

CHAPTER IX  
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This last chapter includes a summary of findings of the present study and conclusions reached on the basis of evidence presented in the preceding chapters. It also includes some significant recommendations for the solution of Thai dairy industry problems.

9.1 The agriculture of Thailand is the most important part of the national product because it is the main source of wealth; rice looms above other crops in importance. The farm land area in 1965 amounted to 23.5 per cent of the total area of the country. About 3,400,000 farms, with an average size of 9.334 acres, are operated by Thai farmers at present. The farms, rice, dairy, and other types, are characterized by their area, number, and small size. In 1970/71 they produced 13,270,000 tons of rice worth about 13,174.8 million Baht (about 4,391.6 million kroner).

Although significant as an important industry, they have encountered sticky economic problems, such as low productivity. Most farmers are unable to cope with their problem and need government aid. The government must therefore assist them in overcoming the problem by various measures. Because earlier aids were performed without any planning, it is difficult to know the result.

However, the Economic and Social Development Plans initiated in 1961 were launched by the government to develop agriculture and to increase the national income. The development of dairy farming and other agricultural branches were also covered by these Plans. After implementation of the First and Second Plans, agricultural production did increase to a great extent.

The government itself has considered the dairy farms a significant branch of Thai agriculture. It is thus its policy to

promote, • and guide dairy farmers in various ways as mentioned in the three National Economic and Social Development Plans. But the policy is weak; a new overall praotiaa policy and appropriate measures for dairy industry development are thus proposed. One • 1&ifi08Blt project of the government is the Dairy Farming Promotion Organisation of Thailand, which oonduota • XpUtiofo and developmental research into dairy farming.

9.2 Historically, dairy farms have been operated for many years in Thailand. But they have received little attention from the farmers. They are very much underdeveloped because of lack of dairy science and experience, producing unhygienic milk in very small quantities, insufficient to meet a growing demand. Owing to such unfavourable conditions, the country 'has to import yearly products of various typos in large quantities at high cost to supply the demand originating since the early period of commercialized economy, beginning about the reign of King Chulalongkorn. Many Thais consume dairy products mainly because they have realized their high nutritive value.

In 1969 more than 166,393 tons of dairy products worth about 692,338,000 Baht were consumed, of which oondwnswd and dried milk constituted the biggest portion. This amount indicates the great demand for the products.

The factors effecting the demand for dairy products are the *real* price and brand of the product, the real income and taste of the consumers, population size, the products' advertisements, and availability of substitute goods. Particularly, income-level change affects the lower-income consumer's product consumption. The degree of income elasticity of demand is relatively flexible. The product's price affects the degree of product consumption at every income level. The product brand has also much influence over consumption; advertisements stimulate consumption to some extent. The substitute goods have influenced the demand for the milk for some time.

The per capita consumption of milk in 1973 was approximately 102.12 ounces. It is low because the rural proplw in great

Part do not consume milk products, due mainly to their low income. However, consumption by the people has increased; this trend in consumption is remarkable. Thai population growth also contributes directly to increased consumption.

9.5 In 1969 there were 525 dairy farms in Thailand, raising about 4,132 milk cows and producing about 4,745,000 kgs. of milk. The average size of a dairy farm was 7.9 cows. The average number of years of a dairy farm was 14 years and over living on each dairy farm was 4. The total investment averaged about 100,000 Baht per farm. But in 1972 there were 1,270 dairy farms of this type, raising about 5,262 milk cows and producing about 9,026,815 kgs. of milk worth about 27,441,517 Baht. The main milk production was concentrated in the Central Region. The unit size of a dairy farm was 8.2 heads. The size was still small compared with the 1969 corresponding amount; however, the total milk production has increased considerably since 1967. While most small dairy farms are privately-owned units, two of them are government ownership dairy farms and one other is a quasi-government dairy farm. Those dairy units can be grouped into the Indian-style dairy farms and the modern dairy ones. The first group consists of traditional dairy farms using traditional techniques. The second group consists of those organized and managed along modern dairy farming techniques.

On the traditional dairy farms, all farm lands are rented. The barn and physical farm layout are rather primitive and unhygienic. There is a lack of good drainage. Dairy cattle, which are mixed ox-cows, are kept in the barns by stall feeding. The cattle are fed with green roughage and concentrate twice a day. Some Indian dairymen collect the green roughage from fields for their cows. But some others buy the roughages and concentrate. Total feed consumption amounts to many tons of roughage and concentrate per year.

