CHAPTER I

INTRODUCTION

1.1 Background

Vietnam is an agricultural country of which over 80% of the population is living in and earning from the agricultural sector. Agriculture products share 30% of the total GDP (Cuc, 1995). Thus, the Vietnam government has given high priority to agricultural production, which is considered as the foundation of economic development and vital in economic development strategies.

Coffee, to the annual value of US$ 15,000 million, is produced as a commodity. It is second after oil, in world production ranking (Kushalappa and Eskes, 1989). Altogether, 20 million people throughout the world are employed in coffee growing, of which, most of them are from poor countries in Africa and Latin America. Coffee is the major export and the principle source of foreign exchange for many developing countries and is the key factor in their national development (Oerke *et al.*, 1994).

According to FAO (1998), the harvesting area of coffee in the world was 11, 232,280 hectares and the total output reached 5,988,345 tons in 1997. Coffee is grown in many countries in the world and those countries having large areas of coffee production are Brazil, Colombia, Indonesia, and Vietnam. Table 1.1 shows coffee production in selected countries from 1990 to 1999.

Table 1.1 also shows that world coffee production is not stable. The total output of coffee in Asia increased from 936,600 tons in 1990 to 1,308,801 tons in

1996. In Asia, the country that has the largest coffee production is Indonesia when in 1997 its coffee output reached 481,387 tons.

In Table 1.1 it can be seen that the dynamics of Vietnamese coffee production in comparison to other Asian countries has increased significantly from 9.6 % in 1990 to 29.1 % in 1997.

Table 1.1 Coffee production in selected countries from 1990 to 1997

Unit: thousand tons

Items	1990	1992	1994	1996	1997
Vietnam	92	119	180	320	400
Indonesia	413	421	450	475	481
India	118	180	208	223	205
Philippines	134	127	162	119	121
Thailand	72	80	72	80	76
China	33	38	44	48	48
Malaysia	7	8	11	10	10
Asia	954	1,056	1,158	1,309	1,377
Brazil	1,463	1,293	1,306	1,343	1,171
Colombia	845	965	722	671	721
World (Total)	6,124	6,070	5,763	6,187	5,988

Source: *http://www.fao.org. 1998.*

Coffee was introduced into Vietnam by French missionaries in 1857. Coffee plantations were established in the North Midlands in the late 1800's and in the North Central Coast in the early 20th century. In the 1920s, suitable coffee growing areas were discovered in the Central Highlands region. By 1945, Vietnam had about 10 thousand hectares of coffee, most of which was in the central region.

Because of the low yield (around 0.5 tons/ha), production was only 4500 tons yearly, most of which was exported to France (VINACAFE, 1999).

During the period of 1954-1975 when Vietnam was divided into distinct regions, the North took over the French plantations and established 24 state cooperatives. Coffee production in that period reached approximately 5000 tons in 1968, but gradually declined later due to lack of coffee market and low price. So many coffee farms were replaced by food crops because this time Vietnam had to import a lot of food. In the South, coffee production reached the same value in 1973. Following reunification and peace in the country, coffee production was more than doubled as compared with that of the previous years and eventually reached 12,000 tons in 1980 (VINACAFE, 1998).

Vietnamese coffee production consists of two sectors, including state owned enterprises and the private sector. From the 1980s to the 1990s, the Vietnamese economy changed to become market-oriented which affected the structure of coffee production. According to Phong (1996), during the 1980s, state-owned enterprises occupied about 66% of the total coffee area which produced 72% of the total output, clearly indicating their key role in coffee production. The private sector has also improved rapidly. Now the private sector holds 75% of the sown areas, of which 65% are harvesting areas which produce 77% of the total coffee output.

The new macro-economic policies of the government have allowed the private sector to develop strongly. This has also had positive impacts on the development of coffee production in Vietnam in recent years.

In Vietnam, agricultural commodities such as rice, coffee, and rubber constitute the major bulk of exports. Recently, coffee has become one of the main export products of Vietnam. Vietnam is now close to being the third largest producer of robusta coffee and has a high potential to become the second after Indonesia. Vietnam's performance is particularly impressive and the recent normalization of trade relationships with the United States provides a further boost to coffee industry there (ITC-UNCTAD/WTO, 1996).

The coffee area in the whole country is about 362,200 hectares and the annual gross output is more than 404,000 tons, of which about 382,000 tons is exported. Compared to the coffee area and coffee output from 1975 to 1998, the area has increased 27 times and the coffee output increased 66 times (Sung, 1999). The coffee area and coffee outputs are shown in Table 1.2.

