CHAPTER I

INTRODUCTION

1.1 Background

Vietnam is an agricultural country with over 80% of the population living in and earning from the agricultural sector. Agriculture contributes around 30% of the total GDP (Cuc, 1995). Thus, in its economic development strategies, the Vietnamese government has given high priority to agriculture as the top industry underpinning economic development (Communist Party of Vietnam, 1996).

Animal husbandry, which is an integral part of the Vietnamese farming systems, contributes about 27% to the total agricultural GDP (Cuc, 1995). In recent years, the restructure of agricultural production has been in the direction of pushing animal husbandry as a main production branch, to make it more proportional to the cultivation branch. The government's goal is to increase the contribution from the animal sector to 45%-50% of the total agricultural GDP by the year 2020 (Institution of Strategical Development, 1996).

The milk industry in Vietnam is being developed currently. Under a centrally-planned system, state enterprises operated inefficiently. Therefore, both quantity and quality of dairy herds decreased significantly. After changing to a market-oriented economy, Vietnamese dairy farming had more chances to develop due to the support of the government in terms of capital, technology, infrastructure, etc. Farmers are now free to decide what to do, how to produce and how to market their farm products.

Thus, both the population of cows and the quantity of raw milk have increased rapidly. In 1990, Vietnam produced only 8,500 tons of raw milk, but in 1998, that figure grew to 32,800 tons.(Table 1.1).

Table 1.1: The situation of development of cow herds in Vietnam

Indicator	Unit	1990	1995	1996	1997	1998
1. Total population of cows	'000 head	11.0	21.0	22.5	24.5	26.2
- Milk cows	,,	4.7	8.0	10.2	10.8	11.1
2. Total amounts of milk	'000 tons	8.5	21.0	27.8	31.3	32.8

Source: Center of Vietnamese Extension, 1999

Some regions of the country, such as Lam Dong, Moc Chau, Bavi and the suburb of Ho Chi Minh, and Hanoi Cities have been evaluated as large potential areas for dairy farming. However, so far most cows are being reared in the South of Vietnam. In 1997, there were about 24,500 dairy cows in the country, over 80% of which were located in Ho Chi Minh City and its vicinity (Vang, 1998).

Table 1.2: Cow population in different regions of Vietnam

(Unit: head)

Regions	1996	1997	1998
Lam Dong region	740	760	800
Ho Chi Minh city and its vicinity	18,543	19,990	21,000
North Coastal Center region	180	250	300
Moc Chau region	1,600	1,800	2,040
Hanoi city and its vicinity	1,500	1,700	2,020

Source: Centre of Vietnamese Extension, 1999

Although there is considerable progress, milk output in Vietnam is still too low compared with that of neighbour countries like China, Thailand, and Indonesia (e.g., in 1996 the level of raw milk production per capita in Vietnam was only 0.4 kg, while this indicator in Thailand reached 7.9 kg). It satisfied only 8.6% of the demand for dairy products in the country. The remainder (more than 91%) came from importation. The development of dairy cow therefore, is essential for Vietnam in order to increase domestic milk production to 15%-20% in the next 10-12 years (Vang, 1998).

1.2 Statement of problems and rationales

Demand for milk and milk products has been increasing due to population growth, urbanisation and increases in the levels of income. Increase in the demand is also largely due to awareness of its nutritive value. Kon (1972) said that, apart from its essential value in the artificial rearing of infants, milk displays best its nutritive value as a component of a mixed diet. For example, half a litre of cow's milk supplies some 25% of calories, 40% of the protein, 70% of the calcium and the riboflavin, and about one third of the vitamin A. Therefore, expansion of the dairy business and promotion of the milk drinking habit contributes to improving the standards of living for farmers and decreasing the rate of malnourished children. This is very significant for Vietnam where malnourishment among children is widespread {the percentage of child malnutrition among those under-five years old was 42% (Communist Party of Vietnam, 1996)}.

Dairy farming is also attractive as a regular cash income and for the creation of employment opportunities in rural areas. Specifically in Vietnam there are only about 18% of rural labourers who work over 210 man-days per year and 21% of rural

labourers work less than 90 man-days per year (Hien, 1995). Thus, creation of employment opportunities in rural areas by developing cow herds is one strategy of the Vietnamese government.

Dairy farming in Vietnam has been developed rapidly during several recent years. In 1990, the number of cows was 11,000 head and this figure increased nearly double in 1995 (Center of Vietnamese Extension, 1997). However, the number of cows in Vietnam is not high when compared with that of its neighbour countries like Taiwan (119,000 head in 1994) and China (3.6 million head in 1994). Despite having the highest population, the level of milk consumption per capita in China was still 2.5 times higher, at 8.7 kg/year, than that of the Vietnamese consumption level. Moreover, in China, 89.3% of the above value (8.7 kg/year) was produced in the domestic sector. Meantime, in Vietnam the figure was only 7.7% (FAO, 1994). In fact, the annual milk import has been increasing from year to year. In 1990, Vietnam imported 2,800 tons and in 1997 that figure reached 50,000 tons (Cat, 1998). This proves that milk consumption in Vietnam is growing. In other words, the potential for the Vietnamese internal milk market is very large.

