

SOME CONTEMPORARY FEATURES OF INDONESIAN DAIRY INDUSTRY

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Abstrak

Konsumsi susu di Indonesia cenderung meningkat sejak tahun 1969, yang menjadi dasar pengembangan industri persusuan saat ini. Makalah ini merupakan tinjauan dari gambaran keadaan industri persusuan di Indonesia. Penelitian ini didasarkan pada data sekunder dan informasi yang dikumpulkan dari lembaga, instansi, dan sumber-sumber terkait dengan persusuan nasional. Makalah menyimpulkan bahwa industri persusuan sarat dengan perlindungan pemerintah. Bidang budi daya dan produksi susu segar dicirikan oleh usaha skala kecil yang jumlahnya banyak, sementara bidang pengolahan (IPS) dikuasai oleh perusahaan besar yang jumlahnya sangat sedikit. Pasar susu segar lebih bersaing daripada pasar produk susu. Bahkan beberapa produk diproduksi oleh perusahaan yang oligopolistik atau bahkan monopolistik. Walaupun produksi susu segar diorganisasikan dalam bentuk koperasi, peranannya sangat lemah dibandingkan dengan peranan IPS. Peranan koperasi ini akan semakin melemah nanti, manakala aturan-aturan GATT/WTO akan diterapkan di kemudian hari. Nilai elastisitas permintaan harga dan pendapatan produk susu tampaknya elastis, sehingga apabila pendapatan per kepala penduduk Indonesia meningkat, maka permintaan akan produk susu akan meningkat pula. Hal ini akan menyebabkan peningkatan impor produk susu. Untuk memelihara kepuasan konsumen di dalam negeri, maka beberapa kebijakan perdagangan dan investasi dalam pengolahan susu perlu dilonggarkan agar tercipta persaingan yang sehat.

Kata kunci : konsumsi, industri persusuan, susu segar, elastisitas

Abstract

The milk consumption trend in Indonesia has been growing since 1969, which is thought to be basis for developing existing dairy industry. The paper attempts to review the present picture of dairy industry in Indonesia. The study is based on the secondary data and information obtained from relevant sources. The paper concludes that the dairy industry is heavily regulated. The fluid milk production is characterized by small-size operations on one hand, and the processing side is dominated by quite a few large scale corporations on the other hand. The fresh milk market is relatively more competitive than the dairy products market. Some dairy products are produced under oligopolistic or even monopolistic factories. Although the fresh milk production is organized under co-operative system, its role is weak relative to the factories' role. The role of co-operative will further dwindle when the GATT/WTO agreement becomes in effect. Both price and income elasticities of dairy products seem to be elastic. Thus, as income per capita improves, the demand for dairy products are expected to increase. This will lead to higher growth of imports. To maintain consumers' satisfaction, trade and investment policies in milk factories needs to be relaxed to stimulate fair competition.

Key words : consumption, dairy industry, fluid milk, elasticities

INTRODUCTION

Milk consumption in Indonesia started with a low base. Per capita consumption prior to 1969 was not known, but in that year, when the PELITA (the Five-year Development) program was first launched the estimate was 1.49 Kg. By the end of the program period in 1973, it arrived at 2.64 Kg, an increase of about 77 percent. The trend has continued until recently making the consumption per capita in 1993 reaching to possibly

over 4.39 Kg. It has shown that as economic development proceeds the demand for dairy products will expand accordingly, as demonstrated in other developing countries. This presumably follows due to an increase in per capita income.

Recognizing this trend, the government introduced a policy of integrating domestic production of fresh milk with the existing processing companies in the early 1980s. It was after then the milk processing companies in Indonesia were required to absorb local

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fresh milk produced by dairy farmers. At the same time, production of fresh milk was also enhanced through credit program. The policy still remains in tack today. As economic and world trade environment changes, however, Indonesian dairy industry is required to make some adjustments.

The purpose of this paper is to examine the dairy industry development in Indonesia. It contains investigation on characteristics of farm gate production. It discusses some government policies related to the dairy sector and analyze features of processing structure. It then reviews studies of dairy product consumption followed by an evaluation of its potential.

