Chapter 5

Marketing Mix of Milk and Dairy Products in Peninsular Malaysia

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Chapter 5
Marketing Mix of Milk and Dairy Products in Peninsular Malaysia

Chubashini Suntharalingam

1. Introduction

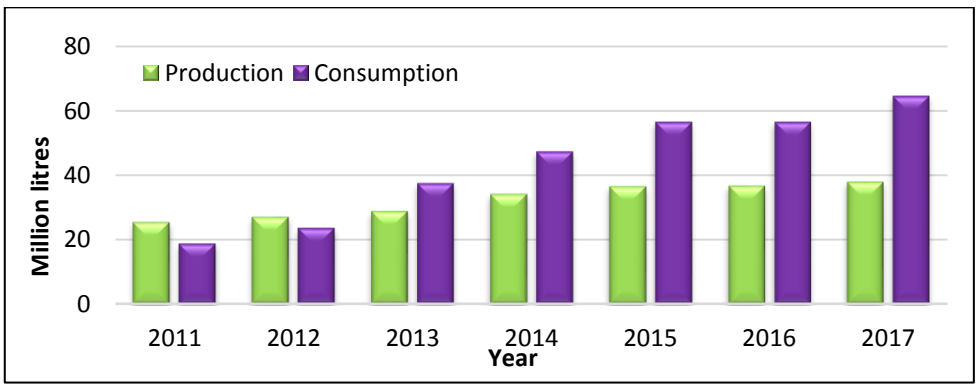
This case study on dairy marketing in Malaysia is commissioned by the Economic Research Institute for ASEAN and East Asia. This report was based on an extensive field work carried out among dairy farmers in the Southern Zone of Peninsular Malaysia. It encapsulates the marketing mix of milk and dairy products and elaborates on the marketing channels widely used by dairy farmers in distributing their products to consumers.

This is the first-ever study carried out in Malaysia focusing on the marketing and value-added aspects of milk and dairy products. Previous studies and publications on milk and dairy were mainly centred on the production aspect of dairy farming.

2. Production and Consumption of Milk in Malaysia

Globally, the outlook of milk and dairy consumption has decreased among developed countries while it is projected to increase in developing countries (FAO, 2013; Kearney, 2010). In Malaysia, domestic milk production is somewhat slow in its growth while consumption of milk has increased by about fourfold between 2011 and 2017 (Figure 5.1). In 2011, milk production was registered at 25.40 million litres and gradually increased to 36.60 million litres, demonstrating an increment of RM11.20 million litres in 7 years, reporting a growth rate of 5%. Meanwhile, milk consumption increased by 44.10 million litres in the same period; from 18.90 million litres in 2011, it sharply increased to 62.80 million litres in 2017. Milk consumption experienced an annual growth rate of 22% during the same period.

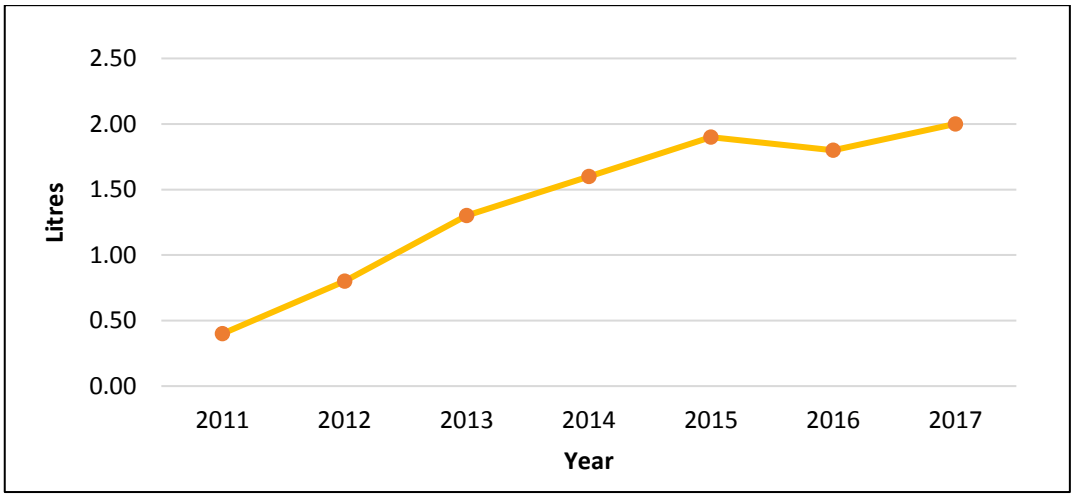
Figure 5.1: Milk Production and Consumption in Malaysia



Source: Department of Veterinary Services (2017 and 2018).

