



Title	Study on Safe Vegetable Supply Chain of Supermarkets in Vietnam
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Citation	北海道大学. 博士(農学) 甲第14156号
Issue Date	2020-06-30
DOI	10.14943/doctoral.k14156
Doc URL	http://hdl.handle.net/2115/82855
Type	theses (doctoral)
File Information	Nguyen_Thi_Kim_Oanh.pdf



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**Study on Safe Vegetable Supply Chain of Supermarkets in
Vietnam**

(ベトナムのスーパーマーケットによる安全野菜のサプライチェーンに関する研究)

**Hokkaido University Graduate School of Agriculture
Division of Bio-systems Sustainability Doctor Course**

Nguyen Thi Kim Oanh

Acknowledgements

I would like to express my sincere thanks to all those who supported and encouraged me to complete my doctoral journey.

My sincerest gratitude to Professor Hiroshi SAKAZUME, my supervisor, for his continuous precious support, immense guidance and encouragement. All the field trip surveys he joined with me in Vietnam help my research become more meaningful. His kind supports and enormous attention to my research and my study life have been helped me during my study journey. Also, my special thanks to Dr. Agr. Yoshiharu SHIMIZUIKE, for his encouragement and valuable suggestions throughout the period of my study.

I would like to sincerely thanks to Vietnamese government for granting me a scholarship (Program 911) that without this I would not have been able to come and pursue my PhD study in Japan. My thanks will also extend to the Vietnam National University of Agriculture where I have worked as a lecturer, my colleagues at the Faculty of Accounting and Business Management who gave me the permission for studying abroad and supported me during my study.

My field surveys in Vietnam cannot be success without the kind support from many organizations and individuals. My sincere thanks to Dr. Nguyen Thi Tan Loc, Fruit and Vegetable Research Institute, for her valuable input and for providing many contacts and useful advices for my research. My thanks to Ms. Vu Thi Thanh Huyen, Sorbone Business School, Université Paris Panthéon Sorbone, Ms. Nguyen Thi Dan, for their kind support in field surveys, and valuable advices as well. My sincere thanks to all participants who were involved in my research for providing me the primary materials and valuable information to produce my thesis.

My special thanks to Prof. Carpenter for editing and correcting English. I would like to thank staffs and friends at the Department of Agricultural Economics, and my laboratory mates. My special thanks to Dr. Yuko WAKIYA, Ms. Zheng Haijing for their kind support not only on my research but also for my life and many other things. You are my family in this second home of mine. My sincere thanks to Mr. Akiyama for his kind

help on my study life and translating the reviewer comment in my paper from Japanese to English. Thanks to all my Vietnamese friends in Hokkaido University: Nguyen Thi Thuy Hang, Pham Quoc Quynh Anh, Ms. Hanh, Ms. Dang Thi My Linh, Ms. Truong Thi Cat Tuong, Dr. Le Minh Tam and others for sharing the moments in my study life. My thanks to Ms. Le Thi Thu Huong, PhD student in Kyushu University, for sharing and encouragement when I am down.

Last but not the least, my PhD research would have not been possible without the love, moral support, encouragement, sacrifices, prayers from my parents, parents in - law, brothers and sisters, relatives, friends and my lovely family: my son Pham Tien Dat who is my most motivation to complete my PhD research, and my husband Pham Ngoc Tiep who shares all happiness and stress time during 3 years and always encourage me to complete the PhD journey successfully. To all, thank you very much and I love you all.

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Abbreviations

CB	Certification Body
EU	European Union
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
GAP	Good Agricultural Practice
GSO	General Statistics Office of Vietnam
HQ	Hygiene & Quality
M & A	Mergers & Acquisition
MARD	Ministry of Agriculture and Rural Development
MOST	Ministry of Science and Technology
MRLs	Maximum Residue Levels
NGO	Non - Government Organization
QC	Quality Control
RAT	Rau An Toàn (In Vietnamese)
SKU	Stock Keeping Unit
TCVN	Tiêu Chuẩn Việt Nam (Vietnamese)
VietGAP	Vietnamese Good Agricultural Practices
WHO	World Health Organization
WTO	World Trade Organization

Introduction

1. Background of the research

Food quality and food safety issues are drawing considerable attention throughout the food supply chain in Vietnam, especially related to vegetables owing to the increasing of pesticide residues in production (Nguyen-Viet *et al.*, 2017; Pham *et al.*, 2016; Van Hoi, Mol and Oosterveer, 2009). On the demand side, the increasing pesticide availability found on vegetables (Pham *et al.*, 2016) has led in recent years to consumer concern over food quality and safety. In the period 2011-2016, Vietnam witnessed 1,007 food poisoning outbreaks that involved approximately over 30,000 cases and causing 164 deaths (Chinh Phu, 2017). Thus, it has become necessary to reduce consumer uncertainty about food safety and quality by providing more guarantees and information regarding these issues. Vietnamese government, therefore, made an effort to improve the food safety by setting numerous standard in vegetable industry. In 1998, 'Safe vegetable' was first introduced by the Ministry of Agriculture and Rural Development, followed by the introduction of VietGAP and organic that was born from 2008 and 2006, respectively.

In addition, Vietnam is at the early step of retail modernization with the emergence of a large number of modern retail stores (Masayoshi and Le, 2012). The first supermarket appeared in Vietnam in 1993 (Mark and Luc, 2002). The number of modern retail outlets has risen significantly between 1995 and 2015, from only 10 supermarkets to 812 outlets (Nguyen and Sakazume, 2020). The rapid expansion of supermarket in Vietnam is a result of incentives from Vietnamese government for food safety and modernization of food distribution (Nguyen-Viet *et al.*, 2017). In order to enhance product quality and differentiate their products from those in traditional markets, supermarkets have found they need tangible proof of good practice via certification system for safe vegetable.

The emergence of safe vegetable together with increasingly consumers' concern on food safety and quality, and the higher imposition from supermarket to differentiate with traditional market have increased the pressure for producers to engage in standards system for safe vegetable, that have resulted number of changes in fresh food supply chain. However, farmers' adopting the standard is still low, only around 10% of vegetable was

certified as safe vegetable (Nguyen-Viet *et al.*, 2017). In addition, the implementation of standards for safe vegetable remains controversial since many farmers just adopt the certification to meet the requirement from supermarket, and thus, do not fully compliance with the standard.

The marketing channels of agricultural products can be grouped into two channels: traditional and modern distribution systems (Masayoshi and Le, 2012). As for vegetable supply chain, while the structure of conventional supply chain involves a large number of intermediaries, the safe vegetable supply chain especially to supermarket seem to be short chain with fewer actors. Since consumers are increasingly enjoying the supermarket shopping experience and placing their trust in the reliability of supermarket food quality, supermarkets, therefore, become more important actor for distributing safe vegetables. The emergence of supermarket has created the changes through which safe vegetables move from producer to consumer and participating actors in the supply chain. It is, therefore, meaningful to understand the supply chain of safe vegetable by supermarkets in Vietnam, especially the distribution and procurement practices by players in safe vegetable supply chain.

2. Review of previous researches

2.1. Supply chain of fresh agricultural products

(Tan and Shaw, 1998) explains the supply chain as a network of business units that produce materials, transform these materials into intermediate and final products, and deliver them to customers via a distribution system. Similarly, the supply chain consists of a number of organizations that are involved in transferring goods from the point of production to the point of consumption (Plazibat, Čejvanović and Vasiljević, 2016).

Research on fresh foods supply chain has received the great attention from many researchers in both developed countries and developing countries.

(Lemanowicz and Krukowski, 2009) provide an overview of the fruit supply chains in Poland, Spain, Greece, and the Netherlands. Their results indicated that, in all four cases, the players involved along the supply chains are the same including nurseries, producers, intermediaries such as cooperatives, fruit processors, wholesalers, retailers and

the end consumers. The differences lie majority in the degree of concentration at each step of the supply chain.

Research on the supply chain of fresh fruit and vegetables in Germany, the result of (Volker *et al.*, 2007) indicated that the supply chain of fruit and vegetables is characterized by a large number of different participants, and a wide range of distribution channels exist. The major trend is the increasingly importance of retailers at the expense of wholesale business. (Negi, 2014) discusses about the status of fruit and vegetable supply chain in India and supply chain efficiency and suggests that the supply chain of fruit and vegetable is greatly inefficient which lead to the big losses and less income to participants in the chains.

(Zakaria and Abdul Rahim, 2014) provides an overview of fruits supply chain in Malaysia and indicates the major players along the supply chain consist of producers, intermediaries such as collectors/wholesalers, retailers and consumers. Their result also identifies that the fruit supply chain of fruits of independent farmers is similar with contract farmers.

Some studies have focused on food supply chain of supermarkets. (Perena, Kodithuwakku and Weerahewa, 2004) focused on the vegetable supply chain of supermarkets in Sri Lanka to examine whether the emergence of supermarkets has created the alternative supply chains that are different from the existing traditional supply chains. Their research analyzed the structure of three type of supermarket vegetable supply chain operating in Sri Lanka including (i) supermarkets with a small number of outlets (one or two outlets); (ii) supermarkets with a fairly large number of outlets (seven or eight outlets); (iii) supermarkets with the highest number of outlets (i.e.64). They concluded that supermarkets create alternative supply chains of vegetables, but, it is created only with respect to supermarkets with the large number of outlets.

(Chin, 2015) examines the influence of supermarkets in Malaysia's food system, focusing on the supermarket-farmer relationship via contract farming. The results indicated that the supermarket is dominant, however, the relationship between supermarkets and small farmers is indirect and supermarkets have little direct interaction with contract farmers in contract farming. (Blandon, 2006) accesses the form and level of

smallholder farmers participating in the supermarket supply chain of fresh fruit and vegetable. The results indicated that collective action allows small farmers to actively participate the supermarket supply chain, suggesting the lower transaction costs and facilitate for small farmers in new food supply chain. However, the participation of small farmers in supermarket supply chain is still minor and there is still lack the evidence to conclude that the participation in the supermarket supply chain has positively impact on the small farmers' livelihoods.

2.2. Global value chain approach

Value chain analysis has become one of the most prominent and useful tool to evaluate of food marketing and distribution. Many researches based on Global value chain theory have been grown.

(Dolan and Humphrey, 2000) analyzed the fresh vegetable trade linkages between Kenya and Zimbabwe producers and UK supermarkets from global commodity chains perspective. Particularly, they have paid attention to the governance of the chain, and highlight the role played by large retailers in defining the outputs and structure of the chain and the impacts of requirements from supermarket on producers and exporters. The result identified that the market for fresh vegetables imported in UK supermarkets from Africa has increased in volume and product variety. This not only developed the market for imported vegetables, but also led to the transformation in the trades' structure and participating actors. The governance of the chain is the major factor in this transformation, focusing on three different aspects:

- ✓ The positioning of the chain: UK supermarkets make the main decision about the positioning of the chain. They decide which characteristic that the product meet to supply consumers (quality, consistency, variety, processing, product combinations, packaging, reliability of supply and price).
- ✓ The structure of the chain: UK supermarkets increased their control by reducing the number of suppliers and tightening the linkages along the chain. The main participants in the chain remained (producers and exporters in Africa, UK importers,

UK supermarket), however, the number of participating actors and the relation amongst actors changed.

- ✓ Meeting performance standards: Producers and exporters have to meet the standard from retailers. Supermarkets decide about the inclusion and exclusion to ensure the standard they required are met. Poor performance in food hygiene and safety standards may lead suppliers being excluded from the supermarket chains.

(Reardon, 2006) argued that new procurement system with four key pillars replaced the old purchasing system based on sourcing from traditional wholesalers and the wholesale markets in developing countries. Four key pillars include: (1) specialized procurement agents that called ‘specialized/dedicated wholesalers; (2) centralized procurement through Distribution Centres; (3) assured and consistent supply via ‘preferred suppliers’; (4) high-quality and increasingly safe product via private standards imposed on suppliers. These standards, generally, play the functions as instruments of coordination of supply chains by standardizing the requirements of product over suppliers.

(Schipmann, 2006) compared value chain of chili on national market and export market with regard to benefit and barriers to integration for smallholders in Ghana. The direct comparison of fresh chili for national and export chain showed that the export market provides additional benefits such as higher income, more secure income source, upgrading possibilities. However, the entry barriers are higher in the export market. In other way, the comparison of all value chain (fresh chili, dry chili, chili powder) in the national market with one for export market showed the different results. Specifically, the non-traditional chain of chili powder offers more benefits than the export chain. However, entry barriers are highest in this chain. The author, and thus, concluded that the difference between national market and international market is not the decisive distinction for potential benefits and entry barriers; it is rather the final supplied products.

2.3. Standards and certification system on food value chain

2.3.1. Effects of standards on developing countries

The effects of public and private standards on developing countries’ agricultural sectors have been carried out by various researches.

Standards have become a particularly important issue for developing countries, where compliance with standards may be difficult, however mandatory for market access to value-added markets (Farina and Reardon, 2000; Henson and Loader, 2001). Some reasons were discussed as explaining the increasing importance of food standards in developing countries such as globalization of food production, consumers' demand for high-quality and safe product, increased importance of trade in fresh products, changing structure of agri-food chains, foreign investments and enhanced technical and scientific knowledge (Trienekens and Zuurbier, 2008; Maertens and Swinnen, 2009; Henson and Humphrey, 2009; FAO, 2010; Maertens and Swinnen, 2007).

The literature on food standards has focused on two analytical approaches (Jaffee and Henson, 2004). The first approach focuses on international standards ruled by members of the World Trade Organization (WTO) and how these have broadened the standards of developed countries. Most studies consider standards as barriers, highlighting the technical and managerial difficulties that developing countries face in compliance (Augier, Gasiorek and Lai Tong, 2005; Brenton and Manchin, 2002) and the high cost of compliance with standard exclude small farmers from export value chain (Dolan and Humphrey, 2000; Graffham, Karehu and MacGregor, 2007). The other literatures suggest that private voluntary standard act as catalysts for modernization and processes of upgrading in the food supply system or enhanced competitive positioning to global market from developing countries (Henson and Humphrey, 2010; Jaffee and Henson, 2005; Jaffee and Henson, 2004).

(Maertens and Swinnen, 2009) discussed the impact of trade on poverty that affected by public and private standard in trade for vegetable export chain in Senegal. The results showed that export of vegetable from Senegal to the EU grew sharply despite raising standards in EU markets, and thus, contributing critical to rural income and reducing the poverty. Tightening standard lead to the shift from smallholder contract farming to large-scale production. Poorer households benefit via labor market rather than via product markets. The author also confirm that the standard plays the role as catalyst to trade, shift the view standards as barriers to trade.

The rise of standards influences the industry structure, marketing activities, actor conduct along the supply and value chain (Hammoudi, Hoffmann and Surry, 2009). Standard may narrow a value chain by creating a direct relationship between producers and their buyers. In addition, compliance with standards can raise costs, put pressure on firm finances, decrease marginal benefit, and might exclude small-scale farmers from the global value chain (Dolan and Humphrey, 2000).

Neilson, 2008 discussed how the coffee value chain structure in Indonesia change due to the implementation of standard (Starbucks C.A.F.E. Practices standard). The results highlighted the exclusion of some actors from the value chain while the newcomers and others take on new roles. Specifically, the results showed three main changes: (i) the prioritization of farmer cooperatives over traditional trade networks; (ii) exporter consolidation and up-stream involvement of international traders; (iii) “contract farming” and enclosed value chains.