FARM-GATE SECTOR

Dairy farming was first introduced in Indonesia in the 19th century during the Dutch colonial era in an effort to supply milk to the Dutch population. This was done by importing bulls and heifers of Ayrshire, Jersey, and Milking Shorthorn breed from Australia and Holstein Frisian (H-F) cattle that were brought here by the Netherlands Indische government from the Netherlands (Sudono 1985 and Siregar 1992). The skill is then passed on from one generation to the next only by experience.

Cattle imports have continued since then in order to improve the local breed and to expand domestic milk production. For fulfilling the milk demand in 1962, when the Asian Games was held in Jakarta, some H-F cattle were imported from Denmark, and in 1965 from the Netherlands, and in 1979 to 1980 Ilawara-Shorthorn cattle were also imported from Australia (Sudono 1985). But this has not reduced the volume of raw milk import which has grown continuously.

Siregar (1992) claimed that the dairy cattle generally reared in Indonesia are H-F type. If not in pure-breed, they may be cross-breeds and grading up pedigrees of H-F race. The breed continued to be imported by the Indonesian government through out the 20th century. The cattle may have been imported from the Netherlands, Denmark, United States of America (USA), New Zealand, and Australia.

When the government introduced the Dairy Farm Development Program through credit scheme for farmers in the early 1980s, heifers were mostly H-F type being imported from USA, New Zealand, and Australia. These heifers were distributed to farmer participants who lived mostly in Java. Through the government regulation, fresh milk production is kept in small scale operation in light of income generating and employment

creating principle. These farmers are scattered in Java, the most densely populated area in Indonesia. It is a system that confined cattle in small barn in which cattle are kept and fed in shed by bringing all feed, in concentrate and forage from the outside.

The production sector of dairy were made up by 31,438 dairy cattle farmers in 1973, about 0.22 percent of the total farming households according to Central Bureau of Statistics (CBS) Agricultural Census. While the number of farmers grew by 8.44 percent within 10 years since 1983, the number of dairy farmers was more than double that of in 1973, making its percentage to the total farmers rose at 0.41 percent.

The number of farm households again increased by 26.47 percent from 1983 to 1993 reaching to 19,713,806 households, but that of dairy cattle grew with a faster rate by 42.28 percent within the same period to 92,000 families. From those figures, obviously the dairy cattle farmers increased in its percentage with respect to farmer population, even though it is only 0.47 percent. Today, there may be 95,000 to 100,000 dairy farmers.

The increase in the number of farms was accompanied by an expansion in cattle population. Within 1973 to 1983 period, the population has almost tripled with a rate of 18.29 percent per annum and during 1983 to 1993 decade, the number of cattle has grown with a lower rate of 7.72 percent. Starting from 1989 the number of dairy cattle has increased in trend by 5.16 percent per annum, making domestic milk production increased by 3.45 percent annually. However, milk import was also growing by 11.61 percent per annum.

Judging from this high rate of growth, the dairy policy has been successful to meet one of its target to substitute for milk imports. One basic argument that advocates for the development of dairy sector is indeed the import substitution consideration.

At the present time the majority of farmers has size only 3 to 4 heads of lactating cows per household with productivity of only 9 to 10 liter per head per day. The productivity per cattle has tended to decline by 1.6 percent a year. The reasons for the low productivity have been elaborated by Smith and Riethmuller (1995). These relate to the problems of cattle and feed management, and lack of extension. Research on the subject is certainly needed, especially to that which suits the Indonesian case. Given the existing condition of confined system, for example, what the size of herd would be to make the farm viable to a farmer, and how the farmer would then formulate the feed ration by himself.

The import has continued to increase because domestic production has always fallen short of demand that in per capita basis it increased at almost 5 percent per annum. This rate of growth is justifiable because the per capita consumption of milk in Indonesia is still yet at a very low level and therefore has low share in the household expenditure.

