government of DIY Province gives an emphasis on development of dairying in this regency (Sulastri and Maharjan, 2005).

3.1. Milk Production in DIY Province

Most of the milk producers in DIY Province do dairy activities as the secondary occupation. **Table 3** presents the average dairy cows holdings by the milk producers in all three regions. In the year 2001, they were 3.2 heads in rural area, 6.3 heads in sub urban area and 7.2 heads in urban area and were composed of lactating cows, dry cows, heifer that would be lactating in time of 2-12 months, and calves that would be lactating after 24 months with normal rearing. In 2003 the average dairy cows holdings by the milk producers increased in rural and sub urban areas but it decreased in urban area. The dairy cows holding were 4.4 heads in rural area, 6.7 heads in sub urban area and 5.6 heads in urban area in 2003. Milk yield per head per year is about 2,000 to 2,300 liters increasing in all the study regions in 2003. The average lactation period is about 270-290 days (Sulastri and Maharjan, 2005).

Table 3. Dairy Cows Holding per Household in the Study Regions

Description	Regions					
	Rural (n=76)		Sub-urban (n=7)		Urban (n=5)	
	2001	2003	2001	2003	2001	2003
Average dairy cows holding (head)	3.2	4.4	6.3	6.7	7.2	5.6
Milking : dry cows ratio	75:25	69:31	74:26	70:30	81:19	87:13
Milk production/head/year (liter)	2,023.6	2,126.7	2,308.3	2,362.8	2,054.6	2,102.3
Average lactation period (days)	274.7	287.2	289.2	292.7	268.3	286.5
First calving age (months)	28.8	27.2	27.8	25.6	28.4	27.3
Calving number (times)	2.2	2.8	2.4	2.9	3.0	2.9
Calving interval (months)	18.4	18.1	15.8	15.2	19.2	18.7

Source: Sulastri and Maharjan, 2005.

3.2. Milk Marketing in DIY Province

Milk producers in the study regions tend to sell their milk through cooperative although some also sell their milk directly to consumers and local agents. The cooperative supplies the milk to the milk processing plant. The milk processing plant processes the milk and distributes it to the consumers as the milk products. Cooperative also distributes a part of milk to the local agent and consumers directly, and a part is treated as ultra heat temperature milk¹ and distributed to the consumers directly (**Figure 3**).