Taking the case of the EurepGAP standards, (Konefal, Mascarenhas and Hatanaka, 2005) argue that the rise of private standards and the increasing authority of supermarkets are the result of a restructuring in agro-food networks. These are increasingly dominated by supermarkets that not only set private standards but according to the authors control ‘what food is grown where, how, and by whom’.

2.3.2. Impact of certification standard on farmers

Literature about standards and certification shows conflicting results regard to the impact of certification on farmers.

The positive impacts were found such as higher selling price, improve food safety and higher productivity or higher net income (Kamau *et al.*, 2010; Dörr and Grote, 2009; Duc Tran and Goto, 2019; Bayramoglu, Gundogmus and Fusun Tatlidil, 2010; Asfaw, Mithöfer and Waibel, 2007).

(Krause, Lippe and Grote, 2016) reveal that adoption of public GAP standards results in positive income effects for mango producers, but not for orchid producers. This can be explained by the fact that certified mango producers can sell their products to high-

value retail chains which offer higher prices for their products, while certified and non-certified orchid producers cooperate with traders from the same value chain.

On the negative side, the literature result shows that complying with standards and certification may increase the investment costs for production inputs, facilities or additional labors, barrier to market access (Okello, 2005; Green and Matthew, 2008; Giovannucci and Ponte, 2005) (Graffham, Karehu and MacGregor, 2007). Neilson, 2008 mentioned some main cost associated with the certification of smallholder production include the cost of upgrading the system in order to meet new requirement; the cost of maintaining farm documentation; the cost of verification (auditor fee); and the indirect costs of facilitating farmers organizations, providing extension and possibly research to meet the standard

(Mausch *et al.*, 2009) compared the effects of standards on three types of farm exporting vegetable under EurepGAP in Kenyan including smallholder, large-scale contracted, and exporter-owned farms. Their results indicated that larger farms are performing less efficiently compared to smallholders in general. EurepGAP has increased monitoring cost, however the level of these costs is different among the farm types and smallholder producers remain the important supplier for the exported companies.

(Meuwissen *et al.*, 2003) gives an overview of the costs and benefits of food-safety and hygiene systems, traceability systems and the certification from the food industry and consumer perspective. Their discussion focus on the three major aspects: (i) the positive effect on trade: food-safety and hygiene systems and traceability systems are an indication of the quality and product background. Certification further facilitates the communication about the product; (ii) the enhanced license to produce: introducing the type of systems and schemes depend on upgraded market and the introduction of new requirements; (iii) the price premium: uncertainty involved consumers' willingness to pay an extra price for food safety system and certification system. They conclude that, generally, more attention for the technical issues of traceability and certification than for economic considerations. In addition, their research did not distinguish between the different participants of the food chain, or between the different types of systems and certification schemes.

Satisfaction with certification schemes

Some studies have focused on the evaluation with the certification system by farmers.

The result of Albersmeier, Schulze and Spiller, 2009; Bravo, Spiller and Villalobos, 2012 indicated that most farmers in Latin America and farmers in Chile are satisfied with the organic certification system. Bravo, Spiller and Villalobos, 2012 concluded that perceived benefits regarding to farm income improvement is the most important factor that influence farmers' satisfaction. Perceived cost in term of bureaucracy held negatively affects farmers' expectation. Surprisingly, the perceived reliability of certification has no significant role in determining the satisfaction of farmers. Similarly, Albersmeier, Schulze and Spiller, 2009 found the perceived usefulness in term of operational benefit and relationship with buyers and the certification bodies' reputation became the most important factor that influence the evaluation of organic certification from farmers.

Schulze *et al.*, 2008 researched on the evaluation of quality assurance systems for International Food Standard in European agribusiness and found several factors that effect on the standard evaluation including perceived cost/benefit ratio; the catalogue of standard requirement; communication by standard owner. Their result indicated the factor perceived cost/benefit ratio is the most important factor that influence the evaluation of the International Food Standard of agribusiness firms.

In summary, the vast majority of the literature provides the overview about the general map of the supply chain, or focusing on narrow actors in the supply chain. There is lack evidence on the supply chain for safe vegetable or specific standard of vegetable, specifically on the process of establishing procurement routes from production to distribution.

2.4. Previous researches about safe vegetable in Vietnam

There are increasingly interested in safe vegetable in Vietnam amongst researchers.

(Dinh, Truong and Zhang, 2016) evaluates the effectiveness of safe vegetable production in Hanoi City. The results shown the area for safe vegetable production in Hanoi City increased significantly in the period from 2012 to 2015, however, the productivity is not high. The economic efficiency of safe vegetable production, therefore,

is still low. (Duong, 2014) suggested the solution to develop safe vegetable production in Vietnam such as technical advancements, organizing production, support policies and management, trade promotion, product advertisement, or promoting development of the vegetable production.

Research on the distribution of safe vegetable, the results of (Ho and Dao, 2006, Nguyen *et al.*, 2008) shown that safe vegetables are distributed via collectors, cooperatives or intermediate companies to supermarkets or safe vegetable stall chains. In contrast, the result of (Pham *et al.*, 2013) (Ngo *et al.*, 2019) indicated that safe vegetables are majority sold to traditional markets before handing to consumers. It suggested the difference in the distribution system of safe vegetable by the time.

Other researches focuses on specific standard of safe vegetable, especially VietGAP standard. Study on producers, (Le *et al.*, 2016) analyzed the adoption of VietGAP standard and indicated that farm size, net profit, accessibility to VietGAP information, and membership in lychee farmers' group significantly influenced the probability of high adoption of VietGAP in lychee producers. (Ho Van, Teruaki and Yosuke, 2017; Dang and Kampanat, 2018) investigated the determinants affecting farmers' adoption of Vietnamese Good Agricultural Practices (VietGAP) for tea production. The estimation results demonstrate that these decisions were mainly driven by characteristics of the farmer and the tea farm grower (number of family laborers, tea farm size, tea price, access to irrigation systems). (Trifković, 2016) argued the desire to improve market access is the key motivation to adopt the standards from farmers and processors. Processing companies in pangasius sector prefer to vertically integrate primary production largely instead of encouraging contract farming and the application of quality standards in order to have stable supply that can meet safety and quality attributes.

The results of (Marschke and Wilkings, 2014) showed that certification schemes operating in Vietnam are not appropriate for small producers in the Vietnamese aquaculture sector (shrimp or other species) and suggested that it will be necessary to customize separate national standards for these small producers. On the other hand, (Tran and Goto, 2019) indicated that specialty green tea farmers received positive economic impacts from the certification scheme via higher average selling prices and sales volume.

The certification system was not, however, examined overall. (Nguyen and Sakazume, 2020) discusses the standard structure for safe vegetable in supermarket chains including RAT, VietGAP and organic. Other studies highlight consumer attitudes toward food quality certification and labels. (Nguyen *et al.*, 2017) suggested that Vietnamese consumers' familiarity with quality certification for rice and vegetables was relatively low. However, consumers prefer VietGAP vegetables that are sold in supermarket chains. They are willing to pay higher amount for VietGAP vegetable with full traceability and quality certification label. Therefore, quality certification label is important in order to meet the diverse needs of consumers (Thai, Tran and Pensupar, 2017).

Some researchers focused on the global value chain and food safety an certification standard (Tran, Bailey and Wilson, 2013; Nguyen and Jolly, 2020). Some changes in the structure and conduct of participating actors along the chains were found: slight decrease the number of farms less than 1.0 ha and increase of farm more than 3.0 ha; increase the number of cooperatives; shift in export to other import alternative market with less stringent quality requirements because of the imposition of standard by the United States and EU market.

In summary, research on safe vegetable in Vietnam focus on the status of safe vegetable production, general distribution channel of safe vegetable or narrow standard (VietGAP) for safe vegetable, little is known on the structure of safe vegetable supply chain of supermarkets in Vietnam.

3. Research objectives

This study clarifies the supply chain of safe vegetable by supermarkets in Vietnam, with special interest in the process of establishing procurement routes from production to distribution of safe vegetable. To do so, we distinguish among supermarket direct channel from direct management farm of supermarket, agricultural cooperatives, and agribusiness farms and supermarket indirect channel from trading companies.

The thesis is organized into four chapters (see figure 1). Chapter 1 provides an overview of standard and certification system for safe vegetable existing in Vietnam. Chapter 2 provides a description of supermarket supply chain and standard structure for

safe vegetable in supermarket. Chapter 3 discusses the supermarket direct channel by analysis the structure of marketing channel for safe vegetable from direct management farm of supermarket, agricultural cooperatives, and agribusiness farms and their evaluation toward certification system for safe vegetables. Supermarket indirect channel that is operated by trading companies is mentioned in chapter 4 by accessing their structure of procurement and marketing system for vegetable and their attitude toward certification standard of safe vegetable.

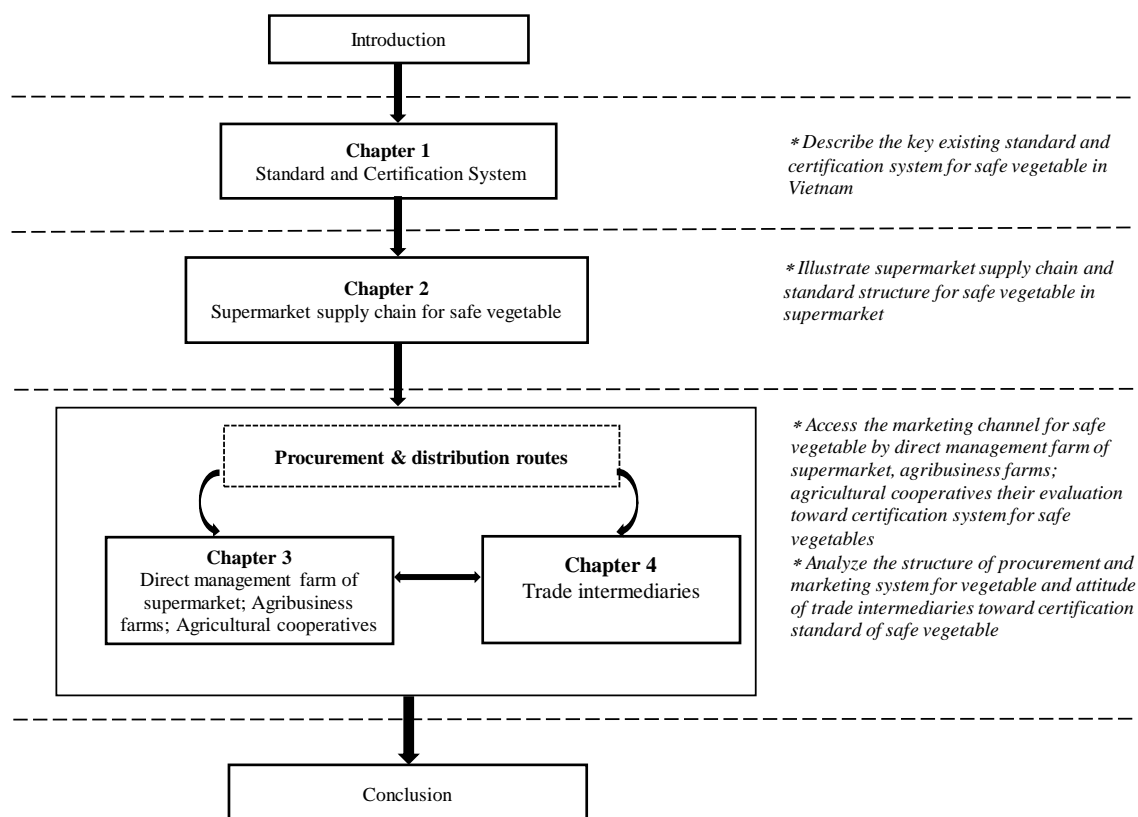


Figure 1. Research flow chart

Source: Authors

4. Research methodology

The research applied a purposive and snowball sampling method to select participants. The primary data for the research were collected through a market survey using face-to-face interview with selected actors involved in vegetable supply chain including farmers (certified and non-certified), agribusiness farms, agricultural

cooperatives, trade intermediaries, and retailers including supermarkets and traditional retailers. Other actors such as farmers' group, government, researchers are also interviewed to have broader understanding about certification standard system existing in Vietnam.

The investigation was conducted mainly in Hanoi City. In addition, exploratory investigations were conducted in Son La Province, Bac Giang Province, Hai Duong Province to observe a number of farms and trading activities (see figure 2).



Figure 2. Map of Northern Vietnam and location of the study areas

Note: ★ Study area

Total of actors interviewed is shown in table 1.

Table 1. Actors interviewed

Actor	Sample size	Location	Method
Supermarket chains	4 supermarket chains	Hanoi	In-depth interview and observation
Traditional retailers	3		
1. Retailers in traditional market	2	Hanoi	In-depth interview and observation
2. Street vendor	1		
Farmers			
1. Certified farmers (member of cooperative)	11	Hanoi & Moc Chau	In-depth interview and observation
2. Non-certified farmers (non-member of cooperative)	6	Hanoi	
Certified organizations			
1. Agricultural cooperative	7	Hanoi	In-depth interview
2. Agribusiness farm	2	Moc Chau	observation
Traders			
1. Collectors	5	Hanoi	In-depth interview observation
2. Wholesalers	3	Hai Duong	
3. Trading companies	5	Bac Giang	
Other authorities			
1. Lecturer/Scientist	1	VNUA ¹	
2. Scientist/ Senior manager	1	FARVI ²	
3. “Safe vegetable” stall chain (<i>Bác Tôm</i>)	1	Hanoi	In-depth interview
4. Farmer’s group	2	Moc Chau Hanoi	
5. Government officers	3		

Source: Authors

¹ Vietnam National University of Agriculture

² Fruit and Vegetable Research Institute

Data collection was divided into three stages in the field.

First, we began with interview retailers focusing on the supermarket chains in Hanoi City in order to understand the traditional supply chain and supermarket supply chain and trace back to their suppliers. We chose Hanoi City as the destination for the first research stage based on some main reasons: (i) one of the most important cities in term of economic activity; (ii) attractive destination for modern retailers especially supermarket (137 supermarkets in 2015, only after Ho Chi Minh city); (iii) one of the pioneer for safe vegetable program and have big area for safe vegetable production; (iv) majority market of vegetable consumption in Vietnam.

For supermarket, four supermarket chains were chosen to analyzed including Aeon, BigC, Fivimart and Vinmart (detail in chapter 2). First, we placed a phone call or send document to arrange the appointment, and then visited supermarket directly to interview the supermarket manager, or purchasing executive, or senior staff of supermarket. Each interview lasted about 90-180 minutes. We then keep contact with supermarket respondents and continue ask for more information via email, phone or social network such as Zalo, Messenger.

Table 2. A list of the interviewed respondents in supermarket

Respondent ID	Supermarket	Positions
#1	BigC	Purchasing Executive
#2	BigC	Head of Fruit and Vegetable Counters
#3	BigC	Warehouse senior staff
#4	Aeon	Purchasing Executive
#5	Aeon	Head of Fruit and Vegetable Counters
#6	Fivimart	Supermarket Manager
#7	Vinmart	Head of Fruit and Vegetable Counters

Source: Authors

For traditional retailers including two retailers in traditional markets and one street vendor, we made a short conversation directly with retailers in traditional markets in their free time. For retailers in traditional markets, we made the interviewing several times since

they have a small stall in the markets. For street vender, after the short directly interviewing, we have more information by making a phone call.

