

Empowering Farmers to Develop the Thai Dairy Industry

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Abstract

The objectives of this study were to analyse the Thai dairy industry and suggest the means to strengthen and empower farmers as well as to develop the industry. Making use of empirical data generated by interviews and questionnaire study, this paper aims to shed more light on the future development of the dairy industry in Thailand. The strengthening of farmers as well as the development of the Thai dairy industry through means of consolidation, school milk program and National Dairy Board might be possible at this time. Other developing countries might also gain from Thailand's experience to better position their dairy policies. The conclusions strongly argue as to why the Thai dairy industry should be sustained.

Keywords: dairy, developing countries, development, empowering, farmers, industry, strengthening

I. Introduction

The dairy industry plays an important role in the Asian region's economic development. In fact, Asian countries do not enjoy comparative advantage in dairy production (Peng and Cox, 2006). In particular, Southeast Asian countries do not produce enough fresh milk to satisfy their needs. The dairy industry has been plagued with problems in cattle feeding systems, farm management, herd replacement quality, acquisition and distribution systems, as well as unfavorable weather. Even though governments have provided some aid such as technical assistance and financial support, these programs have not sufficiently extended to local dairy industries to satisfy domestic demand; these countries greatly depend on imports (Dong, 2006).

Like other countries in Southeast Asia, Thailand imports a large volume of dairy ingredients to supplement local milk production (Aiumlamai *et al.*, 2006; Aiumlamai, 2007). Both local raw milk, which is produced by dairy farmers and collected mainly by dairy co-operatives, and imported dairy

ingredients are put into the manufacturing process, which leads to an artificial over-supply problem in the dairy industry later on. Most large dairy processors in Thailand are operated by multinational companies and few dairy co-operatives also have processing activities. Dairy products are mostly supported by the domestic market, which is divided into 2 segments. The first is the commercial milk market which plays a significant role for large dairy processors. The second is the artificial milk market, namely school milk program (SMP), which plays a primary role for small dairy processors. It is only the SMP (the Thai government restricts dairy processors to the use of only local raw milk) which provides an outlet for over 30% of local raw milk as well as overcoming the artificial over-supply problem in the dairy industry.

Recently, more than 20,000 farming households are involved in dairy farming in Thailand (Department of Livestock Development (DLD), 2006). Milk production has been steadily increasing and is estimated to be around 776,000 tons produced by some 292,000 dairy cows (Office of Agriculture Economics (OAE), 2007). Most dairy

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farms, approximately 71%, are classified as small scale farms with less than 20 lactating cows whereas the rate of replacement heifers is up to 60% for each farm. The average milk production per lactation was $3,945 \pm 1,537$ kilogram (Aiumlamai *et al.*, 2006), which is relatively low compared to international standards; 6,200 kilogram in the EU, 8,400 in the US and 3,300 in New Zealand (Rabobank, 2004).

Importantly, Thai dairy farmers play a key role as first-line producers, supplying a large volume of fresh milk for the dairy industry each year. However, their productivity still does not satisfy the massive domestic demand due to scale inefficiencies and low productivities per cow, so better farm management is needed to boost overall productivity. Moreover, Thai dairy farmers must develop themselves in order to meet consumer demand for better food quality, safety and organic agriculture. Certainly, they need much more knowledge, investment and marketing skills to serve the market efficiently so as to help them survive in a changing world.

The aim of this study is to answer the question: Are Thai dairy farmers, who are the first-line producers, able to develop themselves? If so, by what means is it possible to better enable Thai dairy farmers to sustain this economic activity in the long run?