From the cumulative milk production from 1989 to 1993, which amounted to 1,823,640 tons of milk in Indonesia, 93.5 percent was produced in Java. West and East Java have almost equal share of production, that is 33.84 percent and 33.18 percent, respectively. Central Java contributed about 27 percent to the cumulative number. It means that the dairy development program has taken place primarily in Java where dairy farming has been in existence for a long time.

Almost 90 percent of fresh milk in West Java is sent directly to factories. The remaining is taken by milk treatment before it ends up in the factories. In Central Java 77 percent of milk produced by farmers is shipped to milk treatment and the rest is delivered directly to the processing plants upon the Gabungan Koperasi Susu Indonesia (GKSI= Indonesian Dairy Co-operative Union) approval, while in East Java all milk produced has to go through the GKSI milk treatment before it is later delivered to the processing plants. Overall there is more milk delivered directly to the plants than that shipped through the milk treatments.

There has been an argument that Indonesia does not have any comparative advantage in the dairy sector. This is not supported by convincing evidence, however. The author is positively certain that milk in liquid form produced in Indonesia will always have comparative advantage in domestic market relative to its counterpart from overseas, at least from the transportation cost point of view. Its income elasticity of demand is very elastic (Somantri, 1984). However, if the fluid milk is used as raw material to be processed further, its products may or may no longer be competitive.

There may be some inefficiencies at the farm-level production and collection stage as well as in the processing and marketing stage. The only problem with the fresh milk at the present time is that its market share is still yet very low, less than 10 percent in West Java and only less than 1 percent in overall Java. Some efforts should be initiated to increase this level further. And by looking back from the experience in the past, especially throughout PELITA I (1969-1973) during which the dairy industry was not integrated, the domestic farm sector was not able to keep up with the

growing and dominant processing industry. Milk production was almost stagnant, in spite of the growing domestic milk market because the factories preferred to import raw milk from abroad than to purchase local milk. They would tend to extend their import quotas since raw milk imports were a lot cheaper.

Some indirect approaches to make the domestic dairy farming gains its comparative advantage is how to expand the consumption of fresh milk and or to encourage the substitution of that form into milk products in the consumer preference, and to establish a systematic genetical improvement program preferably through cross-breeding in the farm. As shown by Kasryno *et al.* (1989), household farming rearing cross-breeds are the most efficient type of farming relative to the corporate farming with imported-breeds in terms of resource use. This type of farming has been common in Indonesia, but there may be problem of size since the existing farm is generally very small.

It has to be kept in mind however that, as per capita income grows and as economy develops we would expect that fresh milk consumption will grow. Public campaign and school-fresh milk program could also raise that consumption. This in turn could make the economic efficiency of dairy production improving faster.

INVESTMENT AND TRADE REGULATION OF DAIRY PRODUCTS

The condition of entry to the dairy product processing has been so stringent. This has not changed since 1980s. It has caused the processing side of the industry to be dominated by large scale corporations. As a consequence, although the fresh milk production is organized under co-operative system, its role is weak relative to the factories' role. And the role of co-operative will further dwindle when the GATT/WTO agreement becomes in effect.

Based on the list available from the Ministry of Industry and Trade, nineteen enterprises have been approved in the dairy product processing in the nation with the value of investment ranging from more than Rp. 1 billions to almost Rp. 60 billions and the number of employment created ranging from 22 to 590 local labors and from none to 6 foreign labors, but two companies await for plant constructions. A staff in the ministry explained that two companies have applied for the government approval to enter the processing within the last three years through the Co-ordinating Board for

Capital Investment (*BKPM*), with the investment valuing between Rp. 1 billions to Rp. 50 billions, but the approval has not been granted. This would create employment to about 650 locals and 5 foreign workers. In 1994, eighteen companies are observed to be operational in milk processing, and twelve are in ice manufacturing.

In May 1995, the government has again issued a presidential decree on negative list of investment, called the Presidential Decree No. 31 1995. This opens up an opportunity for new business to put investment on the dairy processing. The decree states that investment in the dairy product processing is already closed unless it has an integration with the production of fresh milk. In the second attachment of the decree it is also stated that dairy farming is set aside for smallscale operation. However, it is allowed to have partnership with big corporation under nucleus-smallscale system (*BKPM*, 1995).