Table 3. A list of the interviewed traditional retailers

Respondent ID	Location	Position
#1	'Frog market' in Gia Lam District	Traditional retailer
#2	Phuc Loi market in Long Bien District	Traditional retailer
#3	Long Bien District	Street vendor

Source: Authors

Based on such information from supermarket respondents, participants involved in supermarket supply chain was identified and chosen to interview. Thus, a second stage of the research consisted of interviewing agricultural cooperatives and agribusiness farms. Beside the list of agricultural cooperatives provided by supermarket, the interviewed agricultural cooperatives were chosen from suggestion of a Scientist/ Senior manager (FARVI). In this stage, beside Hanoi City, agricultural cooperatives and agribusiness farms located in Moc Chau District (Son La province) were selected. Moc Chau District in Son La Province represents a mountainous area for developing vegetable and supplying to Hanoi market especially for off-season vegetables. The same process was applied to sample interviewees with agricultural cooperatives and agribusiness farms. We placed phone call to arrange the appointment, and then visited agricultural cooperatives and agribusiness farms directly to interview. Each interview lasted about 120-240 minutes (farm visit included). Certified and non-certified farmers were chosen to interviewed based on the introduction from cooperative manager in the local commune including 11 certified farmers (of which 5 in Hanoi City; 6 in Moc Chau District); 6 non-certified farmers in Hanoi City.

Table 4. A list of the interviewed respondents in agricultural cooperatives and agribusiness farms

Respondent ID	Location	Positions
#1	AC/ Hanoi	Cooperative Manager
#2	AC/ Hanoi	Cooperative Manager
#3	AC/ Hanoi	Cooperative Manager
#4	AC/ Moc Chau	Cooperative Manager
#5	AC/ Moc Chau	Cooperative Manager
#6	AC/ Moc Chau	Cooperative Manager
#7	AC/ Moc Chau	Cooperative Manager
#8	Agribusiness farm/ Hanoi	Company Manager
#9	Agribusiness farm/ Moc Chau	Company Manager

Source: Authors

Note: AC - Agricultural Cooperative

For the third stage, trade intermediaries were interviewed. In this step, traders located in Hanoi City, Bac Giang Province and Hai Duong Province were selected based on the information from supermarkets (in the first step). Bac Giang Province and Hai Duong Province is near Hanoi City (around 60 kilometres from Hanoi City), and is one of the major market supply vegetable for Hanoi market. As for trading companies, the respondents are selected from the list provided by supermarkets. In addition, a sample of collectors and wholesalers were chosen by two ways. First, identified from interview with trading companies; Second, randomly selected by field observation on wholesale markets or collection center near farm gate. Each interview lasted about 60 -180 minutes.

Table 5. A list of the interviewed traders

Respondent ID	Location	Positions
#1	Hanoi	Traditional Collector
#2	Hanoi	Traditional Collector
#3	Hanoi	Traditional Collector
#4	Hai Duong	Traditional Collector
#5	Hai Duong	Traditional Collector
#6	Hanoi	VietGAP Collector
#7	Hanoi	Wholesaler
#8	Hanoi	Wholesaler
#9	Hanoi	Wholesaler
#10	Hanoi	Manager/ Trading Company
#11	Hanoi	Manager/ Trading Company
#12	Hai Duong	Purchasing Executive /Trading Company
#13	Hai Duong	Manager/ Trading Company
#14	Bac Giang	Manager/ Trading Company

Source: Authors

Chapter 1. Overview of standard and certification system for safe vegetable in Vietnam

1. Introduction

This chapter aims to provide an overview of standard and certification system for safe vegetable in Vietnam. The chapter is structured into five sections as follows. Section 2 gives background information about vegetable sector in Vietnam. Section 3 presents overview of standards and certification system for agricultural products. Section 4 outlines the key voluntary standard and certification for vegetable in Vietnam. Section 5 briefly summarizes the chapter.

2. Overview of vegetable sector in Vietnam

2.1. Vegetable production in Vietnam

2.1.1. Status of vegetable production

Vegetable sector plays an important production sector in whole agriculture industry in Vietnam. With the temperate, wet tropical and subtropical climate, Vietnam has favorable conditions for fresh vegetable production year round. Vegetables production in Vietnam can be divided into three categories due to the season: winter crops (November-March); summer crops (April-October), and vegetables grown year-round (Pham *et al.*, 2013). Winter crops are more diverse than summer crops that grown root, fruit and leafy vegetables. There are about 80 vegetable species that are grown in Vietnam. They are divided into several groups (i) Leafy vegetables; (ii) Fruit vegetables; (iii) Root and tuberous vegetables; (iv) Other vegetables.

In recent years, especially from 2012, production areas of vegetables have developed rapidly (see figure 1.1). In 2007, the harvested area for vegetable in whole country only had 0.47 million hectares. This number reached a peak of 0.89 million hectares in 2014 and slightly decreased to 0.84 million hectares in 2017. The vegetable yield in the period from 2007 to 2017 fluctuated from around 14 tonnes/ha to around 17 tonnes/ha and stable increasing from 2015 to 2017 (FAOSTAT, 2019).

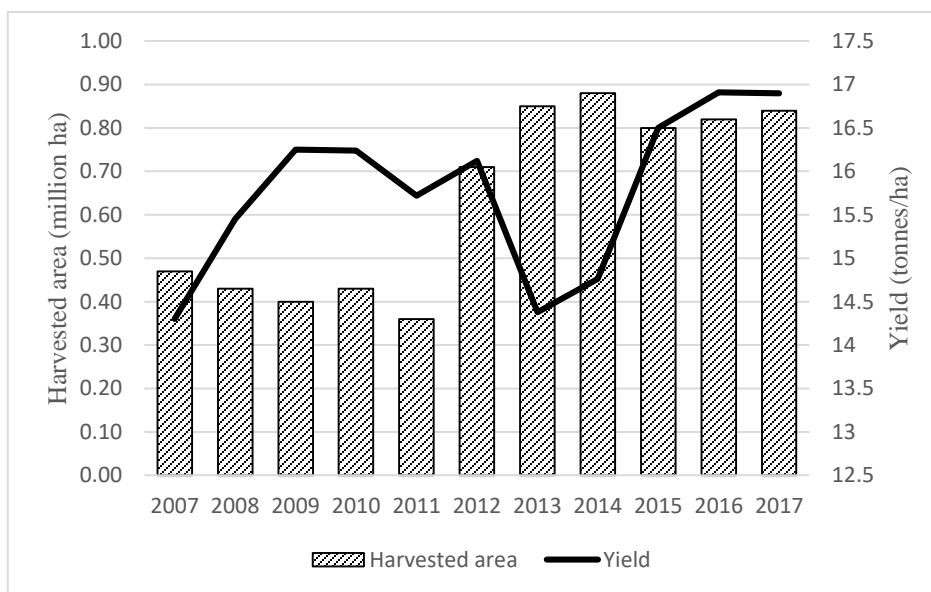


Figure 1.1. Trends in vegetable harvested area and yield, 2007-2017

Source: FAOSTAT, 2019

Note: Vegetable data is for freshness vegetables and not include roots/tubers, maize and soybean

The vegetable is cultivated mostly in places with favorable land and climate conditions such as Red River Delta, Mekong River Delta and Lam Dong province. Mekong River Delta is the largest grown vegetable area in Vietnam, followed by the Red River Delta (figure 1.2). At Red River Delta, in 2013, the total area of cultivated vegetable was 160 thousand ha, representing 19% of total area for vegetable in whole country. In Mekong River Delta, the vegetable area reached 227 thousand ha representing 27% of the total vegetable area of the country. Lam Dong province is the biggest area for developing vegetable with the harvested area reached to around 50 thousand ha in 2012 (see figure 1.3).

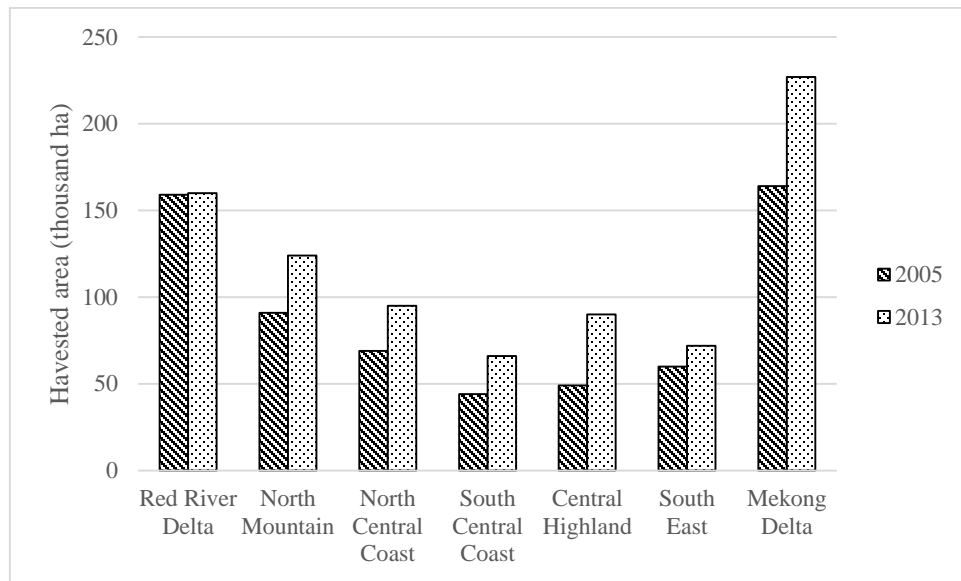


Figure 1.2. Vegetable harvested area by region in 2005 and 2013

Source: 2005 data from (Ly-Nguyen *et al.*, 2014) , which was adapted from original work of Ministry of Agricultural and Rural Development

2013 data from (Duong, 2014), which was adapted from original work of Crops Production Department 2013

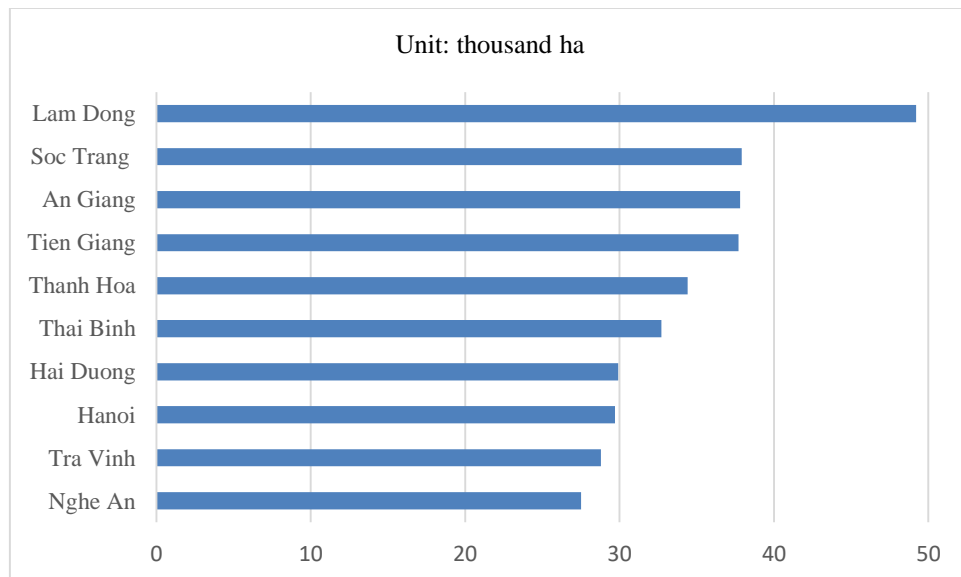


Figure 1.3. Top 10 provinces had largest cultivated vegetable area in Vietnam 2012

2.1.2. Domestic consumption

Domestic demand and the government plating goal are the main drivers of production. Although vegetables are an integral part of Vietnamese diet, meat and rice continue to be the most important item in household food budget. Nationally, the share of total daily life expenditures spent on food and drink is still high at around 51% in 2016. In 2016, around 4.4% of total food expenditure is on vegetable. Currently, the vegetable industry majority supplies the domestic market.

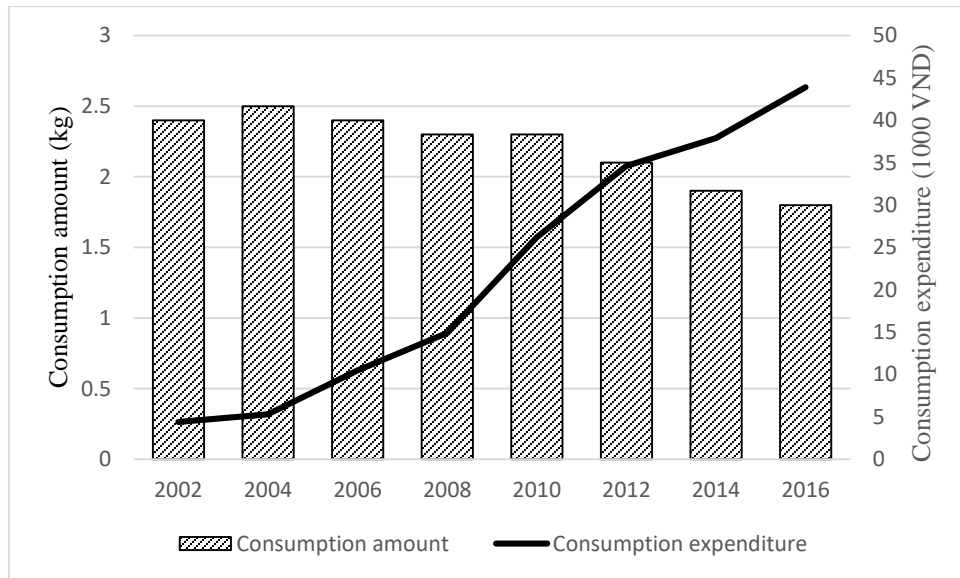


Figure 1.4. Average amount and expenditure of household per month for vegetables, 2002-2016

Source: GSO, 2012

GSO, 2016

Figure 1.4 shows a downward trend of household consumption amount and increase trend of consumption expenditure on vegetables. In 2016, vegetable consumption was 1.8 kilogram per capita per month, decreased 28% compared with 2004, while the expenditure for vegetable increased significantly from 4.4 thousand VND in 2002 to 43.9 thousand VND per capita per month in 2016 (approximately 10 times). It shows that consumers tend to consume more high quality product on their shopping decision. It opens bigger market for certified vegetables with high quality in future.