II. Methodology

Qualitative and quantitative methods were used in the study. The Delphi model was used to obtain expert opinion and an in-depth interview was designed. The 15 interviewees were representatives from top management level of the dairy processors in the North-East of Thailand, which contribute to the SMP. The interviewees were asked to describe and discuss means to encourage dairy farmers. The interviews were recorded and transcribed, with each interview lasting from 60–90 minutes, and all qualitative data were compiled into a questionnaire. In terms of survey research, a total of 300 questionnaires were distributed to 60 dairy processors around the country, which contribute to the SMP, and each processor was provided 5 questionnaires for all levels of management. There were 100 questionnaires subsequently returned with 60 usable questionnaire responses, representing a response rate of 20%. The content analysis was used for qualitative data analysis. Quantitative data was analysed by using of the SPSS for Windows, in terms of univariate, bivariate and multivariate analysis.

III. Dairy industry in Thailand

From the time when the Thai dairy industry started over 50 years ago, it has been an essential factor in the economic development of local farmers and the health promotion of people. The involvement of more than 20,000 farming households around the country was part of the policy of the previous government to develop the dairy industry which gradually moved from the processing of milk to the transformation of products. The government agencies which play a key role in industry are distributed between 4 ministries: Ministry of Agriculture and Co-operatives, Ministry of Commerce, Ministry of Industry, and Ministry of Public Health. In recent years, FTAs are likely to push the industry towards competitive standards in line with international competitive standards. Furthermore, increases in expensive milk production will make it more difficult later on for the industry to adjust to a more liberal trade environment.

IV. Growth with some chronic problems

It is notable that dairy consumption in Thailand depends largely on fluid milk consumption, particularly ready-to-drink milk (RDM), which has increased by nearly 7%. This means that 117 dairy co-operatives, which consist mostly of small scale farmers, and 21 private milk collection centers have a good opportunity to serve a growing market (Table 1).

Even though precious campaigns on the health benefits of dairy milk have been more effective, dairy milk is still threatened by a misconception that it is only suitable for the young. Moreover, dairy milk is substituted by soy milk which is promoted as a phytoestrogenic food and is also perceived as having similar bone health benefits to dairy milk. This might pose a threat for public health due to the low bio-availability of calcium in soy milk. Additionally, large dairy processors favor using imported dairy ingredients as input in the manufacturing process in order to attain lower production costs. This means that local raw milk is not fully utilized in processing activities and, significantly, leads to an artificial over-supply problem in the dairy industry.

In general, it is understandable that a business-as-usual policy prevails as a means to improve corporate financial performance. More specifically, however, the Thai dairy industry is different from other countries due to its background which impresses some stakeholders much more in terms of

Table 1. Milk production and consumption rate of ready-to-drink milk (RDM)

Year	Dairy cow (Heads)	Milk production (Tons)		Consumption rate of RDM (Kilogram/head/year)
		Raw milk	RDM	
2000	194,003	520,115	580,000	9.17
2001	199,417	587,700	610,000	9.57
2002	207,444	660,297	660,500	10.19
2003	265,827	731,923	683,600	10.46
2004	296,472	842,611	773,582	12.03
2005	310,085	888,220	809,760	12.63
2006	291,965	775,976	867,602	13.36
Increase rate (%)	7.54	7.35	6.99	6.55

Source: OAE (2007)

Table 2. Ready-to-drink milk (RDM) contribution by category

Year	UHT milk (Thousand litres)	Drinking yoghurt (Thousand litres)	Pasteurized milk (Thousand litres)	Total (Thousand litres)
2000	348,000	288,000	76,000	712,000
2001	374,000	306,000	86,000	766,000
2002	369,000	306,600	89,800	765,400
2003	386,600	297,000	97,800	781,400
2004	350,900	328,240	120,780	799,920
2005	386,100	354,860	131,340	872,300
2006	399,300	394,240	144,100	937,640
Increase rate (%)	2.52	5.51	11.41	4.75

Source: SIG Combibloc (2006)

corporate social performance. To clearly understand that background, a 42-year-old general manager of a dairy co-operative disclosed:

Milk over-supply problem is impossible if dairy processors use only local raw milk, not imported dairy ingredients, as input in the manufacturing process and they should realize that Thai dairying is one of the Royal projects.