In 2011, an average Malaysian consumed 0.4 litres of milk in a year; at the end of the 6 years, the consumption per capita increased to 2litres/year (Figure 5.2). Rising incomes and increased awareness on the nutritional benefits of milk and dairy products, coupled with change of taste of preference among Malaysian consumers, have contributed to the growing demand for milk and dairy products (Sim and Suntharalingam, 2015).

Figure 5.2: Per Capita Consumption of Milk in Malaysia



Source: Department of Veterinary Services (2018).

3. Dairy Programmes and Policies in Malaysia

Programmes and policies related to the dairy sector in Malaysia are outlined in the country's various 5-Year developmental plans, beginning in 1966, and national agricultural policies, beginning 1984. The 5-year developmental plans outlined specific programmes for the dairy sector while the agricultural policies were broader in nature. A summary of these programmes and policies are discussed in this chapter. A comprehensive review of these programmes and policies can be drawn from the article by Sim and Suntharalingam (2015). Recent policy developments are included in this section to update on the latest programmes and policies concerning the dairy sector.

5-Year Developmental Plans

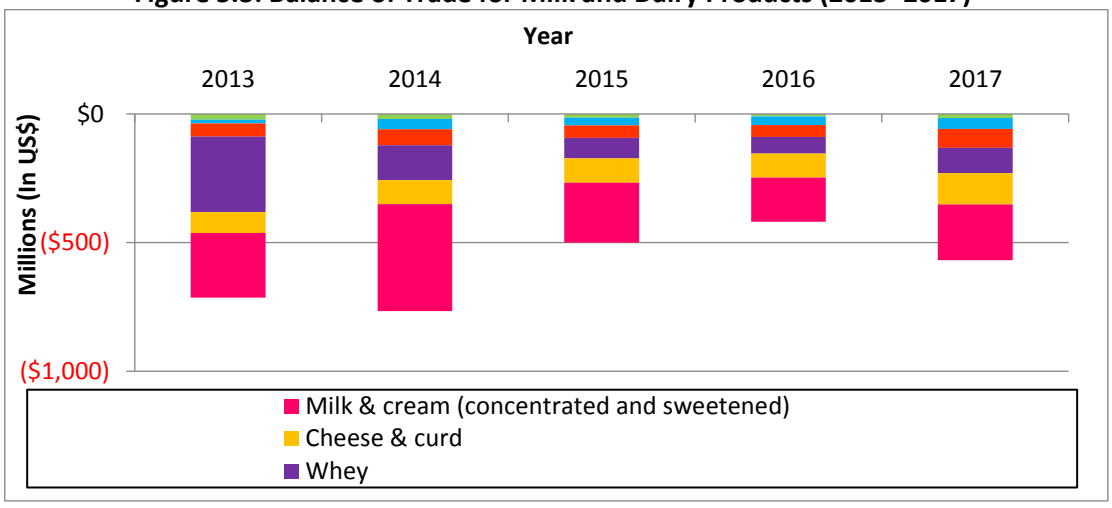
Between 1966 (the start of the First Malaysia Developmental Plan) and 1995 (the end of the Sixth Malaysia Plan), a period of 40 years, programmes and policies catered towards increasing the milk production capacity with the establishment of milk collection centres operated by the Department of Veterinary Services (Table 5.1). These programmes and policies were formulated to reduce the high reliance on imported dairy products. The department offered a range of services to dairy farmers, i.e. assistance in obtaining loans; testing of milk quality; and transporting, storing, and marketing of milk. However, from the Seventh Malaysia Plan (1996–2000) onwards, the country began to rely on imported dairy

products once again to compensate for the insufficient supply of local milk in the domestic market.

Over 4 decades, policies and programmes pertaining to the dairy sector were formulated and adopted to develop this sector into a sustainable one. However, as government shifted focus towards industrialisation beginning from the 1980s to the early 2000s, the agriculture industry took a back seat. The dairy sector specifically was hit hard as numerous dairy developmental projects which were planned since the First Malaysia Plan (1966–1970) were abandoned due to lack of proper implementation. The under-reporting pertaining to initiatives carried out during the First and Sixth Malaysia Plans failed to offer insights on the success or failure of these projects. Hence, the impact and outcomes of these initiatives were never ascertained to recommend strategies and corrective actions to be taken to strengthen the development of the dairy sector. Further, with the lack of governmental support to follow through with prior efforts, the supply of local milk continued to deteriorate, causing imported milk to flood the Malaysian market, and defeating the whole purpose of the dairy plans and programmes in the first place.

Imports of foreign milk and dairy products posed a disadvantage to local dairy farmers who were unable to market fresh milk at a competitive price. The balance of trade for milk and dairy products over the last 5 years (2013–2017) demonstrates that demand for value-added dairy products, such as cheese and curd, butter and other dairy spreads, is rising. To meet the demand for these products, Malaysia continues to import (Figure 5.3).