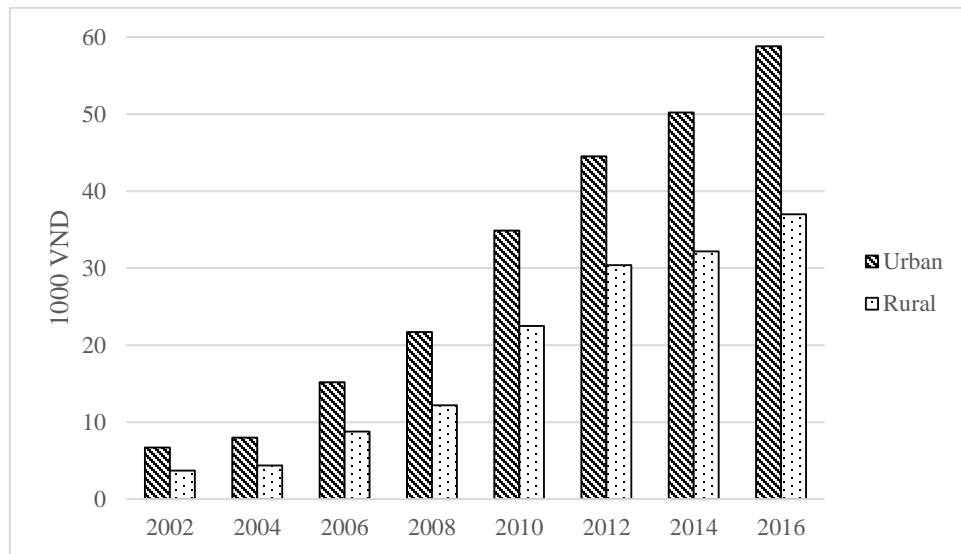


Figure 1.5. Monthly consumption expenditure per capita on vegetables by urban - rural, 2002-2016

Source: GSO, 2012

GSO, 2016

Figure 1.5 shows the rapid growth of consumption expenditure on vegetables by both urban and rural consumers in the period from 2002 to 2016. In 2016, monthly average expenditure on vegetables per capita in rural areas rose to 37 thousand VND, an increase of 10 times compared to 2002; expenditure in urban areas reached 58.8 thousand VND, an increase of 8.8 times compared to 2002. Generally, the ratio of vegetable consumption expenditure in urban areas is higher than that of rural areas, around 1.6 times higher. It is easy to understand because of the higher income of urban areas and the wild harvested vegetables in the diet of rural areas.

Vegetable consumption varies from region to region (figure 1.6). In general, monthly average expenditure per capita was lowest in the North Central Area and Central Coastal Area and highest in the Red River Delta region.

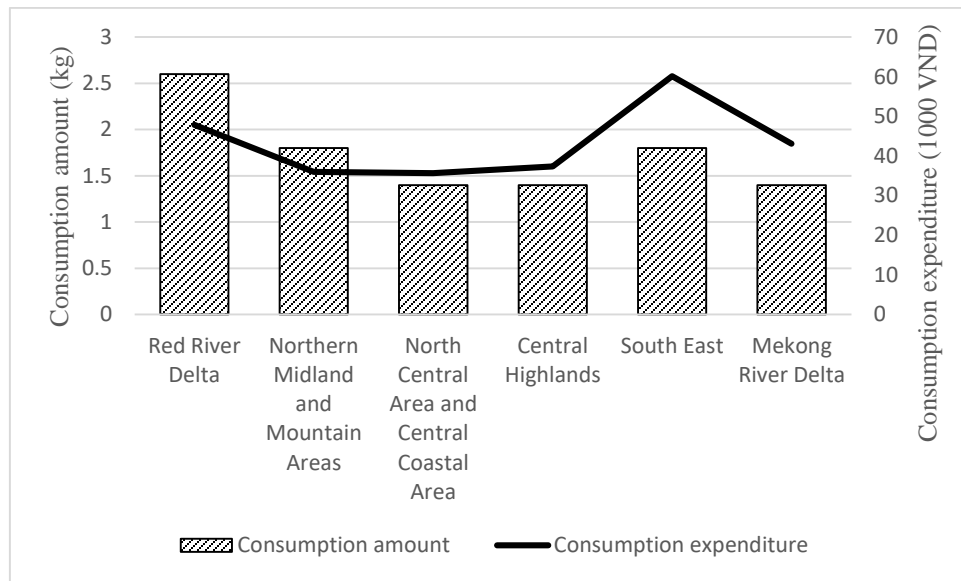


Figure 1.6. Monthly consumption amount and expenditure on vegetable by region, 2016

Source: GSO, 2016

2.1.3. Export volume and value

In recent years, Vietnam has made remarkable progresses in exporting of fruit and vegetable. Figure 1.7 shown that export volume saw a trend of decrease, while export value was more stable and grew significantly in 2017. From 2014 to 2016, trade has been in high volume but low value product. However, in 2017, exported vegetables focus more on high value product. Specifically, total vegetable export volume was 152 thousand tonnes in 2017, down 14.1% compared with 2016, but the export value for vegetable reached around 300 million USD, higher 71.4% in comparison with 2016. However, export trade of vegetable is still modest with the export quantity only around 1% of the total vegetable production quantity in 2017.

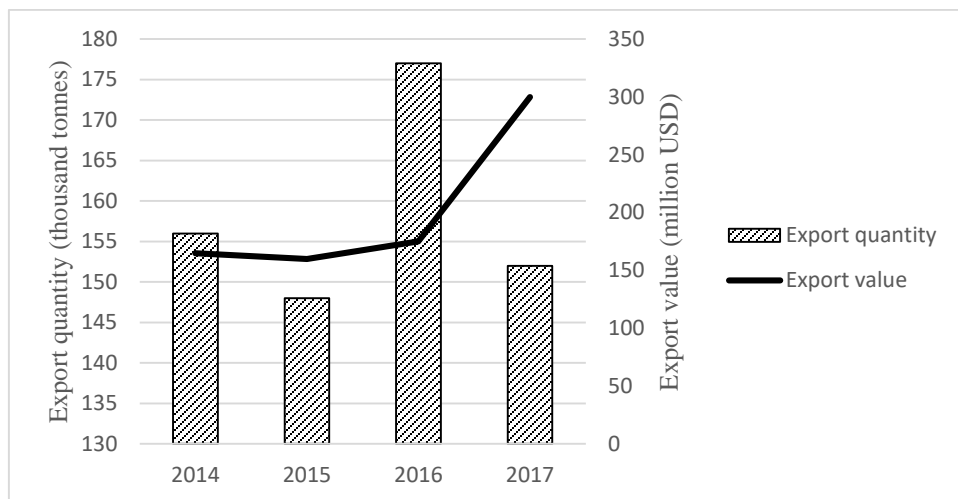


Figure 1.7. Export quantity and value of vegetable, 2014-2017

Source: FAOSTAT, 2019

Note: Vegetable data does not include maize, soybean

Major export markets

According to the statistic of General Department of Vietnam Customs 2019, Vietnamese fruits and vegetables have been exported to over 28 countries in the world. China, America, Korea and Japan were the major export markets for fruits and vegetables of Vietnam with the market share of 77%, 3.8%, 3.1% and 2.6%, respectively.

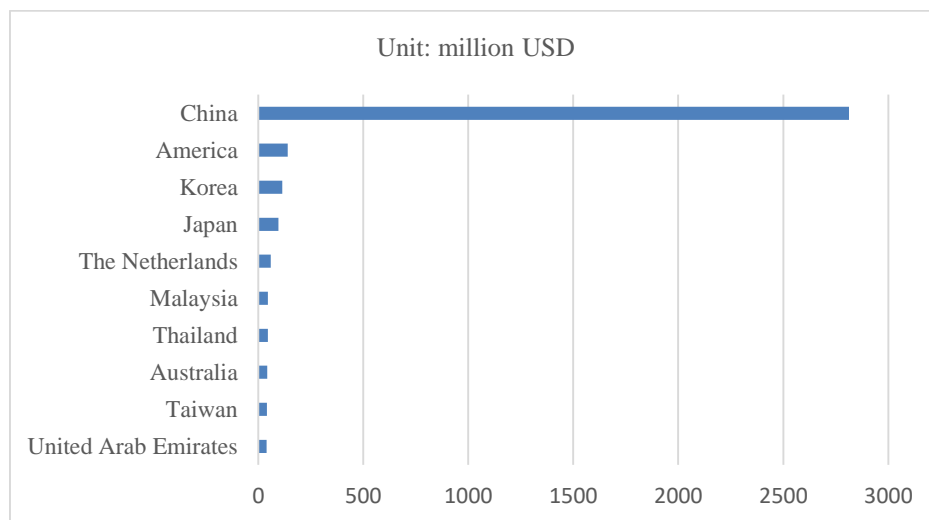


Figure 1.8. Top 10 leading fruit and vegetable export markets of Vietnam in 2018

Source: General Department of Vietnam Customs, 2019

66.8% Vietnam’s vegetables export volume in fresh, followed by preserved form (22.2%), frozen form (8.87%). Other forms include canned (1.43%), and dried form (0.7%).

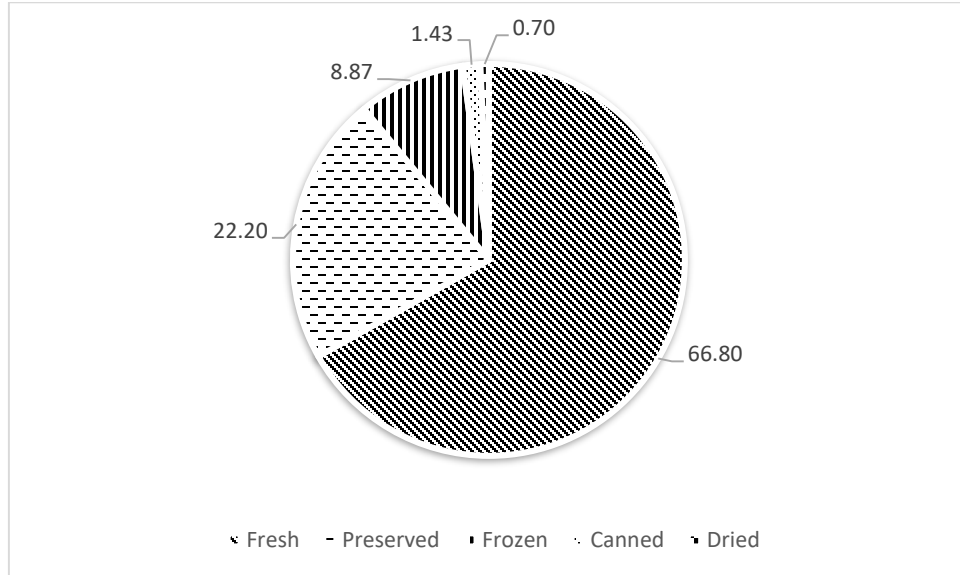


Figure 1.9. Form of export vegetables in 2017

Source: Calculated by author based on FAOSTAT, 2019

The major fresh export vegetables include sweet potatoes, with the quantity of 28.2%, followed by chilies and peppers (21.3%), cabbages (6.4%) and carrots (4.7%) (table 1.1).

Table 1.1. Export quantity and value of some key fresh vegetables in 2017

Type	Export volume		Export value	
	Value	%	Value	%
	(thousand tonnes)		(million USD)	
Sweet potatoes	43	28.2	85.7	28.5
Chilies and peppers (green)	32.4	21.3	73	24.3
Cabbages and other brassicas	9.7	6.4	6.4	2.1
Carrots and turnips	7.1	4.7	4.7	1.6

Source: FAOSTAT, 2019

2.2. Safe vegetable production

2.2.1. Status of safe vegetable production in Vietnam

In order to cope with the unsafety of vegetables, in 1998, the government issued the first document about Temporary production of “safe vegetable” under the Decision No.67/1998/QĐ-BNN-KHCN Ministry of Agriculture and Rural Development (MARD, 1998).

In 2008, high requirements of food safety from GAPs, VietGAP as the national standard for safe vegetable production was born under the Decision 379/QĐ-BNN-KHCN of Ministry of Agriculture and Rural Development (MARD, 2008a).

In addition, organic production was also introduced in Vietnam since 2004 from the project of ADDA - VNFU (Agriculture Development Denmark Asia - Vietnam Farmer Union). In 2017 Ministry of Science and Technology promulgated the Decision 3383/QĐ-BKHCN (MOST, 2017a) on publication of national standards on organic agriculture standard, provided a new direction for organic agriculture in Vietnam.

Over 20 years of safe vegetable development, the safe vegetable production still very small and lower as expected following the government plan. The area for safe vegetables is only around 10% of total 880 thousand vegetable area crop land in 2015 (Nguyen-Viet *et al.*, 2017). By the end of 2017, there were more than 3,443 ha of certified VietGAP vegetables (Dao, Hoang and Pham, 2015). The proportion of VietGAP area and organic area is very small, accounting for 0.35% and 0.01%, respectively of the total vegetable area. One of the major reasons for small proportion of safe vegetable production is high cost in production including certificate cost while it lacks the market for safe vegetables and the absence of guaranteed quality indications on the product to distinguish from conventional vegetables.

2.2.2. Safe vegetable production in study areas

Famous area for safe vegetable production

To date, there is no official statistics about certified area for safe vegetable production in whole country. Some famous provinces that have developed safe vegetable for a long time including Lam Dong province, Ho Chi Minh City and Hanoi City.

Box 1.1. Status of safe vegetable production in Lam Dong Province and Ho Chi Minh

City

*Lam Dong
Province*

The planned area for safe vegetable in Lam Dong Province reached 2,500 ha account for 20% of total land for vegetable (Ngo *et al.*, 2019). In 2016, there were 187 organizations and individual adopted the VietGAP certification with total certified area reached 1,288 ha. 1 organization was certified under GlobalGAP with around 7.5 ha of certified area, and 1 company adopted organic certification with 4 ha of certified area. 82 organizations adopted the certificate of compliance with food safety regulations (Lam Dong Agricultural and Rural Development Department, 2017).

The key area for safe vegetable production located in Don Duong District, Lac Duong District, Duc Trong District, and Da Lat City.

*Ho Chi Minh
City*

In Ho Chi Minh City, safe vegetable land reached around 3,464 ha account for 95% of total land of vegetable. 721 organizations and individual adopted VietGAP certification with 448ha of the total certified land. Total VietGAP vegetable output reached 47 thousand tonnes. The safe vegetable land estimated 4,500 ha in 2020 (Ho Chi Minh People's Committee, 2016)

The key area for safe vegetable production located in Cu Chi District, Binh Chanh District and Hoc Mon District.

Safe vegetable production in studies areas (see box 1.2)

Box 1.2 Status of safe vegetable production in study areas

Hanoi City Hanoi is the capital of Vietnam with an area of 3,329 km² covering 30 districts. The total land in vegetable production is more than 12,000 hectares spread over 22 districts, of which 5,044 hectares are in compliance with food safety regulation, 224 hectares in VietGAP and around 50 hectares devoted to the growing of organic vegetables. In recent years, Hanoi has focused on expanding safe vegetable production to provide sources of high quality vegetables for its inhabitants. In its period of 2017-2020 development plan, total cropland dedicated to safe vegetable production will reach 8,100 to 9,100 hectares (Hanoi Agricultural and Rural Development Department, 2016).

There are a number of cooperatives and companies that have obtained certification. There were 192 organizations that have gotten certificates of compliance with food safety regulations. Up to June 2018, there were 42 producers that had been certified under VietGAP standards.