V. Pasteurized milk and dual milk markets

Concerning RDM, there are 3 categories: UHT milk, drinking yoghurt and pasteurized milk. UHT milk is the main product, roughly 47% of all RDM. Pasteurized milk is the least, with only 13% of RDM, but it is increasing faster than the others. Unquestionably, pasteurized milk shows more potential and should be underlined in terms of business growth (Table 2).

As a result, local raw milk does not fully utilize its processing potential. The government has allo-

cated a budget of over 7,000 million baht per year to support the SMP and its quota figures for both pasteurized milk and UHT milk are 70% and 30%, respectively. This presents a good opportunity for some dairy co-operatives to consolidate their positions and become small processors providing pasteurized milk to the SMP. The SMP offers both an outlet for over 30% of local raw milk and a basis for future market growth as it creates a familiarity with dairy products at a very young age. By this means, the artificial over-supply problem in the dairy industry can be corrected and the business growth of pasteurized milk in the commercial milk market will become more evident. Furthermore, the growing awareness of dairy products not only fosters a culture of dairy consumption but also increases per capita dairy consumption in Thailand.

Indeed, UHT milk and drinking yoghurt require a lot of investment. Due to the high costs of manufacturing, marketing is essential so these kinds of business are mostly operated by large processors.

Table 3. UHT milk value by brand

Year	Foremost (Million baht)	Thai Danish (Million baht)	Nongpho (Million baht)	Total (Million baht)
2000	3,394	2,052	1,508	12,956
2001	4,372	2,054	1,656	14,066
2002	4,586	2,344	1,564	14,044
2003	3,870	2,796	1,536	14,878
2004	4,250	3,012	1,520	15,010
2005	5,222	3,678	1,702	15,424
2006	6,107	3,746	1,650	16,849
Increase rate (%)	11.29	10.87	1.72	4.54

Source: SIG Combibloc (2006)

Pasteurized milk, which requires less capital investment, is both the cheapest product and the freshest in taste. However, as it has a short shelf-life of 7-10 days, preservation is required and short delivery times are required. Therefore, dairy co-operatives must take every opportunity to engage in pasteurized milk processing activities in order to serve the local milk market. This situation is illustrated by comments from a 39-year-old product manager of a dairy co-operative:

I personally ensure that pasteurized milk is fit for dairy co-operatives to run the business efficiently. Moreover, the campaign should be promoted to create demand like this; "Local milk for local health and local people".

VI. Local processor and creation of positive image of product

Considering UHT milk, the top 3 brands of market share are Foremost, Thai Danish and Nongpho. The first one is a multinational company, and the latter two companies are local processors. Together, these 3 companies share approximately 60% of the UHT milk market. The business growth of Foremost is the most encouraging, with an increasing growth rate of around 11% (Table 3).

It is well known that multinational companies are driving the dairy industry through product differentiation and innovation. The business environment is very competitive and innovation plays a key role in the fight for market share. Health benefits are the main research area for processors seeking opportunities to create innovation. However, Thai government intervention on the processing side is still very strong. Despite the abolition of the local content regulations, the government still determines, to a large extent, the volumes of local raw milk to be

purchased by processors.

Even though the growth rate of Thai Danish is not the highest and the rate of Nongpho is the lowest of all increasing rate, there are indications that these 2 companies benefit local farmers. Recently, Thai Danish, one of the top 3 brands, boosted its goodwill by giving the product a positive and natural image by printing on the carton that the product is made from fresh local milk. In so doing, Thai Danish simply differentiates a commodity through statutory requirement as well as raising consumer awareness in an uncomplicated way. This point is exemplified by a 51-year-old president of a dairy co-operative:

"Made from fresh local milk" is a very important asset for the dairy processors to improve the image of product. It is actually quite marketable. Today's people have better education and information.

