

## CHAPTER III

## PRODUCTION AND MARKETING OF MILK

Having understood the consumption of milk and milk products, we should turn to investigate the production and marketing of milk by the farmers in order to gain more knowledge of dairy industry in Thailand. We shall investigate first the milk production on farms and then the marketing of milk.

## 3.1 Milk Production on Farms

On the basis of main produce, the farms can be grouped in order of importance, into rice-crop farms, fruit and vegetable farms, rice-crop and upland-crop farms, and animal-raising farms. The animal-raising farms are divided into the poultry farms, pig farms, cattle and buffalo farms, and one-dairy-cattle farms.<sup>1)</sup> To achieve the present study's purpose, the one-dairy cattle farms, the basic dairy economic units, shall be presented for further analysis.

## 3.1.1 Economic Purpose

The main economic purpose of the farms is, of course, milk production carried on so as to increase farm income by marketing the products at a better price, and thus to elevate the standard of living on Thai farms. Other purposes are indeed secondary. Government operated dairy farms' purposes are at least to promote dairy farming and to train Thai farmers dairy farming techniques. These purposes are obviously those of the Dairy Farming Promotion Organisation of Thailand at

<sup>1)</sup> "Farming Systems of the Central Region", Agricultural Economy News (Vol. 203, October, 1973), pp. 6-11.

**Muang Lek, Saraburi.** All the above purposes of the farms are  
 ● purly obvious to the farmers themselves.

However, today the Dairy Farming Promotion Organization of Thailand and the Thai-German Dairy Farm are highly developed, They are now large scale dairy farms. The scope of their activities is thus wider than usual. They cover not only milk production and dairy farming promotion and training, but also dairy research and the processing and marketing of milk on the home market. As development centres, the purposes of the two farms are understandably varied. They can be delineated as the following: (1) to produce raw milk; (2) to promote dairy farming; (3) to undertake training in dairy farming; (4) to conduct dairy research; (5) to buy raw milk from dairy farmer members; (6) to process milk and milk products of better quality; and (7) to market the dairy products on the home market for money return.<sup>1)</sup>

### 3.1.2 Private and Government Ownership Dairy Farm

Most dairy farms in Thailand are privately-owned; but two of them, namely, the Kasetsart University Dairy Farm and Thai-German Dairy Farm, belong to the government.<sup>2)</sup> Also, according to the law, the Dairy Farming Promotion Organization of Thailand is a quasi-government dairy farm. Of the 423 dairy farms, at least 138 units are owned and operated by Indian milkmen today. One of the privately-owned dairy forms belongs to Their Majesties the King and Queen of the country. It serves as a scientific model for dairy farmers.

### 3.1.3 Traditional and Modern Dairy Farms

On the basis of modern dairy farming techniques,

<sup>1)</sup> This information was obtained by careful study at the Dairy Farming Promotion Organization of Thailand.

<sup>2)</sup> A reason why the government undertakes dairy farms is that it wants to make them experimental dairy farms to promote better knowledge in this field.

dairy farms can be grouped into the Indian-style **dairy farms** and the **modern dairy farms**. The first group consists of the **farms typifying traditional small-scale business** and situated in urban areas such as Bangkok. The reasons why they are traditional are the following: (1) they use traditional methods of dairy farming such as manual labour operation and out-of-date milking equipment, (2) they sell their milk without pasteurization, and (3) they use a poor system of manure disposal which creates a public health nuisance. They are thus primitive.

The second group consists of modern-type dairy farms owned mainly by Thai farmers. They are more scientific because the farms are organized and managed along modern dairy farming techniques by educated operators. Particularly, the farms are hygienical, active, and lively all the year round. Moreover, some of the scientific dairy farms have their own modern dairy plants for processing milk to be sold on the home market.

#### 5.1.4 Indian-style and Scientific Physical Layout

The Indian-style farms' physical layouts are almost identical; each farm is utilized for open ground and for farm buildings. The buildings which are made of wood consist of two parts, one for the farm family and the other for dairy cattle. The section for the family is the front part with two stories. The family lives upstairs. The ground floor is used for a sitting room and multi-purpose storage for keeping dried cowdung, roughages, and concentrate. The central portion forms the entrance to a dairy barn in the back. A utensil stand and feed kitchen are arranged in the front and in the back on the left side of the ground floor respectively.

The rear part of the wooden building is the barn, built about one metre above the ground. The barn 20 metres long and 7 metres wide, measures approximately 1,400 square feet

inside. It accommodates dairy cattle.

A small road used for transportation and a play ground are placed in front of the building. Behind the barn, an open ground is used for disposal of farm manures and waste roughages<sup>1)</sup> (see Figure 4). In sum, the physical layout is unscientific by reason of tradition.

It does not at all meet the standard of a modern dairy layout, which is designed and operated by owner entrepreneurs. Generally speaking, the farm land area is divided into two parts: on the first the one or two-story wooden buildings for a farm family's living and dairy cattle sheds with sewage disposal are erected separately and of moderate size; on the second one, the bigger part, is used for species of grasses, legumes, and other fodder crops; green pastures with trees; and internal small roads for transportation. A small tank for keeping water for farm consumption is also built in the area on some dairy farms. Some farms of this type, such as Suanjitladaa Dairy Farm at Bangkok, have their own modern dairy plants of one story with four operation rooms and dairy machinery. The plant is erected separately and scientifically for processing purposes. Most of the farms of this group have strong fences to indicate farm area specification. In fact, the buildings are appropriate to their uses and not too unhygienic in many respects (see Figure 5). In sum, the layout is scientific in many respects.

### 3.1.5 Mixed or Cross Breeds

It is found that thousands of dairy bovine populations--cattle and buffalo--are raised by the Indian dairy farms. The dairy cattle are not purebred, but are mixed or cross breeds between foreign (e.g., Holstein and Brown Swiss) and local (Zebu)

<sup>1)</sup> Division of Agricultural Economics, Economic Survey on Indian Urban Dairy Farming in Bangkok (Bangkok: the Division, 1964), p.6.