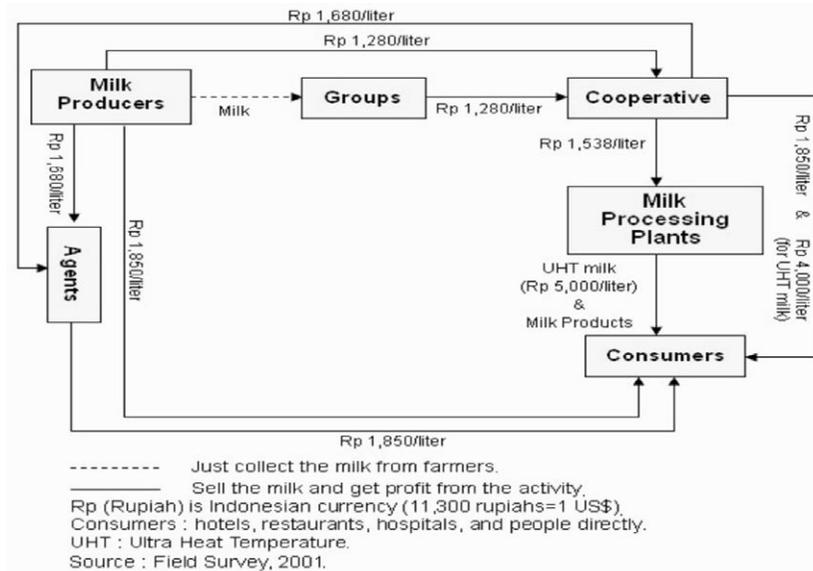


Figure 3. Milk Marketing in Daerah Istimewa Yogyakarta Province, Indonesia

Selling price received by the milk producers depends on the buyers (direct buyers) of milk. If the milk producers sell their milk to the cooperative they get 1,280 rupiahs per liter. Then cooperative sells the milk to the milk processing plant at 1,538 rupiahs per liter, with a margin of 258 rupiahs per liter. The price difference of 258 rupiahs is operational cost and benefit of the cooperative and becomes one of its main income sources, used to run the cooperative. Then milk processing plant sells the milk as ultra heat temperature milk with 5,000 rupiahs per liter to the consumers in various paper packets of different volumes; 250 ml, 500 ml and 1,000 ml. The price difference of 3,462 rupiahs is processing cost, including packaging and benefit of the processing plant. If the milk producers sell their milk to consumers through an agent, they get 1,680 rupiahs per liter and then agents sell to the consumer with the price of 1,850 rupiahs per liter. The price difference of 170 rupiahs is benefit of the agents. Milk producers get the highest price of milk if they sell directly to the consumers. The price will be 1,850 rupiahs per liter. Thus, it can be understood that there is a selling price difference of milk according to the marketing channel.

Milk producers in the study regions tend to sell milk to the consumers directly because they can get the highest price, at least they expect to sell their milk through an agent. Actually the difference price of selling milk is an incentive for the producers to sell the milk outside of cooperative. From the aspects of consumers, if they buy milk directly from the milk producers (or through an agent) the price of milk is

much cheaper (almost one-third of the price of ultra heat temperature milk produced by milk processing plant). But they have to treat it and consume within the same day.

All the milk producers in Sleman as the rural area sell their milk to the cooperative. Being a mountain hinterland region, they have no other opportunities. Yogyakarta as an urban area and being the capital city of the province and Bantul as sub urban area and being very close to Yogyakarta have access to sell their milk outside cooperative. Some milk producers in sub urban and urban areas manage to market their milk without the help of intermediaries. They produce large quantities enough to contract fixed

Table 4. Selling of Milk by the Milk producers in the Study Regions

Regions	2001				2003			
	Selling milk to							
	Cooperative		Outside Cooperative		Cooperative		Outside Cooperative	
	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
Rural (n=76)	76 (100)	76 (100)	–	–	76 (100)	76 (100)	–	–
Sub urban (n=7)	4 (57.1)	7 (100)	3 (42.9)	–	1 (14.3)	7 (100)	6 (85.7)	–
Urban (n=5)	–	5 (100)	5 (100)	–	–	5 (100)	5 (100)	–

Source: Field Survey, 2001 and 2003.

Note: Inside the () is percentage.

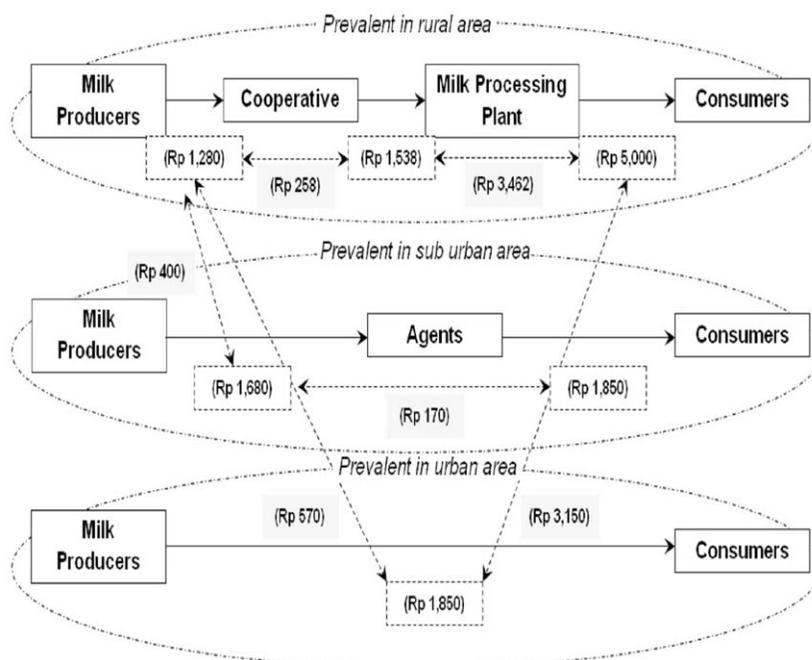


Figure 4. Selling Price Difference of Milk in Different Marketing Channels

regular supplies with agent or they sell straight to consumers (at the farm or at the consumer's door). In 2001, all the milk producers in urban area and nearly half of the milk producers in sub urban area sold their morning milk individually to local restaurants, hotels, hospitals and other consumers directly. In 2003, all the milk producers in urban area and most of the milk producers in sub urban area (85.7%) sold their morning milk outside the cooperative. Some milk producers in sub urban area collaborated to collect the morning milk and then sold together to a construction firm in the region on a contract basis. They got higher price than the cooperative price in this direct selling. But they sell all the milk produced in the afternoon to the cooperative and fulfill their duty to provide milk to the cooperative as the members (**Table 4**).