It appears that even though the possibility of entry is there, it remains to be seen, however, whether or not new comers wish to join the industry. The condition of integrating fresh milk production between small size farming with big milk processing in one business undertaking would be risky for the new comers. In Central Java location, this type of arrangement actually had been tried once with no success. In this regard it would be more appealing to consider an arrangement that would offer a processing company to grow its own cattle to produce its raw milk.

With respect to trade, the Minister of Finance has issued two decrees that determine the tariff level of all tradeable products in Indonesia, through the decrees No. 213/KMK. 01/1995 and No. 214/KMK.01/1995 on May 23, 1995. Related to dairy products, there has been some reduction in the import duties from 30 percent to 25 percent across the board. This can be seen in the Heading/Subheading 0401, which consists of commodities such as milk and cream, not concentrated nor contained added sugar or other sweetening matter. The same applies to Heading/Subheading 0402, which are milk and cream, concentrated or containing added sugar or other sweetening matter, with the exception of Subheading 0402.10.100 (Heading/Subheading 0402 in powder form, in packing of 12.5 Kg net or more) which stays at 5 percent import duty; Subheading 0402.91.000 (Heading/Subheading 0402 not containing added sugar or other sweetening matter) which reduces from 35 percent to 30 percent import duty; Subheading

0402.99.000 (other Heading under 0402) that reduces to 30 percent tariff.

Import tariff on Heading/Subheading 0403 (buttermilk, curdled milk and cream, yoghurt, kefir and other fermented or acidified milk cream, whether or not concentrated or containing added sugar or other sweetening matter flavored or containing added fruit, nuts or cocoa) have also been reduced by 5 percentage point, excluding Subheading 0403.10.900 which are made up by yoghurt not flavored nor added fruit nor cocoa products that reduce by 10 percentage point; Subheadings 0403.90.100 consisting of buttermilk products (in packing of 25 Kg net or more), 0405.00.100 containing milk fat product, 0406.10.100 that includes fresh cheese including whey cheese and curd which stay at the same level of tariff of 5 percent. Value-added taxes of 10 percent also applies to most of the milk products.

Aside from the imposition of import tariffs and the value added taxes, the government also regulates milk product import. The products can only be imported through companies categorized as Registered Companies (*Importir Terdaftar*). The policy has been in place since 1982 when the government first launched the national dairy development. It was based on the Joint Ministerial Decree of 1982, the government formulated the scheme of interrelating milk import quota for milk processors and the amount of milk that has to be absorb from domestic production, through mixing ratio of fresh milk absorption and milk import which is issued as a license to import, called the *Busep* as mentioned above. For instance, the ratio in 1982 was (1 to 8), declining to (1 to 0.7) in 1988, and growing to (1 to 2.9) in 1995. Since the policy has potential of being misused, the government again issued a Presidential Instruction (*Inpres*) No. 2 in 1985 by establishing the National Dairy Coordination Team to monitor the implementation of the *Busep*.

In related matters, the Minister of Industry and Trade has published a decree No. 14/MPP/SK/I/1996 on January 25, 1996 regarding the trade regulation of commodities. The Article No.3 contains the list of the Registered Importers of dairy products depending on whether or not the imports are in the forms of raw milk or processed and finished ones. It is also conditional to whether or not the users are dairy or non-dairy processing.

Of eighteen dairy processing factories that require raw milk in 1994, only 10 companies are given license to import and only two companies allowed to

purchase raw milk from abroad to be used by non-dairy processing. And the import should only be done by those factories that hold the *Bukti Serap (Busep)*, literally meaning the Absorption Certificate), as a prove that it has already absorbed some local fresh milk. Each of these imports is conducted after having been approved by the Directorate General of International Trade. The imports of finished or processed milk can be approved only if its brands and types have been registered in the Ministry of Health list. By considering this trade regulation, it is conceivable that some processing companies have to purchase the raw milk from other companies. In the case where the company needs to import some more raw milk and at the same time it is unable to get the Busep on its own, the company would purchase the Busep from the listed companies above, because the Busep itself is tradeable.