Red River Delta (RRD) is one of the regions that has a large demand for livestock breeding development. This is because it is a region with high population density (1,224 persons/km^2) which implies large demand for milk and meat (Kim, 1995). In addition, labour and feed are available. There are about 4 million agricultural labourers (around 25% of the country's agricultural labourer total), 4,284 ha grass field and 23,937 ha mountainous and hill areas. However, potentials for developing livestock raising activities were only exploited at low level (Kim, 1995). According to Binnie (1995), milk production in the Red River Delta remained very low and served

only 4% of the estimated demand. More than 95% of the milk consumed locally is processed in the South of Vietnam or imported from other countries, whilst milk processing factories located in the region could not buy enough raw milk to process (one of them operated at only one third of its capacity).

Although potential exists, milk production in the RRD has not been developed as fast as was generally expected. Consequently, many questions are posed and are required to be answered in the very near future. For example, is there a shortage of raw material in milk processing factories? If so, does it result from unprofitability in raising cow or problems in marketing systems or other factors? What are the obstacles in the milk production and marketing systems? What are the attributes of milk productivity? etc. To answer these questions, it is necessary to investigate the whole range of milk production and marketing activities. But up until now, there have been few studies conducted in Vietnam that focused on these problems. Thus, the study of milk production and marking systems in the Red River Delta is very necessary and significant.

1.3 Literature review

1.3.1 Previous studies related to farming and dairy farming

In terms of economies of size, several studies have shown that increases in herd size are not reflected in increased production per cow. However, larger herds do commonly increase labour efficiency and decrease costs of producing milk. Hours per cow, in a 50-cow herd, average about half the time required in a 10-cow dairy operation (Campbell and Marshall, 1997). They also argued that the main factors that influence dairying in different countries include (1) adaptation of the country to

dairying, (2) history of dairying in a country, (3) the character and interest of the people, (4) urbanisation.

By examining farm size in the Red River Delta, Binnie (1995) found that after land was assigned to farmers (marked by Revolution N_{10}), farms was small (0.3 ha) and fragmented (5 to 6 lots up to 2 km apart). However, new Land Law (effective in October 1993) allowed the transfer and leasing of land up to 3 ha. This has led to considerable land consolidation in current years. The land was used more efficiently and directed toward specialisation; i.e. one pursues the occupation upon which one is skillful. Thus, more farms became larger and raised more animals.

In America, Weersink and Tauer (1991) used Granger causality tests to analyse the causal relationship between dairy farm size (measured as number of dairy cows per farm) and productivity (measured as milk production per cow). They found that productivity change had caused changes in average herd size. Instead, the direction of causality appeared to be from herd size to technology. The changes in both productivity and farm size were largely brought about by price changes. For example, high feed prices reduced concentrate feed usage, which caused the decrease in productivity. However, a high feed price could encourage small farmers to sell their herds and specialize in crop production, leaving milk production to larger dairy farms and increasing the dairy farm size. They suggested the major determinant of changes in dairy farm structure should be dairy price policy.

The results of the survey on nutrient level of the hybrid dairy in Hanoi, conducted by Lap *et al.* (1998), showed that cow herds in the region could be classified into four groups according to their milk yield:

(1) Less than 7 kg/day/cow

(2) 7-10 kg/day/cow

(3) 10-15 kg/day/cow

(4) Greater 15 kg/day/cow.

The cow having less than 7 kg of milk per day got only 18,000 Kcal of equivalent energy which was only large enough to maintain the body and produce 5-7 kg of milk per day. The cow belonging to third group (10-15 kg/day/cow) was fed about 27,000-32,000 Kcal of energy equivalent. This level of feeding permitted the cow to grow well and to produce high yield of milk. However, they also warned the farmers against a high ratio of concentrate feed in the cow's ration, especially the ration applied to the fourth cow group. The study suggested farm households should increase the quantity of coarse protein, calcium, and phosphorus.

In the South of Vietnam, Dat *et al.* (1998) considered the milk production capacity of nuclear crossbred cow groups, such as F1 1/2, F2 3/4 and F3 7/8 blood of Holstein Friesian cows. They found that their yields were very high. The F2 3/4 blood of HF cow gave the highest milk yield, which reached to 4,879 kg per milking cycle of ten months, and was followed by F1 ½ blood of HF cow with average milk yield of 4,773 kg.

1.3.2 Some studies into the marketing system

Kohls and Downey (1967) asserted that there were at least 3 major approaches to the analysis of marketing problems - the functional approach, the institutional approach and the behavioural system approach. While the functional approach

considers the jobs that must be done, the institutional approach considers the nature and character of the various middlemen and related agencies. In the firm (or organisation), four major types of problems with their associated behavioural systems are input-output, power, communication, and adaptive systems.

