

CHAPTER 5 CONCLUSION AND RECOMENDATION

5.1 Conclusion

The traditional and modern supply chains for cabbage from Phetchabun province and Royal project foundation, Chiang Mai, Thailand, were investigated. The traditional chain consisted of farmers, collectors, wholesalers and retailers while the modern chains included farmers, packinghouse, distributor and retailers. Farmers in traditional and modern chain incurred the highest loss of 15% in the traditional chain, while the modern chain incurred a loss of about 8% mainly due to insect damage. Collectors, wholesalers and retailers in the traditional chain incurred an average loss of 7% each due to physical damage. In the modern chain, the packinghouse incurred an average loss of 3% each due to physical damage and weight loss. The total loss of cabbage in traditional and modern supply chains was about 19-35%. Factors contributing to losses included climate, improper packaging, infrastructure, transport, sanitation and lack of understanding or knowledge of quality management. Farmers only focused on production with no postharvest value-added activities. The major cause of loss of cabbage was physical damage during transport from farm to retailers. The wrapper leaves were the most important in protecting the head from damage during transport. However, if there were too many wrapper leaves during transport, transport cost and wastage increased. Therefore, cabbage heads with at least 2 or more wrapper leaves were the most effective in maintaining the postharvest quality during transport from farms to retail markets. Interestingly, the most severe loss of cabbage heads was found on the top layer of the truck at about 25% loss in non-wrapper leaves of cabbages and a little physical damage in the middle or bottom parts on the truck. We recommend that cabbage farmers keep at least 2 wrapper leaves after harvest to prevent bruising of cabbage heads during transport and fasten the top layer of cabbages on the truck to avoid severe postharvest loss.

These finding were used in developing the quality management model for cabbage. With this and low farmgate price, the farming venture gave high income to farmers, with those in the modern chain being better off (96% ROI) than those in the traditional chain (89.2% ROI), since the latter had higher production cost and lower farmgate price. Additionally, in the traditional chain, the return on investment (ROI) of collectors,

wholesalers and retailers was almost same (22.3%, 22.1% and 20% ROI) while in the modern chain, the ROI of distribution was highest among modern chain actors (75.7%).

Besides, the level of awareness of GAP among the traditional farmers in the Phetchabun province is low. Therefore, promotional campaigns have to be intensified to increase awareness. In addition, training and extension services have to be conducted on an extensive scale to ensure that larger farming communities benefit from the scheme. Due to the lack of quality control arrangements, the farmers are lacking market information and access to gain higher quality. A private quality control system should be developed to improve trust between the farmers and buyers. Technical support should be provided to the farmers by the quality control authority in coordination with local government agencies. Small farm size in cabbage production made the farmers gain higher yields and have less production costs.

High yield and less cost productions are important issues for farmers. Understanding consumer's need is the most important for farmers in order to make the cabbage to meet the consumer requirements. Sanitation (4.00 ± 0.08), freshness (3.91 ± 0.09), chemical residue (3.52 ± 0.08), compactness (3.48 ± 0.14), price (3.38 ± 0.09), defects (3.25 ± 0.10) as well as size (3.05 ± 0.05) of cabbage head were the most important factors in purchasing decisions for consumers.

Chlorophyll, carotenoid, ascorbic acid and soluble solids contents of cabbage differed with leaf position in the head. Outermost leaves had the highest chlorophyll, carotenoid and ascorbic acid contents while the innermost leaves had the highest soluble solids content.

Low temperature storage remarkably increased storage life of cabbage. Storage life was about 18 days at 4 °C and 12 days at 10 °C compared with only 4 days at 28 °C. The extension of storage life was due to the reduction of losses in chlorophyll and water content, thus maintaining the green color and turgidity of the leaves. Respiration rate and ethylene production were likewise retarded with low temperature storage, thus delaying senescence. In addition, low temperature storage reduced the losses in soluble solids and ascorbic acid contents, thereby preserving the nutritional value of cabbage.

5.2 Recommendation Model for Cabbage Quality Management

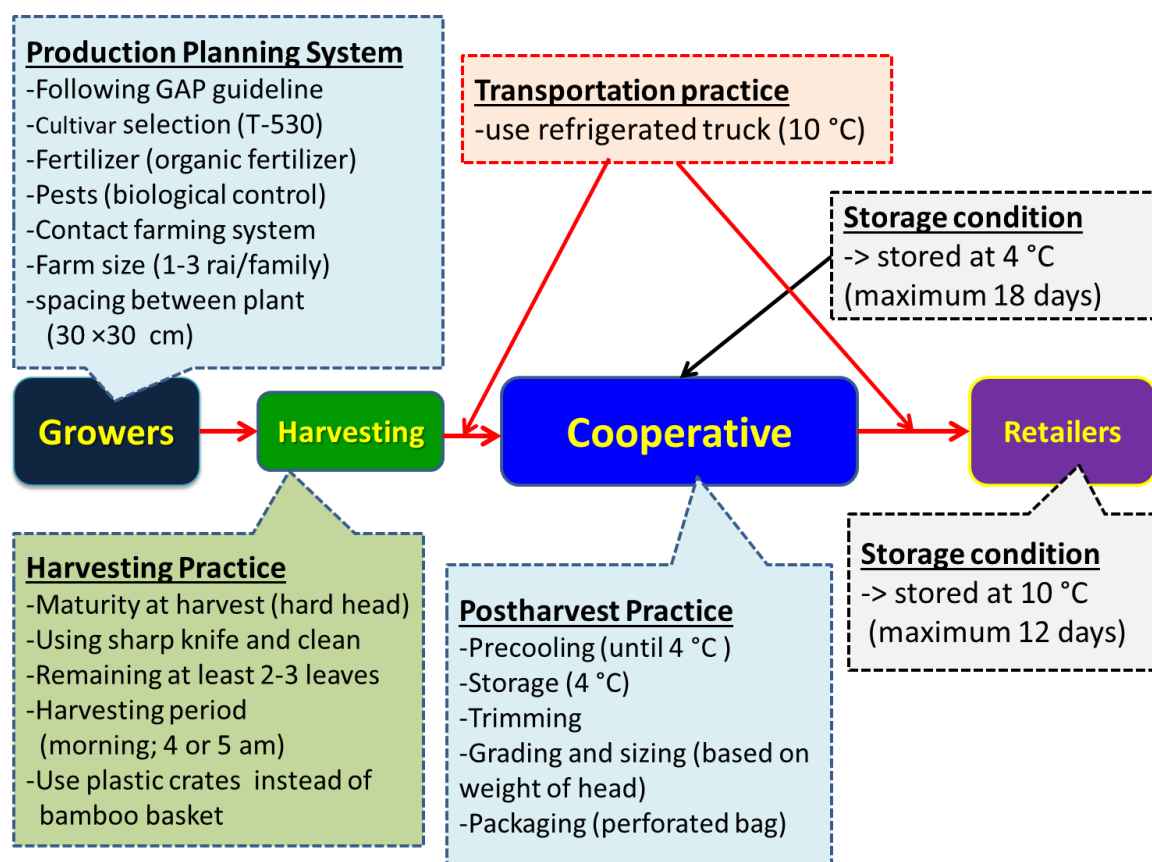


Figure 5.1 Recommended model to produce good quality cabbage in the supply chain.