Three milk producers living in sub urban area sell most of their milk on a contract basis (one year, fixed price) to the institutional consumers (hotel, restaurant and construction firm). Milk in excess of the contracted quantities is sold through commission agents in the free wholesale market (auction sale). If they cannot supply the agreed quantity in full, they are obligated to make up the deficit from outside purchase (e.g. buy from the other milk producers or cooperatives).

The marketing channels for milk is short; from the cooperative and/or milk processing plant, the milk is transported by truck to local distributor-wholesalers who in turn supply to general stores and supermarkets in the cities. Regional distribution of sale demonstrates that the majority of ultra heat temperature milk is consumed within a limited area around the processing places (cooperative and milk processing plant).

The cooperative sells the ultra heat temperature milk to the consumers at the price of 1,000 rupiahs² per 250 ml. The cooperative price for ultra heat temperature milk is cheaper than the price of ultra heat temperature milk produced by the milk processing plant. The milk processing plant sells the ultra heat temperature milk to the consumers at the price of 1,350 rupiahs for 250 ml pack, 2,600 rupiahs for 500



Source: Photograph by Maharjan.

Figure 5. Ultra Heat Temperature Milk Produced by the Dairy Cooperative in DIY Province

ml pack and 5,000 rupiahs for 1,000 ml pack. The cooperative produces the 250 ml pack of ultra heat temperature milk only.

3.3. Constraints in Milk Marketing

The marketing of milk, principally produced by the milk producers in rural area, is difficult, especially against the background of poor infrastructure and low technology level of refrigeration.

Hence, the milk marketing activities are determined by technical considerations such as the nature of the product and the relative locations of the milk producers and consumers, and the distinct income segmented markets. The nature of milk production as an agricultural activity, and of milk as an agricultural product, is the main reason for the dominant role played by cooperative in milk marketing. The key principle underlying the establishment of cooperative is to do with bargaining power and economies of scale in activities. Cooperative marketing evolves because on one side of the trade of milk are many milk producers with a product which is perishable and costly to transport (Raja, 2002). This is true for milk producers in rural area, who have limitation in transportation facility. First part of **Figure 4** shows the situation prevalent in rural area, where milk producers do not have choices in selling the milk.

Food habits also impacts on the milk marketing since most of the Indonesian people do not have milk drinking habits and have lactose intolerance problem. According to Khomsan (2005), during the early years, babies and young children's bodies produce adequate quantities of the enzyme that enable to process milk in their digestive system. As they grow, the amount of this enzyme decreases, causing many people to suffer from a variety of health problems, including diarrhea if they drink milk.

4. Milk Consumption Pattern in DIY Province

Measured milk consumption varies considerably between, and within, countries in the tropics. Milk is a traditional, widely used product in India, and in much of Africa, the Americas and the West Indies. While wealthy consumers in poor countries regard milk as a basic food product, poor people in poor countries regard milk as a supplement to the traditional diet. For the urban poor in poor countries, milk and milk products are usually too expensive for them to buy in significant amounts. At the same time rural poor use milk and dairy products from their own livestock as a major source of food. In India, a person in low income group buying considerable amounts of milk and milk products is very common. Some pastoral tribes in Africa rely almost exclusively on milk as their only source of food protein for certain periods of the year (Malcolm, 1999).

Generally milk consumption increases due to the increase in people's income. Malcolm (1999) mentions that people in low income countries have higher income elasticity of demand for all foodstuffs than people in wealthier countries. Rapid economic growth and rising population mean people are earning higher disposable income, which often accompanied by changes in diets, widens markets to a greater range of processed foods, including milk.

Taking note of these points, field research about the milk consumption was done in Yogyakarta Municipality and Bantul Regency because there were milk consumers³, especially fresh milk consumers⁴. There were not fresh milk consumers in Sleman Regency. This is the reason why Sleman was dropped from the milk consumption study.

4.1. Socio-economic of Characteristic of the Respondents

This part discusses the situation of educational level of housewife respondents and the household income. Educational level and income are considered as the factors that influence the milk consumption among the people.

