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## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 Background**

In Thailand, dairy farming has been promoted by the government since 1960. It started with the establishment of the Thai Danish Farm and Training Center (TDDF) at Muak Lek, as a joint venture between the Thai and Danish Governments. TDDF's activities included the farm land preparation, purchase of cattle, construction of farm building, training of service and development of a dairy colony, provision of extension services and development of a small dairy plant as well as a marketing system for pasteurized milk production. In 1971, the Thai Government took over TDDF and it was reorganized under the management of a newly established government enterprise, under the name of "The Dairy Farming Promotion Organization of Thailand" (D.P.O.).

The objectives of D.P.O. are to promote milk production, to process milk and to sell milk products. Several important activities have been employed by D.P.O. to promote dairy farming. These include offering crossbred heifers at cost prices to newly established dairy farmers, training new dairy farmers, provision of extension services, artificial insemination, veterinary centers and buying of fresh milk at guaranteed price.

In 1966, The Thai German Dairy Project in Chiang Mai was established and operated as a joint venture until 1977, at which time it was taken over by the Department of Livestock Development (D.L.D.). Since 1979, D.P.O. has been responsible for the processing and marketing functions from the plant in Chiang Mai.

Currently, there are approximately 60 dairy cooperatives in Thailand particularly in the provinces of Saraburi, Ratchaburi, Chiang Mai and Ayutthaya. However, milk production is still not enough for local consumption and the country imports increase

every year. Given the present status, dairy farm production is promoted and given support by the government so as to reduce milk imports (Table 1.1 and Table 1.2) and to provide good occupation, reliable and relatively high income for rural farm families (Office of Agricultural Economics, 1997).

Table 1.1 Production and demand of raw milk production in Thailand.

Year	Demand of raw milk (ton/year)	Raw milk production (ton/year)
1992	302,479	287,164
1993	362,807	320,894
1994	426,263	348,212
1995	493,851	408,551
1996	584,721	474,090
1997*	693,039*	539,618*

Source: Office of Agricultural Economics, 1997.

Note: \* Estimated value

Dairy farmers often need to borrow money from available sources because they could not afford high capital investment in the period of start up and expansion of their dairy farm operations (Karnjanasirm, 1995 ; Wongpalub *et al.*, 1992). Recently, new dairy technologies such as milking machine, improved breeds, are highly recommended to farmers to improve farm production and incomes. These add up to credit needs and credit become vital to dairy farming up until now.

Table 1.2 Quantity and value of milk production imported into Thailand.

Year	Imported milk products		Imported powder milk	
	Quantity (ton/year)	Value (million baht/year)	Quantity (ton/year)	Value (million baht/year)
1992	114,013	5,570	62,147	2,768
1993	106,293	5,163	52,375	2,485
1994	143,391	6,202	71,749	2,914
1995	154,828	8,230	79,919	4,123
1996*	96,253*	6,184*	54,349*	3,238*

Source: Department of Custom, 1997.

Note : \* Data during January 1996 - October 1996.

## 1.2 Rationale

Almost of all dairy farmers must borrow money to begin dairy farming (Kavila and Opartpattanakit, 1991). While there are various credit institutions, both formal and informal, the most important credit of dairy farmers is the Bank for Agriculture and Agricultural Co-operatives (BAAC). BAAC approves an amount of loan to dairy farmers depending on the ability to pay back with some consideration to land property and other income. However, credit is one of the constraints for some dairy farmers when they get less credit than their capital need which may limit their opportunity to earn more profit. On the other hand, when some dairy farmers get credit more than their capital need, there are chances that loan may be misutilized and not repaid back in time. The major problem was due to the fact that BAAC does not know the production performance of dairy farmers and their optimum level of capital need. There is thus, a need for a careful investigation of the dairy production function in the first stage. Furthermore, the optimum level of capital need must be derived from the resulting production function.

Thus, it is important to investigate the gap in credit provision and needs that exist between credit institutions and dairy farmers through the assessment of the productivity of different dairy farms and their capital needed. This will lead to a better guide to determine appropriate levels of loan required by dairy farmers and that to be approved by credit institutions.

### **1.3 Objectives of the Study**

Given the above background, the following are the objectives of this study.