To analyze the marketing systems, Bain (1968) initiated the "Industrial Organization" approach. The principle of this approach was to evaluate the efficiency and fairness of the system by examining the structure, conduct and performance of individual markets within the economy. A few indicators could be listed such as degree of seller and buyer concentration, degree of product differentiation, buying and selling practices, marketing cost and margin, and so on.

Snarup *et al.* (1985) showed that the effective marketing strategy, especially for seasonal and perishable commodities, depended mainly on the decision of where, when, how and how much to market. For this the services of a chain of middlemen and functionaries became inevitable. They also indicated that in various markets the marketing system was different, and therefore the price spread might also be different. The major use of comparative marketing margin for various markets would be to help to know in which market there was scope for reducing marketing costs. The price spread and marketing margin were good yardsticks for measuring marketing efficiency.

With the purpose of improving efficiency of the milk marketing system in the organized sector, Vijayalakshmi *et al.* (1995) compared the procurement cost of the organized and informal sectors of the dairy industry in Bangalove and Kolar districts (India). They revealed that the organized sector lost Rs 0.13 per kg of milk marketed

under existing conditions. On the contrary, the informal marketing sector, by using differential procurement price, diversified procurement channels and selective selling channels, earned Rs 0.42-0.77 per kg of milk marketed. Through analyzing the correlation between procurement cost and the important factors influencing this cost (i.e. volume of milk per route, distance covered/route, number of dairy cooperative societies/route, etc.), the authors indicated that a significant reduction in procurement cost is possible if the volume of milk collected per route increases.

1.3.3 Concept of production function and its application to dairy farming

1.3.3.1 Concept of production function

According to Bishop and Toussaint (1958), the production function is a mathematical relationship describing the way in which the quantity of a particular product depends upon the quantities of particular input used. They detailed that the chemical, physical and biological properties of inputs determine the kind and amount of output which will be received from particular combinations of inputs. This concept was confirmed by Henderson and Quandt (1980). They asserted that the production function gives mathematical expression to the relationship between the quantities of inputs employed and the quantities of output produced. The farm (or entrepreneur) is able to use many different combinations of input for the production of a given level of output.

Once the production function is discovered, it provides very useful information for making decisions by producers. However, information from production function analysis can never be perfect. It should be interpreted with caution and judgement. Dillion and Hardaker (1984) gave some reasons to explain this situation. First, there

will always be uncertainty about the effect of such uncontrolled 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 sets of observations. Fourth, prices and opportunity costs may not be known with certainty. Fifth, every farm and farmer are unique. Resource qualities and amounts vary by farms. Managerial skill, opportunity costs, etc were different from farmer to farmer.

With regards to algebraic forms of production function, Dillion and Hardaker (1984) gave three forms which stand out as being of the most general usefulness. They are the quadratic polynomial, the square-root quadratic polynomial, and the Cobb-Douglas function (power function). However, the authors also indicated that both the quadratic and square - root quadratic functions are generally not as convenient to use as the Cobb-Douglas function when there are three or more variable factors to be considered.

1.3.3.2 Production function estimation in the dairy farm sector

Bravo-Ureta and Rieger (1991) used cross-sectional data for a sample of 511 New England dairy farms to estimate a Cobb-Douglas stochastic production frontier, which is the basic for deriving a stochastic cost frontier and related efficiency measures. They applied annual milk production per farm as a dependent variable. Annual consumption of concentrate, forage feed per farm and variable labor measured in full time worker-equivalents were used as explanatory variables. The authors also considered effects of technical and regional factors by including both of them in the model in form of dummy variables.

In Nepal, Poudyal (1997) estimated production function to examine the relationship between inputs used in milk production and the output of milk. He used average milk output per cow (liter/year) as the dependent variable and the expenditures on fodder and concentrate fed (kg/year), average size of cow, and labor cost as explanatory variables. He found that all those independent variables had a positive sign and a significant effect on milk yield.

While analyzing the impact of credit institutions on dairy farming, Limkhumduang (1998) utilized the Cobb - Douglas production function to consider the efficiency of farm inputs and to determine the optimum level of capital needed. She used the amount of milk output (kg/year/household) as the dependent variable. Independent variables included in her model were labor charge, land use, levels of investment in concentrates and fodder, farm size, frequency of success in artificial insemination, years of raising, kinds of breed and loan repayment performance.

From the literature review, it is evident that common independent variables included to estimate the production function of milk are concentrate, fodder feed and labour cost. The dependent variable is usually the measure of annual milk output per household or per animal. Regarding the functional form, most of the above authors specified a Cobb-Douglas production function.

1.4 Objectives of the study

The overall objective of the study is to understand milk production and marketing systems in the RRD of Vietnam. The specific objectives are as follows:

1. To examine milk production system in the study areas,
2. To investigate the marketing system of milk in the study areas, and
3. To identify the factors affecting output of raw milk with regard to different agro-economic zones.

1.5 Usefulness of the study

This study would provide decision-makers, policy planners and researchers with basic information about the existing milk production and marketing systems. The information would provide background knowledge for decision making and incentive policy implementation to promote milk production and marketing as well as for further in-depth study in this field in Vietnam.