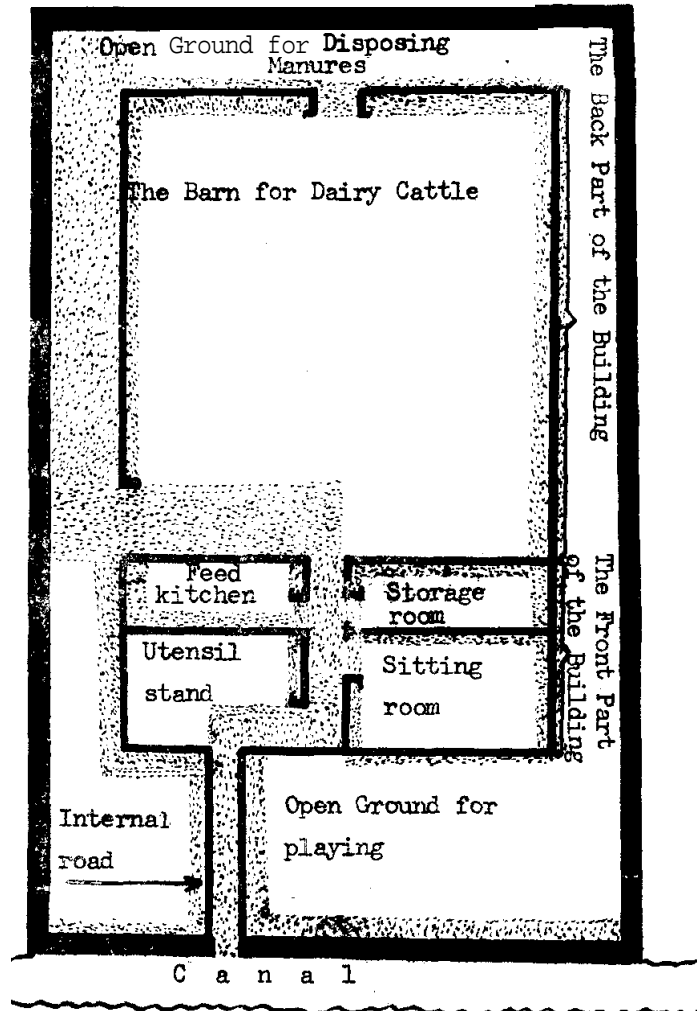


Figure 4

Indian Dairy Farm Layout in Thailand, 1972

Source: Division of Agricultural. Economics, "Economic Survey on Indian Urban Dairy Farming in Bangkok," 1964, p.6.

breed. 1) The buffaloes raised by some of the farms are of local breed. Some Indian dairy farms have no bulls for breeding, but borrow or hire bull's services from others. Artificial insemination, introduced by the Livestock Department under the Ministry of Agriculture and Cooperatives, also interests Indian dairymen today.

The dairy cattle raised by the second group of farms are of many foreign breeds such as Red-Dane, Brown-Swiss, Jersey, and Holstein-Friesian cows. But today Thai crosses are bred to produce a mixed breed offspring able to stand the tropical climate of Thailand. Most of the dairy farms raise the mixed or cross breeds for milking; in fact, they can stand the heat very well.

### 3.1.6 Small Dairy Business Units

1) In 1969 there were 523 dairy farms, located in every region of Thailand and raising about 4,132 milk cows mainly for milking. 2) The average herd per farm was 7.9 cows in 1969. There was, of course, considerable difference in the size of herds, varying from one to sixty cows. But most of the farms were small compared with those in western countries. If we take the farm area as the basis for consideration, the average size was about 3 rai (about 1.077 acres). The total investment in livestock and fixed assets averaged about 100,000 Baht per dairy farm. The average number of persons fourteen years of age or over living on each dairy farm was four. 3)

2) But according to the 1372 dairy farming study by the Division of Agricultural Economics, the main part of milk production of the country was undertaken in the areas

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1) Ibid., p. 3.

2) Op.Cit., p. 9.

3) This data was obtained from the Division of Agricultural Economics.