OTHER GOVERNMENT POLICIES

One major government policy instrument to foster local dairy production is by providing subsidized loan to participants. There are indirect benefits of this credit program as well. These include supposedly an improvement in the income of the poor group and an incentive to a farmer who wants to expand his farm.

The participants of the program were organized in farmer groups consisting of 20 to 25 members/group. Having had several farmer groups, then a co-operative was established, called *Koperasi Peternak Sapi/KUD*, to utilize the economic of scale of farm, so they could be able to sell their milk together to the processors. The function of co-operative or KUD is meant as an active agent of not only collecting and selling of milk, but also of services and provision all necessities needed by members on farm and off-farm. The *GKSI* is a secondary co-operative to all dairy co-operatives.

Since the production of fresh milk is allowed only on the hands of thousand small farmers and the processing is maintained by only limited companies it undoubtedly often creates some disputes between the two parties. The dairy farmers argue that the prices they have always received for their milk were not reasonable. On the other hands the milk processing factories claimed that they have always paid prices higher to the domestic milk than to the imported raw milk.

PROCESSING STRUCTURE AND PRODUCT RANGES

The previous section has explained that the domestic production of fresh milk is all absorbed by dairy factories. When excess demand exists, they have to make imports.

From Industrial Survey of CBS (1993), there are only two commodities classified under the group 311 which covers manufacturing of dairy product and others. These commodities are combined in two sub-groups called manufacturing of powdered, condensed and preserved milk (coding 31121) and manufacturing of ice cream (coding 31123). As has been explained in the previous section, nineteen companies belong in the code 31121, that is milk manufacturing group in 1993 and eighteen companies in 1994. Twelve companies involve in the code 31123, the ice cream manufacturing group in 1993 and 1994. The two manufacturing groups require 455,042 thousand liters of fresh milk and 34,746 tons milk powder in 1993, which must be obtained from either local source or imports. The amount of milk imported in 1993 is 32,728 tons. The total value of local milk is around Rp. 243.3 billions, while that of imported one is Rp. 159.3 billions.

The dairy processing sub-group produces a whole range of products: milk powder, condensed milk, fresh milk, baby milk, chocolate milk powder, baby food, cheese, butter, pasteurized milk, yoghurt and others. Nineteen companies involve in the process in 1993. Judging from the total sales, milk powder and condensed milk are the major products of the dairy manufacturing. They have almost equal share of 32 percent each in the industry. Fresh milk product comes third with 12.7 percent share. The most valuable product in the range is the baby milk with the value of Rp. 10 294 per Kg, followed by the milk powder valuing to Rp. 7711 per Kg.

To produce the product mentioned above, the dairy manufacturing requires raw and intermediate products, especially milk. Fresh and evaporated milk all come from local supplies, whereas others are only available from imports. These include butter milk fat and milk powder. Some anhydrous milk fat is bought from local production. The local source is much higher than that of imported one. This is in contrast to that of the milk powder case. In the ice cream processing, almost all raw milk input comes from domestic production.

The liquid fresh milk is characterized by a relatively more competitive market than the dairy products. Some processed products have markets in oligopolistic or even in monopolistic nature. Fresh milk is produced by 10 companies ranging from 0.02 percent to 29.11 percent share in volume. There is no company controlling more than 50 percent share. However, three companies hold about the same share, above 25 percent each, making them control more than 80 percent of production volume. Of all companies producing fresh milk, four hold only 1 percent share at the most.

In 1994, the amount of condensed milk produced in Indonesia was 156,191 tons, produced by only four companies. One company has about 43 percent share in volume, and two companies hold about the same share of 21 percent. These three factories then control more than 80 percent of total production. The milk powder production is controlled by only five companies. No company holds more than 50 percent share. The largest company has about 34 percent share of production volume, and together with the second company controls about 60 percent share.

In the pasteurized milk industry, only five companies are involved. One company even controls more than fifty percent of volume of production. Together with the second largest factory, they hold more than 80 percent share. The other three keep about an equal share around 4 percent.

