

# CHAPTER 1

## Introduction

Cluster is the key factor of area-based development whereas the environmental friendly relation brings about the balance of economic and ecological systems leading to sustainable development. Therefore, the uses of two concepts above to develop the Arabica coffee supply chain of highland farmers cause sustainability and the building of competitiveness on the farmers under an uncertain competition from AEC.

### 1.1 Rational

Arabica coffee is one of the famous economic crops in the northern region of Thailand. Various organizations and highland development projects such as the Royal Project Foundation (RPF) and the Highland Research and Development Institution (HRDI) have promoted the highland farmers to acquire the skills in cultivating Arabica coffee for creating their occupations and income as well as decreasing opium areas and forest encroachment. Because of an appropriate geography and climate of the highland areas in the northern region, Arabica coffee is successful in production and market acceptance, both in quantitative and qualitative aspects.

In the present, the proportion between Robusta and Arabica coffee yields in Thailand is approximately 85:15 percent, which is higher than the proportion in 2008 that was equal to 93:7 percent. The main reasons are not only the promotion and development of government and private agencies, but also the increase in coffee prices where it has been the crucial motivation for farmers to expand the space for growing Arabica coffee. Considering the Arabica coffee production in the northern Thailand, the production trend indicates that the total cultivation areas of Arabica coffee have expanded from 37,581 rais in 2012 to 64,239 rais in 2016 resulting in the increase of yields from 6,047 tons to 9,240 tons at the same time (Office of Agricultural Economics, 2016). The high proportion of the total areas is in the province of Chiang Mai and Chiang Rai.

However, under the changes from the traditional trade systems to free trade systems, especially on entering the ASEAN Economic Community (AEC) in 2015, the doors have been widely open for high international trade and competition of various agricultural products, such as palm oil, soy bean oil, raw silk, sugar, fruit and vegetables, and tea and coffee (Supat Sanguandeeikul, 2011). These changes will inescapably affect Arabica coffee farmers, particularly the farmers who receive incomplete information. The less capable farmers will be lacking access to information, while the ones at a highly disadvantaged position will be severely affected by trade liberalization.

Considering the context of the Arabica coffee farmers in the Pamiang Royal Project Development Center (the Pamiang RPDC) area that have produced the highest yields of Arabica coffee under the promotion and development of the RPF (RPF, 2011), although they have been promoting and developing their production and technologies, as well as being supported through a socioeconomic farmer grouping by the RPF, the group relies on the staff for assistance and guidance. The farmers lack the basic understanding on the purpose of being self-reliant, sharing ideas, doing a joint plan production and marketing (HRDI, 2009). Similarly, with regards to the farmers in the Pang Ma-O Royal Project Extension Center (the Pang Ma-O RPEC) area under the promotion and development of the HRDI, although their major earnings have come from tea and coffee cultivating, most of them are faced with the problems of coffee quality and lack of cooperation in the communities. These issues are considered as a significant weakness for the farmers' competitiveness.

With the philosophy of the sufficiency economy and area-based economic development perspectives, the strength of the community will take place if the local economy is able to be associated with the industries by means of the supply chain. Agricultural communities not only supply raw materials and labors, but they also play a role as upgrading partners by adding the value on agricultural product, providing products that meet the needs of the industry, and using the industry as the economic gateway to link the outside areas. The key and common issue in establishing a linkage in supply chain based on the agricultural community is the industrial cluster defined as geographic concentrations of linked agricultural organizations, such as farmers, agri-business, government and private agencies, etc., in horizontal and vertical linkages for achieving

the goal of sustainable competitiveness enhancement in their field (Porter, 1998, 2003; Patti, 2006). In addition, the supply chain development takes into account the environmental friendliness as another important means for creating value for the Arabica coffee supply chain and enhancing the competitiveness of Arabica coffee farmers in the highland areas (Wu and Dunn, 1995; Walton et al., 1998; Sheu et al., 2005; Kampstra et al., 2006; Vachon and Klassen, 2006).

There are research questions regarding on how to develop the Arabica coffee supply chain network in highland area by using the framework of the green cluster supply chain (GCSC), the collaboration in cluster supply chains concerning with being environmentally friendly, and this framework will help create value and enhance competitiveness for the farmers in the highlands, or not. Therefore, this dissertation aims to explore the conditions and environmental factors before a cluster development in the green supply chains of Arabica coffee farmers in Pang Ma-O and Pamiang villages of the agricultural communities in the highland areas, for gathering the data-base and knowledge used in planning and developing GCSC; the GCSC will be formed into prototypes by using scenario modeling in the view of cost reduction, revenue increment, and competitiveness enhancement.

## **1.2 Research objectives**

- 1) To explore the conditions and environmental factors before a cluster development in the green supply chains of highland Arabica coffee.
- 2) To estimate the optimal green cluster supply chain systems of highland Arabica coffee.
- 3) To evaluate the value sharing to the farmers in green cluster supply chain.
- 4) To assess the farmers' competitiveness in the green cluster supply chain.

## **1.3 Benefits**

The findings of dissertation will bring about the optimum GCSC prototype in the selected highland areas leading to the rise of farmers' income and well-being. Moreover, the relevant agencies can bring this prototype as an application for the policy of highland development and expanding to other areas.

## **1.4 Scope of research**

The nature of this research is an area based research and development that applies the GCSC concept and econometrics methods as the tools for analyzing the supply chain optimization, revenue sharing, and farmers' competitiveness. The scopes of research are the following:

### **1.4.1 Area Scope**

Because there are many cultivation areas of Arabica coffee receiving the support under the RPF and HRDI, the criteria of the area selection depended on the amount of yields and the feasibility in environmental participation. The research framework focuses on highland coffee farmers in the Chiang Mai province. Two areas, Pamiang in the Doi Saket district and Pang Ma-O in the Chiang Dao district are selected in this research by the criteria of the highest amount of yields and the feasibility in environmental participation, respectively. In addition, two assemblers (the Pang Ma-O RPEC and the Pamiang RPDC) and one processor (the RPF) are selected as the samples in this research.

### **1.4.2 Content Scope**

In this research, the analysis of Arabica coffee supply chain is scoped in the three-stage supply chain from the farmers to the assemblers and processor because in the context of the Arabica coffee supply chain in the highland, most of the farmers have sold their products to the RPF through the Pang Ma-O RPEC and the Pamiang RPDC who play the roles as the assemblers. The sales volume of the farmers depends on the production plan of the RPF. Consequently, the activities of the two groups, the RPF, and the Pang Ma-O RPEC and the Pamiang RPDC, have the direct impacts on the farmers. In addition, the parchment coffee of the farmers, the Pang Ma-O RPEC and the Pamiang RPDC, and the coffee bean of the RPF are determined for the product used in the analysis because the farmers sell their products to the RPF in the form of the parchment coffee, while the RPF sell the high proportion of coffee bean to the buyers according to the buyer's orders.