Figure 5.3: Balance of Trade for Milk and Dairy Products (2013–2017)



Source: United Nations (2019).

Realising the consequences of (mis)aligned policies pertaining to the dairy sector, the government stepped up its efforts to increase productivity and the quality of products by balancing production and importation of dairy products during the Tenth and Eleventh Malaysia Plans (2010–2020), pursuing the development of new high value-added products, encouraging good agricultural practices, and adopting modern agricultural technology. The government aspires an increase in productivity and development of high value-added products, a raise in farmers' income level, and a decrease in the dependence on imported dairy products, hence, resulting in a lower food import bill.

Table 5.1: Malaysia Developmental Policies on the Dairy Sector

	Malaysia Plan								
	First (1966–1970)	**Second (1971–1975)**	**Third (1976–1980)**	**Fourth (1981–1985)**	**Fifth (1986–1990)**	**Sixth (1991–1995)**	**Seventh (1996–2000)**	**Eighth (2001–2005)**	**Ninth (2006–2010)**
Status	—	Heavy reliance on imported dairy products in West Malaysia. Dairy Imports – valued at US$68.9 million (1970)	MAJUTERNAK (1972–1983) - Responsible for development and commercialisation of beef & dairy industry. Establishment of milk collection centres (MCCs) – stimulated production of fresh milk, supplementary income for smallholders	8 beef/dairy farms were established throughout the country – 12,000 heads of cattle	Milk production increased threefold (1980–1985), from 8.3 million litres to 28.9 million litres due to improved breeds, increase in the number of dairy farmers, improved dairy management	Production of milk was higher at 34 million litres (1990), increasing annually by 7.4%. Under the dairy programme, 39 new MCCs were established and others were consolidated to be more cost-effective	Milk production at 33.8 million litres (1995)	Milk production at 50 million litres (2000)	Milk production at 41.1 million litres (2005)
	—	—	During the Second Plan, 95% milk and milk product requirements were imported	Milk production increased with the implementation of dairy development programme for smallholders	During the Fourth Plan, 26 MCCs were established, bringing the total number of MCCs to 43	—	50% of total livestock imports is dairy produce	Import of dairy products – valued at RM1.4203 billion (2000)	Import of dairy products – valued at RM1.7451 billion (2005)
	—	—	—	—	Dairy Tech Centre established at Vet Institute at Kluang, Johor to train farmers and dairy technologists in	—	Import of dairy products – valued at RM727.6 million (1995)	—	—

					dairy techniques				
Focus area(s)	Development of two dairy colonies at Batu Arang, Selangor and Pantai, Negeri Sembilan	Establishment of three cattle multiplication units in West Malaysia and expansion of multiplication facilities at Kluang Station to develop large-scale cattle and dairy industry	Establishment of five beef/dairy farms in Johor, Kelantan, Terengganu, Sabah, and Sarawak	The Department of Veterinary Service will continue to implement the beef and dairy component – establish a 1,200-hectare farm at Sisek, Johor and nine MCCs.	Focus on beef and dairy programmes will be continued to increase self-sufficiency level. Improve facilities at MCCs; set up milk depots	Supply of milk estimated to grow annually by 14.8%, from 34 million litres (1990) to 68 million litres (1995). Improve efficiency and quality of fresh milk production. Further consolidation of MCCs	Government subsidies in livestock subsector will be gradually withdrawn.	—	—
	—	—	—	Expected milk production of 23.7 million litres by 1985. An ultra-heat-treated (UHT) milk processing plant will be set up at Air Hitam, Johor	—	—	—	—	—

Source: Economic Planning Unit, Malaysia.

National Agricultural Policies

The agricultural policies that were formulated followed closely Malaysia's development policies. The first phase of the agricultural policy (NAP 1) was to increase the income of farmers, and indirectly the country, by efficient utilisation of resources (Table 5.2). Subsidies for livestock were reduced, and privatisation was introduced to increase production and encourage mechanisation. This aspiration followed through to the second agricultural policy (NAP 2). Due to trade liberalisation, competition among similar agriculture-producing countries heightened, and farmers were requested to increase production while reducing cost. The third agricultural policy (NAP 3) was formulated as a result of the inclusion of agricultural products in the ASEAN Free Trade Area Agreement, coupled with the weakening of the ringgit, Malaysia's currency, during the Asian financial crisis. These scenarios attributed to the revision of NAP 2.

The recent National Agro-food Policy (NAFP) continues to re-emphasise the focus and plans of previous agricultural policies. Further, the importance of food safety and increasing income of 'agropreneurs' were also stressed. Nutritional security was also emphasised, in line with the Sustainable Development Goals. Understanding that personnel play an important role in the development of the agriculture sector, the government stressed the crucial need for increasing the competency level of workers in this sector. With skilled workers, the NAFP aims to reduce the dependence of unskilled labour by adopting modern technologies in the farms.