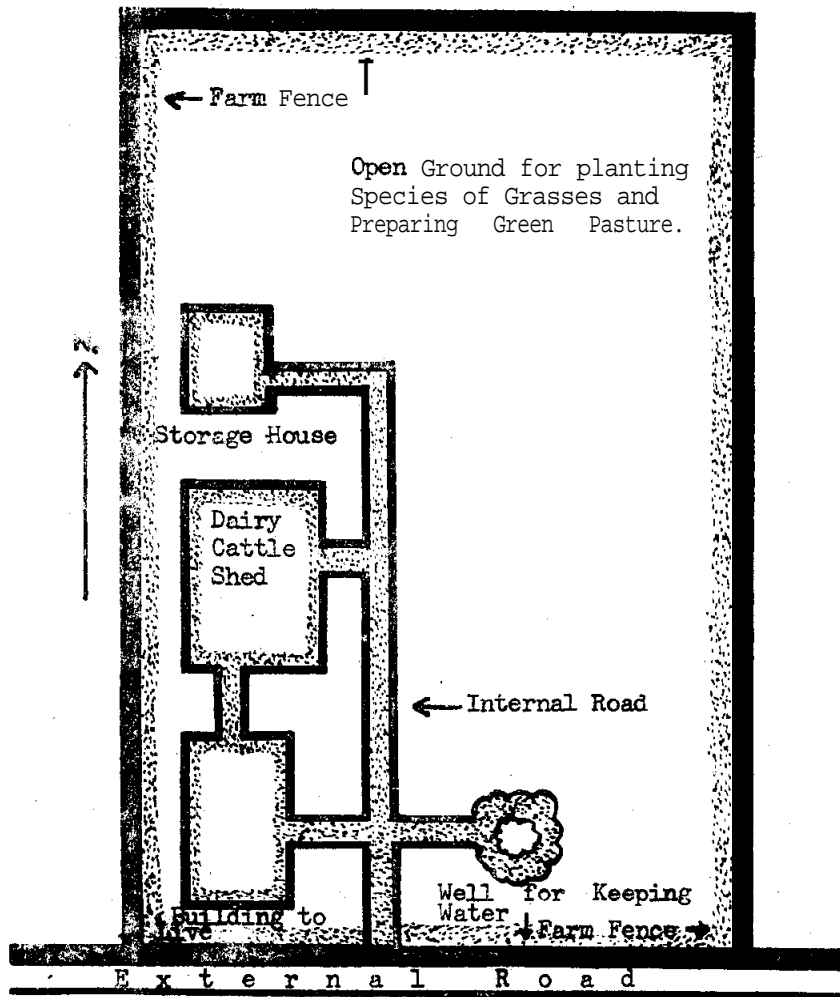


Figure 5

Dairy Farm Layout in Thailand, 1972

of Ayuthya, Ratburi, Saraburi, Nakornpathom, Petburi, Chiengmai, Petchaboon, and Bangkok. In 1972 there were 1,270 dairy farmers in Thailand, raising about 10,717 dairy cattle. Of this number, the milk cows amounted to 5,262, or 49.10 per cent of the entire number. The average size of herd per farm in 1972 was 8.2 heads.<sup>1)</sup> Although it increased slightly from the corresponding 1969 amount, the size was still small.

Our next important task is to assess the number of dairy cattle raised by the dairy farms in the areas of Qyudthya, Ratburi, Nakornpathom, and Petburi, the areas in which the main milk production has been studied consecutively. During the 1971-1972 period 57 dairy farms in the four provinces' areas, raising 470 dairy cattle, or 8.3 per dairy farm, were sampled for the study purpose. Of these, 176 were milk cows, or 3.1 per dairy farm. These numbers, arranged in accordance with the dairy farms' sizes, are presented in the following table.

Table 3

Number of Dairy Farms and Dairy Cattle by Size in the Areas of Ayudthya, Ratburi, Nakornpathom, and Petburi July, 1971-June, 1972

Farm Size: No. of Milk Cows	No. of Dairy Farms	%	No. of Cattle per Farm	No. of Milk Cows per Farm
1.0-2	20	35.09	5.6	1.7
2.1-4	24	42.11	3.0	2.9
4.1-6	10	17.54	11.4	5.1
6.0-Over	3	5.26	17.2	7.4
All farm sizes	57	100.00	8.2	3.1

Source: Division of Agricultural Economics.

It may be observed that in the table the average number per farm of dairy cattle was 8.2, of which 3.1 is the number of milk cows. It was thus a small-size dairy farm.

<sup>1)</sup> Economic Survey, loc. cit.



### 3.1.7 Feed Supply

With respect to cattle feed, the farmers produce all the necessary ingredients. Many kinds of grasses are grown at the modern dairy farms. They are, for instance, *Glycine javanica* and *Sorghum aluum* which are effective in feeding dairy cattle. Some farms, such as the farm of the Dairy Farming Promotion Organization of Thailand, experiment with various kinds of grasses to find out the best ones for producing a high milk.

Besides the grasses, concentrates for milk cows are also supplied. According to a formula developed locally by dairymen, concentrates consist of rice bran, *Sorghum vulgare*, maize, soya-bean cake, salt minerals, peanut cake, etc. *Sorghum* grain, broken rice, and cotton seed are frequently included in the concentrate mixture. The concentrates are good for the cross breeds as well as for pure breeds.

At the Indian dairy farm, the cattle consume both green roughages and concentrates, but buffaloes graze on open ground. The dairymen do not grow the roughages because of insufficient land, they instead buy them in bundles to be piled up in the farm storage rooms, usually enough for two days' consumption at a time. The roughages consist mainly of para-grass with small amount of water convolvulus. Some dairymen collect for their cows green para-grass from paddy fields or roadsides as well. No Indian dairy farm uses pineapple plants, maize, cane molasses, lead tree leaves (*Lucaena gluca*), or others (except cane tops) for consumption by cows.

The dairymen also buy concentrates at fluctuating prices from month to month, and they can be rather expensive. They consist of broken rice, rice bran, and small amounts of raw sugar, soyabean residues, and salt, which are justified by the entrepreneurs. The cattle are decently fed according to feed standards developed by the "cow sense" of the dairymen.

### 3.1.8 Feeding Schedule

The dairy cattle of both Indian and modern dairy farms are normally fed twice daily, once at 9 o'clock in the morning and again at 4 o'clock in the afternoon. They are fed with the concentrates first and then with the roughages. The feedings last about two hours, during which time farm labourers clean the barns, Buffaloes at Indian farms are also fed twice a day, once at 6 o'clock in the morning and again at 6 o'clock in the evening. As they depend more on outside grazing, the feeding is a supplementary measure. On the average, the consumption per dairy animal on the Indian farms daily amounts to 1.8 kgs. of concentrates and 23.5 kgs. of roughages.

### 3.1.9 Water Consumption

Dairy cattle farms in Thailand require a large amount of water for consumption, e.g., for feeding the cattle, cleaning barns, sheds, utensils, and other necessities. The daily amount of water per Purn varies according to kind of bovine, milk volume produced, daily temperature, and farm scale. Under ordinary conditions, each head requires about 15 gallons of water daily during rainy and cold seasons. But during the hot season it requires about 27 gallons of water per day.<sup>1)</sup>

### 3.1.10 Milking Equipment and Methods

As observed, the milking at the Indian dairy farms is done along traditional ways; for instance, milking is done by hand, out-of-date utensils are dirty, and milking cows are unhealthy. The barns are not cleaned by the milkmen. As a result, the milk is unhygienic and has an unattractive appearance.

Cows are usually milked twice a day, between 4 to 6 o'clock in the morning and 2 to 4 o'clock in the afternoon.

<sup>1)</sup> This data was collected from the Division of Agricultural Economics under the Ministry of Agriculture and Cooperatives.

Cows can adapt to any kind of milking schedule but prefer to follow the same daily schedule. Change of schedule will affect the milk production<sup>1)</sup>

But conditions at the modern dairy farms are different; most of them do their work scientifically, resulting in clean barns, properly groomed cows, properly cleaned udders before milking, clean modern utensils, and healthy cows. Milking of some farms even use the milking machines. The milk produced at the farm of the Dairy Farming Promotion Organization of Thailand is not touched by hand. Consequently, the milk, by current standards, is hygienic and has an attractive appearance. Cows are usually milked twice a day during the feeding times previously mentioned.