Water consumption at the farm amounts to many gallons per day. Milking equipment is all locally produced, such as bottles and buckets. They are simple and inexpensive. The milking is very

traditional. The farms supply many bottles (750 c.c./bottle) of cow milk and of buffalo milk. Milk is sold, without pasteurization, to consumers and others. Milk is delivered daily by bicycles or trucks. Payment by regular customers is made at the end of the month, for irregular customers, in cash on delivery. The farms employ labourers as regular hands. Their receipts exceed expenses. As a whole, the Indian dairy is very productive.

Although the Odia dairy farms raise dairy cattle of many foreign breeds, such as Red-Dane and Brown-Swiss cows, most of them raise cross-breeds for milking. The farms produce all the necessary ingredients for feeding. They grow grasses of many kinds and also imulatoaoaly produce the concentrates for their cattle. Two of the farms conduct experiments with various kinds of grasses to find out the best ones for feeding. The dairy cattle are normally fed twice a day with the concentrates and the roughages. The feed consumption amounts to many tons of roughages and concentrates per year. Each head of bovine population requires about 27 gallons of water daily during the hot season.

The milking equipment is modern; most of the farms do the milking satisfactorily. The equipment and the cows' udders are cleaned before milking, in the morning and in the afternoon. The milk is hygienic and has an attractive appearance. Both family labour and hire labour are utilized by the farms. The first is not paid, but the second is regularly paid by the farm owners. The monthly wage varies from 200 to 300 Baht with board and lodging provided.

Nearly all the milk produced by the farms is sold in the raw form to domestic buyers. The rest of the milk is consumed on farms and is also used for other purposes. But at the farms with processing plants, milk is partly processed for products of superior quality such as pasteurized fresh milk and dried milk. The farms without plants supply the raw milk in cans to the markets. But the ones with plants supply their finished products in containers of various sizes to the markets. The products are delivered daily by trucks and refrigerated cars from the farms.

The price for the product is • mtsblioht • oordln(1 to its quality; it varies in different parts of the country. The average price paid to milk producers in the Central Region for one kg. of raw milk was 3.04 Baht in 1971-72. The wholesale price paid to the Dairy Farming Promotion Organisation of Thailand for its one kg. of pasteurised fmb milk was 6.25 Baht in 1971-72. The payment for tbo milk mold is on 8 weekly or monthly basis for regular buyers, but for irregular buyers tb8 payment is immediately collected in cash. Usually, in t b o sale o f raw milk by the farmers, they have • WWtOWd problems such 88 unfair prices.

The four dairy marketing co-operative societies of farmers were established to answer these and other problems. But they are not true co-operative organizations and have faced some difficulties.

The total capital investment of new small-scale dairy farms with land area of 20 rai and 5 cattle amounts to 100,000 Baht. The tot81 investment of a new large-scale modern dairy farm is very m o b higher. The investment for 008 traditional dairy farm 00 the average was 82,405 Baht. On tbo basis of the quantity of raw milk produced and the per-unit price obtained, average receipts per dairy farm was 29,486.14 Baht in 1969. Average expense per dairy farm was 3,901.24 Baht in tbo same year. This resulted in net income per dairy farm of 25,584.90 Baht. As 8 whole, tbo • Ot0?pzi8e 18 produottvo. The most important factors affecting dairy-farm income are tbe dairy-farm business size, labour efficiency, and rate of production. Pbo farm with large size, better labour • fficiency, and 8 higher rate of production can • ◆m 8 higher income.

9.4 The main • 00Wmi0 purpose of the • ight privately-owned dairy firms is to maximize profits by producing and marketing of the products mainly on the local market. Three of these limited companies are owned by Thai business meo; the five others, by foreigners. All these owners are nonfarmers holding big properties. Each company's size is medium, having 8 share capital about 33 million Baht, employing about 175 employs88 and producing about 19,008.63 tons of dairy products in 1971.

