CHAPTER II

RESEARCH METHODS

2.1 Scope of the study

The Red River Delta (RRD), which is one of seven economic regions of Vietnam, was chosen for conducting the research. It includes nine provinces and cities, namely Haiphong, Haiduong, Hungyen, Hanoi, Hatay, Hanam, Ninhbinh, Namdinh and Thaibinh. In addition to common features of the region, each province also has its own characteristics. However, due to budget and time limitation, the study focused only on two locations. Hanoi and Hatay provinces, where cow herds accounted for over 90% of the total cow population in the RRD, were selected as representative of the region.

The overall objective of the study is to understand milk production and marketing systems in the RRD. Thus, the study concentrated on describing the systems with emphasis on the size and structure of cow herds, feeding practices, cost and profitability of dairy raising, marketing channels, milk price combined with its quality and marketing cost. Research results were based on extensive surveys of the whole system of milk production and marketing in the region. The majority of the information was collected from interviews with a large number of interviewees. However, due to having difficulty getting information, the study did not investigate milk-processing factories. Moreover, there was only a few interviewed households using any system of records, therefore most responses were based upon the memory recall of the respondents (which are subject to memory bias).

Ideally time series data would have been more appropriate for the study to see the production trend so as to make a more meaningful conclusion. However, such data was not available; so the findings of the study might have limitations.

2.2 Data collection

2.2.1 Secondary data

To gain a better understanding of the milk production and marketing systems in the study areas, a number of relevant publications were reviewed. Research studies on dairy farming, annual progress reports, and biophysical, socio-economic and demographic characteristics of the study sites were also collected from various sources. Some of the sources could be listed as follows:

- The statistical yearbook
- The Ministry of Agriculture and Rural Development
- Centers of Extension
- Statistics Department at provinces, and districts
- The Finance and Price Bureau

2.2.2 Primary data

To get sufficient and accurate data, before carrying out an actual survey, questionnaires were compiled after consultion with local leaders and experienced people. After that, preliminary testing of questionnaires was conducted in 10 households and necessary changes were made.

Formal survey using structured questionnaires was conducted to gather the major part of information needed to achieve the objectives of the study. The necessary data was collected as follows:

- Farmer's general characteristics such as education status, family members, experience in dairy farming of household head, total land use, source of income.
- Dairy farm sizes and the structure of cow herds.
- Feeding practices.
- Cost and output of milk production.
- Reasons for dairy farming of farmers.
- Credit and sources of credit.
- Marketing agents and their characteristics.
- Marketing channels.
- Price and quality of raw milk.
- Marketing costs.
- Problems in milk production and marketing.

2.2.3 Sampling technique

The multi-stage sampling method was administered in order to get representation from the region.

First, provinces were selected based on their contributions to total milk production in the region. Hanoi and Hatay provinces were picked as representative of the region according to this basis. After that, one district (having the highest cow population) was chosen for each province.

Second, from the selected districts, a random sampling method was used to select the farm households. The sample included 90 farmers and 30 marketing agents (Table 2.1). Location of the study areas was depicted in Figure 2.1.

Table 2.1: Total respondents by location

Location	District	No. of farmers	No. of marketing agents
Hanoi	Gialam	50	25
Hatay	Bavi	40	5
Total		90	30

Number of respondents in each location was selected according to proportion of the total households involving to milk production and marketing in the whole location.