The key area for safe vegetable production (more than 20ha) located in Dong Anh District, Thanh Tri District, Gia Lam District, Van Duc District, Chuong My District etc.,

Son La Province Son La Province is located in the northwestern mountainous region of Vietnam and covers an area of more than 14,000 km² and includes 12 districts and 11 ethnic groups. This region has a suitable climate for temperate vegetables during the summer with access to key markets including Hanoi. The Moc Chau Plateau is one of the key areas for the development of safe vegetables in Son La Province and has a cool temperate climate suitable for growing safe off-season vegetables. In 2013, the People's Committee of Son La Province signed Decision No.1252/QĐ-UBND approving a comprehensive plan for a safe vegetable production area for the period 2011-2020, with the amount of cropland for vegetable production that meets all safety requirements expected to reach 6,700 hectares in 2020 (Son La People's Committee, 2013).

	<p>Moc Chau has the largest area under vegetable cultivation (1,279 hectares). In 2017, there were 13 cooperatives that were certified as being in compliance with the food safety regulations. However, the area of cultivation certified under VietGAP is still small, with only 44 hectares and 15 units having VietGAP certification; 11 are located in Moc Chau District.</p>
<p><i>Hai Duong Province</i></p>	<p>Dai Duong Province is located in the center of North Vietnam, about mid-distance from Hanoi to Hai Phong. The natural area of the province is 1,661.2 km². The area crop land for vegetable reached 18,000 ha in 2017. The productivity was around 0.3 ton/ha.</p> <p>For VietGAP production, in 2019, the certified land for VietGAP vegetable reached 199,76 ha. The plan for VietGAP vegetable reaches 400 ha in 2020 (Hai Duong News, 2019).</p> <p>Some famous area for developing vegetables were Cam Giang District and Nam Sach District for carrot (1,400 ha); Kim Thanh District, Gia Loc District and Tu Ky District for cabbage, cauliflower and kohlrabi (4,600 ha); Nam Sach District and Kinh Mon District for onion, garlic (4,900 ha).</p>
<p><i>Bac Giang Province</i></p>	<p>Bac Giang Province is located in the Northeast region of the country, being situated 50 kilometres to the east of Hanoi. The province covers an area of more than 3,800 km². The area crop land for vegetable reached 18,000 ha in 2017. The vegetable output was 308 thousand tonnes.</p> <p>The land for safe vegetable reached 3,400 ha that accounted for 18.9% the total crop land for vegetable production. In 2019, the certified land for VietGAP vegetable reached 300 ha (Bac Giang Portal, 2019).</p> <p>The key area for safe vegetable production located in Tan Yen District, Yen Dung District, Lang Giang District, Hiep Hoa District, Viet Yen District and Bac Giang city.</p>

3. Overview of standards and certification system for agricultural products

3.1. Definition and purpose

3.1.1. Standards

A standard is a “document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for

activities or their results, aimed at the achievement of the optimum degree of order in a given context” (ISO/IEC, 2004).

Food standards are “rules of measurement established by regulation or authority” (Reardon and Farina, 2001) and are enforced by governments, food companies and retailers. The aims of food standard is to (i) assure the confidence to consumer in the food chains; (ii) increase the information available to the final consumers, help them make informed decision concerning the food that were purchased (Vieira, 2006).

One of the main objectives of the use of standards is to standardize certain aspects of production and trade. Often this means that all relevant actors adhere to the same procedures or product specifications to facilitate trade, ease logistical procedures, prevent consumer fraud or improve quality. For example, the standardization of weight measurements greatly facilitates trade. However, quality improvements are not an automatic result of standardization. This will only be the case when the advocated standard requirements are an improvement on common practice.

Different types of standards

Generally, food standards can be classified according to (i) the type of standards; (ii) the nature of standards; (iii) the sphere of standards; and (iv) their geographic focus (Karki, Fasse and Grote, 2016). Based on the type of standards, they are either public or private, while based on the nature, they are either mandatory or voluntary. They are divided into product or process standards based on the sphere. Finally, based on the geographic focus, they are national, regional or international (Maertens and Swinnen, 2006).

(Henson, 2006) distinguishes between standards as being mandatory, voluntary and *de facto*. *Mandatory* or regulatory standards, named technical regulations by the Technical Barriers to Trade Agreement, are standards set by public institutions whose compliance is obligatory in the legal sense. *Voluntary* consensus standards arise from a formal coordinated process involving participants in a market with or without the participation of the government. While mandatory standards are generally the sole preserve of public institutions, both public and private institutions can be involved in the governance of voluntary standards. Finally, *de facto* standards arise from an uncoordinated process of

market-based competition of private firms. These standards refer to a set of specifications to gain market share through authority or influence.

According to (Schulze *et al.*, 2006), there are public (state-run) and private certification systems. As for governmental certification systems, it serves the consumer protection purposes by providing quality labels to improve market transparency. Public certification systems help to prevent mislabeling through laws and fines enforced by public authorities. However, most certification schemes are privately organized. As for private certification system, the certification procedures tend to be different depending on the purposes: either useful for consumer marketing or to meet the demands of institutional buyers.

Public standards are those standards designed by governmental organizations and can either be mandatory or voluntary (Karki, Fasse and Grote, 2016). Private standards are standards that are designed and owned by non-governmental bodies both such as profit (e.g. large food enterprises, supermarket chains) and non-profit organizations (Liu, 2009). WTO has defined three types of private standards, based on the source of definition of the standards (Henson and Humphrey, 2009):

- ✓ Individual company standards: These are set by individual companies, in the case of food and safety standards mostly by large food retailers, who then implement them along their supply chain.
- ✓ Collective national standards: These standards are set by collective organizations operating within specific countries, including industry associations and NGOs.
- ✓ Collective international standards: Collective international standards apply a cross-country perspective and are thus mostly hosted members of different nationalities.

	Mandatory	Voluntary
Public	Regulations	Public voluntary standards
Private	Legally-mandated private standards	Private voluntary standard

Figure 1.10. Forms of standards

Source: (Henson and Humphrey, 2009)

Figure 1.10 shows that the form of public standards is regulations promulgated by the governments that are mandatory. However, the government also develop standards that are voluntary.

Process standards specify how the product should be produced, while product standards are specifications and criteria for the characteristics of the final products (FAO, 2003; Vieira, 2006). Information standards relate to the labelling and other communications that go with the products (Vieira, 2006). Social and environmental standards in agriculture are essentially process standards. These process criteria might or might not influence the characteristics of the end products (FAO, 2003).

Process standards can be further divided into (i) management system standards and (ii) performance standards. Management systems standards set criteria for management procedures, for example for documentation or for monitoring and evaluation procedures. They do not set criteria for the performance of the management system in terms of what actually happens in the field or the packing station. Performance standards, in contrast, set verifiable requirements for factors such as the non-use of certain pesticides, or the availability of sanitary services (FAO, 2003).

3.1.2. Certification

Certification is a procedure by which a third party gives written assurance that a product, process or service is in conformity with certain standards. Thus, certification can be seen as a form of communication along the supply chain, as the certificate demonstrates to the buyer that the supplier complies with certain standards (International Organization for Standardization ISO, 1996). Similarly, “certification is the (voluntary) assessment and approval by an (accredited) party on an (accredited) standard” (Meuwissen *et al.*, 2003). (Schiefer, 2003) mentions that “sustainable and effective certification must allow clearly identifiable segmentation through, e.g. branding of products from clearly specified supply chains”. Certification systems are established to provide the guarantee that product characteristics are met and/or production processes are persistent (Holleran, Bredahl and Zaibet, 1999).

In the agricultural and food industry sector, certification refers to all kinds of food products which have been produced based on organic or bio-dynamic farming technologies or on Integrated Pest Management (Dorr and Grote, 2009).

The organization performing the certification is called a *certification body* or certifier. The certification body might do the actual inspection, or contract the inspection out to an inspector or inspection body. The certification decision, i.e. "certificate", is based on the inspection report, possibly complemented by other information sources (FAO, 2003).

Certification is always done by a *third party*. Third-party certification is where the inspection is carried out by an impartial and independent body with no direct interest in either the economic relationship between the supplier and the buyer or the standards scheme owner (FAO, 2003). An internal control is a first-party verification where the body conducting the audit is the same body that complies with the standard. Second-party verification occurs when the body that owns the standards scheme conducts the audit on the users of the standard and determines their compliance. Second-party certification can also refer to an internal control system where the buyer or diverse stakeholders in the chain are involved in monitoring compliance with a standard. This is found in organic participatory guarantee systems and geographical indications.

The purpose of certification is to reach a defined performance and to make this perceptible to stakeholders. Stakeholders can include consumers, other customers, governments, risk-financing parties such as banks and insurance companies, or society as a whole. Also the company itself can be a stakeholder, since certification of food safety and traceability systems gives organizations a tangible approval of good practice and a tool for due-diligence defense in case of product safety (Henson and Holt, 2000). For stakeholders regarding the certification as a valuable tool, they must trust the certification scheme as well as the certifying party. Also, there should be regular tests or audits to verify whether the certified party still reaches the agreed performance level.

On the one hand, implementing food safety standards can increase costs for firms. In addition, firms have incentives to protect their reputation, and thus, they may implement state-of-the-art food safety practices without any prodding from the government.

Additionally, because consumers might be willing to pay more for food that they perceive as safer, firms have another incentive to implement stricter food safety regimes. The higher prices consumers are willing to pay could compensate firms for the costs of food safety provision. A firm will adopt more stringent food safety practices if the cost is smaller than the resulting benefit to the firm in the form of reduced risk of losses, reduced liability, and higher consumer willingness to pay for the safer food (Mitchell, 2003).

Certification can act to impede exports either because explicit bans are placed on imports of particular products or the cost of compliance with requirements diminishes export competitiveness. Standards can therefore be a source of competitive advantage for the developing countries if they upgrade capacity and make the necessary adjustments in the structure and operation of their supply chains. For many high-value foods, including fruits and vegetables, the challenges of international competitiveness have moved beyond price and basic quality parameters to greater emphasis on food safety. Indeed, rising food safety standards serve to accentuate supply chain strengths and weaknesses and thus, affect the competitive positions of countries and distinct market participants (Jaffee and Henson, 2004).

3.2. Good Agricultural Practices System for agricultural product

Good Agricultural Practices, as defined by FAO, are a “collection of principles to apply for on-farm production and postproduction processes, resulting in safe and healthy food and non-food agriculture products, while taking into account economic, social and environmental sustainability”.

3.2.1. Europe - GlobalGAP

GlobalGAP originally started in 1997 as EurepGAP, an initiative by retailers belonging to the Euro-Retailer Produce Working Group and changed its name to GlobalGAP in 2007. GlobalGAP aims to establish one standard for GAP with different product applications capable of fitting into the whole of global agriculture. The standards helped producers comply with Europe-wide accepted criteria for food safety, sustainable production methods, worker and animal welfare, and responsible use of water, compound

feed and plant propagation materials. Harmonized certification also meant savings for producers, as they would no longer need to undergo several audits against different criteria every year (GlobalGAP).

GlobalGAP certification covers: (i) Food safety and traceability; (ii) Environment (including biodiversity); (iii) Workers' health, safety and welfare; (iv) Animal welfare; (v) Includes Integrated Crop Management (ICM), Integrated Pest Control (IPC), Quality Management System (QMS), and Hazard Analysis and Critical Control Points (HACCP) GlobalGAP certificates are issued by GlobalGAP approved certification bodies (CBs), who conduct GlobalGAP audits on farms. These accredited certification bodies issue GlobalGAP Certificates to producers who have successfully implemented the GlobalGAP Standard. There are 159 independent and accredited CBs to carry out GlobalGAP Certification worldwide. Certificates are valid for 12 months. Today GlobalGAP is the world's leading farm assurance program, translating consumer requirements into Good Agricultural Practice in a rapidly growing list of countries - currently more than 135 (www.globalgap.org).

3.2.2. National GAP standards in the ASEAN region

a. Malaysia - MyGAP

In early 2002, the Malaysian government (Department of Agriculture - DOA) introduced a public GAP certification scheme for fresh fruits and vegetables called SALM (Skim Akreditasi Ladang Malaysia). SALM was aimed at creating vibrancy within the domestic commercial fresh fruit and vegetable sector by promoting “agricultural practices that are environment-friendly, sensitive to workers' welfare and yield quality products that are safe for consumption” (Robert and Menon, 2007).

In 2013, the Malaysian Ministry of Agriculture and Agro-based Industry launched MyGAP as the rebranding exercise of the three existing GAP schemes established in 2002. MyGAP is a comprehensive certification scheme for planting, aquaculture, and livestock to certify commercial farms which adopted GAP to produce high quality and safe produce for the markets. Major aspects under the scheme include conditions relating to the environmental setting of the farm, farmer's adherence to GAP, and safety of the produce.

This scheme has received overwhelming responses from the growers in the country, particularly on the produce targeted for international and regional markets.

Record keeping is one of the most important elements for farm verification. A certification requires three times of sample collection of crops and water from the applicant farm for the laboratory residue analysis of pesticides and heavy metals. A certification will last for two years. Before the end of the term, the farm can apply for recertification. The government bears the cost of inspection and residue analysis, providing publicity for promotion (Valk and Roest, 2009).

b. Thailand - Q-GAP

Q-GAP standard has been developed by the Thai government as a part of the national strategy for food safety and has been implemented since 2004. Q-GAP standard is a public voluntary standard aiming to improve quality and safety of agricultural products with respect to environment and ecology. In addition, the standard's goal is to increase consumer confidence in the domestic market and to enhance competitiveness in the international market.

The standard contains eight key points including requirements and how to inspect the farm production. The control points are: (1) water source; (2) cultivation site; (3) use of agricultural hazardous substances; (4) product storage and on-site transportation; (5) data records; (6) production for disease and pest-free products; (7) management of quality agricultural production and (8) harvesting and post-harvest handling (Sardsud, V, 2007).

The certified farms will be audited at least one more time by the government agencies after obtaining the certification.

c. Indonesia - IndoGAP

IndoGAP and its certification, SiSakti, was launched in 2004 by the government. The Indonesian Vegetable Research Institute and the Indonesian Ministry of Agriculture actively supported this development of GAP. The Indonesian GAP certification system has 16 elements, which are based on GlobalGAP and provides for a step-by-step movement towards GlobalGAP.

d. Philippines - PhilGAP

The programme for GAP for fruits and vegetables farming in the Philippines known as PhilGAP was launched in 2006. The main objectives of the PhilGAP certification programme are: (1) to facilitate the adoption of GAP to ensure food safety and product quality, while also ensuring environmental protection and the health, safety and welfare of workers; (2) to produce safe and high quality agricultural crops for consumers; and (3) to facilitate access for agricultural crops from the Philippines to neighboring ASEAN markets and other foreign markets (Secretario, 2017). The programme has six components - farm location, farm structure, farm environment, farm maintenance, farm practices and farm management.

e. Asian region - AseanGAP

ASEANGAP was developed by the ASEAN Secretariat (with member country representatives) and launched in 2006 as a standard for good agricultural practices during the production, harvesting and post-harvest handling of fresh fruits and vegetables in the ASEAN region. The purpose of ASEANGAP is to:

- ✓ Facilitate harmonization of national GAP programmes in the ASEAN region;
- ✓ Facilitate trade regionally and internationally;
- ✓ Enhance the safety and quality of fruit and vegetables for consumers;
- ✓ Enhance the sustainability of the environment in the ASEAN region;
- ✓ Protect the health, safety and welfare of workers

ASEANGAP consists of four modules covering food safety, environmental management, worker's health, safety and welfare, and produce quality (FAO, 2014).