### 3.1.11 Labour Utilization

1) To conduct the farms' activities effectively, human labour, as a factor of production, is utilized by the farms; it can be divided into family labour and hired labour, the former being the more common. Family labourers help the entrepreneurs in many respects such as, feeding, collecting grasses, milking, cleaning sheds, cleaning milk bottles, marketing, and keeping the cattle at specific places. Labourers of this type are not paid wages by the entrepreneurs because they are family members.

Hired labour, the less common type, is either fully or partly utilized by both Indian-type and modern farms, such as the Suanjitlada Dairy Farm in Bangkok, where those who render service are paid regularly by dairy farms' owners. These workers are assigned day-to-day activities such as feeding, milking, delivering milk, collecting roughages, cleaning barns, and supplying water. The owners direct and manage the farms.

Some dairy farms hire labourers throughout the year, though some others do not because of their small size.

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<sup>1</sup>"Division of Agricultural Economics, Economic Survey on Indian Urban Dairy Farming in Bangkok (Bangkok: the Division, 1964), p. 20.

The labourers so hired are considered full-time. They are paid on a monthly basis by some dairy farms, and on a weekly or daily basis by others. The monthly wage varies from 200 to 300 Baht, depending on age, sex, and kind and amount of work done on the farms. Board and lodging are also provided by employers to the labourers as part payment for services. Some of the smaller dairy farms hire parttime labourers who work for about 50.05 hours per month. Their average pay is 43.20 Baht per month, a very small amount.

Dairy farms employers, like those in other industries, employ and treat employees according to the provisions of the Thai Labour Act of 1972, which requires compliance with its provisions.

2) Our next task is to present a detailed analysis of family labour utilization on 57 dairy farms in the areas of Ayudhya, Ratburi, Nakornpathom, and Petburi during the 1971-1972 period. The family labour consists of (1) labour utilized for the operation of entire dairy herds-- feeding, cleaning, collecting grasses, and miscellaneous other duties-- and (2) labour utilized for the milk cow operation proper-- milking, cleaning milk bottles, and delivering milk. The following table illustrates the utilization of each type of family labour by the 57 dairy farms.

Table 4  
Types of Labour Utilized by the 57 Dairy Farms  
1971-1972

Dairy Farms in the Areas of	Hours of Using Labour for whole Cowherds		Hours of Using Labour for Milk	
	Total	Average	Total	Average
Ayudhya	53,285.6	285.2	10,034.3	112.1
Ratburi and Nakornpathom	52,984.6	230.6	18,322.8	245.0
Petburi	8,695.7	173.9	6,835.3	638.8
Total & Average	114,965.9	237.1	.	1

Source: Division of Agricultural Economics.

In the table the time of utilizing the labour for the whole dairy herd operation amounted to **114,965.9 hours**, or **237.1 hours** per head during the **1971-1972** period. The dairy farms in Ayudthpa area used much time in this category because the collecting of grasses took much effort. In the same period the time spent on labour for the milk cows operation proper amounted to **35,192.4 hours**, or **201.1 hours** per head. The farm in Ayudthya area used less time for this purpose, because the raising of milk cows required less effort than raising cattle in general.

The labour utilization per head by size of the 57 dairy farms is shown in Table 5. The table shows that larger

Table 5

## Family Labour Utilization per Head by Farm Sizes, 1971-72

Farm Sizes: No. of Milk Cows	No. of Hours for Milk Cows	No. of Hours for Non-Milk Cows	No. of Average Hours for Whole Herds
1.0 - 2	588.33	278.36	371.46
3.1 - 4	453.96	247.73	321.90
4.1 - 6	383.79	214.21	280.47
More than 6	261.42	169.92	209.21
Averaged for all farm sizes	438.24	237.14	309.73

Source: Division of Agricultural Economics.

farms of larger size utilized less labour time per head than smaller farms during the 1971-1972 period. Labour time for full herd operation of the farms with 1-2 milk cows amounted to 371.46 hours per head. But simultaneously the farms with more than six milk cows used 209.21 hours per head. The average number of hours per milk cow used by farms of all sizes was 309.73 during the same period. It is noted on the table that the number of hours of labour for one milk cow was greater than that for the non-milk-cows. The yearly raising of milk cows requires much labour.

It is also found that the per-head hours of family labour varies slightly in number from month to month. The corresponding data is presented in Table 6. In the table the average number of hours per milk cow in one month amounted to 37.81, that of hours' per head of cattle in general in one month amounted to 27.22.

Table 6  
Hours of Utilizing Labour per Head in One Month  
of the 57 Dairy Farms in the Areas of the 4 Provinces,  
- July, 1971-June, 1972

Month	Per Milk cow	Per Head of All Cattle
July	38.36	27.83
August	40.50	30.02
September	37.72	27.04
October	39.19	27.06
November	37.48	26.18
December	37.10	26.06
January	37.85	26.20
February	34.94	24.52
March	37.68	27.46
April	37.98	27.78
May	38.87	29.06
June	36.90	27.36
<b>Average per head</b>	37.81	27.22

Source: Division of Agricultural Economics.

To visualize the trend of the family labour utilization, a graphic method is used here. The figure indicates that the curves are almost level. This means that the family labour utilization was only slightly variable during the 1971-1972 period (see Figure 6).

### 3.1.12 Quantity and Quality of Milk

1) It was found that the cow milk produced by the Indian dairy farms contained about 3.8 per cent fat and the buffalo milk, 6 per cent fat, high indeed for this country.