Most of the companies have their own modern dairy plants, with a scientific plant layout for efficient utilization of space and a modern production process for transforming raw materials into dairy products of quality standards. The raw materials used in the production process are bought in large quantities by these firms from vendors abroad. Local raw milk is bought by these firms in very small quantity, but they buy local sugar in large quantity for production.

No commitment on purchasing of raw milk is made by these firms. The prices paid for one kg. of A grade silk end of B grade silk are 3.50 Baht and 3.25 Baht respectively. The condensed milk, pasteurized fresh milk, ice cream, butter, and others are produced by these firms, condensed milk being the most important product.

The properties of these products, which must meet the quality standards required by the standards and the regulations concerned, are irregularly inspected by a committee under the Ministry of Public Health. Such nondurable goods are marketed locally and internationally. Condensed milk is exported to Laos.

The market demand for these goods is strong today, the condensed milk market is competitive. After production, the marketing functions are performed by the producers, the most significant being selling and pricing the goods. Before selling, the product is reasonably priced by the producer under conditions of rather strong competition, but the fixed price is under government control. The cost-plus method of pricing these products is practiced; it is based on the producer's total per-unit cost of the product plus an additional amount for profit. The fixed price for one tin of 397 grams of condensed milk was 3.15 Baht in 1973.

Usually, after the pricing, the selling function is performed for the exchange of goods. It is conducted with the contracting of buyers and the sellers and negotiation of terms of exchange. Other marketing functions, i.e., merchandising, storing, financing, market informing, transporting, packaging, risk assuming, grading, standardizing, and controlling, are performed to some extent by the producer.

The approximate amount of investment per firm was at least 20,000,000 Baht in 1971. Average output per firm was about 11,301,901.88 Baht in 1970. And the average revenue per firm was about 12,421,875 Baht in the same year. The net income per firm was about 1,119,973.13 Baht. The firms' dairy business enterprises were successful in 1970. However, they have encountered problems of increasing output of product production and lower prices. Factors have caused some of the firms to record a loss.

9.5 Historically, before 1788 Danish agriculture was organized on a feudal basis. However, agricultural reforms originating in 1760 destroyed the feudal system radically. Consequently, grain production increased considerably in later years. The Danish credit co-operatives established later were an important measure in assisting the farmers to be land owners. The Danish folk high schools, organized first for the farmers, were regarded later as a factor contributing to the co-operative development.

Social awakening after the wars of 1844-56 and 1964 resulted in creating a valuable philosophical motto of the day which later became the truth of the co-operative movement. The consumers co-operative formation in 1866 introduced in actuality the co-operative principle and later inspired Danish farmers to solve dairy problems. But after 1875 a heavy fall in price of grain due to improved technology caused the Danish farmers to change from grain production to dairy farming and co-operatives.

As to the dairying which existed earlier, its method was incredibly primitive. The quality of the "peasant butter" was poor. Its price was lower than that of the "estate butter". The price difference stimulated small farmers to improve their butter by organizing dairy companies, but failed because of serious problems.

However, the Danish farmers at Hjedding made a successful solution to problems by organizing the first successful co-operative dairy in 1882. The firm could solve the problem of producing and marketing butter successfully because of contributive factors, such as volume of business, the suitable and appropriate way of organizing, and the efficient mechanical separator. The price of

rev milk sold to the farmers became higher than that of produce sold  
 • lewben. Owing to such great economic success, the firm became  
 a valuable model for other co-operative dairies organized later in  
 Denmark. The farmers realized that their problems of poor quality  
 • and low price could be solved successfully by the true co-operative  
 dairy, not by the profit-seeking firm. This economic realization  
 stimulated the rapid formation of co-operative dairies all over  
 Denmark.

In 1938 there were 1,405 co-operative dairies with about  
 190,000 members. The firms also united to form higher organiza-  
 tions to perform functions corresponding to their needs. They have  
 met needs well up to the present time. The co-operatives solved  
 the farmers' problems and created better economic and social con-  
 ditions. However, today they encounter the economic problems of  
 increasing costs of operations, etc.

The Danish co-operators have decided that large-scale  
 co-operative dairies are more economical than the small and unecon-  
 omical co-operative dairies to gain size and economies is being  
 undertaken by the FDDA today. Thus, the firms decreased consi-  
 derably in number; only 397 co-operative dairies, with about  
 75,000 individual members, remained in the country in 1970.