Table 5.2: National Agricultural Policies

NAP 1 (1984–1991)	NAP 2 (1992–2010)	NAP 3 (1998–2010)	National Agro-food Policy (2011–2020)
Objective: Maximise income from agriculture for farmers and the country through efficient use of resources	Objective: Increase production, competitiveness, and sustainable production	Objective: Enhance food security, increase productivity and competitiveness, deepen linkages with other sector, venture into new frontier areas, conserve and utilise natural resources sustainably	Objectives: Address food security and safety to ensure competitiveness and sustainability; increase income of 'agropreneurs'
Subsidies for crops, livestock, and fishery except paddy, pepper, and sago were reduced.	Policy on research and development emphasised, commercialisation encouraged	Policy for large-scale operation and commercialisation formulated	Incorporated strategies that are in line with nutritional aspects of food system
Privatisation, large-scale production encouraged, mechanisation encouraged	Self-sufficiency not encouraged, no comparative advantage	Private sector involvement increased	Efforts also taken to empower human capital and ensure sufficiently skilled labour force – modern technology and mechanisation encouraged
Increase in cost of production and some food crops were sidelined. Cash crops seemed to be prioritised.	Shift from agricultural economy to industrial economy, agriculture was considered non-productive –labour and capital intensive		

Source: Ministry of Agriculture and Agro-based Industry, Malaysia.

4. Case Study on Dairy Marketing in the Southern Zone of Peninsular Malaysia

Background

As mentioned, this case study aims of offer some insights into the marketing aspect of the milk and dairy products in the Southern Zone of Peninsular Malaysia. Hence, this report encapsulates the marketing mix of milk and dairy products and elaborates on the marketing channels widely used by dairy farmers in distributing their products to consumers.

Field interviews and data collection involved 74 dairy farmers in the Southern Zone of Peninsular Malaysia, comprising the states of Johor, Melaka, and Negeri Sembilan (Table 5.3). Semi-structured questionnaires were used in data collection. Farmers were encouraged to share their thoughts in an open discussion to gain a deeper understanding of the marketing process.

Table 5.3: Respondents of the Study

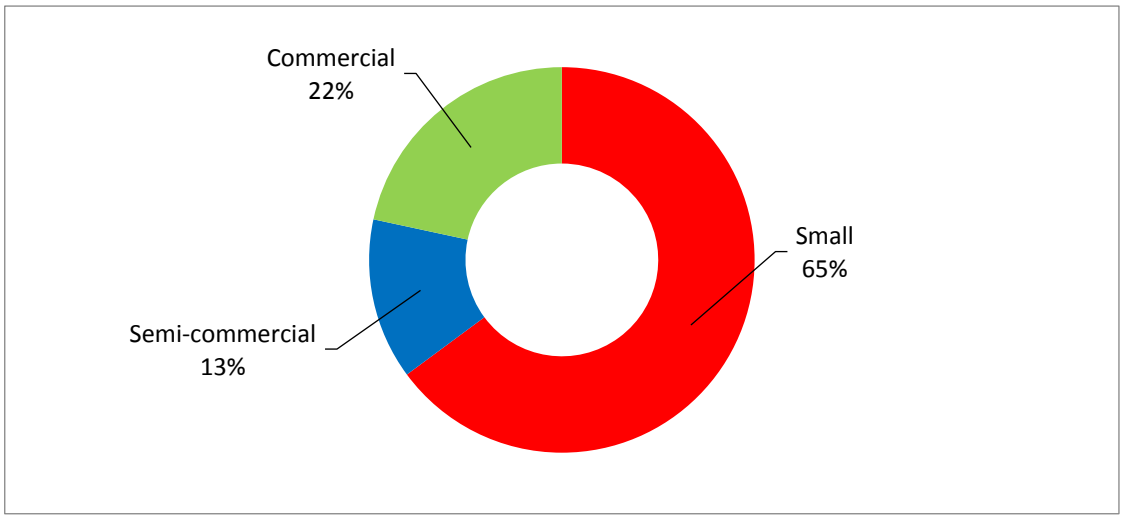
State	Number of Farmers
Negeri Sembilan	21
Johor	44
Melaka	9
Total	**76**

Source: Author's compilation.

Classification of Dairy Farms

In Malaysia, dairy farms are classified based on the number of adult -females on a farm. A farm with 30 or less adult-female cows is classified as small scale. Semi-commercial farms have between 31 and 49 adult-female cows while large-scale farmers, commonly known as commercial farmers, manage 50 and more adult-female cows. Majority (65%) of dairy farms in Malaysia are operated on small scale, followed by commercial scale (22%) (Figure 5.4).