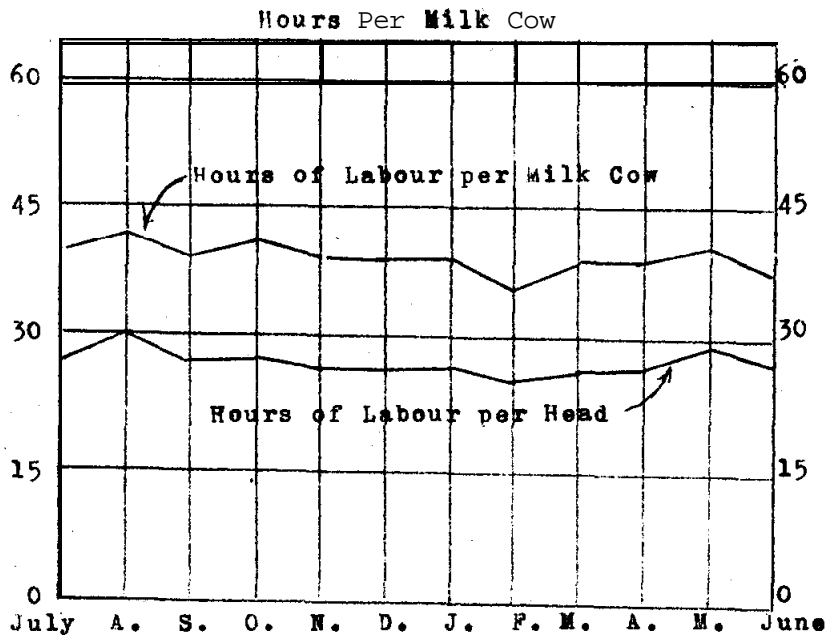


Figure 6  
Hours of Utilization of Family Labour Per Milk Cow of the Dairy Farms in the Areas of the 4 Provinces, 1971-1972

Source: Table 6.

Rut the milk produced by the modern dairy farms contains about 4.5 per cent fat. This is also high, although the cow is much affected both by the hot climate and feeding practices.

The volume of annual milk production by all the dairy farms in Thailand was approximately 4,745,000 kgs. in 1969,<sup>1)</sup> With the average milk production per cow amounting to about 1,150 kgs. In 1972 the total volume was about 9,026,815 kilos,<sup>2)</sup> increased considerably from that of the year 1969.

The larger portion of yearly milk volume came from farms located in the areas of Ayudhya, Saraburi, Ratburi, Nakornpathom, and Bangkok (see the map), a result due mainly to fertile

<sup>1)</sup> Somnuk Sriprang, "Problems of Milk Cows", Agricultural Economy News (Vol. 157, Dec., 1969), p. 9.

<sup>2)</sup> Data collected from the Dairy Farming Promotion Organization.

soil for grazing and high consumer demand in Bangkok. Dairy farms in the other provinces produced milk in smaller quantity because of lower consumer demand. Some other reason for the larger portion of yearly milk volume is that most of government organizations, administering the activities of dairy farm promotion, are in the Central Region's area. They can administer the activities economically and effectively because of fast communication within the area. Their officials can perform their functions to assist the dairy farms in the area to the full extent because of the nearness. Therefore, most of the dairy farms are able to produce the raw milk in larger quantity.<sup>1)</sup>

2) Our next significant task is to present in detailed analysis the quantity of milk from 176 cows of the 57 studied dairy farms in the areas of Ayudhya, Ratchaburi, Nakhonpathom, and Ratchaburi during the 1971-1972 period. The farms' average quantity of milk is arranged in accordance with the farms' sizes and presented in Table 7.

Table 7  
Average Quantity of Milk by Farm Sizes, 1971-1972<sup>2)</sup>

Farm Size: Milk Cow	Average Quantity (kgs.) Per		
	Farm	Head	Head Per Day
1.0 - 2	3,701	2,197	6.0
2.1 - 4	6,923	2,419	6.6
4.1 - 6	11,729	2,327	6.4
6.0 - Over	15,589	2,106	5.8
All farm sizes	7,092	2,310	6.3

Source: Division of Agricultural Economics.

1) This information was obtained through personal observation by the author.

2) The dairy farms' sizes are arranged in accordance with the number of cows raised.



In the above table the overall dairy farms' average quantity of milk per farm and cow during the one-year period was 7,092 kgs. and 2,310 kgs. respectively. The daily rate of milk produced by one cow of dairy farms in the above-mentioned areas during the same period was 6.3 kgs. The daily high rate of milk production was 6.6 kgs., found in the dairy farms with 2.1-4 milk cows.

### 3.1.13 Trend in Milk Production

TO measure and forecast the trend in milk production, the statistical methods of least squares should be utilized carefully, but unfortunately the available statistics of milk production are not sufficient for this purpose, because of the newness of dairy industry development. However, we have the milk production for some years as shown in the following table.

Table 8  
Total Milk Production in Thailand, 1967-1972

Year	Kilograms
1967	2,275,000 <sup>1/</sup>
1968	3,312,000 <sup>1/</sup>
1969	4,745,000 <sup>2/</sup>
1970	4,277,800 <sup>2/</sup>
1971	6,168,500 <sup>2/</sup>
1972	9,026,815 <sup>3/</sup>
1973	7,300,000 <sup>2/</sup>

Source: <sup>1/</sup> Nop Anomasiri, "Land Co-operative Bulletin (No. 1, Oct.-Dec., 1966), p. 10.

<sup>2/</sup> Somnuk Sriprang, "Agricultural Economy News" (Vol. 157, Dec., 1969), p. 9.

<sup>3/</sup> Divisions of Agricultural Economics.

The table indicates growing production of milk in Thailand. For measuring the trend, the graphic method will be applied in this section. The graph shown in Figure 7 describes the upward curve of the total milk production in the country since 1967. Note that this milk output has continued to in-

crease, even though dairy farming is difficult in this tropical climate. The dairy farmers must be very efficient in the management of their farms, having overcome a number of production problems (but not every problem, as mentioned later). They attribute their growth to the Danish technical assistance mentioned previously. Without this assistance the farmers would have managed their dairy farms by trial and error methods, and their milk output would not have increased so sharply.