Coffee area and coffee output in Vietnam has increased very fast. At present, the total harvested area accounts for more than 360,000 hectares. In general, production area has increased gradually. Coffee plantation area increased rapidly in the 1990s. Table 1.2 shows that in 1985 the area under coffee was 44,700 hectares, 5 years later the plantation area reached 119,314 hectares which is an increase of nearly 3 times. From 1991 to 1993 coffee areas declined slightly, as it was the transition period where the state owned enterprises were transferred to private entrepreneurs. After 1993, the coffee area has increased significantly and reached 340,300 hectares in 1997. The output of coffee also increased continuously from 136,330 tons in 1993 to 421,000 tons in 1997. From 1993 to 1998 the area of coffee increased around 258 % and the coffee output increased approximately 197 % (Vietnamese statistical yearbook, 1999).

Table 1.2: Planted area and coffee production in Vietnam, 1970-1998

Year	Area ('000 ha)	Compare with the previous year (%)	Gross Output ('000 ton)	Compared with the previous year (%)
1970	9.2		3.4	
1975	13.4	145.6	6.1	180.0
1980	22.5	167.9	8.4	137.5
1985	44.7	198.7	12.3	146.4
1990	119.3	266.9	92	748.0
1991	115.1	96.5	100	108.7
1992	103.2	89.7	119	119.0
1993	101.3	98.1	136	114.3
1994	123.9	122.3	180	132.0
1995	186.5	150.5	218	121.1
1996	254.2	136.3	317	145.3
1997	340.3	133.9	421	132.7
1998	362.2	106.4	404	96.1

Source: *Vietnam Statistical Yearbook.1999.*

Almost all of coffee products in Vietnam area exported. During the 1980's and early 1990's most coffee was exported to Russia. After the collapse of the Soviet Union and Eastern Europe countries, the Vietnamese coffee industry met a lot of export difficulties. From 1991 up to now, coffee export has increased very fast from 93,500 tons in 1991 to 382,000 tons in 1998 (Table 1.3). These is resulted from the changing in policies of the Vietnamese government in agricultural sector as well as in open the door of foreign relationship with other countries in the world.

Table 1.3 shows that the amount of coffee exported from Vietnam has increased rapidly both in quantities as well as value. In 1991, Vietnam only

exported 93,500 tons (approximately US$ 77.6 million), and this amount reached 382,000 tons (approximately US$ 594 million) in 1998. Vietnam obtained its highest coffee export value in 1995 because that year the coffee output of Brazil (the biggest region in terms of coffee production) was low due to drought. So the world supply of coffee decreased and the price increased fast.

Table 1.3: Vietnam Coffee export, 1991-1998

Year	Export ('000 tons)	Price (US$/tons)	Value (mill $ USD)
1991	93.5	830	77.6
1992	116.2	720	83.6
1993	106.0	900	95.4
1994	170.0	1,941	330.0
1995	248.0	2,665	661.0
1996	283.7	1,653	469.0
1997	392.0	1,269	497.5
1998	382.0	1,554	593.8

Source: *http://* www.fao.org, *1999*

Vietnamese coffee is exported to more than 40 countries around the world. The largest market is USA (60,000 tons/ year) followed by EU countries and Japan (Nhan, 1997). Most of Vietnam's export of coffee products were green coffee, because Vietnam's coffee industry, especially the coffee processing sector, is poorly developed due to lack of investments. The development of the processing system is not proportional with the increase in the annual gross output. Coffee processing plants have not established sufficiently at the local production units (Khai, 1997).

Most farmers normally use unspecialized and simple machines to pulp coffee fruit. The average capacity for each machine is 100-200 tons per year. The final product is coffee beans. For the rest of the processing stages, coffee is processed by some factories, which have larger capacity with around 1,000-3,000 tons/year/machine. Because of low management skills, some factories have not been using all their potential capacity. The main problems of coffee processing in Vietnam are lack of synchronization in processing methods, management skills, equipment, and investment all of which have adversely effected coffee grades and prices. These problems have result from low efficiency of coffee processing sectors.