9.6 The Danish co-operative dairy is a producing and  
 marketing co-operative-type firm because it is buyer, producer,  
 and seller. It is owned by Danish farmer members. It is managed  
 under a specific set of co-operative principles agreed upon by the  
 farmers and beneficial to them. Its main economic purpose is to  
 obtain the highest price possible for the output sold for its  
 members. The firm's essential economic functions are buying input  
 to be used in the production process, producing the output with  
 utilities required to satisfy buyers' wants, and marketing the  
 output at the highest price possible.

To attain the purpose, the primary co-operative dairy  
 of non-stock type utilizes capital for physical facilities and  
 day-to-day operations. The amount of capital required depends  
 on the size of the dairy business and the quality of goods wanted.



The main method of acquiring capital is borrowing, making a long-term loan at 8 Danish bank 05 the members' joint and unlimited liability. The loan is annually repaid to creditors from the firm's profit. An advantage of this method is the simplicity of computing and understanding the repayment.

The firm is based on membership voluntarism. The milk-producing farmers are free to join and leave the firm, for the voluntary system can usually attract the members. Therefore, they naturally patronize the firm. This open-membership principle has an economic advantage, in that free access to membership will facilitate the most appropriate size for the undertaking. However, this principle can be broadened up to an optimum point only, because the firm is subject to Danish laws. Beyond this point the per-unit cost will increase.

As studied, membership of the firm is homogeneous because all the members are producers and sellers of the same kind of goods; their economic interests are not in conflict with each other. The firm thus can serve 811 members in the best possible way.

As observed, the farmer members assume the agreements written in the by-laws of the firm. Some of the agreements oblige the members to supply the firm with hygienic milk only and oblige the firm to buy milk delivered to it by them. They are obliged to buy the skim milk and buttermilk in quantities proportionate to their milk deliveries. The agreements' economic advantages are, e.g., guaranteeing regular and continuous deliveries of milk from the members, putting the firm in a better position to adjust its operating costs, and making calculation of exact quantities of milk for future planning possible. The agreements result in developing the members' loyalty to the co-operative.

As observed, the firm utilizes a pooling system in handling the milk of members. Its specific advantages are, e.g., keeping each member's milk in one specific place, enabling the firm to finance its operations more easily, placing the firm in a better bargaining position, and resulting both in effective selling and in economical handling of the products. Although it has certain disadvantages, its advantages are greater.

The primary firm adopts an equal voting system. That is, its members are given equal voting rights—one member, one vote—concerning all decisions, irrespective of individual wealth because human dignity is regarded as the most important basis of voting and human rights are placed above property rights. This democratic principle is justified because there is no great difference in wealth amongst the members. However, the higher firms of the YO type adopt unequal voting because of the great difference in the size of their member firms.

The firm's refund of its profits is based on a principle of surplus distribution. The profit is distributed among the member-patrons in proportion to the quantity of milk each has delivered to the co-operative. The profit is shared from the members' having received a low price for their produce, and the size of profits yield depends on the turn-over. It is fair that each member receive a share of profit in proportion to his share of the turnover. Such a share results in an increase of the unit price received for the produce sold. The member who supplied the largest quantity of milk receives the biggest share of the profit. To have a maximum increase of the unit price, the firm must operate its affairs to have a maximum difference between average total cost and the selling price. If the difference reaches its maximum, the optimum level in the surplus distribution is reached.

9.7 The primary firm's essential economic functions are buying, producing, and marketing dairy products. It buys and utilizes various resources for producing the dairy products. The important resource bought daily is the raw milk delivered by the members in metal cans and tested by the methylene-blue test or the Gerber test. Thus, the price paid varies with the milk quality. One kg. of milk with fat percentage of 3.80 is priced at 1 Baht (33.40 Baht) per present. In April 1970-March 1971 the firms bought 3,595 mill. kg. of milk. (The quantity of milk bought by each firm depends on its size.)

In its hygienic plant the firm turns out products of high quality from the raw milk. Thereby, the four factors of

production are utilized. Certain aspects of some inputs such as form-losing and daptation appear in production. Thus, want-satisfying properties are created for the outputs. The outputs consist of the chief products, i.e., butter, cheese, fresh milk, and condensed and dried milk, and the by-products such as cream, ice-cream, and skin milk. Each of these products has its own quality characteristics. For instance, the fresh milk is processed from the raw milk from tubercle-free herds, and it must be pasteurized and standardized with a fat content of at least 3.8 per cent and have a pleasing flavour and appearance.