4.1.1. Educational Level of the Respondents

Table 5 shows the relation between housewife's education level and frequency of drinking milk in the household. There was no illiterate housewife in the study areas. The number of housewives who have graduated from primary school was only 13% in urban area, but it was higher in sub urban area at the level of 42.7%. The number of housewives who have university education was higher in urban area (8.2%) than in sub urban area (1.6%).

Out of 38 housewives of the households who drink milk every day 18 (47.4%) have high school certificate and 11 (28.9%) have university certificate. Of the other 9, one (2.6%) has primary education and 8 (21.1%) have secondary education. Among 72 households with housewives who have primary education, only one (1.4%) drinks milk everyday. Out of 110 households with housewives in the group of secondary educational level, 8 (7.3%) drink milk every day. 18 (24.3%) of 74 households with housewives who have high school certificate are 'everyday' milk drinkers and among the 14 people, who were graduated from the university, 11 (78.6%) drink milk everyday and the other 3 (21.4%) drink milk 'sometimes' only. The findings show that in general, frequency of drinking milk increases with the increasing of housewife's educational level, in both urban and sub urban areas.

Table 5. Frequency of Drinking Milk among the Respondents Based on the Housewife Education Level and Living Area

Education level	Urban (n=146)			Sub urban (n=124)			Sub total (n=270)			Total
	+	=	-	+	=	-	+	=	-	
Primary	-	2	17	1	8	44	1 (1.4)	10 (13.9)	61 (84.7)	72 (100)
Secondary	2	9	54	2	10	29	8 (7.3)	19 (17.3)	83 (75.4)	110 (100)
High	14	22	10	4	8	16	18 (24.3)	30 (40.6)	26 (35.1)	74 (100)
University	9	3	-	2	-	-	11 (78.6)	3 (21.4)	-	14 (100)
Sub total	29 (19.8)	36 (24.7)	81 (55.5)	9 (7.3)	26 (20.9)	89 (71.8)	38 (14.1)	62 (23.0)	170 (62.9)	270 (100)
Total	146 (100)			124 (100)						

Source: Field Survey, 2003.

Note: All the numbers are number of people and inside the () is percentage. + drinking milk everyday. = drinking milk 'sometimes' (once a week, twice a week, infrequently). # do not drinking any type of milk. Primary: Those with primary school certificate (6 years of schooling). Secondary: Those with secondary school certificate (9 years of schooling). High: Those with high school certificate (12 years of schooling). University: Those with university certificate.

4.1.2 Households Income

Table 6 shows that there were large numbers of people who do not consume milk in DIY Province, 55.5% in urban area and 71.8% in sub urban area due to various reasons. Income is one of the main reasons. Percentage of respondents who consume milk everyday increase with the increase of household income. Less than 20% in urban area and 8% in sub urban area respondents consume milk everyday. The

rest, 24.7% in urban area and 20.9% in sub urban area consume milk ‘sometimes’ only.

The majority of people still regarded milk as luxurious beverage. At the price of 5,205 rupiahs per can of 397 gram of sweetened condensed milk, similar with the price of 2.3 kilogram of rice, consuming milk has become a second choice for them. People first choose carbohydrate rich food and they ignore its nutritional content. Many of them stop to drink milk when they reach the age of six to seven years. Thus there are no households who drink milk everyday in the household income group of less than 500,000 rupiahs per month and only one household who drink milk ‘sometimes’, in sub urban area. The number of households who consume milk, including ones who drink milk everyday’ increases as the household income increase.

Table 6. Frequency of Drinking Milk according to Income Groups and Living Area

Area	Level of household income (million rupiahs/month)												Sub total		
	<0.5			0.5-1.0			1.0-1.5			>1.5					
	+	=	#	+	=	#	+	=	#	+	=	#	+	=	#
Urban (n=146)	-	-	2	8	6	38	11	23	39	10	7	2	29 (19.8)	36 (24.7)	81 (55.5)
Sub urban (n=124)	-	1	5	2	9	63	7	13	20	-	3	1	9 (7.3)	26 (20.9)	89 (71.8)
Total	-	1	7	10	15	101	18	36	59	10	10	3	38 (14.1)	62 (23.0)	170 (62.9)
Total	8 (3.0)			126 (46.7)			113 (41.8)			23 (8.5)			270 (100)		

Source: Filed Survey, 2003.

Note: + drinking milk everyday. = drinking milk ‘sometime’ (once a week, twice a week, infrequently). # do not drinking any type of milk. Inside the () is percentage.