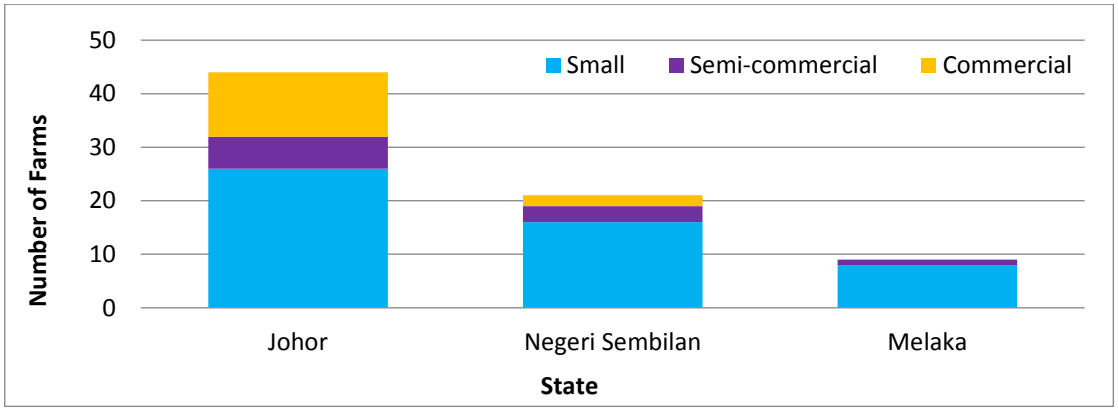
Figure 5.4: Classification of Dairy Farms in the Southern Zone of Peninsular Malaysia



Source: Author's compilation.

Only Johor and Negeri Sembilan have commercial farms while all three states have semi-commercial farms (Figure 5.5).

Figure 5.5: Distribution of Dairy Farms in the Southern Zone of Peninsular Malaysia



Source: Author's compilation.

Average Milk Production

Generally, the Southern Zone produces about 12,795 litres/day. Commercial farms, which are few, produce the most milk (6,295 litres). This accounts for 49% of Southern Zone milk production, followed by small-scale farmers at 35% (4,477 litres of milk), and the remaining 16% is produced by semi-commercial farms (2,023 litres of milk). Milk production in Johor is the highest among the three states, depicting a volume of 7,815 litres, followed by Negeri Sembilan (3,810 litres) and Melaka (1,170 litres). Large milk production in Johor is due to the establishment of commercial scale farms. They produce about 64% of total milk produced in

this state, amounting to 4,995 litres/day. Meanwhile, in Negeri Sembilan, milk production is closely distributed among the three scales of farm operation with an average of 1,270 litres/day/farm. In Melaka, small-scale farms dominate milk production with 970 litres/day

Types of Milk and Dairy Products

The largest volume sold is raw milk while yoghurt is the least volume sold (Table 5.4). The value-added dairy products commonly sold in the Southern Zone market are flavoured milk and yoghurt. Ninety-one percent (91%) of milk produced is sold raw or fresh, without any processing involved. Only 9% of total volume of fresh milk is added value to produce three types of dairy products: yoghurt, flavoured milk, and ghee.

Demand for yoghurt is in all three states. Flavoured milk has a higher demand in Negeri Sembilan. Generally, the processing involved in producing these dairy products vary between minimal to extensive. Processing milk into flavoured milk and yoghurt is relatively easy. Commercial farmers produce all the flavoured milk in Negeri Sembilan and a substantial amount of yoghurt in Johor. Nevertheless, small-scale farmers in all three states contribute to the production of yoghurt. Most often, it is the women at home who are responsible for yoghurt production. Production of ghee, which requires elaborate processing efforts, is also carried out by women; it is only produced by farmers in Negeri Sembilan as and when there is a demand for it.

Table 5.4: Types of Milk and Dairy Products Distributed in the Southern Zone of Peninsular Malaysia (RM/litre)

State	Total Fresh Milk	Raw Milk	Flavoured Milk	Yoghurt (in Milk Equivalent)
Johor	7,815	7,331	0	484
Negeri Sembilan	3,812	3,110	646	52
Melaka	1,170	1,145	0	25
Total	**12,797**	**11,586**	**646**	**561**