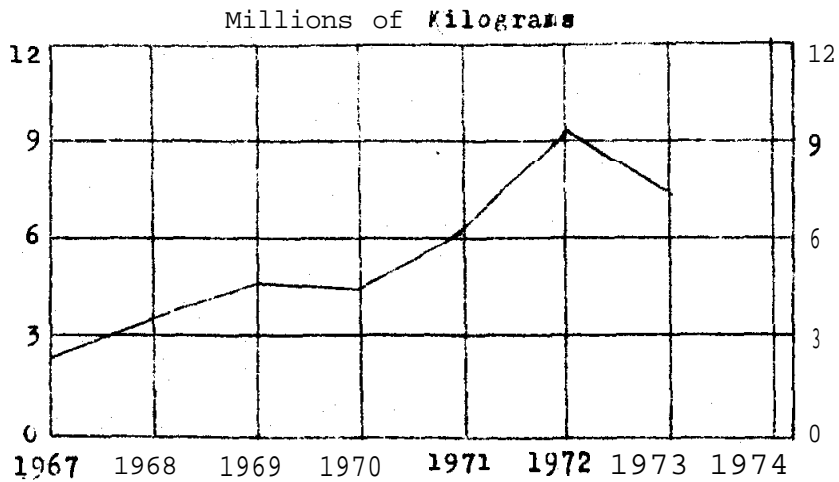


Figure 7

Total Milk Production in Thailand, 1967-1973

Source: Table A

### 3.1.1 Valuation of Milk

In terms of money value, the dairy farms produced about 9,026,815 kgs. of raw milk with an estimated value of about 27,441,517 Baht in 1972, or about 75,132.24 Raht per day. This value is calculated at an average wholesale price of 3.03 Raht per kg. of milk.<sup>1)</sup> The price calculated is based on the

<sup>1)</sup> Data was collected from the Dairy Farming Promotion Organization of Thailand,

market price of milk in general. This annual value is indeed remarkably significant for the milk producers as a whole. It also means that the producers have greater economic resources than in the past, and are thus in a better economic position.

### 3.1.15 Milk Utilization

This study has revealed that no exact quantitative data of milk utilization at the farm level has yet been collected and analysed by any organization or person today because the dairy industry is very new in the country. However, we have found that nearly all the milk is sold in the raw form by the producers to buyers in the country. The rest of the milk--not a great quantity--is consumed as fluid on farms or used for other purposes.<sup>1)</sup> This is mostly true for the dairy farms without processing plants. But at the farms with processing plant the raw milk is processed into products of superior quality. At the Suanjitlada Dairy Farm the raw milk is utilized simultaneously for the production both of dried milk and of pasteurized fresh milk.<sup>2)</sup>

## 3.2 Marketing of Milk

One of the most important activities of the dairy farms is the marketing of milk output for financial returns, indeed its main purpose. To achieve this purpose, the dairy farm must strive to obtain for their output returns which to some extent exceed the cost incurred. The following sections detail various aspects of marketing revealed by the present study.

### 3.2.1 The Market

The market of raw milk is composed of at least three

<sup>1)</sup> This information was collected from the Division of Agricultural Economics, Ministry of Agriculture and Co-operatives.

<sup>2)</sup> This information was obtained through personal observation by the author.

elements: 1) sellers, 2) buyers, and 3) the market area. The sellers are milk producers in touch with buyers. In Thailand this contact is made directly.

The buyers who communicate with the sellers for the buying of milk are some privately-owned dairy plants, some other types of firms, and individual consumers in the country. In addition, the Dairy Farming Promotion Organization of Thailand, the Kasetsart University Dairy Farm, the Thai-German Dairy Farm, and the Suanjittlada Dairy Farm are all producers as well as buyers of raw milk today, producing the raw milk on their own farms and simultaneously buying the commodity from other producers. According to its policy, the Dairy Farming Promotion Organization of Thailand buys raw milk only from producers who have ever undergone training at its Dairy Training Centre.

As to the quantity of milk bought daily by each buyer in 1972, the Dairy Farming Promotion Organization of Thailand bought 10,200 kgs.; the Kasetsart University Dairy Farm, 1,410 kgs.; the Thai-German Dairy Farm, 1,400 kgs.; the Suanjittlada Dairy Farm, 500 kgs.; the Bangkok Dairy Plant Company, 2,540 kgs.; the Foremost Dairies Company, 3,000 kgs.; the Nongpo Powder-milk Company, 500 kgs.; the S.R. Brother Company, 100 kgs.; other firms, 1,987 kgs.; and individual consumers, 3,000 kgs. The total quantity of milk bought amounted to about 24,734 kgs. per day.<sup>1)</sup>

As observed, the first four economic units are the good buyers who always buy the raw milk in constant quantities from the sellers at the fair price. They more or less try to extend dairy farm business of the country. But the Bangkok Dairy Plant Company, the Foremost Dairies Company, the S.R. Brother Company, and other firms buy the raw milk in constant quantities in some years only. The quantities of milk bought by them vary with their policies. It is therefore difficult for the sellers to regard them as permanent buyers.

<sup>1)</sup> Data was collected from the Division of Agricultural Economics.

The milk market area, the one in which transfer in the ownership of milk are affected, is narrow. Because communication media used for the selling and buying are personal meeting, telephone, and letter within the country only, the sellers sell their raw milk only locally.

### 3.2.2 Milk Preparation for Market

The sellers with pasteurizing plants and marketing apparatus, such as the Organization mentioned and the Suanjitlada Dairy Farm, must process the milk before delivery. The milk must be pasteurized by milk pasteurizing machines for hygienic milk and then placed in containers by packing machines. Each container is printed with the name of the farm on which the milk is produced, its trade mark or brand, weight of milk, and the words "Fresh pasteurized Milk."

The farms without processing plants have milk cans which are filled with raw milk for delivery to the buyers mentioned above. But at the Indian-typa dairy farms, the raw milk is put into "Mekong" whisky bottles, containing 1.67 pounds and directly delivered to some individual consumers.

### 3.2.3 Selling and Transporting

Selling is done directly by the sellers. The methods utilized are personal sales and advertising. The first method is utilized daily, the second resorted to occasionally.