4.2. Milk Consumption according to Milk Types and Living Areas

In DIY Province there are 4 types of milk that are available in the market. They are sweetened condensed milk, ultra heat temperature milk, milk powder and fresh milk. Sweetened condensed milk is the most popular among all types of milk. Most popular brand of sweetened condensed milk is Susu Indomilk produced by Indomilk Milk Processing Plant and Susu Bendera produced by Friesche Vlag Indonesia Milk Processing Plant. Milk Processing Plants also make standardization for packaging of sweetened condensed milk and milk powder. Sweetened condensed milk is marketed in 397 gram per can and 2 liters of liquid milk can be made from a can of this milk. Standardized milk powder is marketed in 400 gram and 800 gram packages. Two liters of liquid milk can also be made from 400 gram of milk powder.

The average of retail prices of sweetened condensed milk was 5,205 rupiahs per a can of 397 gram as mentioned above and 15,283 rupiahs per 400 gram pack of milk powder in DIY Province in September 2003. We can see clearly that sweetened condensed milk is much cheaper than milk powder. Even the price of milk powder is much more expensive than sweetened condensed milk and ultra heat temperature milk, whose content is good for the growing children and the people prefer to choose it. Fresh milk is consumed by some few people. Consumers sometime buy this kind of milk from milk producers directly or through agents or at times even in restaurants.

Most common type of milk is sweetened condensed milk followed by milk powder which need no

refrigeration. Ultra heat temperature and fresh milk need refrigerators for preservation. About 60% of respondents in urban area and 26% in sub urban area have refrigerators. This is one of the reason & why the people who consume ultra heat temperature milk and fresh milk are more in urban area than sub urban area.

Preparing liquid milk from sweetened condensed milk is very easy. One has to put some of them in the glass then add some hot water and mix. Most of the people can drink sweetened condensed milk, but it is not recommended for the baby because the sugar content is very high (40%). Ultra heat temperature milk; the consumers can buy it in supermarkets or shop and just open the box or bottle and can be consumed. Milk powder - this type of milk- can be given to the baby and also used for the bakery. Preparation of fresh milk is also very simple. It simply needs to be mixed with boiled water or mix with fresh water first and boil.

In terms of the amount of milk consumed by the people, urban people consume milk more than sub urban people. In DIY province in 2003, the average monthly per capita expenditure for food was 143,789.5 rupiahs (Central Bureau of Statistics, 2004). The monthly per capita milk expenditure was 23,392.1 rupiahs and 21,211.8 rupiahs in urban and sub urban areas, respectively, for the household who consume milk everyday. It was 7,244.2 rupiahs and 5,867.9 rupiahs in urban and sub urban areas, respectively, for the household who consume milk 'sometimes' only (**Table 7**). The share of milk in monthly per capita food expenditure was 16.3% and 14.8% urban and sub urban areas, respectively, for the household who consume milk everyday. It was 5.0% and 4.1% in urban and sub urban areas, respectively, for the people who consume milk 'sometimes' only.

Table 7. Monthly Milk Consumption per Capita according to the Milk Types

Milk types	Urban (n=146)				Sub urban (n=124)			
	Every day		Sometimes		Every day		Sometimes	
	Volume (ml)	Amount (Rp)	Volume (ml)	Amount (Rp)	Volume (ml)	Amount (Rp)	Volume (ml)	Amount (Rp)
Sweetened condensed milk	6068.3	15,792.8	883.6	2,299.7	4,904.3	12,763.4	926.1	2,410.3
Ultra heat temperature milk	694.3	3,471.5	789.7	3,948.5	397.5	1,987.7	–	–
Milk powder	458.8	3,506.2	87.1	665.6	820.8	6,271.9	437.7	3,344.7
Fresh milk	336.0	621.6	178.6	330.4	102.0	188.8	61.0	112.9
Total	7,557.4	23,392.1	1,939.0	7,244.2	6,224.6	21,211.8	1,424.8	5,867.9

Source: Field Survey, 2003.

Note: Respondent, who consumes milk, are 100 (65 in urban and 35 in sub-urban). Multiple answers were allowed. Rp (rupiah) is the Indonesian currency. Every day: drink milk at least once a day. Sometimes: drink milk once a week, twice a week, infrequently. The volume of milk were calculated in the uniform volume unit equivalent (in ml) and the amount of milk was calculated based on the market price. Volume of 1 kg of fresh milk is 1,027 liter.