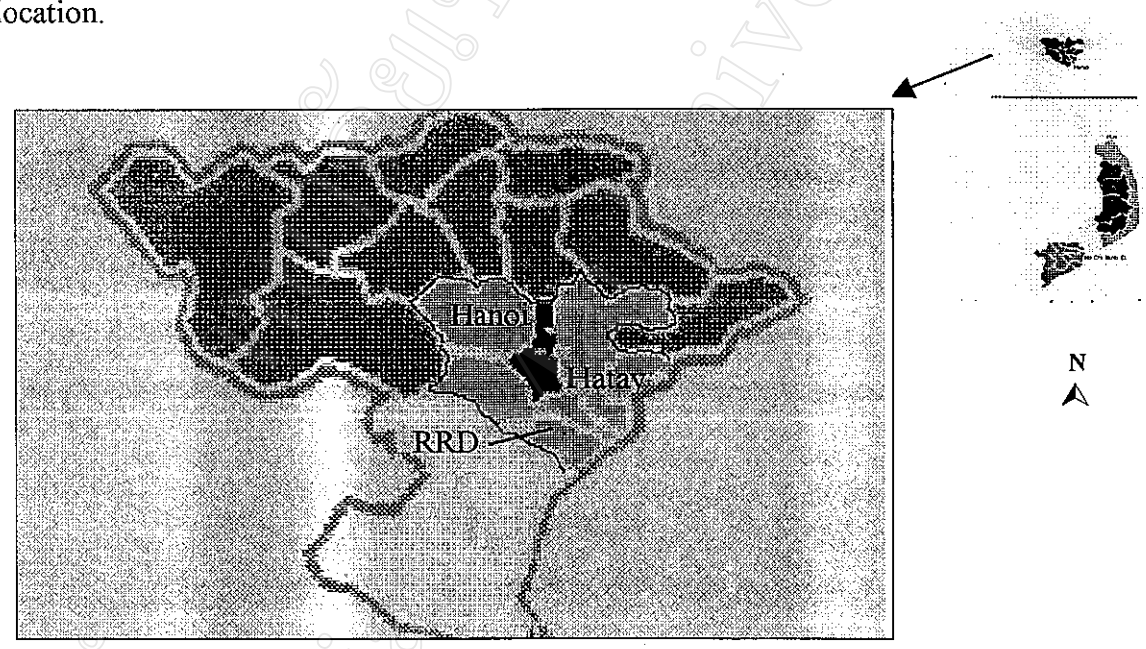

Figure 2.1: The map showing location of the study sites

2.3 Data analysis

Descriptive methods with contingency tables, diagrams, and charts were used to achieve the first and second objectives. In addition, the quantitative analysis method was also applied to measure factors affecting milk output.

2.3.1 The descriptive analysis

In order to achieve the objectives of the study, analyses of the cross-section data were used. From survey and secondary data, the descriptive statistical analysis methods were applied to discuss and analyse the milk production and marketing systems.

To describe the milk production system, the study focused on dairy farm size, structure of cow herd, input use, cost of milk production for different kinds of breed and the profitability of raising cows. The study also considered sources of credit as well as problems in milk production and marketing. The gross margin analysis approach was addressed to reflect the profitability of milk production. Some indicators can be calculated as follows:

Gross revenue = Total output multiple price per unit

Gross margin = Gross revenue minus total variable cost.

Total cost = Variable cost plus fixed cost.

Net return = Gross revenue minus total cost.

Return to input (i) = {Net return plus costs of input (i)}/Quantity of input (i).

To understand the existing milk marketing system, the study involved describing the characteristics of marketing agents, marketing channels, price combined with quality of raw milk and the difference in selling prices amongst intermediary agents. The study also calculated marketing costs and margins for some marketing channels.

2.3.2 Quantitative analysis

2.3.2.1 Cobb-Douglas production function

The third main task was to identify the factors affecting milk output regarding different agro-economic zones. This was done by estimating a production function that expresses the relationship between input used in milk production and the milk output. Determinants of the production function included information of input utilization (the level of investment in concentrates, fodder feed and labour) and other information such as the types of breed, farm dairy size, educational level, and dairy farm experience of the household heads. The form of Cobb-Douglas function was chosen to express this relationship. Following are main reasons to explain the choice:

First, agricultural input-output relationship usually follows the law of diminishing returns. Cobb-Douglas production function meets this law.

Second, Cobb-Douglas function is simple and easy for estimation and interpretation.

Third, values of intended variables in the model satisfied the conditions of the Cobb-Douglas production function (they must be greater than zero).

The choice was supported by Dillion and Hardaker (1984). They suggested that when there are three or more variables, it is generally best to use the Cobb-Douglas function.