The Vietnamese coffee industry is still very limited in types of products since almost all coffee exports are coffee beans. Other types of coffee products such as instant coffee, candy, cakes, and beverages are produced by a few domestic companies which use small amounts (around 1000-1500 tons/year) of coffee products. Export of green beans explains the 10-12 % lower price of Vietnam coffee than that of other countries. In 1998, the average export price of Vietnam coffee was US$ 1,554/ton, while the price in other countries in the region was US$ 1,610 / ton in the same year (VINACAFE, 1999).

In recent years, some coffee processing machines were imported by private entrepreneurs and some joint-venture companies, but there is still a lack of modern technology for coffee processing. This situation requires a answer from the coffee processing systems since why has there been shortage in coffee processing systems. Is it that there is low efficiency in coffee processing firms or not so that coffee processing systems have not developed enough.

In short, it is necessary to study the economic efficiency of coffee processing systems to understand the problems and prospects of coffee production in order to suggest feasible policies and strategies aiming at improving the coffee industry in Vietnam.

1.2 Problems and Rationale

In terms of coffee quality, Lingle (1996) said that the main reason for the success of the coffee products industry is coffee quality. This quality relies on good processing of coffee beans and beverages to make suitable coffee products. UNCTAD/WTO (1996) concludes that coffee quality is important because of marketing coffee beverages. In previous decades, most people have increased their living standards, thus demands for better coffee quality has been increasing. Producers who do not pay attention to this trend are facing the risk of loosing their markets.

Micheal *et al.* (1979) also emphasized that in coffee processing, speed is highly desirable in order to obtain maximum quality. This is accomplished by organization, planning, training, staff discipline, and by providing reliable and well-maintained equipment of ample capacity to meet peak loads. To increase development in the future, the coffee industry of Vietnam has to improve in all aspects of production from farms to the final products, especially in the processing stages in order to improve the quality of their coffee products.

In terms of coffee prices, Nhan (1998a) showed that many foreign companies have bought raw coffee products from Vietnam and then processed them for sale with higher prices. Foreigners have gained the benefits from coffee processing. An economic efficiency evaluation of coffee processing systems is

needed in order to find out the factors which effect the quality and prices of coffee. The findings of these studies will serve as guides to select suitable methods for increasing profits.

Vietnam's coffee industry has increased greatly in plantation area and yield. According to the coffee developing program of MARD, Vietnam will have a growing area of 400,000 hectares with an estimated total output of 550,000-600,000 tons in 2010. The coffee areas in the Central Highlands occupies 60% of the total area of the country and it is the best location for coffee development (Nhan, 1998b).

According to Phuong (1998), more than half a million hectares of the Badalt area in the Central Highlands has high potential for coffee development. Daklak is the largest province having 164,988 hectares under coffee cultivation with a gross output of 212,144 tons in 1998 (Daklak, 1998). Hence, there is a big gap between coffee production and coffee processing, which needs to be improved. The industrial processes and equipment for coffee production, especially post-harvest techniques such as selection, classification, storing, and packaging should be upgraded (Nhan, 1998b). This entails the study of the economic efficiency of coffee processing firms aiming at providing information and support for investment strategies for coffee processing systems in the future.

As noted above, almost all Vietnamese coffee products are exported. The domestic demand of Vietnam coffee is very low (5-10 %). The amount of exported coffee from Vietnam has increased rapidly in terms of quantity as well as value. In 1991 Vietnam only exported 93,5 tons (approximately US$ 77.6 million), but this amount reached to 358,000 tons (US$ 593 million) in 1998 (Vietnamese Statistic yearbook, 1999).

Coffee production and export in the Central Highlands has not increased as fast as expected to become the dominant region of coffee development in Vietnam. There are many problems which still exist for coffee processing systems there. Answers as to the following questions are needed. Why is there a shortage of coffee processing factories? Is there an unprofitability in processing or because of other factors? What are the obstacles faced by coffee processing firms? What are the attributes of coffee processing productivity? It is necessary to investigate the details of coffee processing firms. So far, research work on these problems is still limited in Vietnam. Studying the economic efficiency of coffee processing firms is the way to understand the root of those problems. This can help to find the reasons for these problems. It is imperative to understand the linkage between the economic efficiency of coffee processing firms and the development of coffee industry in this area.

1.3 Literature review

It would be difficult to provide a concise and up to date global view of all the precise green coffee processes in use (Clifford and Wilson, 1985). In general, coffee processing can be divided in to two types: dry and wet process methods. The dry processing method is the oldest and simplest, consisting of three basic steps. The harvested fruits (cherries) may be subjected to some form of sorting, but are then dried in their entirety, usually in the sun. The dried cherry coffee is then subjected to a milling operation (or hulling, or dehusking) to separate out the green beans. The initial drying of the fruit also means that the final beans are sufficiently dry for subsequent storage and bagging for export. The dry process method, in particular, is ued for about 95% of Brazilian arabica coffee, and is also used in the preparation of robusta coffee in most parts of the world where it is produced (Clifford and Wilson, 1985).