4.3. Milk Consumption according to Income Groups, Milk Types and Living Areas

In general, milk consumption increases with the increasing of household income (**Table 8**). In urban area, people with the monthly income less than 500,000 rupiahs do not consume any type of milk. But

the people, belong to same group income, in sub urban area sometime consume sweetened condensed milk. Consumption of all types of milk, except sweetened condensed milk, increases with the increase of household income. In the case of sweetened condensed milk, the consumption decreases with the increasing of household income. But sweetened condensed milk is the most popular among all milk types. All people prefer to consume sweetened condensed milk because it can be found easily in the market, preserved easily and consumed easily as mentioned above.

Ultra heat temperature milk consumers are limited and most of them are urban people. This type of milk is easily found in urban shops and supermarkets than in sub urban area. In the study areas, the milk powder consumers are also few. Most of the consumers of this type of milk are children less than 5 years old. The price of milk powder is most expensive among all types milk, found very easily in the market and also as mentioned above, its preservation is simple without refrigerator, hence more people in sub urban area, who do not have refrigerator, consume it.

Few people consume fresh milk both in urban and sub urban areas. Actually price of fresh milk is cheaper than sweetened condensed milk. The price of two liters of liquid milk made from sweetened condensed milk (5,205 rupiahs) is more expensive by 1,505 rupiahs than the same 2 liters of fresh milk (3,700 rupiahs). But due to the limitation of fresh milk in the market, and its need to be consumed soon, within the same day in absence of refrigerators, most people prefer to choose sweetened condensed milk.

Table 8. Monthly Milk Consumption per Capita and milk type according to Income Groups

Area	Income (M Rp)	<0.5				0.5-1.0				1.0-1.5				>1.5			
		Everyday		Sometimes		Everyday		Sometimes		Everyday		Sometimes		Everyday		Sometimes	
		Volume	Amount	Volume	Amount	Volume	Amount	Volume	Amount	Volume	Amount	Volume	Amount	Volume	Amount	Volume	Amount
Urban	SCM	-	-	-	-	6,218.4	16,183.4	1,027.2	2,673.3	6,132.1	15,958.8	843.2	2,194.4	5,854.4	15,236.1	780.5	2,031.3
	UHT milk	-	-	-	-	442.2	2,211.0	582.7	2,913.5	675.3	3,376.5	713.2	3,566.0	965.4	4,827.0	1,073.2	5,366.0
	Milk powder	-	-	-	-	323.0	2,468.2	59.3	453.1	413.2	3,157.5	77.8	594.5	640.3	4,892.9	124.2	949.1
	Fresh milk	-	-	-	-	160.2	296.4	130.6	241.6	310.4	574.2	183.3	339.1	537.4	994.2	221.9	410.5
	Sub total	-	-	-	-	7,143.8	21,159.0	1,799.8	6,281.5	7,531.0	23,067.0	1,817.5	6,694.0	7,997.5	25,950.1	2,199.8	8,756.8
Sub urban	SCM	-	-	400.0	1,041.0	5,102.1	13,278.2	1,006.9	2,620.5	5,061.1	13,171.5	918.6	2,390.7	4,549.6	11,840.3	852.9	2,219.7
	UHT	-	-	-	-	159.8	799.0	-	-	386.7	1,933.5	-	-	646.1	3,230.5	-	-
	Milk powder	-	-	-	-	752.9	5,753.3	376.4	2,876.3	762.2	5,824.4	437.3	3,341.6	947.2	7,238.0	499.4	3,816.2
	Fresh milk	-	-	-	-	-	-	56.7	104.9	109.3	202.2	59.1	109.3	196.8	364.1	67.2	124.3
	Sub total	-	-	-	-	6,014.8	19,830.5	1,440.0	5,601.6	6,319.3	21,131.6	1,415.0	5,841.6	6,339.7	22,672.9	1,419.5	6,160.2

Source: Filed Survey, 2003.

Note: Income (M Rp), Income in million rupiahs. SCM: Sweetened condensed milk, UHT milk: ultra heat temperature milk. Volume of all milk types are in ml and the volume of 1 kg of fresh milk is 1.027 liters. Amounts are in rupiah (Indonesia currency).

4.4. Milk Sources

Most of the types of milk are now sold through retail outlets, especially supermarkets and shops. All the respondents buy sweetened condensed milk, ultra heat temperature milk and milk powder in supermarkets and/or shops. Fresh milk is sold through agent, restaurant and/or home delivered. **Table**

Table 9. Buying of the Fresh Milk in DIY Province.