The milk used for the butter production during 1954-1971 decreased because of the increased interest in the production of cheese and condensed milk. However, the percentage of milk used for this purpose is still larger than that of milk used for other products. Thus, butter remained the most important product, though the approximated trend of annual butter production was downward. The percentage of milk used for cheese production increased slightly during the same period; it is the next number in order. Thus, the cheese ranks second in importance. The approximated trend of annual cheese production was somewhat upward due to the increased foreign market demands. The percentage of milk used for processed milk increased slightly during the 1954-1967 period because of growing demand and ranks third in importance. Its trend, in this respect, has been slightly upward since 1934. The percentage of milk used for the condensed and dried milk production increased because of the growing foreign market demand, and ranks fourth in importance.

The function of marketing dairy products is significant because production depends on marketing. In particular, the farmers take initiative in the selling of the products in various ways. In this connection, some sales promotion activities for the main products are performed at home and abroad by the central organisation. Exhibitions of experimentally-manufactured butter and cheese, district dairy shows, and large dairy shows represent sales promotion activities. The firms sell their outputs in larger quantities along the foreign

trade channels. The remaining products of smaller quantities are sold regionally. In 1970-1971 about 244,677 tons of products worth 3,861,501,000 Baht (1,289,167,000 kroner) were exported by the Danish co-operative and privately-owned firms. These export figures are of great economic significance to the sellers.

Pricing the products consists of pricing on a competitive market and Danish pricing, the one for the products sold regionally and the other for the products for export sales. The competitive price is established by supply and demand. The pricing for the products sold regionally is done by the "voluntary price mechanism in the PDDA"; it is based on the estimated running costs of milk production on farms end of the dairies. The system establishes quotations for each of the products to serve as a basis for prices paid to the dairy producers. The purpose of this pricing is to secure possibilities to compensate low export prices by higher home market prices. The securing is achieved by means of a duty imposed on all milk fats of the products sold internally. As to the products for export sales, they are priced by the Butter Export Board and the Cheese Export Board. The former fixes the "settling price" for butter delivered to the authorized exporters on the specific criteria basis, who must pay the butter producers at this price. If it is lower than the actual export price, the former may collect levies on that butter to be paid into the compensation fund, from which supplementary payments are made for butter fetching lower actual export prices. The latter fixes the weakly guiding quotation for cheese for export sales. It is vested with the same power to collect levies as is the former.

The international transporting of the products is always performed by the sellers. and the regional one is performed by them on some occasions. The cold-storage of the products is managed by the sellers for economic utilities. Risk assuming is undertaken by the firms. The firms perform the functions of standardizing, grading, branding, controlling, and packaging scientifically and continuously, particularly the products for export sales which must be treated strictly and continuously in those respects. Only the products of

particular types which fulfil required quality standards can use the Lux Brand for export sales. If non-compliance with the requirements is found, the one concerned loses the right to use the brand mark, and his product cannot be exported.

Researching is continuously conducted in various aspects of the dairy industry. Besides this, market informing is performed mainly by the FDDA and its branches. Financing, an essential function in accomplishing the marketing task, is performed by the firm.

9.8 The total operating costs, the sum of fixed costs and variable costs, are defrayed largely by the firms for form-utility creation and marketing performance. On the basis of costs, the per-unit cost can be found; it was, e.g., 0.33 Baht (11.12 ¢) per kg. of received milk in 1970. The per-unit cost has increased steadily up to the present due to increased cost of living, etc.

The firms' total return is great. In 1970 the net per-unit return was 1.58 Bsht (52.77 ¢) per kg. of received milk. It was more than the per-unit cost of any prior year. The firms might thus be regarded as successful co-operative dairy enterprises in 1970 even if they have encountered increased operating costs and distribution difficulties.

9.9 Many dairy farmers in Thailand have encountered critical dairy problems: problems of milk-production techniques, dairy-product production, and milk marketing. The milk-production techniques practiced in Thailand are primitive in many respects, such as unscientific animal-raising. It causes the milk to be low in quantity and poor in quality.