The farms sell their pasteurized milk on a daily basis to buyers such as individual consumers, business firms, and some hospitals and schools in Bangkok and nearby provinces. The most important selling point is that the commodity is delivered in the containers by refrigerated cars or cars with ice coolers.

Today 51 dairy farms in the Mauglek area of Saraburi deliver daily their raw milk in cans by trucks to their co-operative dairy for testing, whereupon the dairy sells the milk to

the Dairy Farming Promotion Organization of Thailand. These farms are supported **and** promoted by the buyer in nearly all aspects of the dairy farming, e.g., techniques and marketing. Producers who are members of the co-operative dairies at Ayudhya, Nakhonpathom, and Ratburi deliver their raw milk to the dairier for testing and maintaining its quality, after which the dairies sell the raw milk to other dairy firms.

The other sellers without processing plants deliver their raw milk in cans by trucks to dairy firms in Bangkok: the Foremost Dairies Company (Bangkok) Limited, the Bangkok Dairy Plant Company, the Suanjittlada Dairy Farm, the Kasetsart University Dairy Farm, and the Pop Dairy Products Company, Limited. Today the Pop does not buy the milk from the sellers because it has ceased processing raw milk for selling. And Foremost does not buy from Ayudhya Co-operative Dairy because of its unhygienic milk.

The Indian-type dairy farms distribute their raw milk by bicycles and trucks directly to individual homes, coffee shops, dealers, bakeries, and occasional buyers. The farms do not sell their milk to privately-owned dairy firms because such firms dislike unhygienic milk. More than half of the milk of the Indian-type farms is sold in the unpasteurized form because they have no facilities and no marketing organization of their own. Surprisingly, the milk is accepted by the buyers because they are certain that, after boiling at home, the milk is hygienic.

#### 3.2.4 Price of Milk

1) The prices to be presented here should be divided into (1) the price for raw milk and (2) the price for pasteurized fresh milk. The price for raw milk from the modern dairy farms is established according to its quality or its fat percentage-- e.g., 3.5, 4.0, or 5.0. The price varies in different parts of Thailand. For example, the standard price for the 3.5 per cent

fat milk delivered to the Dairy Farming Promotion Organization of Thailand is 3.0 Baht per kilogram. Moreover, the price varies from month to month at present. The payment for the milk sold is billed on a weekly or monthly basis for regular customers, but for irregular customers the payment is immediately collected in cash.

In the case of the Indian-type dairy farms, the weighted average price of cow milk and buffalo milk per "Mekong" Whisky bottle were 2.70 and 3.17 Baht, respectively. The prices were constant in 1972. The system of payment is similar to that of the modern dairy farm. No difficulty in collecting the proceeds in full is encountered by the sellers.

The following table contains the milk prices paid to milk suppliers in the four provinces during the 1971-1972 period.

Table 9  
Average Milk Prices Paid to Milk Producers  
in the four Provinces<sup>1</sup> Areas, 1971-1972.  
Baht/kg.

Date	Ududhya	Ratburi & Nakornpathom	Petburi	Average
Jul., 1971	2.70	3.07	4.85	2.96
Aug.,	2.77	3.00	4.68	2.99
Sep.,	2.80	3.13	5.00	3.07
Oct.,	2.79	5.15	5.00	3.11
Nov.,	2.80	3.14	5.02	3.08
Dec.,	2.82	2.54	5.00	2.98
Jan., 1972	2.80	3.19	4.99	3.08
Feb.,	2.70	3.21	5.02	3.17
Mar.,	2.83	2.95	5.00	2.36
Apr.,	2.80	3.37	5.00	3.13
May.,	2.77	3.01	5.00	2.96
Jun.,	2.75	2.99	5.29	2.99
Average	2.78	3.12	4.99	3.04

Source: Division of Agricultural Economics.

The price for pasteurized fresh milk from farms with processing plants is fixed at a slightly higher level than the product's processing cost. The following table contains the prices paid

by the buyers of pasteurized fresh milk to three selected sellers in 1971-1972.<sup>1)</sup>

Sellers	Wholesale Price (Baht/kg.)	Retail Price (Baht/kg.)
Dairy Farming Promotion Organization of Thailand	6.25	7.00
Kasetsart University Dairy Farm	6.40	8.00-10
Thai-German Dairy Farm	5.00	8.00

It is noted that the sellers sold their pasteurized fresh milk on the basis of wholesale and retail prices. The payment is similar to that of the modern dairy farm.

2) To know the raw milk prices received by the sellers in past years, available pertinent statistics of raw milk prices in a main market are presented in the following table.

Table 10  
Price of Grade B Raw Milk Received by Sellers  
in Thailand, 1966-1972

Year	Baht per kg.
1966	3.00
1967	3.50
1968	5.00
1969	5.25
1970	5.25
1971	3.50
1972	3.50

Source: The Bangkok Dairy Plant Company.

It is noted that the raw milk price paid by one buyer is different from that paid by another. It depends not only on the milk quality mentioned but also on each buyer's opinion of the product. The statistics in the table indicate an increase in the price for grade B raw milk paid by the Bangkok Dairy Plant Company from 1966 to 1972. That is, the per-unit price increased from 3 Baht to only 3.5 Baht during the seven years.

<sup>1)</sup> Division of Agricultural Economics.



The price for raw milk did not fluctuate; it steadily but slightly increased during the period of time. Note that every main buyer has bought this milk at the same price since 1972.

3) Besides milk marketing, some dairy farms sell other farm resources, such as cattle for beef. However, the sale of the resources is not significant because the price of beef was low, at 16 Baht per kg., in 1973; and the sale volume was relatively small in the same year.

### 3.3 Costs and Return<sup>8</sup>

Owing to the milk consumption increase mentioned above, dairy farming enterprises in Thailand market their milk locally with a positive net income. To test this hypothesis, investigation of investment, receipts, expenses, and incomes of the 523 dairy farms is conducted in this section.