VII. Strengthening of small dairy processors through cooperation

In order to understand the broader picture of small dairy processors which participate in the SMP, the results of the questionnaire study were quantitatively analysed. The findings show that most respondents are new dairy processors, established no more than 10 years (45.0%), with assets of less than 50 million baht (91.7%). Their workforces are no more than 10 persons (41.7%) and compensation per year is less than 1 million baht (53.3%). For these respondents, overall billing declined (25.0%) as did net profit before tax (26.7%) whereas cash flow increased by less than 10% (26.7%) (Table 4).

That means that the small dairy processors have few opportunities to strengthen themselves by formerly used means. Recently, Thai Danish effectively cooperated with 10 small processors located

Table 4. Demographic characteristics of respondents

Item	Percent	Item	Percent
1. Location of organization		8. School milk billing	
Zone 1 (North)	30.0	Less than 10 million baht	30.0
Zone 2 (West and South)	10.0	10–20 million baht	16.7
Zone 3 (Central, East and North-East)	60.0	More than 20 million baht	53.3
Total	100.0 (60)	Total	100.0 (60)
2. Type of organization		\bar{X} =28.1 S.D.=27.9 Min.=2.2 Max.=100.1	
Private company	18.3	9. Commercial milk billing	
College of Agriculture and Technology	38.4	Less than 1 million baht	68.4
Dairy Co-operatives	43.3	1–2 million baht	13.3
Total	100.0 (60)	More than 2 million baht	18.3
3. Establishment of organization		Total	100.0 (60)
No more than 10 years	45.0	\bar{X} =3.4 S.D.=10.1 Min.=0 Max.=46.7	
11–20 years	21.7	10. Overall billing	
More than 20 years	33.3	Decreased less than 10%	18.3
Total	100.0 (60)	Decreased 10–20%	6.7
\bar{X} =14.6 S.D.=7.6 Min.=3.0 Max.=29.0		Decreased more than 20%	25.0
4. School milk business		Increased less than 20%	18.3
No more than 5 years	33.3	Increased 10–20%	10.0
6–10 years	41.7	Increased more than 20%	21.7
More than 10 years	25.0	Total	100.0 (60)
Total	100.0 (60)	11. Net profit before tax	
\bar{X} =7.2 S.D.=3.8 Min.=2.0 Max.=13.0		Decreased less than 10%	18.3
5. Asset of organization		Decreased 10–20%	18.3
No more than 50 million baht	91.7	Decreased more than 20%	26.7
More than 50 million baht	8.3	Increased less than 20%	21.7
Total	100.0 (60)	Increased 10–20%	6.7
\bar{X} =25.1 S.D.=18.8 Min.=3.0 Max.=80.3		Increased more than 20%	8.3
6. Number of employees		Total	100.0 (60)
No more than 10 persons	41.7	12. Cash flow	
11–20 persons	25.0	Decreased less than 10%	16.7
More than 20 persons	33.3	Decreased 10–20%	18.3
Total	100.0 (60)	Decreased more than 20%	18.3
\bar{X} =16.6 S.D.=11.0 Min.=3.0 Max.=40.0		Increased less than 20%	26.7
7. Compensation per year		Increased 10–20%	13.3
Less than 1 million baht	53.3	Increased more than 20%	6.7
1–2 million baht	30.0	Total	100.0 (60)
More than 2 million baht	16.7		
Total	100.0 (60)		
\bar{X} =1.1 S.D.=0.8 Min.=0.1 Max.=3.0			

Table 5. Strategic partners of Thai Danish

Province	Dairy co-operatives	College of Agriculture and Technology	Private company	Total
Khon Kaen	1	1	0	2
Udon Thani	1	0	0	1
Sakhon Nakorn	2	0	0	2
Loei	0	0	1	1
Maha Sarakham	0	0	2	2
Roi-Et	0	1	0	1
Ubon Ratchathani	0	0	1	1
Total	4	2	4	10

