

# CHAPTER 1 INTRODUCTION

## 1.1 Background and Significance of Study

Leafy vegetables are important crops in Southeast Asian countries that provide income to many small farmers, processors, and other entrepreneurs, and serve as an important healthy food for the rural and urban populace. Leafy vegetables are rich sources of vitamins, minerals, and dietary fiber. Deficiency in vitamin A is a major problem in 37 countries, mostly in Southeast Asia and Africa, with 250,000-500,000 people, mostly children, becoming partially or totally blind yearly. More than 2 billion people worldwide are anemic or have insufficient iron intake. Green leafy vegetables are rich in vitamin A, C and iron. Sustainable and reliable food supply systems are needed to ensure global food availability, access to food at the household level, and more opportunities for development of people's well-being (Acedo, 2010). Leafy vegetables are a highly variable group of crop plants that can be broadly defined as vegetables grown for their edible leaves. However, the distinction between leafy and non-leafy crops is not always clear. Leafy vegetables include, among others, spinach, turnip, parsley, lettuce and cabbage.

Cabbage (*Brassica oleraceae* var. *capitata* L.) is an economically important leafy vegetable crop in Thailand with a production per year of about 222,826 tons and is one of the most widely cultivated vegetables in Northern Thailand, particularly in Chiang Mai and Phetchabun provinces (DOAE, 2009). The traditional supply chain for cabbage is generally long and complex. Before cabbages reach the market, they are traded by collecting agents at the village and district levels. Often, cabbages have to be transported over long distances from the production areas to the market. Poor handling can result in significant product loss. Quality losses are in the forms of yellowing of outer leaves, wilting of leaves and physical damage of head during transportation (Cantwell and Suslow, 2007). Postharvest losses of leafy vegetables vary with commodity, location, growing season, and other factors such as standards of quality and consumer preferences and purchasing power, which differ greatly among countries and across cultures (Boonyakiat, 1999). Postharvest loss estimates in developing countries are alarming (e.g. 20-50% of production), and efforts are still lacking to establish the seriousness of the problem and the interventions needed (Kader and Rolle, 2004). Low

temperature or cold storage is the single most effective method of prolonging the postharvest life of fresh produce. It reduces respiration rate, ethylene production and sensitivity, moisture loss, and growth of pathogens (Cantwell and Suslow, 2007). However, the technologies for reducing postharvest losses need to not only be environmentally friendly but also affordable to small farmers and rural enterprises. In addition, cabbage is a highly seasonal crop with an oversupply during production peaks and undersupply during the lean season, which results in highly fluctuating prices. Cabbages reach the retail markets at least one or two days after harvest, thus quality significantly decreases in that time. Therefore, maintaining the postharvest quality of cabbage with supply chain management integration is important for all players in the cabbage supply chain.

## **1.2 Objectives**

- 1.2.1 To map and analyze the cabbage supply chains in Phetchabun province and the Royal Project Foundation in Chiang Mai province, Thailand
- 1.2.2 To assess the postharvest loss of cabbages in supply chains
- 1.2.3 To perform cost analysis of cabbage supply chains in Phetchabun province and the Royal Project Foundation in Chaing Mai, Thailand
- 1.2.4 To determine consumer preferences of cabbage quality in Thailand
- 1.2.5 To analyze the nutritional quality in different leaf layers of cabbages
- 1.2.6 To determine the efficacy of low temperature storage in maintaining the postharvest quality of cabbages in supply chains
- 1.2.7 To recommend the good quality management system for cabbage supply chain

## **1.3 Scope of Research**

- 1.3.1 Assessment of cabbage supply chains and postharvest losses in Phetchabun province and the Royal Project Foundation in Chiang Mai province, Thailand
- 1.3.2 Evaluation of the cost effectiveness of the cabbage supply chains
- 1.3.3 Development of techniques to reduce postharvest losses and maintain the quality and shelf life of cabbages

## **1.4 Expected Results**

- 1.4.1 Knowledge on the characteristics of cabbage supply chains in Phetchabun province and the Royal Project in Thailand
- 1.4.2 Identification of critical points of quality losses in cabbage supply chains in Phetchabun province and the Royal Project Foundation in Thailand
- 1.4.3 Techniques to keep better quality of cabbages and reduce logistics costs of cabbages in supply chains
- 1.4.4 Interventions to improve the performance of cabbage supply chains for Phetchabun province