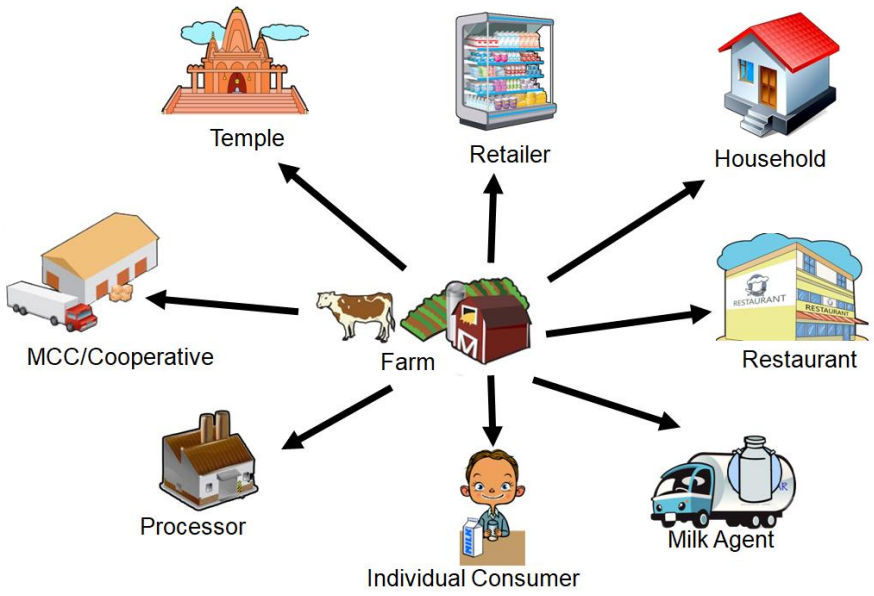
Source: Author's compilation.

Promotion and Marketing Channel of Milk and Dairy Products

Milk from small-scale farms is distributed via eight marketing channels (Figure 5.6), while milk from commercial farms is sold primarily to cooperative/milk collection centres (MCCs), processors, restaurants, agents, and retail outlets. Small-scale farmers have established close relationships and trust among individual consumers and households. Individual consumers are those who live close to the farm. They frequent the farm to obtain their supply of milk and dairy products. Meanwhile, for households, milk and dairy products are delivered at their doorsteps. The demand for milk and dairy products is much more stable for households compared to individual consumers. Yoghurt and milk are the two items frequently used for prayers; hence, there is a high demand for them in temples. While the demand for these

items are relatively stable throughout the year, occasionally during major festivals, demand increases and prices skyrocket. Since prices of milk and yoghurt during these periods are higher, farmers tend to divert their milk and yoghurt sale towards these requests which ultimately assist farmers in increasing their income.

Figure 5.6: Marketing Channel of Raw Milk in the Southern Zone



MCC = milk collection centre.
Source: Author's compilation.

In recent times, to sustain in the milk farming business, small-scale farmers are diversifying their markets by negotiating with restaurant and retail outlet owners to purchase from them. Generally, no formal promotional activities are carried out for the marketing of local fresh milk and dairy products. Majority of farmers market their milk and/or dairy products to close friends and relatives or to those who are in close contact with their friends and family members. The mode of promotional activities is often carried out via word-of-mouth.

Price of Milk and Dairy Products

This section offers some insights into the marketplace and ex-farm price for milk (fresh and flavoured) and dairy products (yoghurt, ice cream, and ghee).

- Market and ex-farm price for fresh milk

Individual consumers pay a higher ex-farm price for a litre of milk in Johor (RM4.30/litre) and Negeri Sembilan (RM4.67/litre), while in Melaka, processors pay the most with RM4.83/litre (Table 5.5). Temples in Johor pay the second-highest ex-farm price for milk with RM4.19/litre,

while in Negeri Sembilan, milk delivered to households fetch the second-highest price with RM4.25/litre. In Melaka, restaurants offer the second-highest price for a litre of milk, RM4.30.

The biggest difference in average ex-farm milk prices between the three states is milk sold to processors in Melaka (RM2.20/litre). The least difference is milk sold to retailers. Individual consumers in Johor and Negeri Sembilan and processors in Melaka have a high purchasing power for raw milk.

The formal market is where milk is delivered to cooperatives/MCCs operated by the Department of Veterinary Services; informal markets cover markets other than cooperatives/MCCs. The difference in ex-farm prices for formal and informal markets for a litre of milk sold is RM1.65 for Johor, RM2.17 for Negeri Sembilan, and RM1.93 for Melaka. Informal markets (individual consumers, processors, temples, and restaurants) offer the best ex-farm prices for fresh milk.

Cooperatives/MCCs are critical players in the formal distribution channel of fresh milk. However, their purchase prices are kept lower than the informal market. This is primarily attributable to the fact that a large quantity of milk from farms are delivered to the MCCs and cooperatives/DVS have negotiated with large processors to purchase the milk on a contractual basis. Thus, the price of milk is already predetermined. Although the price offered by the formal market is not as competitive as that of informal markets, farmers are assured of a stable income. They can minimise market risk and focus on managing their farms.

Commercial farmers prefer this mode of sale since they can profit with the large volume of milk produced in their farm. Additionally, due to the large volume of milk, it is also convenient for them to deliver milk to one location rather than to many other outlets. This approach does not only save them time but also help them reduce transactional costs.