Table 6. Gaining from cooperation between small processors and Thai Danish

Small processors (SP)	Thai Danish (TD)
1. TD eliminates the need of capital investment in UHT milk plant.	1. SP provide sustained raw milk supply.
2. TD provides greater profits than the transportation cost is able to earn.	2. SP provide efficient logistics.
3. TD provides a guarantee for raw milk purchasing.	3. SP provide opportunity to market “made from fresh local milk”.
4. TD provides opportunity by which ideas, concepts and technologies are able to be transferred.	4. SP provide opportunity to allow the sub-contracting business to emerge.
5. TD provides opportunity for entering new markets.	5. SP provide opportunity for the rest of target area to be covered.

in 7 provinces in the North-East of Thailand. The strategic partners fall into 3 categories: Dairy co-operatives, College of Agriculture and Technology and private company. Even though the main product of the partners was pasteurized milk in order to serve the SMP, they also launched products in order to serve the local milk market (Table 5).

Despite the corporate, social and financial performance of each processor being unique to the nature of the organization, investment and management, the mutual benefits are better than expected (Table 6).

Briefly, the mutual benefits are viewed as follows: Firstly, the small processors could take advantage of opportunities to borrow more ideas, concepts and technologies to improve their production and marketing. Secondly, Thai Danish could exploit economies of scales, not only for the sustainability of raw milk supply, but also to enhance its competitive strength through efficient logistics. Furthermore, Thai Danish could gain opportunities to generate umbrella brand products. For example, Thai Danish could emphasize not just UHT milk but other products under the Thai Danish brand or launch sub-brand products in order to avoid negative impacts to the image of the Thai Danish brand, or both.

VIII. Trigger to strengthening of small dairy processors

The results in Table 7 indicate that cash flow positively affects corporate competitiveness, ($R^2=0.575$). This means that cash flow is essentially needed by small processors in order to enhance competitiveness through investment in product differentiation to meet consumer demand, set up proactive marketing to increase market share, and diversify the business to reduce risks. However, short cuts to avoid lead time, as well as to establish a better

cash flow, sooner rather than later, led a 53-year-old president of a dairy co-operative to comment:

I agree with consolidation which is intended to exploit economies of scale, if the resources are allocated efficiently and corporate financial performance improved significantly.

In sum, the dairy industry in Thailand has a good opportunity to develop itself since fluid milk consumption is steadily increasing. Dairy ingredients are important to supplement local milk production and are also favored in the manufacturing process to attain lower production costs. The latter has led to an artificial milk over-supply problem in the industry. Thus, government has allocated a budget to support the SMP in order, not only to serve as an essential outlet, absorbing over 30% of local raw milk, but also to play an important role in increasing per capita dairy consumption. Due to the fact that pasteurized milk needs a smaller investment, some dairy co-operatives, which have become small processors, must find opportunities to engage in milk processing activities to serve the local milk market as well as to gain a greater share of profits. Cooperation between small and large processors is emerging and increasing mutual benefits are expected among strategic partners. Cash flow is needed as a trigger to enhance the competitiveness of small processors, with scale efficiencies and corporate financial and social performance the target of improvement through consolidation.

IX. Future development of the dairy industry in Thailand

i) The urgent implementation: consolidation of scale efficiencies

As Pingali (2006) indicated, consumption patterns in Asian countries have shifted away from

Table 7. Regression coefficient (b) of factors affecting the competitiveness

Factor	Model 1	Model 2	Model 3
1. Location of organization (1): Zone 1 (North)	8.031	9.420	17.451
: Zone 3 (Central, East and North-East)	3.544	5.157	8.701
2. Type of organization (2): Private company	0.288	-6.255	-5.966
: Dairy Co-operatives	-2.720	-14.659	-17.379
3. Establishment of organization	-0.445	-0.661	-1.106
4. School milk business	1.132	3.061	4.194
5. Asset of organization	-0.00579	0.236	0.178
6. Number of employees	1.165	1.258	2.423
7. Compensation per year	0.994	3.437	4.431
8. School milk billing	-0.274	-0.338	-0.613
9. Commercial milk billing	-0.504	0.004485	-0.459
10. Overall billing	-0.009334	0.002497	0.001563
11. Net profit before tax	-6.238	2.859	-3.379
12. Cash flow	0.169**	0.168	0.336*
Constant	64.905	51.909	116.814
Multiple R	0.761	0.680	0.758
R square	0.579	0.462	0.575
F	4.426	2.759	4.348
Sig. of F	0.000	0.005	0.000