The total amount of chocolate milk powder produced in 1994 is 1,679 tons. Of that amount, one factory produces more than 90 percent. Butter is produced by only two companies with each having the shares of 73 percent and 27 percent, out of 1149 tons of total production. Cheese is only produced by a factory with total production of 3,046 tons in 1994.

Looking more deeply into the firms individually, many processing companies involve in more than one product lines. Three companies produce condensed milk and milk powder at the same time. Two companies involve in producing condensed milk and fresh milk. Two companies have condensed milk and pasteurized milk as their products. Two companies combine condensed milk and ice cream as their outputs.

Three companies are observed to produce more than three products in combination of condensed milk, milk powder, fresh milk, ice cream, and butter. One company even produces seven product types. These include condensed milk, milk powder, pasteurized milk, ice cream, follow on food for baby, and chocolate milk powder. This company controls the last two products.

One factory controls condensed milk and butter milk markets.

CONSUMPTION OF DAIRY PRODUCTS

To measure the importance of dairy products in the household consumption, three indicators could be used. The first is the expenditure participation rates that measure the proportion of the sampled households that report purchase (or use) of dairy products. The second is the budget share of the dairy products expenditure out of the total household expenditure. Both measures have to move in the same direction. The higher these two indicators the more important the dairy products are in the household consumption bundle. The third is the price and income elasticities of demand for milk or dairy products. These coefficients measure how sensitive the consumption also changes if price or income changes. Center for Agricultural and Development (CARD, 1987) accounted that 30 percent of the urban households in Indonesia claimed the participation in consumption of milk products, while in the rural areas it was only 13 percent. In percentage terms, there were more Off-Java households consuming dairy products in both regions, rural and urban and the estimated average budget share on animal products ranging from 0.055 to 0.079. It means that animal products expense is extremely low in the consumption budget. It is only less than one percent of the total household expenditure. The figures are even lower in the 1990 as estimated by Rachman and Erwidodo (1995), who obtained the budget share of the egg and milk group only ranging between 0.032 to 0.060. By comparing results from these two studies, we could be certain that the budget share of dairy products is actually low.

Demand elasticities of milk or dairy products with respect to its own price and income are not known for certain. The estimates of elasticities of demand for a specific type of milk products are even more scarce. Some studies have reported their estimates but the results are mixed. More research on the subject is still required. On the fresh milk, an interesting results were obtained by Somantri (1984) in Bandung town who estimated that the price elasticity of demand for fresh milk was also low, -0.088 but the income elasticity is high, 1.18. One study using the CBS 1980 multi-purpose household survey data obtained that price elasticities of demand for animal products (meats, poultry, and dairy products) were in the range of -0.9 to -1.05, and income elasticities were between 1.54 to 2.53 (CARD 1987).

Agency for Agricultural Research and Development (AARD, 1992) report presented the estimates of price and income elasticities of demand for milk in Java using the CBS 1990 Susenas data. The estimates are -0.08 and 1.54 respectively. In the Off-Java group, AARD (1993) gave price elasticity estimates that range from -0.03 to -0.95 and income elasticities ranging from 0.84 to 1.79. These would give averages price elasticity of demand for milk around -0.66 and income elasticity about 1.32. If the averages are taken between Java and Off-Java, we would get estimates of price elasticity -0.60 and of income 1.34.

At least two other studies have used the same set of data. Rachman and Erwidodo (1994) obtained the elasticity estimates of demand for the egg and milk group in the Indonesian consumption bundle was -0.57 and 0.39 with respect to its own price and to income, respectively. Hermanto *et al.* (1995) developed the milk products group, rather than combining it with the egg. They acquired totally different figures. With respect to price its average is -0.63 and with respect to income it is 1.66. By synthesizing estimates already obtained by other studies, Trewin *et al.* (1995) produced the estimates of elasticities. These estimates are -1.03 for own price elasticity and 0.59 for income elasticity of demand for milk products. Although the results are different, it is conceivable that the milk demand is both price-elastic and income-elastic in Indonesia, as is normally found in other developing countries. As income per capita grows, in line with the growth in the general economy, demand for dairy products are expected to be increasing. If major change in the dairy policy does not occur, the higher growth of dairy products import will be undeniable. This has shown by the growing ratio of domestic to import milk in recent years.