Specifically, the Cobb-Douglas production function was expressed as follows:

$$Y = f(Co, Fo, La, Ed, Ex, Fs, Br, D, u)$$

or

$$Y = a\ Co^{b1}\ Fo^{b2}\ La^{b3}\ Ed^{b4}\ Ex^{b5}\ Fs^{b6}\ Br^{b7}\ e^{b8D}\ e^{u}$$

Where:

Y = Total raw milk output of household per year (kg/household/year)

Co = Total expenditure on concentrates for milk cow(s)

(thousand VND/household/year)

Fo = Total cost of fodder feed for milk cow(s) (thousand VND/household/year).

La = Total labours taking care of milk cow(s) (man-day/household/year)

Ed = Education level of household head (number of years attending school)

Ex = Experience in dairy farm of household head (number of years raising cow)

Fs = Dairy farm size (number of milk cows/household)

Br = Breed (average percentage of HF blood in milk cow herd of household)

D = Regional dummy variable

D = 1 for Hanoi city

D = 0 for Hatay province

u = error term

a, b_i = coefficients

e = exponential indicator (2.71828).

2.3.2.2 Definition of the variables used in the model

Y (Milk output of household)

Potentiality to increase milk production can be considered in two ways, by increasing the number of productive dairy cows and/or by increasing the productivity of existing cows. However, it would be difficult to achieve the objectives of increasing milk production alone from increasing the productivity of existing cows in the RRD where the cow herd size per household is very small. In addition, milk yield of a cow depends highly on its physiological characteristics which can not easily be impacted

upon by humans. With the purpose of improving milk output in the region, thus the dependent variable was defined as total milk output of household. It was measured in kg per year.

Co (Concentrates) and **Fo** (Fodder feed)

Feed has been considered as much important factor affecting the milk yield of cows. The experiment conducted by Thuong (1998) indicated that when an F1 ½ blood of HF cow was fed 6.5 feed units per day its milk yield was only 1.8-2.0 ton/milking cycle, but as the ration went up to 9.5 feed units the yield reached to 2.7-2.8 ton per milking cycle. Thus, feed was used as a basic variable in the model and was expected to have a positive relationship with milk output. In this research, the feed was divided into two kinds, namely concentrates and fodder feed. Dairy farmers in practice used mixed-feed which included corn meals, rice bran, soybean, fish meals, mineral, etc. to feed their cows. Consequently, these feed items should be converted into either the form of aggregate value or nutrients (i.e. total digestible nutrients, digestible crude protein, etc.). To make it simpler, concentrates and fodder feed were measured in terms of aggregate value (thousand VND). Constant price was applied to calculate cost of feed for every household, so that influence of price variation was avoided.

La (Labour)

The labour variable was the summation of family labour and hired labour used in the milk production only. It included all dairy-farming activities such as feeding, milking, cleaning, etc. Labour was measured in total man-days of household per year (one man-day was 8 hours in day). A positive relationship of labour on milk output was expected in the model.

Ed (Education level of household head)

The educational status of the household head is generally considered important for milk production, as it reflects the abilities of the household in resource management, advanced technique application, etc. The educational level of the household head thus was included in the model and was expected to have a positive effect on milk output per household.

Ex (Experience of household head in raising cow)

The experience of household head was measured as his/her years of raising cows. Many empirical studies showed that the experience of the household head contributed significantly to managing cow herds efficiently, to preventing kinds of cow diseases, etc. Limkhumduang (1998) in her study in Thailand has also reported that dairy farming experience is one of the significant predictors of the milk production. Hence, the experience of the household head was included in the model, and its positive relationship with milk output was addressed.

Fs (Dairy farm size)

The farm size variable was the number of milk cows in each household. A positive effect from farm size on milk output was of course expected in the model.

Br (Breed)

Milk yields of different cow breeds were recognized to vary considerably. According to Vang (1998), milk yield of a HF crossbred cow could be 1.5-2 times higher than that of a domestic cow. Thus, the average percentage of HF blood in a household's cow herd was used as a proxy variable to consider the contribution of the cow breed in the milk output of the household. It was expected to have a positive relationship with the dependent variable.