Small-scale farmers, on the other hand, prefer to sell milk informally because their milk production is low. Hence, to capitalise on the quality of milk they produce, they can fetch a higher price in informal markets. However, to sell informally, they should seek markets on their own. This is the trade-off they must make, i.e. spend time and money in managing their farms (minimise cost) or in seeking alternative markets to increase income (thereby maximizing profit). Small-scale farmers will benefit if the government intervenes and assists them establish market connectivity to improve their income capacity.

Table 5.5: Marketplace and Average Ex-farm Price of Fresh Milk (RM/litre)

Marketplace	Johor	Negeri Sembilan	Melaka	Difference (Max–Min)
Temple	4.19	3.83	4.00	0.36
Household	—	4.25	3.60	0.65
Agent	2.97	3.44	—	0.47
Restaurant	3.69	3.83	4.30	0.61
Cooperative/milk collection centre	2.65	2.50	2.90	0.40
Retail outlet	3.30	3.40	—	0.10
Individual consumer	4.30	4.67	—	0.37
Processor	2.69	2.63	4.83	2.20

Source: Author's compilation.

- Market and ex-farm price for yoghurt

Generally, individual consumers from the three states offer a relatively high price to consume yoghurt (Table 5.6). The average ex-farm price of yoghurt sold to individual consumers in Johor fetches a relatively high price compared to other marketplaces within the three states. One possible reason for this higher price of yoghurt sold in Johor can be attributed to Singaporean consumers. In recent years, the currency exchange rate between the Singapore dollar and Malaysian ringgit has resulted in Singaporeans having higher purchasing power, which enables them to exercise this power by buying similar quality products available in Singapore from Johor. Johor, being very near Singapore, is the second–most visited state by Singaporeans (United Nations, 2019) who drive across to Johor during weekends for their weekly/monthly grocery shopping. Further, many Malaysians living in Johor commute daily to Singapore for work. With a salary in Singaporean dollar, they are willing to spend a little more on quality products as well. The high price paid by individual consumers offers an advantage to dairy farmers in Johor to increase their income level.

Yoghurt is easily available and accessible in numerous marketplaces in Johor. However, the picture is different in Melaka as the only distribution channel of yoghurt is via individual consumer. The lack of an efficient cold chain system could be a limiting factor in marketing yoghurt to a wider distribution network in Melaka.

In the marketplaces where yoghurt is available, the prices offered by Johor outlets are observed to be comparatively higher than those offered in Negeri Sembilan, except for retail outlets. Retail outlets in Negeri Sembilan are not only able to charge a higher price than Johor retail outlets but also among other outlets in Negeri Sembilan. This could probably be due to two reasons. One is that retail outlets in Negeri Sembilan has better cold storage facilities. Thus, due to food safety concerns, consumers are more confident in purchasing such perishable item from these outlets. Another probable reason is the low volume of farm-fresh

yoghurt supplied to retail outlets. In any event, a farmer generates more income if he sells to a retail outlet in Negeri Sembilan.

Table 5.6: Ex-farm Prices of Yoghurt (RM/litre)

Marketplace	Johor	Negeri Sembilan	Melaka	Difference (Max–Min)
Temple	6.00	—	—	—
Household	6.66	5.50	—	1.16
Restaurant	6.00	3.83	—	2.17
Retail outlet	4.88	6.75	—	1.87
Individual consumer	8.00	6.00	6.00	2.00

Source: Author's compilation.

- Market and ex-farm price for flavoured milk and ghee

Flavoured milk is mainly produced by commercial farms in Negeri Sembilan and sold to processors and private agents with an average ex-farm price of RM1.93 for 200 ml (Table 5.7). The flavoured milk is sold at night markets or selected retail outlets. Ghee is produced by small-scale farmers and is sold to individual consumers for RM10/250ml. The price of ghee is relatively high due to the following reasons:

(i) It is produced only if there is a request for it.
(ii) Only high quality of milk is used to make ghee.
(iii) A large amount of effort is required to produce ghee as the process is generally time consuming.

Table 5.7: Ex-farm Price for Flavoured Milk and Ghee

Dairy Product	Negeri Sembilan
Flavoured milk (200 ml)	1.93
Ghee (250 ml)	10.00

Source: Author's compilation.

- Market and ex-farm price of other dairy products and waste

Dairy farmers also market other dairy products such as ice cream and jelly when there is a demand and the price of the products is determined then. Cow dung is dried and used as fertiliser and is also sold to those who demand for it.

5. Discussion and Conclusions

In recent years, the dairy sector in Malaysia has continued to lag in terms of productivity and product diversification and quality, hence, increasing the importation of milk and dairy products. Further, the demand for milk and dairy products continues to increase annually; in return, due to the inability to adequately supply domestic milk to the market, Malaysia's dairy import bill has continued to escalate, contributing to the deficit of milk and dairy trade balance.