4. Key voluntary standard and certification in vegetable sector in Vietnam

4.1. Rau An Toan (RAT)

4.1.1. Definition and objective

In response to the priority requirement for food safety arising particularly from the crisis in food poisoning during the period 1994 -1997, MARD issued Temporary Regulations on Safe Vegetables Production (Rau An Toan - RAT) in 1998 (MARD, 1998). From this document, 'safe vegetable' is understood to meet the minimum safety standards set by WHO and FAO. Specifically, 'safe vegetable' must meet the requirements of soil

quality, irrigation water, pesticide residues and microorganisms. By definition, safe vegetables include all vegetables having authentic characteristics, with toxic chemical levels below the MRLs (Maximum Residue Levels) and microorganism levels also within tolerated limits, making them safe for consumers and the environment. In 2012, 'safe vegetable' has been revised and expanded by Circular No. 59/2012/TT-BNNPTNT issued on November 9th, 2012 regulating safe vegetables, fruit and tea production management (MARD, 2012). According to this Circular, one of the core requirements for attaining RAT is that producers have to possess a certificate of compliance with food safety regulations. Therefore, if a producer has this certificate, his or her vegetables will be accepted as a RAT vegetable. Article 2 of the Circular explains that the term "safe vegetable" corresponds with the following cases:

(1) Vegetables meet national technical standards on food safety conditions (QCVN 01-132: 2013/BNNPTNT, issued by (MARD, 2013) according to Circular 07/2013/TT-BNNPTNT and be applied to manufacturing and processing establishments, except for small production farms);

(2) Or vegetables produced according to the safety certification process of provincial department of agriculture and rural development;

(3) Or vegetables that meet VietGAP standard or equivalent.

The safe vegetable scheme is voluntary for farmers, and the Government provides the necessary assistance to farming organizations for its implementation.

4.1.2. Description of the requirements

Certification is provided after auditors have visited farms to evaluate farming practices and their compliance with stipulated criteria. To receive the certificate, producers are evaluated based on various criteria that are divided into 8 groups with 24 control points based on analyses of soil, water and produce (MARD, 2012). Base on the evaluation result, application will be evaluated and group as Grade A, grade B or grade C 8 control groups are:

(1) Cultivation site;

(2) Soil and substrates management;

- (3) Water source;
- (4) Seed, fertilizer and pesticide use;
- (5) Human and organization;
- (6) Production process and waste and pollution management;
- (7) Data record and traceability;
- (8) Sample test result.

4.1.3. Certifying steps and monitoring

Inspection and certification are undertaken by an authorized local government agency. The certification process may vary depending on the province. In principle, the conditions to be met are clean soil, onsite availability of water resources and sound practices such as use of good seeds, appropriate use of organic and inorganic fertilizers, limited use of growth stimulants and pesticides, and appropriate pre-harvest intervals. Inspections and rapid testing to ensure that chemical residues are below the prescribed MRLs are being carried out, based on internationally acceptable testing methods for the analysis of pesticide residues. Safe vegetables have to be produced on farms certified by the government.

The assessment and certification process in RAT can be outlined as follows:

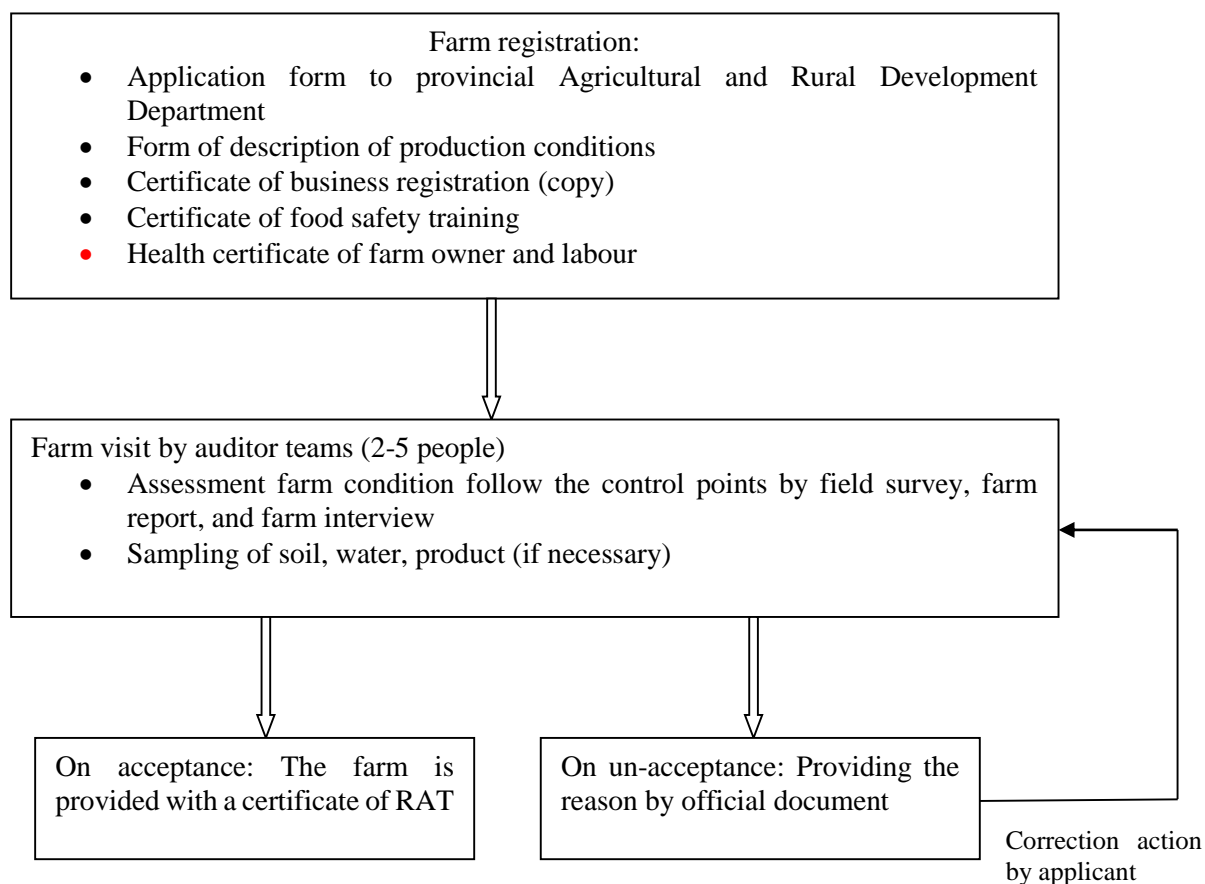


Figure 1.11. Flow chat of RAT certification process

Source: MARD, 2007

RAT is certified by the Department of Agriculture and Rural Development, although the standards and controls are quite lax. The cost of applying for the certification for farmers is not too burdensome and is valid for three years.

4.2. Vietnamese Good Agricultural Practices (VietGAP)

4.2.1. Definition and objective

VietGAP (Vietnamese Good Agriculture Practices) is a national good agricultural practices standard for food safety issued by MARD in 2008. It consists of the rules, orders and procedures that guide agricultural producers to produce, harvest and process agricultural products to meet a number of requirements. These include the requirements

to do with food safety and quality, product traceability and environmental protection (MARD, 2008a).

The aim of VietGAP for the production of fresh fruit and vegetables, according to MARD, 2008 were:

- 1) to enhance the responsibility in production and management of food safety of individuals and/or organizations;
- 2) to create the approval feasibility of VietGAP food safety for individuals and/or organizations;
- 3) to ensure the transparency, traceability and recall of produce;
- 4) to enhance the product quality and economic efficiency of fruit and vegetable production in Vietnam.

4.2.2. Description of the requirements

In total, there are 12 sections with a total of 65 control points and compliance criteria of the VietGAP certificate. They are categorized as “major must” which present 86% and “recommendations” (14%). The item of harvesting and post-harvest handling is a control target in the major must category with 28.6%, followed by chemical (including pesticides) with 19% (see table 1.2).

Table 1.2. Summary of VietGAP control points and compliance criteria

No.	Compliance and control points	Major must	Recommendation	Total
1	Cultivation site assessment and selection	3	0	3
2	Planting materials	2	0	2
3	Soil and substrates management	2	2	4
4	Fertilizers and soil additives	5	0	5
5	Water	2	0	2
6	Chemical, including pesticides	10	3	13
7	Harvesting and handling produce	16	0	16
8	Waste management and treatment	1	0	1
9	Workers and training	4	3	7
10	Documents, records, traceability and recall	6	0	6
11	Internal audit	3	1	4
12	Complaint handling	2	0	2
	Total	56	9	65

Source: Own compilation based on VietGAP checklist (MARD, 2008a)

4.2.3. Certifying steps and monitoring

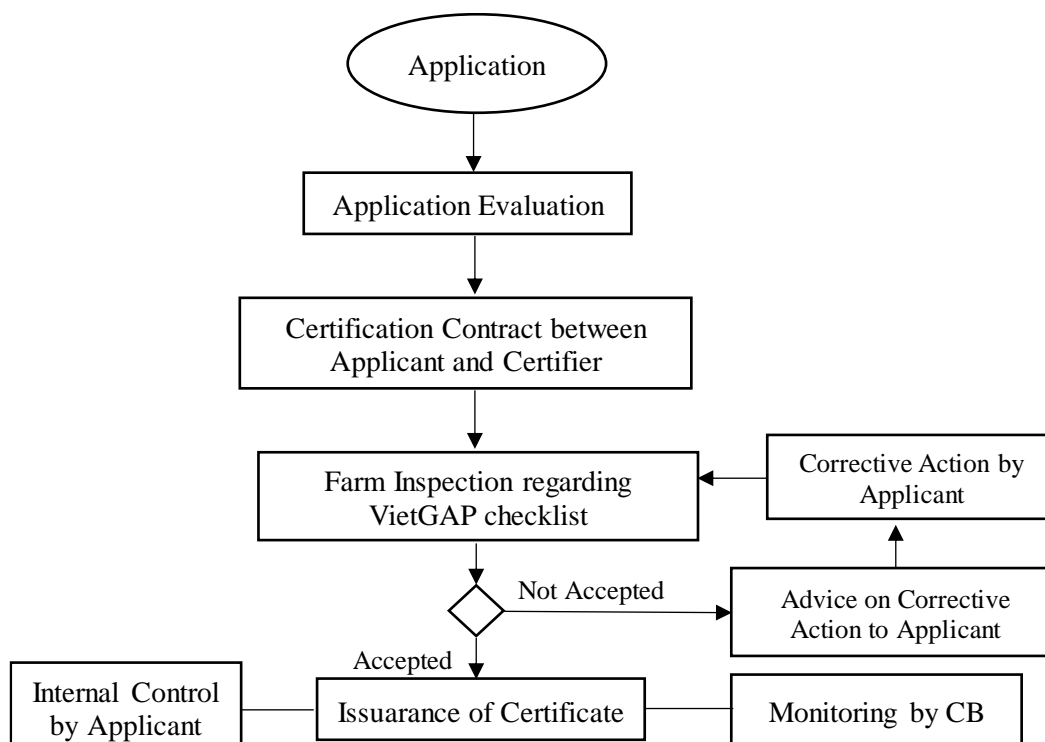


Figure 1.12. VietGAP certification procedure

Source: (MARD, 2008b)

The organization certifying the VietGAP for safe vegetables, fruits and tea is an organization meeting all prescribed conditions and accredited by a competent state agency.

VietGAP certificate is verified by a third-party organization accredited by the government and the certificate is effective for 2 years. VietGAP is a high cost system and requires considerable effort on the part of producers, making it difficult to expand production under it and is not very suitable for many farmers whose land holdings are small and fragmented.

Table 1.3. List of certification bodies for VietGAP vegetable

No.	CBs name	Address	Specified code
1	Vietnam Certification Centre (QUACERT)	Hanoi	VietGAP-TT-13-03
2	Hanoi Agricultural Products Quality and Certification and Analysis Center	Hanoi	VietGAP-TT-15-03
3	TQC Center for Testing and Quality Certification	Hanoi	50/CN-TĐC
4	IQC Certification and Inspection Joint Stock Company	Hanoi	VietGAP-TT-14-05
5	VinaCert Certification and Inspection Joint Stock Company	Hanoi	VietGAP-TT-13-02
6	Quality Assurance and Testing Center 3 (QUATEST 3)	Ho Chi Minh City	VietGAP-TT-13-11
7	National Agro-Forestry-Fisheries Quality Assurance Department- Branch 4	Ho Chi Minh	VietGAP-TT-13-08
8	Ho Chi Minh City's Center for Agricultural Consultancy and Support	Ho Chi Minh	VietGAP-TT-13-06
9	FCC Control and Fumigation Joint Stock Company	Ho Chi Minh	VietGAP-TT-12-03
10	The Superintendence and Inspection of Coffee and Products for Export and Import Joint Stock Company (CAFECONTROL)	Ho Chi Minh	VietGAP-TT-13-12
11	National Agro-Forestry-Fisheries Quality Assurance Department- Branch 2	Da Nang	VietGAP-TT-12-01
12	Globalcert Certification Joint Stock Company	Da Nang	VietGAP-TT-12-02-24-0053
13	VietCert Certification and Inspection Centre	Da Nang	VietGAP-TT-15-02
14	Dalat Nuclear Research Institute	Lam Dong	VietGAP-TT-14-04
15	Lam Dong Quality Assurance and Testing Center	Lam Dong	VietGAP-TT-13-09
16	National Agro-Forestry-Fisheries Quality Assurance Department- Branch 6	Can Tho	VietGAP-TT-13-01
17	NHONHO Technology Company	Can Tho	VietGAP-TT-13-04
18	National Agro-Forestry-Fisheries Quality Assurance Department- Branch 1	Hai Phong	VietGAP-TT-13-07

19	Tien Giang Technical and Biotechnology Center	Tieng Giang	VietGAP-TT-13-13
20	National Agro-Forestry-Fisheries Quality Assurance Department- Branch 5	Ca Mau	VietGAP-TT-14-01
21	National Agro-Forestry-Fisheries Quality Assurance Department- Branch 3	Khanh Hoa	VietGAP-TT-13-10

Source: <http://vietgap.com/>

4.3. Organic

Vietnamese government has recognized organic vegetables as Safe vegetable and puts organic production into the Vietnamese standard system. Like VietGAP and RAT, organic is a voluntary standard, it means that producers may choose whether or not to do it and the State would not force it.

4.3.1. Participatory Guarantee System - PGS

For Organic vegetable, several kind of standards are appearing in Vietnam vegetable market and PGS certification which introduced from 2004 under the ADDA - VNFU (Agriculture Development Denmark Asia - Vietnam Farmer Union) has strong presence from various researchers. PGS production is based on the Vietnam PGS Organic standards in line with the MARD's standard for Organic production and Processing. There are a total of 6 groups with 38 requirements for PGS standard. Thanh Xuan commune, Soc Son district in Hanoi city is the pioneer applying PGS standard and the production area for PGS organic vegetables in Thanh Xuan commune reached around 20 hectares in 2018. PGS organic standard is a private standard with the certificate perform via NGO and the certification values in 12 months. PSG is suitable for small-scale farmers because of low certification cost.