Remark: *and **=Statistical significance ($p < 0.05$) and ($p < 0.01$), respectively

(1) Reference group=Zone 2 (West and South)

(2) Reference group=College of Agriculture and Technology

Model 1=dependent variable is competitive importance

Model 2=dependent variable is competitive advantage

Model 3=dependent variable is competitiveness, or a full model

staples towards livestock and dairy products due to rapid economic and income growth, urbanization, and globalization. The average per capita dairy consumption in Thailand is thus steadily increasing. However, it is still significantly lower compared to the per capita dairy consumption of 330 kilogram in the EU-15, 310 kilogram in Australia, and 251 kilogram in the US (Dong 2006). This means that the Thai dairy industry has a good opportunity to develop (as indicated in Table 1), if demand is created through effective campaigns and better information dissemination (as one of the interviewees pinpointed), as well as improved supply and, particularly, production and distribution processes, to better meet the consumer demand. Furthermore, as Thai dairying is one of the Royal projects (as one of the interviewees noted), the government must fervently believe that the project has significant social capital, from the King to the Thai people. So, the government must strongly support the role of dairy co-operatives which provide a useful gateway primarily for small scale farmers. Certainly, this applies not only to the dairy co-operatives, but also the dairy farms, the number of which must be

significantly reduced through consolidation in order to create scale efficiencies, attain lower production costs, and improve milk quality (as one of the interviewees suggested). In addition, know-how, investment, and marketing are specifically required in order to boost corporate financial and social performances (as indicated in Table 6). That means that it is not only producer consolidation that is needed but also cooperation between producer and processor at the same or different scales (as shown in Table 5). It seems not too difficult, but not easy either. It is also worth noting by which the cooperation between the public and private sectors in the process of creating new rules, both private and social benefits can be realized.

ii) The short term implementation: school milk program as efficient outlet

In contrast to Mendonca *et al.* (2004) who suggested that innovation becomes an ever more central issue for the development of firms, this study reveals that it is rarely possible for dairy co-operatives, which are mostly small firms (as presented in Table 4), to invest in innovation. They really need the cash

flow to improve corporate financial performance (as highlighted in Table 7), rather than for innovation, which is not their priority. Pasteurized milk, which is intended to be used in the SMP, seems suitable for business efficiency for some dairy co-operatives, which have become small processors (as one of the interviewees stated). Interestingly, the SMP not only plays an important role in increasing per capita dairy consumption (see also Campo and Beghin, 2006; Dong, 2006; Fuller *et al.*, 2006), but also provides a way of absorbing over 30% of local raw milk product. To improve, the government must increase the budget as well as increase the number of days for free milk allocation from only 2 school semesters to year round. In fact, fluid milk consumption in Thailand depends largely on RDM, of which pasteurized milk is more interesting in terms of business growth (as found in Table 2). Therefore, dairy co-operatives must take every opportunity to engage in pasteurized milk processing activities to serve the local milk market. Undeniably, a steady cash flow is essential to enhance the competitiveness of small processors and enable them to run their business efficiently (as shown in Table 7) in order to best serve the SMP and also the local milk market (as observed in Table 4). However, perhaps they cannot manage their cash flow, effectively and efficiently as well as systematically, if they still lack the know-how and do not understand how to manage in a suitable way.

iii) The mid to long term implementation: National Dairy Board as an efficient structure

