



Assessing the economic efficiency of post-harvest activities in fresh vegetable supply chains in Vietnam

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5. Conclusion

The results obtained in the study were concluded as follows:

- Weak points occur in all stages along supply chains. These points cause quantitative and qualitative losses and food safety in for both marketing flows, especially in ordinary marketing. These also strongly affect benefits and long-term business of actors in supply chains. The reason is mainly a lack of knowledge and poor facilities in post-harvest handling technique. It is in need of an appropriate post-harvest handling method that could raise profits, maintain quality and reduce losses. It is also important for growers and traders to change the their attitude toward reducing post-harvest losses and that help to enhance their profits and benefits of long-term business.
- Two kinds of vegetable are produced and distributed separately in two marketing flows. Producers have been supported to access better cultivation methods. However, no training course on post-harvest handling technique has been offered to the producers as well as traders in the surveyed channels. There is lack of controls of authorities on food safety and quality in whole marketing chains. Trustful relationships are the main ways among consumers, traders and producers.
- With different requirements for post-harvest activities, actors receive different profits through different marketing channels. Growers and retailers receive higher profits in safe vegetable marketing channel where post-harvest activities require higher. However, there is no difference between collector profits in two channels.
- Post-harvest costs are significantly higher in safe marketing channel than conventional marketing channel partly due to higher post-harvest requirements for safe vegetables (pre-processing, packaging, transporting, selling and keeping conditions). However, higher post-harvest costs lead to lower loss ratio for safe vegetables.
- The safe vegetable channel is economically efficient compared to the ordinary channel due to higher post-harvest activities. Stakeholders in safe vegetable supply chains receive higher profits per one unit of investments and one unit of working hour.

- There is significantly a positive correlation between the post-harvest cost of actors and their net profits in both channels. Positive correlations for all group actors suggest that their net profits increase linearly with their post-harvest costs.
- Post harvest activities were economically profitable. Post-harvest operations raise net profit of stakeholders. Profit increment for safe tomato actors were higher than profit increment for ordinary tomato retailers, especially actors in down-stream stages (from 15 to 26%). Post-harvest activities of stakeholders in the up-streams stages could impact their profits and other actors in down-stream stage as well.
- Different post-harvest activities of actors had different influences on their profits. Pre-processing (sorting, cleaning, packaging, labelling) of producers lead to higher net profits, otherwise ripening treatment had no effect on their profits. Handling operations (proper packing, handling and transporting) of collectors had a positive impact on their net profits. However, shipping container size (up to 25kg) had a slightly a negative effect on profits of collectors. Post-harvest activities (such as sorting, shaded and hygienic selling place and good keeping condition) contribute to raise retailers' net profits.
- Beside post-harvest activities, net profits were also affected by others factors such as business inputs, education and age. Buying quantity had a significant and positive impact on the trader profits. The education status of actors lead to higher profits considerably, perhaps because with better education they absorb improved post-harvest handling technique easily and in correct way. Age collectors had no effect on their profits, but age of producers and retailers had a negative impact on their profits because young retailers are willing to apply new technique.