

Chapter I

Introduction

1.1 Background

The first coffee tree was introduced to Vietnam in 1857. After a long trial period of studying the potential of coffee growing in Vietnam, only until 1910 or 1911 coffee plantation expanded in different places with business target. In 1975, the total area under coffee remained at around 20,000 ha with the production of between 5,000 and 7,000 tons of green coffee. (Nhan *et al.*, 1996)

25 years later, the total coffee area in year 2000 was about 600,000 ha, mainly under robusta coffee, with annual production of over 700,000 tons. That means, after 25 years, coffee in Vietnam increased 30 times in area and 100 times in production. The main proportion of robusta coffee is distributed to four central highlands provinces of DakLak, Gia Lai, Kontum, Lam Dong. DakLak is the largest coffee-producing province of Vietnam with the total coffee area of over 260,000 hectares and average annual volume of over 2 millions tons of fresh weight or 450,000 tons of green bean (DakLak Statistical Department, 2001). In the past decade, coffee has brought a considerable income to the growers and greatly contributed to the socioeconomic development of the province. This has encouraged not only the lowland Vietnamese people to migrate to the central highlands to grow coffee, but also the indigenous people living in the central highlands such as Ede, Giarai, M'ngong, etc. to build up for their own fortune from coffee gardens.

At present, the mono-coffee farms are the dominant system in the coffee-based farming systems of the province. The data from Sung (1997), a former director of Vietnam Coffee Research Institute, found that DakLak's robusta coffee (*Coffea*

canephora Pierre ex Fröhner) under monoculture (intensified) farms gave the highest yields in the world, which averaged about 10.5 tons of fresh berries per hectare. In some regions of the province the yield reached to 25 to 30 tons of fresh berries, equivalent to 5 to 6 tons of green beans (Tu, 1998). To gain such the yield level, the producers have invested highly their capital, and applied technologies, especially chemical inputs. Therefore, their farms depended heavily on external inputs.

Compared to the large proportion and widespread distribution of the monoculture coffee system, the systems of intercropping durian (*Durio zibethinus* Murrery) with coffee, and black pepper (*Piper nigrum* L.) with coffee still occupy a small proportion of the total coffee area of province (Khai, 1996). Yet these systems have been receiving more attention from the coffee producers, because of their benefits in terms of income diversification, low cost of production and sound environment. Hence, these systems are being considered as the potential models for the poor farmers and the smallholders. In addition, studies and researches on these are being encouraged by the local government to develop sustainable coffee production and toward producing the organic coffee with minimum or without external inputs.

In the history of coffee production, the coffee price has a wide fluctuation and instability. During the past 4 years, the price of coffee has been being low, sometimes has been lower than the costs of production. There was little expectation that this will change in the short run. Most of the coffee farmers of the province are small-scale producers now are experiencing a substantial decline in their meager incomes. Chronic low prices undermine the capacity of farmers to produce a quality products and maintain its economical value. The study aims at contributing to develop the properly technical methods for sustaining coffee production. This is in order to help the coffee producers in protecting their natural resources, sustaining their livelihoods, and diversifying their income.

On other hand, in recent years, most of the producers have been facing with the risks such as severe drought during dry season, yield decrease, pest outbreak, soil

degradation. Couple with the sharp drop of the coffee price in the world market has caused great income losses to the growers. But in this situation, some of the coffee farms could still give stable productivity and gain benefits. Therefore, three interesting research questions were raised. They are (1) what technologies have been applied to these farms so that they could stabilize their farms' productivity. (2) Whether or not intercropping coffee based farming systems can be the models for sustaining coffee production of the province. (3) how to manage the farms for sustainable production in order to reduce risks in case of a long-term low coffee price and other natural calamities.

1.2 Rationale

With influence from the Green Revolution, the coffee research sector has been focused on raising the crops yield. Therefore, most of the coffee farms were established in forms of monoculture farms (sun-coffee farm) with intensive cultivation, and depended heavily on external inputs. Several studies on technological application have mainly followed this trend. Numerous research results applied to increase production during past two decades have met the growers' demand initially in raising coffee yield and improving their income. However, the negative impacts of the Green Revolution such as soil degradation, diseases outbreak, low biodiversity. have been reported. Meanwhile, many intercropping coffee-based farming systems with plentiful potentials have not been considered by the research.

On the other hand, all of these research results were applied not only for monoculture but also for intercropping farms. This led to a lack of appropriate technologies for coffee intercropping farms. The technologies applied to intercropping systems have often resulted in high production cost. The farmers chiefly relied on external inputs to manage their farms. Meanwhile, farmers' practices on replacing a part of nutrient inputs by organic matters and managing pests by biological control on farm have been limited. Therefore, research on intercropping farms is needed to contribute to improve producers' skills in practices for reducing production cost, diversifying income and sustaining productivity.

Apart from the constraints, so much good farmers' knowledge and skills, which have been applied to practices, should be evaluated and learnt for scaling out, so that the knowledge could be shared and disseminated with similar conditions not only for the farmers in the studied village, but also with the others.

1.3 Objectives

The objectives of the study are:

1. To describe the technology applied to three coffee-based farming patterns (systems) in order to understand how the farmers managed their farms
2. To analyze among the intercropping and mono-coffee systems in terms of productivity and ecological aspects
3. To identify the best farm practices in each pattern (system) and use them as the demonstration models for learning process of the technological improvement in coffee production