Due to the fact that the Thai government agencies which play a key role in the dairy industry are scattered over 4 ministries, policy implementation as well as cooperation among the agencies are less integrated than they should be. What is encouraging is that institution within the industry or within the government are aware of the need to develop constructive methods for coordinating the expansion of raw milk production and processing. The inefficiencies and confusion created by competition over milk supplies are symptoms of large problems associated with inadequacies in contract law and enforcement, agricultural lending and capital markets, and market information channels (as found by Fuller *et al.*, 2006). In this regard, a first step in transforming the industry into a practical reality would require the establishment of a National Dairy Board (NDB) through the Dairy and Dairy Products Act, for which there has yet to be any response from dairy co-operatives and other stakeholders in Thailand. The NDB's mission seeks to play an instrumental role in re-organizing the dairy industry, both supply and

demand sides. The NDB must explicitly cooperate in the expansion of milk production and processing, promote generic dairy consumption, and improve the image of local fresh milk. At the same time, the NDB must decisively allocate the budget to encourage stakeholders, interdisciplinary specialists and to create a means of organising several work units related to the government sector aimed at setting up a package of dairy strategies for minimizing production costs, increasing research and development and trade and cooperation. So, what is needed is cooperation among government agencies at all levels to construct sustainable development for the dairy industry. Together, the expert farmers must actively participate during the implementation period and should be adequately supported with sufficient staff. However, this is a significant challenge for the NDB. It will succeed if it can specifically promote human capital in dairy production through better farm management which can lead to changes in the influence of social capital in facilitating the success of dairy co-operatives.

To follow these movements, there needs to be a direct and careful implementation of cooperation to strengthen the dairy farmers as well as to develop the dairy industry in the long term. Of course, cooperation between the supply and demand sides should be re-invigorated, particularly with regard to the urban middle class who serve as the key driver in changing consumption patterns. In the end, despite an overwhelming consensus that Thai dairy farmers must empower themselves and also that other stakeholders must create an efficient means to facilitate dairy farmers, it is impossible to achieve this through the distributed functions of dairy farming promotion as they currently exist in Thai government agencies.

X. Conclusions

Thai dairy farmers play a key role as first-line producers that supply raw milk to the dairy industry. However, they have some limitations especially due to scale inefficiencies, which would be improved by better farm management and better feed, as well as improved dairy productivity. Together, know-how, investment and marketing are required to ensure their survival in a changing world.

To do this, it is not only the dairy farmers who must significantly develop themselves but also other stakeholders who must create efficient means to facilitate the dairy farmers, if they really want to co-exist. Urgent strategy implementation and consolidation at both the dairy co-operative and farm

levels is necessary to create scale efficiencies, attain lower production costs and improve milk quality. In the short term, the SMP must be more active and fully funded. Also, free milk should be provided year round to schools as it provides both an important and steady outlet for local milk and a basis for future market growth by creating familiarity with dairy products at a very young age. A managed cash investment is especially needed as a trigger to enhance the competitiveness of small processors to enable them to run their business efficiently to serve both the SMP and a local milk market. Over the mid to long term, the NDB should be established through the Dairy and Dairy Products Act in order to play an instrumental role in re-organising the dairy industry towards cooperation aimed at expanding milk production and processing, promoting generic dairy consumption, developing the image of local fresh milk and establishing a package of dairy strategies.

Overall, indications are that Thai dairy farmers will be able to strengthen themselves through these means, even more so with the constructive support of stakeholders. Certainly, it is not only the empowerment of farmers but also the development of the dairy industry which is at stake. Other developing countries might gain from Thailand's experience and so develop their dairy policies effectively by balancing the demand and supply sides, monitoring and regulating milk quality and safety, and through research and development of dairy products, construction of effective dairy institution, and the creation of trade opportunities and cooperation. Importantly, in order to increase per capita dairy consumption, people must seriously consider the health benefits of milk rather than depend largely on the creation of demand through saturation advertising whereby business profits are the main consideration. Nevertheless, as Thai dairying incorporates significant social capital, from the King to the people, so it is essential to ensure dairy farmers survive and to sustain this economic activity for Thai society for the foreseeable future.

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