Programmes and policies on milk and dairy have been in place for almost 6 decades, yet Malaysia has been unable to sufficiently supply milk and dairy to her population. This is indeed troubling.

Small-scale farmers prefer to market milk and dairy products via informal markets, i.e. individual consumers, households, and temples. Small-scale farmers also spend a lot of effort establishing relationships with their customers; once trust is gained, they tend to have regular customers. The findings of this study confirm the findings of Boniface et al. (2010) and Rauyruen and Miller (2007) which reported that consumer loyalty is a result of trust established with suppliers. Informal markets pay a higher price for milk and dairy products as they demand quality products. However, farmers must make a trade-off: either reduce production costs or maximise profits when they decide to seek informal markets to sell their products. It would be helpful if the government formulates intervention strategies to assist these farmers establish contacts with informal markets so farmers can focus on delivering quality perishable products rather than spending so much time seeking new markets.

While majority of commercial farms prefer the formal market, i.e. cooperatives/MCCs, they also sell at informal markets, such as retail outlets, processors, milk agents, and restaurants. The formal market pays a relatively low price for milk compared to the informal market. However, commercial farmers can make up the loss in price by producing more milk.

Individual consumers from Johor and Negeri Sembilan and processors from Melaka have a high purchasing power and are thus willing to pay a higher price for milk and dairy products available in the market.

The Southern Zone of Peninsular Malaysia is considered the most productive zone for milk production in Peninsular Malaysia. The dairy landscape of this zone is rather interesting. A small population of commercial farms produce the largest volume of milk while a large population of small-scale farms produce a low volume of milk. Nevertheless, small-scale farms have been operating for many decades and have proven to be resilient under lagging conditions that have hit the dairy sector for over 6decades. However, their sustainability is of concern under current conditions, i.e. climate change and Malaysia's economic development.

With the significant number of small farm operations, it is crucial that an efficient cold chain system for milk and dairy products is established to store and transport these perishable items. Most small-scale dairy farms are in rural areas and farmers have to travel a distance to get to the nearest market or MCC (often located in town). Further, majority of them

transport fresh milk in a churn on a motorbike under a hot tropical climate. Under such extreme conditions, there is a high risk of contamination which ultimately affects the shelf life of milk. Hence, time is essential and an efficient low-temperature storage system will definitely help small-scale dairy farmers tackle food safety concerns, ultimately assisting them sustain their milk operation.

Small-scale farmers generally manage the farm themselves or with the help of household members or, in some cases, of unskilled foreign workers. They cannot hire skilled labour as it will add to their operating costs and eventually increase their production cost. While some small-scale farmers have begun to venture into upstream processes, such as processing yoghurt and ghee, only with the assistance of a female family member can this process be sustained.

Additionally, managing a dairy farm is not an easy task. There are no days off for a small-scale dairy farmer. Dairy cows must be milked every day, failing which will cause the cows to be in pain and can result in infection. Small-scale dairy farmers have a social relationship with their dairy cow and they take their responsibilities on their cows seriously. Most often, cows are treated as part of the farmer's family. Additionally, with the enforcement of the Malaysia Animal Welfare Act 2015, government officials are beginning to emphasise the importance of animal welfare to livestock farmers. Farmers are reminded to be kind and compassionate to their animals and to not abuse them to generate higher income (Suntharalingam, 2015).

Among other tasks, small-scale farmers have to seek inputs for the farm and cows, feed the cows, offer medical assistance, milk the cow, clean the farm transport milk to their customers, and establish and manage relationships with their buyers. These leave the farmer with little or no time to venture into producing value-added dairy products. They understand the huge income potential that can be gained from value-added products. But with time constraint and without adequate support on the farm, they can only manage the farm to sustain operations.

The types of milk and dairy products that are readily available are fresh milk, yoghurt, and flavoured milk. Depending on requests, ghee, ice cream, and jelly are also produced. Cow dung or waste generated by dairy cows also have demand. But the farmers tend to spend more time selling milk instead of focusing on transforming waste into wealth, since cash flow is of paramount importance to them. This study has demonstrated that the value-adding activity in the milk and dairy sector in Malaysia has a long way to go. It requires concerted effort from all stakeholders involved in the value chain to reach this goal. Malaysian farmers would indeed benefit to learn from dairy farmers in other countries on the best practices to realise this goal. The government sector can play a role in ensuring that programmes and policies pertaining to milk and dairy production are implemented well and that dairy projects must result in beneficial outcomes that would assist both the farmers and the nation through increased income and reduced trade deficit of milk and dairy products. The private sector can also assist by nurturing and mentoring farmers to increase the quality of milk production for milk farmers to have better market access and to ensure that milk supplied to the markets are safe to be consumed.

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