Most of the farmers have no milk processing plants of their own today because of lack of capital and lack of dairy technical know-how. The farmers cannot keep and process their milk for more economic utility, and cannot produce other kinds of products of better qualities. This inability causes the milk to be easily perishable and keeps the dairy business at a limited degree of development.

The farmers find it very difficult to find a permanent favourable milk market. They can find only an unfavourable milk market on which but 3 portion of raw milk is sold at an unfair price.

The reason for this difficulty is that the farmers have no bargaining power in milk marketing.

The dairy problems mentioned are perhaps consequence of economic backwardness and lack of dairy science on the part of the people. Although the farmers here solved the problems some what by various ways, the problems still retard the dairy industry's progress. To overcome the problems completely, they should be attacked by applying Danish co-operative dairy techniques and Danish dairy training, which are scientific, useful, and relevant to Thai dairies. Besides these reasons, the Danish co-operative dairy system is preferred by the Thai farmers and co-operators to privately-owned firms because of its being better suited to the needs of the farmers. It is reasonable to develop and promote Thai dairy farming because many substantiated factors for the dairy development exist in Thailand: growing demands for dairy products, a growing supply of milk, and considerable grazing for dairy cattle.

The essential aspects of the relevant knowledge and know-how of the Danish co-operative system which can be adapted for solving Thai dairy problems are the fundamental principles: production, marketing, management, organization, and education and training in the field of Danish dairy science. The first consists of the Danish co-operative principles in general and the Danish co-operative dairy principles in particular. These principles should be written into the by-laws of the existing Thai co-operative dairies and of these of the same type yet to be established in the country. The second consists of price establishment for raw milk and the utility ration for milk and milk products. A price for raw milk must be established in accordance with its quality, and it must be reduced if the milk in question is inferior. The products must be produced only in a hygienic dairy plant, and they must be of constantly high standards of quality capable of satisfying consumers' desires. These aspects must be written into the by-laws as well. The third covers market informing, researching, storing, packaging, standardizing, grading, branding, and controlling. The Thai co-operative dairies must perform these functions strictly and continuously. The fourth is the

**scientific and efficient management performed by existing managerial organs of the firm. It must be used daily by the Thai firms. The fifth is the federated type of co-operative organization. When a number of local co-operative dairies exist in Thailand, they should unite to form a higher level of co-operative dairy organizations at regional and national levels, for both commercial and educational purposes. It is also a rational way to strengthen the co-operative dairy enterprise. The last is the theoretical dairy training system. It is systematically organized in the form of an eight-month course in dairy science of a theoretical character. Such educational aspects have to be introduced into Thailand because they will contribute to the solution of problems and the future dairy development of the country.**

The people responsible for the Danish system application are the Thai milk-production farmers, the officials of Department of Co-operative Promotion, and officials of the Dairy Farming Promotion Organization of Thailand. The reasons for making this application is that the farmers are encountering the problems and need solutions. They should thus perform the task. The officials of the organizations are already administering dairy farming promotion activities; they should thus be in charge of the application as well.

9.10 In making the above presentation, we frankly admit that the dairy farm and the co-operative dairies are new economic units in Thailand but they are productive and valuable for the dairy farmers to some extent. However, the producers encounter the problem of producing and marketing of raw milk and dairy products. They cannot overcome these problems because of their economic backwardness. The producers need a solution to their problems. On the above reasoning, the best answer to the problem is the application of the Danish co-operative dairy system because it is a highly developed, successful, scientific, relevant, and useful model. It is therefore reasonable for the people concerned to apply the system in Thailand. Besides, growing demand for the products and a growing supply of raw milk in the country are the factors contributing to the Thai dairy development.

9.11 In this **connection**, the above mentioned **application** should be **scientifically** undertaken by the **peopel concerned**. A new overall precisely written policy sad appropriate **measures for dairy industry** development should be formulated and implemented by the government along the lines delineated **above**. The local dairy **farms**, the already existing **co-operative** dairies, and others of the same type intended to be formed later **must** be strongly promoted by **the** government for their progress. At first, they must be **protected** by imposing tariffs onforeign dairy products. Doing so shall *ensure* the above **economic units'** continuous **progress**.