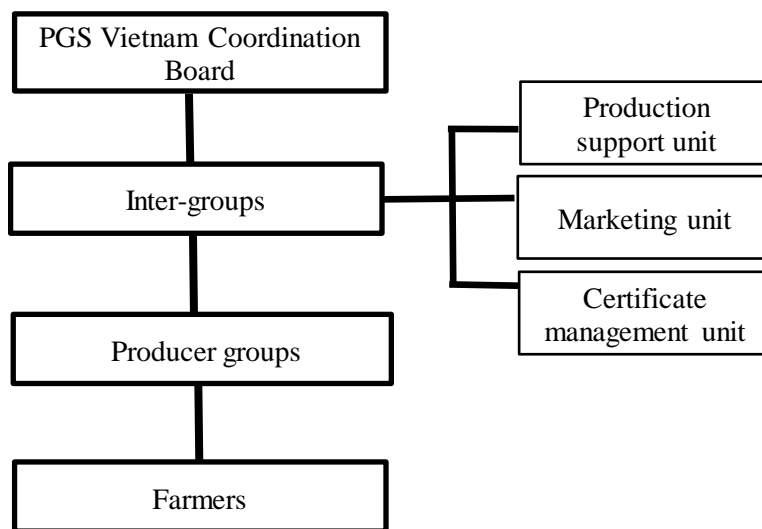


Figure 1.13. Structure of PGS Vietnam

4.3.2. TCVN (*Tiêu chuẩn Việt Nam* - in Vietnamese)

The legal document for organic production is Industry Standard No. 10-TCN602-2006 dated in December, 2006 (MARD, 2006), later is TCVN 11041-2017 for organic farming issued by (MOST, 2017b) under Decision No.3883/QĐ-BKHCHN dated in December, 2017 (MOST, 2017).

TCVN 11041 (*Tiêu chuẩn Việt Nam*) - the National organic agriculture standard, provided a new direction for organic agriculture in Vietnam. This standard provides the general principles of organic production on farms, from the stage of production, processing, storage, transportation, labeling, marketing and requirements for inputs, for example: fertilizers, requirements for stabilizing crop land, pest control and crop disease, food additives and processing aids.

This standard aim to provide requirements for production, processing and labeling of agricultural products produced by organic methods (organic production).

Specific objectives of TCVN (TCVN 11041-1:2017) were:

- ✓ Protect consumers from cheating, avoid commercial fraud and avoid publication of unfounded products;
- ✓ Protect producers, processors following organic standard with agricultural products produced in other ways that are misunderstood as organic;

- ✓ Ensure that all stages of production, pre-processing, processing, storage, transport and marketing are checked and comply with specified standards;
- ✓ Balance the terms of production, certification, identification and labeling provisions for products produced organically;
- ✓ Maintain and strengthen organic agriculture system.

Description of the requirements

The TCVN 11041 standard covers four areas:

Part 1: General requirements for production, processing, labelling of products from organic agriculture;

Part 2: Organic plants/crops;

Part 3: Organically raised livestock;

Part 4: Requirements for bodies providing audits and certifications of organic production and processing systems.

Evaluation method

Organic products are evaluated in accordance with TCVN according to the method of evaluating, supervising the process of production and testing typical samples taken at the farm or on the market when suspecting the use of input materials are not in the allowed list in TCVN on organic agriculture or products contaminated with heavy metals, harmful microorganisms in excess of regulations and technical regulations. TCVN is an example of third-party certification and the certificate is valid for two years.

In addition, there are several standards operating in Vietnam including BasicGAP, GlobalGap and other Organic standards such as USDA, EU, JAS. BasicGAP extracted the important portion (26 control points) about safety from VietGAP and help producers approach with GAP easily (MARD, 2014), but there is no certification and logo for this standard. GlobalGAP and other Organic standard like USDA, EU are costly for Vietnamese farmers and mostly used by private exporters for fish and dragon fruit.

4.4. Comparison between three standards

Table 1.4. Summary of voluntary certification standard for safe vegetables in Vietnam

	RAT	VietGAP	Organic (TCVN)
Year of establishment	1998	2008	2006
Standard setting	Public	Public	Public
Traceability	No	Yes	Yes
Logo	No official logo	Yes	Yes
Certification validity	3 years	2 years	2 years

Source: Compiled by the authors based on (Pham, Nguyen and Nguyen, 2016)

Of the three major standards for safe vegetables in the Vietnamese market, RAT, the minimum level, was established in 1998, followed by the introduction of VietGAP and Organic standards, which were introduced in 2008 and 2006 respectively. All three standards are voluntary and producers may choose whether or not to adhere to them. It can be said that the greatest difference between RAT vegetables, VietGAP and Organic vegetables lies in the quality certificate, the label and the packaging. While RAT suppliers have only a certificate of compliance with food safety regulations, which is not a certificate of the safety of the product itself, VietGAP and Organic have quality certificates that are considered to very strict, since they are conducted and verified by third party. Moreover, lack of an official logo and of traceability is one of the weaknesses of the RAT standard, which also makes it possible for conventionally grown vegetables to be mixed in with RAT vegetables.

Figure 1.14 shows that organic vegetables with no fertilizers and chemical pesticides in production are of high quality standard and stand on the highest position. VietGAP placed in the power position, at the boundary between Safety and Health, and Service and Satisfaction. RAT only comply with Vietnamese safety standard, regulates the maximum content for heavy metals in the soil, cleanliness of irrigation water and pesticides residues prescribed by FAO and WHO. It therefore for safety standard, not quality standard and ensures the minimum condition standard for consumers.

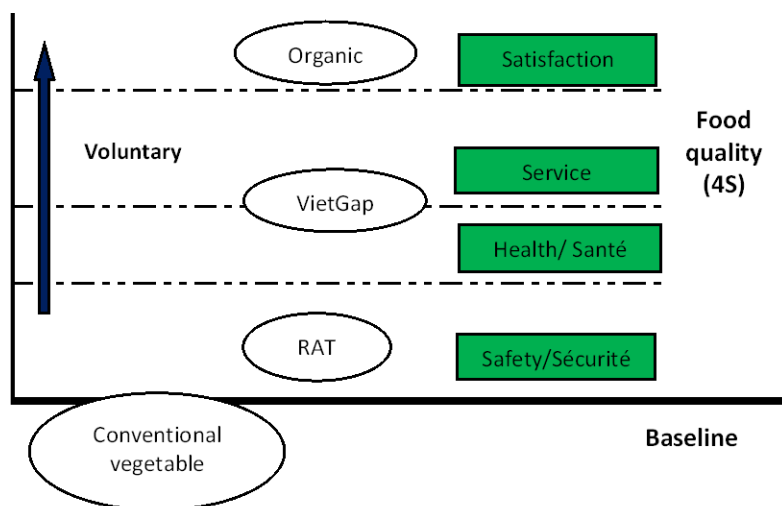


Figure 1.14. Three standards position in food quality model

Source: (Pham, Nguyen and Nguyen, 2016)

5. Conclusion

Vegetable sector play an important production sector in whole agriculture industry in Vietnam. Consumers tend to consume more in high quality of vegetables on their shopping decision that create the bigger market for safe vegetables in the domestic market. However, over 20 years of safe vegetable development, the safe vegetable production still very small accounted only around 10% of total vegetable crop land.

The key public voluntary standards for safe vegetable in Vietnam include RAT, VietGAP and organic. Of these three standards, RAT is minimum standard, organic stands on the highest position and VietGAP at present can be seen as the most popular and widely accepted standard for the safety and quality of vegetables in the Vietnamese market.

Chapter 2. Supermarket supply chain for safe vegetable in Vietnam

1. Introduction

This chapter aims to understand the supermarket supply chain for safe vegetable in Vietnam. The chapter starts with a general overview of modern retail sector in Vietnam. Next, market structure of vegetable supply chain in traditional market and supermarket are analyzed in section 3. Then, it continues with case study analysis of four supermarket chains in Hanoi. Three main contents are considered in section 3 including (i) Safe vegetable procurement channels; (ii) Standard structure for safe vegetables in supermarkets; (iii) Quality control activities for safe vegetable in supermarket chain. Finally, conclusions of the chapter are drawn.

2. The modern retail sector in Vietnam: background

2.1. Stable growth of the modern retail sector in Vietnam

Thanks to Vietnam's large population, its favorable economic environment and increased consumer purchasing power, the retail sector has enjoyed continued and sustained growth in recent years. The wave of supermarket penetration in "transition East Asia" and India happened in the late 1990s or early 2000s (Masayoshi and Le, 2012). In Vietnam, the first supermarket named Minimart appeared in Ho Chi Minh city in 1993, followed by Citimart that was opened by a Vietnamese expatriate who had gained much experience in operating supermarket in Philippines one year later. The success of Citimart encouraged the owners open another supermarket chain named Maximart in 1995 (Cadilhon *et al.*, 2006). Also in 1995 "Mini-mart Hanoi" was established as the first supermarket in Hanoi (Maruyama and Le, 2007).

Although traditional retailers continue to dominate, the number of modern stores has risen significantly, from only 10 supermarkets in 1995 to 812 supermarkets in 2015 (see table 2.1). Hanoi City and Ho Chi Minh City are the country's two biggest cities with total of 316 supermarkets (39%). Of these, 137 stores are in Hanoi (16.9%) and 179 are in Ho Chi Minh City (22.0%).

Table 2.1. Number of supermarkets, Units

	1995	2000	2005	2010	2015
Hanoi	2	20	59	74	137
Ho Chi Minh City	2	40	82	142	179
Whole country	10	107	385	571	812

Source: GSO, 2015

According to the government’s plan for the development of supermarket networks, to be achieved by 2020, 1,200 -1,500 supermarkets will be introduced in Vietnam, and the ratio of modern retail will reach 45% of total retail distribution (Ministry of Industry and Trade, 2012).

2.2. The emergence of mergers & acquisitions (M&A) activities in Vietnam retail market

Over the past several years, Vietnam’s modern retail sector has witnessed vibrant growth, with an increasing number of M&A transactions and the creation of new businesses. In 2006, Vietnam market saw only 32 M&A transactions with the total value of 245 million dollars. This number in 2015 increased impressively with 525 transactions and the value of over 4.3 billion dollars (Phan, 2016). The international retailers have emerged with a series of business transactions. For instance, Aeon (Japan) simultaneously acquired 30% of the shares of Fivimart, a supermarket chain in the north, and 49% of the shares of Citimart, a supermarket chain in the south. At the end of April 2016, Central Group (Thailand) bought BigC Vietnam, which originally belonged to the Casino Group (France) and was valued at US\$1.1 billion. On the other hand, several large domestic enterprises have made moves in an effort to dominate the retail market. For example, after acquiring three local supermarket chains, including Ocean Mart, Maximart, and Vinatexmart, the Vingroup launched the brand Vinmart in 2014. It subsequently has become one of Vietnam’s best-known retailers. Therefore, the Vietnamese retail market continues to show great potential and is becoming an extremely attractive destination for investors.

3. Traditional and supermarket supply chain for vegetables in Vietnam

There are two types of vegetable supply chain in Vietnam including traditional and supermarket channel (see figure 2.1).

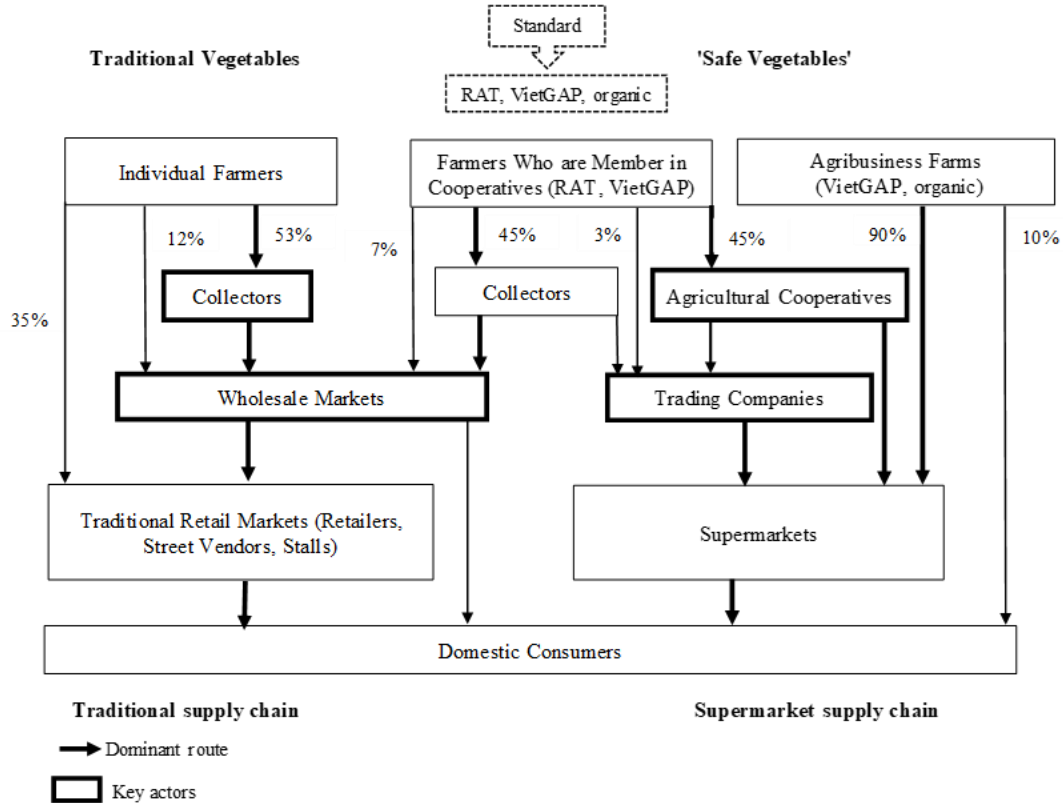


Figure 2.1. Supply chain for vegetable operating in Hanoi City and Moc Chau District, Northern, Vietnam

Source: Field survey (2017-2019)

Note: % based on quantity proportion³

3.1. Traditional vegetable supply chain

Traditional marketing chain currently still remain the dominant chain for vegetable since more than 80% of vegetables are distributed in traditional market before handing to consumers (Nguyen and Do, 2015).

³ We estimate the proportion of vegetables distributed that were self-reported by farmers (farmers located in Hanoi for traditional supply chain; farmers located in Hanoi City, and Moc Chau district for supermarket supply chain).

3.1. 1. Distribution route

The beginning of the conventional chain was individual farmers who may sell their vegetables by several ways:

Pattern 1: Farmers → Traditional markets

Around 35% of traditional vegetables from farmers are sold directly at local traditional retail markets. In this distribution route, farmers transport their vegetables by bicycle or moto-bike directly to local traditional market. In this case, they can get higher selling price compared with other distribution channels. These farmers often own small crop land for vegetable (several Sào⁴) and located near the traditional market (around several kilometers). The vegetable volume is small several dozen kilograms per market day.

“I have small production, and live close Sui market. Therefore, I often delivery vegetable directly to the market at around 4 a.m to sell to small wholesaler or my preferred buyer in the market. If I sell the vegetable directly in the market, I can get higher price compared to village collectors. For example, at present, I get 3,000vnd/mớ⁵ for spinach in the local market, higher 500 - 1,000 vnd/mớ selling to collectors” (traditional farmer in Dang Xa commune, Gia Lam district).