1. To describe the biophysical and socio-economic circumstances of dairy farming in San Kamphaeng and King Mae On districts of Chiang Mai province.
2. To assess productivity among BAAC's dairy farmers in San Kamphaeng and King Mae On districts.
3. To find optimum level of capital need for different dairy farming groups.

### **1.4 Usefulness of the Study**

Outcomes of this research can provide more understanding on the optimum level of capital needed for different groups of dairy farmers. Furthermore, information on production performance and optimum level of capital need are important for credit institution to redesign a credit program to dairy farmers. Also information on production performance with respect to different farm management practices will be useful to dairy programs and policies in Thailand.

## 1.5 Review of Literature

### 1.5.1 Debt and Loan Repayment

During the crop year 1991/1992, average agricultural farm borrowing in Thailand was 8,924 baht and repayment valued at 6,561 baht per household (Office of Agricultural Economics, 1993). Of the total farm loans, 81 percent were provided by formal sources. The rest came from private lenders (Office of Agricultural Economics, 1993). The formal credit sources charged on average an interest rate of 14 percent while it was 37 percent for the informal channels. In term of distribution of farm credit, about 35 percent of total farm loan lending went to the Central plain. The North and South regions obtained 30 and 24 percent of total farm loan. The rest of 10 percent was delivered to farmers in the northeast (Office of Agricultural Economics, 1993).

The most important formal credit sources for the dairy farmers is the BAAC. The BAAC distributed credit in term of special projects such as shrimp promotion, rubber plantation, land development and dairy farming promotion. BAAC supported credit to dairy farming promotion program since 1977. During 1977-1989, the total credit disbursement was 320 million baht to the 1,920 dairy farmers. But dairy farming promotion program was not successful in term of loan repayment due to the repayment rate was the lowest incomparison with the other special projects during the pay back period. The repayment rate from rubber plantation, shrimp promotion, land development and the dairy farming program was 99.7, 87.3, 77.9 and 74.3 percent respectively (Bank for Agriculture and Agricultural Cooperatives, 1989).

In Chiang Mai, dairy farmers borrowed heavily being highly dependent on loan. Loan repayment became very difficult for farmers when dairy farming, a new enterprise did not perform well as in the case of a farmers of village cooperative in Sankamphaeng who borrowed money from BAAC while 98 percent of the farmers borrowed from BAAC with an average loan of 46,399 baht/household, in 1987 their loan repayment was only

about 5 percent (Leorudomvetch, 1987). Tovisitchai, (1992) studying the factors affecting the loan repayment of farmers in BAAC dairy farm project in Phatthana Nikhom district, Ropburi province found that dairy farmers who borrowed money from BAAC averaged about 24,393 baht could pay back only 44.3 percent of total loan. This was due to the fact that the farmers had used part of their income as expenses on home consumption and repayment of non-dairy scheme loans.

### **1.5.2 Factors Related to Credit**

Farm size, labor and farm income has an effect on farmer's debt and the use of loans for farm production. Most credit come from formal institutions. Furthermore, Onchan (1974) indicated that credit utilization for production increased with farm size.

Factors related to demand for credit were found to be income, farm size, land tenure and interest rate (Onchan, 1969; Sinsub, 1976; Tedvanich, 1978). These studies indicated that the amount of indebtedness increased when income and farm size increased, while interest rates were negatively related to the amount of indebtedness.

### **1.5.3 Previous Study Related to Dairy Farming**

Related to dairy farming, Karnjanasirm (1995) studied the assessment of Dairy Farming Promotion Project in Nakhonpatom province. He found that the overall project analysis showed unacceptable results since only 63 percent of farmers continued with the project after seven years operation. It was found that of the ongoing farmers, eighty five percent received average of 79,139 baht of profit per farm per year while 15 percent of them lost the amount of 29,482 baht per farm per year. Furthermore 37 percent of dairy farmers stopped farming. They sold dairy cows and some part of land to pay back loan to BAAC. Furthermore, he indicated that farm size had an important positive effect on dairy raising as he found that 52 percent of the sampled dairy farmers who had 1-10 dairy cows stopped farming most of dairy farmers with 11-20 dairy cows still continued with

the project. In addition, Tumvasorn and Leongvirai (1992) found that dairy farmers in Pattalung province, lost about 16,299 baht/year/household. About 37 percent of dairy farmers stopped dairy farming after a few years.