1) Investment: In undertaking the dairy farms, the entrepreneurs must invest at the beginning in lands, dairy cattle, buildings, equipment, and miscellaneous other items. These form the total investment of the dairy enterprise. The total investment for undertaking a new small-scale dairy farm with land area of 20 rai and 5 cattle amounts to 110,000 Baht at present.<sup>1)</sup> This is a large sum for a Thai farmer. In the case of a new large-scale dairy farm, the total investment is very much higher; but the number of these farms is few. It should be noted that the price of land varies remarkably from region to region, according to available communication. Moreover, it also varies significantly in relation to the location of land used for farming.

Indian dairymen invest in four main items: dairy cattle, buildings, equipment, and horses, of which the cattle item is the most important. They do not buy a piece of land for farming because they are not allowed by the land law to do so. They

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<sup>1)</sup> Data was collected at the Division of Agricultural Economics.

instead rent piece of land for farming. The investment for each dairy farm on the average, was 82,405 Baht.<sup>1)</sup> This also represents a large sum for the dairymen.

2) **Receipts:** The dairy farm's principal incentive to produce the milk with form utility is to sell it at a higher price. For it is generally agreed that dairy farming in Thailand does give a return to its owners although it is not so steady and regular due mainly to the marketing problem (to be mentioned later).

The dairy farms produce mainly fresh fluid milk for sale. A significant part of the dairy farms' total receipts come from the sale of cow milk. A very insignificant part of the total receipts from the sales of other resources such as cattle. In 1969 the 4,132 milk cows of 523 dairy farms produced about 4,745 tons, or about 13,000 kgs. of raw milk per day.<sup>2)</sup> The per-unit price of raw milk was 3.25 Baht in the same year. The total receipts from milk sold in 1969 were thus approximately 42,250 Baht per day, or about 15,421,250 Baht per year. The annual average receipt per dairy farm was about 29,488.14 Baht.<sup>3)</sup>

3) **Expenses:** According to the dairy farming survey conducted by the Division of Agricultural Economics, the average total cost per 5.67 kgs. of raw milk of 523 dairy farms was 2.41 Baht, or 0.43 Baht per kg. in 1969, covering the fixed and variable costs such as feed purchase, wages, transportation, cattle deaths, depreciation, and miscellaneous. Of these items, the feed purchase stands in first place, representing about 60 per cent of the total. On the per-unit cost, the total cost of 523 dairy farms was approximately 2,040,350.00 Baht in 1969, or about 5,590 Baht per day. The annual average expenses per dairy farm was about 3,901.24 Baht.<sup>4)</sup>

4) **Farm Income:** In general, the dairy farms' incomes

<sup>1)</sup> Op. Cit., p. 29.

<sup>2)</sup> Somnuk Sriprang, "Problems of Milk Cows", Agricultural Economy News (Vol. 157, Dec., 1969), p. 9.

<sup>3)</sup> Ibid.

<sup>4)</sup> Ibid.

are **uncertain**; they fluctuate from time to time because of **changeable situations** in the market in Thailand and problematic aspects associated with production and marketing. **However, the dairy farming entrepreneurs** did try their **best** in every **aspect** to market the product at **the best price possible** and to **minimize the costs** of milk production and marketing. Through **their management, the net incomes** of entrepreneurs of 523 dairy farms in 1969 can be realized approximately as the following.

Receipts from the milk sold	15,421,250.00 Baht
<b>Expenses</b> of operation	2,040,350.00 Baht
<b>Net Income for</b> the year	13,380,900.00 Baht

**And the net income per dairy farm** in the **same year** can be also **visualized** as the following.

Receipts from the milk sold	29,486.14 Baht
<b>Expenses</b> on operation	3,901.24 Baht
Rat Income per dairy farm	25,584.90 Baht

This figure is positive net **income, not negative income, because** the receipts exceeded the **expenses, according** to the accountant's concept of income. It gives the desired picture of **the dairy farm enterprise** in Thailand. **As a whole, the enterprise** is productive.

If should be mentioned here that there are some **miscellaneous** items of income and **expenditure, such as the income** from an increase in cattle inventory. Losses from cattle **diseases** are not too significant.

5) Factors Affecting Farm **Income: As studied, many** dairy farms have a positive **net income, but others** have **simultaneously** a negative net income. The main reason for these differences are **readily** stated. They are the **size** of dairy farm **business, labour efficiency, and** rate of production. It is found that a given **farm, combined** with three efficiency factors above the **average (large size, better labour efficiency, and** higher level of production) can earn a very high **income**. The larger farms with better **labour efficiency thus have financial** advantages. **And under normal conditions, large** dairy farms earn higher income. There are thus relationships between **the factors and farm income**.

The higher the milk production per cow, the lower the cost of production and higher the net farm income. The greater the labour efficiency, the higher the income. And the larger the size, the higher the net income.

To know the figurative labour efficiency at present, the labour utilization of the 57 dairy farms in the mentioned provinces' areas should be considered here. A result of the 1971-1972 farm labour efficiency study in figures is presented in the following table.

Table 11  
Relationships of Labour Efficiency to Dairy  
Farm Income, 57 Dairy Farms, June, 1971-October, 1972

Farm Size (No. of Milk Cow)	No. of Milk Cow per Farm	No. of Farms	No. of M.E. <sup>1/</sup> per Milk Cow	Income per Farm (Baht)
1.0 - 2	1.7	20	0.20	13,147.88
2.1 - 4	2.9	24	0.16	25,920.36
4.1 - 6	5.1	10	0.13	37,816.68
6.1 - over	7.4	3	0.09	46,659.72
Average	-	-	0.165	24,617.41

Source: Division of Agricultural Economics.

<sup>1/</sup>One adult work on a farm for 8 hours per day.

From this table it is seen that the small dairy farms with 1-2 milk cows utilized 0.20 of man equivalent (M.E.) per milk cow and had yearly net farm income of 13,147.88 Baht, but the larger farms with 6.1-over milk cows utilized 0.09 of man equivalent only, and the average income per farm was 24,617.41 Baht in 1971-1972. From this finding we can conclude that the larger dairy farm has better labour efficiency, and simultaneously obtains greater farm income. It should thus be the dairy farm entrepreneur's duty to strive to extend his farm business' size for higher farm income.