If we assume that the growth rate in per capita consumption of dairy products is 5 percent per annum at

a given growth rate of population, then the total dairy consumption can be projected. The result is given in Table 1.

As can be seen from the table, the demand for dairy product will persistently be growing, but its rate of growth will be smaller and smaller. This is because we assume that per capita consumption increases at a constant rate, but population increases at a slower rate as time moves on.

The total milk consumption in 1995 will be increased by more than 40 percent of the 1990 level and in 2000 it will be 90 percent larger than the 1990 level and almost 40 percent higher than the 1995 level. In 2005 the total milk consumption of milk will be projected to be almost 1.6 million tons, 37 percent higher than the 2000 level, almost doubling.

If we further assume that the domestic production growth equals to the average growth in the period of 1989 to 1993 at 3.45 percent, it is clear that the gap between the domestic production and the total consumption becomes widen (Table 1). In 2005, the gap will be almost four times as much as that of in 1990. Therefore, unless there is a major change in the dairy policies in the near future, it is inevitable that milk imports will have to be growing to meet the demand. The global trade environment will help to magnify this growth.

CONCLUSION AND POLICY IMPLICATION

The production sector of dairy is dominated by small-size operation of farms designed by the government under the presumption that the dairy farm is able to absorb human labor that grows fast in rural areas. The total population of dairy household tends to increase but it is still less than 1 percent of the total farm households. These small farms are organized in

Table 1. Projection of Population, Dairy Product Demand per Capita, Total Milk Consumption, Domestic Production of Milk, 1991-2005

Year	Population (1)	Per capita consumption (l/year) (2)	Total milk consumption (tons) (3)	Domestic milk production (tons) (4)	Balance (tons) (5) [(3)-(4)]
1990	179,829,800	3.46	621,400	317,000	304,400
1991	182,940,100	3.64	665,426	328,541	336,885
1995	195,283,200	4.44	867,590	377,157	490,433
2000	210,438,600	5.70	1,200,463	448,166	752,297
2005	225,142,900	7.32	1,649,131	532,543	1,116,588

co-operative, called *Koperasi Peternak Sapi* or *KUD*, as primary co-operative and the *Gabungan Koperasi Susu Indonesia* (*GKSI*= Indonesian Dairy Co-operative Union) as secondary co-operative. The co-operative is responsible to collect milk from the farmer members and deliver it to the processing factories. It is also an agent that has to be actively providing services to farmers on production and consumption matters. This has caused some production inefficiencies.

Some problems that lead to the inefficiencies in the farm and the co-operative level are commonly found. These include the management of cattle and feed, and the lack of extension services. Research in this direction is still scarce, especially in the subject of handling a small-scale case such as in Indonesia.

The fresh milk market is relatively more competitive than the dairy products market. Some dairy products are produced under oligopolistic or even monopolistic factories.

Other government policies that are still intact today ranging from credit to farmers to investment, trade and marketing of milk and its products. The entry to processing is already closed causing the processing side of the industry to be dominated by large scale corporations, except if the factory is closely integrated with its raw milk production on the farms. The existing factories are required to absorb local milk under the *Busep* scheme before they are allowed to make imports. Although the fresh milk production is organized under co-operative system, its role is weak relative to the factories' role. The role of co-operative will further dwindle when the GATT/WTO agreement becomes in effect.

Both price and income elasticities of demand for dairy products seem to be elastic. Since the growth of domestic production of milk is slow relative to that of domestic consumption, trade policy on milk imports needs to gradually relaxed to maintain a given level of domestic consumers' satisfaction. For instance, by conversion of the mixing ratio to tariffs that are subject to be reduced and to stimulate fair competition in processing through the relaxation of new entry. On the other hand, the government should continue its support to invest in research and extension on dairy farming and technology that suit to Indonesia situation.

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