In Northeastern Thailand, dairy farmers were not so successful due to dairy farming generated less net income (after paying for concentrate feed and other expenditure) was 21,456 baht/year/household (Wongpalub *et al.*, 1992). Almost all dairy farmers have debt problems in the beginning because of the need to invest high capital. Besides, there were sometimes wide discrepancies in across different organizations credit loan distribution. In some area farmers can borrowed dairy cows from the Livestock Office while some areas had to borrow about 200,000 baht to buy 5 dairy cows and paid 9 percent interest rate (Wongpalub *et al.*, 1992).

Nevertheless, there were evidences of successful dairy farming operations. During crop year 1992/1993 in Thailand, Chamchong and Sirinjinda (1994) indicated that dairy farming could be an alternative for increasing income because it could give return over total cost. The average return over total cost of dairy farming was 136,454 baht/farm/year. In addition, they found that return over total cost of dairy farming increased when farm size increased. Return over cost of small farm size was 62,754 baht/farm/year while that for the medium farm size was 137,722 baht/farm/year and that for the large farm size was 307,961 baht/farm/year. They indicated that production, revenue and return from dairy cow for larger farm size were higher than those of smaller farm size due to the use of the new technology farm management in the production process thereby reducing their cost of production.

### **1.5.4 Concept of Production Function and Application to Dairy Farming**

#### ***1.5.4.1 Concept of Production Function***

A production function provides information concerning the quantity of output that may be expected when particular inputs are combined in a specified manner. The chemical, physical, and biological properties of inputs determine the kind and amount of outputs which will be received from particular combinations of inputs. There are many possible combinations of inputs. Obviously, not all production functions have been discovered, they provide very useful information for making decision by farmers and other producers. Although an individual producer cannot alter production function, a producer can choose between alternative functions arise from the fact that a choice between alternative production functions must be made. If a producer is interested in maximizing net revenue from the use of his resources, producer will wish to employ some production functions in preference to others (Bishop and Toussaint, 1958).

However, the world is never ideal. Information from production function analysis can never be perfect. First, there will always be uncertainty about the effect of such controlled factors as weather and disease. Second, the production function has to be estimated statistically from data which may be imperfect. Third, the estimated production function can only be interpreted as an average relationship across some set of observations. Fourth, prices and opportunity costs may be known with certainty. Fifth, every farm and farmer are unique. Resource qualities and amounts vary between farms. Farmers vary in their managerial skill, their opportunity costs, their assessment of uncertainty and their reactions to it, and in their preferences about the possibilities they see as open to them. For the above reasons, information based on production function analysis must be interpreted with caution and judgement. It can be very useful for both extension and policy purposes, especially when supplemented with macro and other micro economic analyzes. But it should never be regarded as perfect. This is especially so relative to small farms involving a subsistence component and having to operate in a



delicate balance with their physical, economic and social environment (Dillon and Hardaker, 1980).

#### ***1.5.4.2 Application of Production Function on Dairy Farming***

Bravo-Ureta and Rieger (1991) studied on dairy farm efficiency measurement using Cobb-Douglas stochastic production frontier which is the basis for deriving a stochastic cost frontier and related efficiency measurement and neoclassical duality. The stochastic model was used to analyze technical, economic and allocative efficiency for a sample of New England dairy farm. They used concentrate feed, forage feed and labor used in the production of dairy product. They controlled farm location-specific and milking technology-specific effects by including location and milking technology dummies.

Kumbhakar and Heshmati (1995) studied on efficiency measurement in Swedish dairy farms during the period 1976 to 1988. They considered a generalization in modeling inefficiency using panel data. They decomposed efficiency into a persistent farm specific component and a residual farm and time component. In stead of using a single-step maximum likelihood method, they considered a multistep procedure which were used to estimate the parameter of the production function as well as persistent and residual technical inefficiency. They used fodder, material, land , labor and capital as inputs in the production function. In addition to these inputs, they also used experience in farming and time as an explanatory variables.

In Thailand, Somjai (1985) used Cobb Douglas Production function to find the factors related to milk production. She applied land, labor, capital, income, material, experience as inputs in production function. The result revealed that labor, capital, land and experience affected milk production.