According to Oerke *et al.* (1994) the wet process often produces beans of better quality. After pulp removal in a depulping machine the beans are fermented, washed to remove residual pulp, and then dried. The resulting products are known as horn or parchment coffee. Hullers are then used to remove the hull and silverskin. Both processes produce light, greenish raw coffee beans.

When discussing coffee processing efficiency and prices Michael *et al.* (1979) showed that the dry coffee process is inherently cheaper than the washing processing because it is simpler, thus, less labor and machinery are required. They also compare roasted and instant coffee costs where the costs of green coffee for roasted coffee use were higher than for instant coffee blends. Instant coffee blends are usually half to two-thirds the cost of the blends used for roasted coffee. However, capital investment and operating costs ere considerably higher for making instant coffee than for roasted coffee since grading, packaging, and higher labor skills are required in operating instant coffee processing facilities. Coordinating green coffee growing, processing and bean grading with coffee processing can produce a better grade of green coffee which can be exported at a better price.

The research result of Laak (1992) on arabica coffee production in the highlands of northern Thailand showed that wet processing is to be preferred. Lately there has been increased emphasis on achieving high quality green coffee beans using proper wet processing. However, due to lack of running water or processing equipment in many villages, many farmers practice dry processing.

Report (1988) compared the advantages and disadvantages of both dry and wet methods of coffee processing as:

dry method

advantages	disadvantages
1. Easy method. Moisture content correct if bean rattles inside the husk	1. Takes time to dry (10-15 days).
2. The beans do not have to be at equal level of ripening at harvesting.	2. When the color of the coffee beans is dark, there is a low market price.
3. Dry beans can be keep for a long time, can be transported easily.	
4. No water is needed	

wet method

advantages	disadvantages
1. Good coffee bean color desired on the Thai market.	1. Complicated way of processing.
2. Takes less time during processing (about 7 days).	2. If done incorrectly, one may get a lower quality of coffee beans as compared to the dry method.
	3. Needs more equipment and higher investment.

There is one more disadvantage in the wet processing method since this method creates wastewater, which can adversely effect the environment. It is necessary to add wastewater treatment systems when building new wet coffee plants.

According to Yotopoulos and Lawrence (1973), economic efficiency is divided into two components: technical efficiency and price efficiency. Differences in economic efficiency among groups of firms may be caused by differences in technical and / or price efficiency.

Nonparametric analyses of production data are aimed at testing the consistency of observed behavior with a particular optimization rule and certain

technological restrictions, with no need for maintained assumptions about the form of the production function (Bar Shira 1999). These nonparametric methods have been developed by Afriat, Hanoch, Rothschild, and Varian (1984).

Fawson and Shumway; Chavas and Cox (1988), were gained special popularity in analyzing technological changes and productivity in general, and in the agricultural sector in particular.

Recently, Lee and Chambers (1986) developed a short-run expenditure constrained theory of profit maximization. Färe *et al.* (1990) introduced a nonparametric approach as an alternative to the Lee and Chamber model and applied it to a cross section of eighty-two California rice farms. In this model, constrained and unconstrained profit frontiers were constructed while foregone profit was evaluated as dual evidence for the existence of expenditure constraints. They used multiple output and multiple input technology without constructing indices. This model was used for evaluating the economic efficiency of coffee processing firms in Vietnam.

1.4 Objectives

1. To describe the coffee processing system in the Central Highlands in Vietnam, and

2. To evaluate the economic efficiency of different coffee processing firms using different technologies there.

1.5 Limitations and scope of the study

These research results were based on extensive surveys of the whole system of coffee processing in the region. The majority of the information was collected from interviews with owners of coffee processing firms. Two joint-ventures, which have instant coffee processing plants, and the farmers who are involved in the coffee processing systems were omitted because of difficulties in getting reliable information. Moreover, only a few firms interviewed gave detailed financial reports, therefore most responses were based on the memory of the respondents, which are often unreliable.

Ideally, time series data would have been more appropriate for the study to see the production trends so as to make more meaningful conclusions. Such data were not available so the findings of this study might have limitations.