Buy the fresh milk	Urban (n=21)	Sub urban (n=8)	Sub total
	Number of respondents	Number of respondents	
Go to an agent	2 (9.5)	–	2 (6.9)
Go to a milk producers' place directly	4 (19.1)	–	4 (13.8)
Delivered home	11 (52.4)	–	11 (37.9)
Go to a restaurant	8 (38.1)	8 (100)	16 (55.2)

Source: Field Survey, 2003

Note: Multiple answers were allowed. Inside the () is percentage.

9 shows such milk outlets from where the surveyed 29 consumers get the milk. In DIY Province, milk consumers in urban area buy fresh milk from the agents and/or milk producers' place or through home deliveries by the milk producers. All of the sub urban respondents buy fresh milk in the restaurant. Most of the urban respondents (52.4%) buy the fresh milk by getting home delivery every day. Usually fresh milk is delivered at home every morning. Fresh milk consumers are dominated by urban people because they are more aware of the need of protein and calcium for the body and know milk is a good source of for them.

5. Conclusion

Indonesia's growing demand of dairy products has outpaced the domestic production capability. Leaving a wider window of opportunity for imported dairy products. The short falls in domestic milk production is considered a problem that needs to be addressed by Government of Indonesia and Indonesia dairy industry. The government in concern with the industry continuously runs several programs to encourage and increase productivity. However, the dairy industry must still continue to rely on milk imports to fulfill short domestic supplies. Dairy products are primarily consumed as sweetened condensed milk, ultra heat temperature milk, milk powder and fresh milk.

In DIY Province, milk marketing undertaken by the milk producers depends on the location and the choice of consumers. Rural milk producers sell their milk to the cooperative. Being rural area and mountain hinterland region they have no other opportunities. Selling milk in urban and sub urban areas depends on the possibility to sell milk to the consumers directly. Milk producers have incentive to sell milk to the consumers directly because they get the higher price than the cooperative price. Generally milk producers in urban and sub urban areas sell all the afternoon milk to the cooperative and fulfill the duty to provide the milk to the cooperative as a member.

Milk producers price of milk in urban and sub urban areas is better than cooperative price. Selling milk to consumers directly is beneficial both to milk producers and consumers. However availability of such producers in the locality, the refrigerator facility and the milk drinking habit of the consumers directly affect such marketing of fresh milk and indirectly affect in the market channel.

On the consumption part, the findings show that the household income is one of the factors in the milk consumption. In general milk consumption increase with the increasing of household income. The household income also influence in the choosing of milk type among the people. Consumption of sweetened condensed milk decreases with the increasing of household income. Other milk types

(ultra heat temperature milk, milk powder and fresh milk) consumption increase with the increasing of household income both in sub urban and urban areas.

Housewife's education level is also a factor in the milk consumption. In general, frequency of drinking milk in a household increases with the increasing of housewife's education level. The share of milk in monthly per capita food expenditure was 16.3% and 14.8% in urban and sub urban areas, respectively, for the people who consume milk everyday. It was 5.0% and 4.1% in urban and sub urban, respectively, for the people who consume milk infrequently. Some people especially those in lower income still regarded milk as luxurious beverage.

However, still large numbers of people (about 63%) still do not consume milk and fresh milk in specific because of the food habit and stomach problem. Thus, the drinking milk campaign is still needed in order to make the people aware of the importance of milk in getting balanced nutrition, especially for growing children, perhaps through school and factory in DIY Province.

Endnotes

- (1) Ultra heat temperature milk is milk with the sterilization before packaging, then filling into pre-sterilized containers in a sterile atmosphere. Milk processed in this way using temperatures exceeding 135°C, permits a decrease in the necessary holding time (2-5 seconds). Some additional flavors (fruits, chocolate, etc), mineral and vitamin can be added during the process of sterilization.
- (2) The price of 4,000 rupiahs per liter of ultra heat temperature milk produced by the cooperative in **Figure 3** is calculated base on the price of 1,000 rupiahs per 250 ml.
- (3) Milk consumers refer to the people who drink one or both of processed milk (sweetened condensed milk, ultra heat temperature milk and milk powder) and fresh milk.
- (4) Fresh milk consumers refers to the people who drink milk that were bought from the milk producers directly and/or through the agents.

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