Pattern 2: Farmers → Wholesale markets (primary/secondary wholesaler) → Traditional markets (local district, provincial capital, neighbor provinces)

Around 12% of conventional vegetables from farmers are sold through wholesale market where small retailers such as retailers in spot market, street vendor buy vegetable to resell to the end consumers. In this case, farmers located near the wholesale market. Beside their own vegetables, farmers sometime play the role as small collector by collecting vegetable from other farmer and then transport to wholesale market generally by their moto-bike.

“I have several Sào in production majority for leaf vegetables. Because my house is near the Hoang Mai wholesale market, therefore, I transport vegetable at around 2-3a.m to wholesale market to sell to buyers there. I do not have preferred buyer in the

⁴ 1 sào = 360m²

⁵ 1 ‘mớ’ is around 300-500gram

wholesale market. I sell to the buyer who pay highest price, however, the price is often similar between them” (traditional farmer in Linh Nam commune, Hoang Mai district).

Pattern 3: Farmers → Collectors → Wholesale markets (primary/secondary wholesalers) → Traditional markets (local district, provincial capital, neighbor provinces)

A majority of conventional vegetables (~ 53%) from farmers are sold through collectors to distribute to wholesale markets. In case of large scale in production, far from the market and there is no transportation, farmers choose collector to distribute their vegetables. Although the selling price is lower than other distribution channel, farmer can save the transportation cost and sell big quantity of vegetable to collectors.

“My family has 2 labors and we own several sào. We also rent more 7 sào, so the total land for vegetable production up to more than 10 sào. In summer season, we develop majority cabbages, cauliflower or kohlrabi. The output for cabbage may reach to more than 1 ton per sào. We, therefore, sell our vegetables to collectors in our commune because we do not have truck to transport vegetable. In addition, the wholesale market is far from my village” (traditional farmer in Van Duc commune, Gia Lam district).

3.1.2. Important actors in traditional supply chain

The traditional vegetable supply chain involved in various actors including: (i) individual farmers; (ii) collectors; (iii) wholesalers;

Traditional farmers

In traditional vegetable chain, vegetables were cropped and harvested by individual farmers who act as a producer. Some famers act more role as a collector and supply vegetable to wholesale market. Some characteristic of interviewed traditional farmers are showed in table 2.2.

The land size of farmers is small and fragmented, average of 4.3 sào. In general, farmers do not follow any standard and in their production was based majority on their experience. Traditional farmers often crop vegetable independently. They normally lacked the market information especially the market demand since there is very weak

communication between farmers and buyers in the market. There is no evidence of collective action in production or marketing from traditional farmers in study commune.

Table 2.2. Profile of surveyed traditional vegetable farmers

Farmer ID	Location	Gender	Age	Years of education	Land size for vegetable production (<i>Sào</i>)	Distribution route
F1	Linh Nam	Female	65	5	2	Collectors (30%) Wholesale market (70%)
F2	Linh Nam	Female	68	5	1	Collectors (20%) Local market (80%)
F3	Dang Xa	Male	55	9	5	Collectors (60%) Local market (40%)
F4	Dang Xa	Female	48	12	3	Collectors (50%) Local market (50%)
F5	Van Duc	Female	55	9	10	Collectors (100%)
F6	Van Duc	Male	58	9	5	Collector (60%) Local market (40%)

Source: Field survey (2017-2019)

Collectors

Local collectors play the key role in the conventional vegetable system. They buy vegetable from farmer in their commune, and then transport these collected vegetables to wholesale market. Generally, collectors came to the farm gate to purchase vegetables or from collection place near farm gate. In some case, farmers can deliver their vegetables directly to collectors' home for sale. There are several kinds of collectors (i) collection for the province's demand (Hanoi City); (ii) collection for neighbor provinces (Bac Ninh, Hai Duong, Hai Phong etc.). For collectors supply in Hanoi market, they choose wholesale market for selling based on the distance of their market to their home and based on their relationship with buyer. They can transport vegetable by moto-bike (for small collectors) or by truck (for large collectors) to the famous wholesale market. For example, collectors in Thanh Tri, Hoang Mai areas often transport vegetable to Southern wholesale market (Den Lu or Hoang Mai wholesale market). Collectors from Gia Lam, Dong Anh often

supply vegetable to Long Bien wholesale market. For collectors supply in other province market such as Bac Ninh market, Hai Duong or Hai Phong market. The mean of transportation or these collectors is truck. They often have some preferred buyers in wholesale market, but sometimes they act as a retailer in wholesale market.

Wholesalers

Wholesalers also play the important role in conventional vegetable marketing system. They are the major buyers of vegetable from collectors and then sell these vegetables direct to retailers in wholesale markets. Some wholesalers purchased vegetables from other wholesalers. Wholesalers often buy various kind of vegetable in bulk quantity and they have a small stall in wholesale market. Wholesale markets in Hanoi city are often active at night and the range of vegetable on sale is extensive. The key wholesale markets in Hanoi City include Long Bien wholesale market, Southern wholesale market, Van Tri wholesale market, Cau Giay wholesale market, Minh Khai wholesale market.

3.1.3. Quality and standards

In traditional supply chain, conventional vegetable and RAT vegetables were distributed under this chain. There is little or no attention to the standard and quality of vegetables by participants in the chain. Vegetables traded in traditional market were inconsistent, and there was no enforcement to standard by the market. The coordination between actors in traditional supply chain is very low, based mainly on the market. The relationship between participants in the chain (farmers - collectors -wholesalers - retailers) based majority on the trust and their personal relationship that was built for a long time. The verbal agreement was used in conventional vegetable supply chain, and this verbal agreement was based the trust amongst players.

3.2. Supermarket supply chain for safe vegetables

Supermarket are clearly found for certified vegetable or ‘Safe vegetable’. Although the proportion of safe vegetables that were distributed via modern retailers (supermarkets and safe food shops) is still modest, this proportion increased significantly from only 5% in 2016 to 10-15% in 2019 (Ngo *et al.*, 2019). Supermarkets, therefore, become an increasing important channel for distributing ‘Safe vegetable’.

3.2.1. Distribution route

As for supermarket supply chain, ‘safe vegetable’ (RAT, VietGAP, organic) were distributed under this chain. There are several ways that ‘safe vegetable’ can travel from farm gate to supermarkets (see figure 2.1).

Pattern 1: Direct marketing from farm to supermarket

(Agribusiness farms → Supermarkets)

The high ratio of certified vegetable (VietGAP, organic) in agribusiness farm was distributed directly to supermarkets (more than 70%). Modern retailers (supermarkets), compared with other channels, have become the preferred destination for the produce of agricultural enterprises because of the stable quantities they purchase and the higher prices they offer.

Pattern 2: Collective action: Agricultural cooperatives → supermarkets

(Farmers in agricultural cooperatives → Agricultural Cooperatives → Supermarkets)

In this route, around 45% of ‘safe vegetables’ including RAT and VietGAP vegetables after harvesting were sold to agricultural cooperatives to distribute in supermarkets or via trading companies to supply in supermarkets. Agricultural cooperatives become important actors in safe vegetable supply chain. They play not only role in transferring the government fund to farmers but also intermediary collect farmers to modern retailers via formal contract with supermarkets. The role of agricultural cooperatives in marketing safe vegetable was strongly shown the new type of cooperative model case in Moc Chau area (detail in chapter 3)

Pattern 3: Indirect channel via trading company: Trading companies → Supermarkets

(Farmers → Collectors/Agricultural Cooperatives → Trading companies → Supermarkets)

Like agricultural cooperatives, trading companies also play the role as intermediary collect farmers to supermarket. They bought certified vegetables from individual collectors or contact with farmer via agriculture cooperatives, they then sell to supermarkets.

3.2.2. Important actors in supermarket supply chain

The supermarket supply chain involved several key actors including: (i) producer; (ii) collectors; (iii) agricultural cooperatives; (iv) trading companies.

Producers

In safe vegetable supply chain, there are two type of producers: farmers (small scale), agribusiness farms (large scale).

Farmers who are the member in agricultural cooperatives

Safe vegetable farmers often transfer from traditional production under the agricultural cooperatives' orientation. They have been trained the protection method of general epidemic diseases and technical training for safe and VietGAP production. Safe vegetable farmers, therefore, improve their knowledge and skills on safe vegetable production especially on the use of safe and correct pesticides or proper use of fertilizers that not only protect producers' health but also improve the productivity of their crops. Participating the agricultural cooperatives, farmers have better plan for their production. Table 2.3 shows the main characteristic of surveyed safe vegetable farmers.

Table 2.3. Profile of surveyed safe vegetable farmers

Farmer ID	Location	Gender	Age	Years of education	Land size for vegetable production (<i>Sào</i>)	Distribution route
Farmers in Hanoi City						
SVF1	Yen My	Female	40	9	2	Collectors (90%) Middle trading firm (10%)
SVF2	Yen My	Male	48	12	3	Collectors (40%) Wholesale market (50%) Middle trading firm (10%)
SVF3	Linh Nam	Female	42	12	3	Collectors (20%) Wholesale market (35%) Cooperative (45%)
SVF4	Van Duc	Female	50	9	4	Collectors (65%) Cooperative (35%)
SVF5	Van Duc	Male	46	12	12	Collectors (80%) Cooperative (20%)
Farmers in Moc Chau District, Son La Province						
SVF6	Moc Chau	Female	64	5	5.6	Collectors (50%) Cooperative (50%)
SVF7	Moc Chau	Female	62	5	8.3	Collectors (70%) Cooperative (30%)
SVF8	Moc Chau	Female	51	6	5.6	Collectors (80%) Cooperative (20%)
SVF9	Moc Chau	Female	58	9	41.7	Cooperative (100%)
SVF10	Moc Chau	Female	56	6	55.6	Cooperative (100%)
SVF11	Moc Chau	Female	52	5	41.7	Cooperative (100%)

Source: Field survey (2017 - 2019)

Note: SVF - Safe Vegetable Farmer

Table 2.4. Description of interviewed farmers from Hanoi and Moc Chau

	Age	Gender - Female/Male	Land size for vegetable production	Years of Education (year)	Experience in safe vegetable production (year)
Hanoi	45	60%/40%	4.8 <i>sào</i>	10.8	9.4
Moc Chau	57	100%/0%	26.4 <i>sào</i> (0.95 ha)	6.0	3.2

Source: Field survey (2017 - 2019)

Table 2.4 shows that farmers in Hanoi have higher education (completed secondary school) and more experience in safe vegetable production (around 10 years), while farmer from Moc Chau contains larger crop land in production (0,95 hectare). The important reason given by the farmers for following the standard toward the cooperative orientation is that they expect the cooperative distributes their vegetables with higher and stable price. Using cooperative service, following other farmers and receiving the benefits from local government are another reasons for participating in growing vegetable conforming to cooperative orientation.

Agribusiness farms

Agribusiness farm who establish as a company and crop safe vegetable. They often rent the land and labor for their production. The production base is huge and isn't fragmented. These companies often focus on only several special products and distributing their products majority to modern retailers especially supermarkets (detail in chapter 3).

Agricultural Cooperatives

Since the Cooperative Law 2012, some cooperatives operate under model of agricultural service cooperatives that mostly provide base service in stages for production such as input suppliers, irrigation service, or plant protection services (detail in chapter 3). Some cooperatives operate as a new type of cooperative that focused on marketing activities for agricultural products (detail in chapter 3). Most of cooperatives transformed themselves and focused more on marketing of agricultural products. Agricultural cooperatives therefore play the important role in safe vegetable supply chain in collecting safe vegetable farmers to supermarkets.

Trading companies

Trading companies play the role as an intermediary in distribution system of safe vegetables. Generally, they signed contracts with safe vegetable farmer via agricultural cooperatives to collect safe vegetable for supermarket. Some companies developed their own practice of safe vegetable production. Therefore, they have good knowledge about standard for safe vegetable to supply supermarkets (detail in chapter 4).

3.2.3. Quality and standards

Supermarket supply chain differentiates with traditional supply chain by the imposition of certification standard for vegetables. Three certification standards are found in supermarket chains including RAT, VietGAP and organic. Actors involved in the supermarket supply chain, therefore, are more concerned about high quality of products and pay more attention to procure certified vegetables. Supermarket supply chain involves a high level of coordination amongst actors in the chain. The relationship between participants in the chain (farmers - traders - supermarkets) based on the formal contracts.

3.3. Comparison of traditional and supermarket supply chain

Table 2.5. Comparison of traditional and supermarket supply chain

	Traditional supply chain	Supermarket supply chain
Standard	Arbitrary and informal Conventional vegetable; RAT vegetable	Imposition of standard and formal RAT vegetable; VietGAP vegetable; Organic vegetable
Certification	Not required	Required
Quality and monitoring	No/ low Base on physical attributes	High/strict Standards determined by supermarkets/ sample test, supplier audits
Structure		
✓ Farm level	Individual farmer	Farmer in Cooperative Agribusiness farm
✓ Collecting level	Collector Wholesaler	Collector Agricultural Cooperative Trading company
✓ Retail level	Retailer, street vendor in Traditional market	Supermarket

Source: Authors

Traditional supply chain

In traditional supply chain, there is no attention or no requirement about standard of vegetable in traditional market. All vegetables that are distributed in traditional market are considered as conventional vegetables although other vegetables with standard such as RAT may be distributed under this chain. The first actor involved in traditional supply chain is individual farmers who pay less attention to standard or supply high quality vegetable. In this chain, collector plays a crucial role since more than 50% of vegetable from farmers sold through collector. Farmers choose collector because they can save transportation cost and sell in bulk at farm gate. This chain was less structured that farmers and other traders could participate in the chain easy. The coordination between actors in traditional supply chain is very low, based mainly on the market. The relationship between

actors in traditional chain based on their trust that had built up a long-term. In traditional supply chain, there is no enforcement for standards and certification by the market. The actors participate in this chain, therefore, were not incentivized to supply certified vegetable or not emphasis for vegetable differentiation.

Supermarket supply chain

Generally, certified vegetables with standard (RAT, VietGAP, organic) are distributed in supermarket chain. Supermarkets have become an alternative important supply chain for safe vegetable. Supermarkets deal directly with producers, via agricultural cooperatives or work with qualified trading companies. However, supermarkets choose their suppliers strictly. Producers involved in supermarket chain include: (i) Farmers who are the member of Agricultural Cooperative; (ii) Agribusiness farm. In supermarket supply chain, producers have good knowledge about the standard for safe vegetable and they pay more attention to the quality and safety of vegetable that meet the requirement of supermarket. In supermarket supply chain, trading companies are emergence and significant in the supermarket supply chain. Supermarket supply chain differentiates with traditional supply chain by the imposition of certification standard for vegetables. Certification is one of the mandatory requirement for supplier in supermarket supply chain. Actors involved in the supermarket supply chain, therefore, are more concerned about high quality of products and pay more attention to procure certified vegetables.

4. Supermarkets - Case studies analysis

4.1. Description of case studies

Four major supermarket chains in Hanoi were chosen to interviewed. First, the ten most prestigious retailers in 2017 were ranked by financial soundness, media reputation, and online surveys, and the five retailers most frequently mentioned were selected. Then, the four of these five chains that were willing to cooperate were analyzed in detail.

The two multinational supermarket chains selected were Aeon (Japan) & BigC (Thailand); the two domestic retailers are Fivimart⁶ and Vinmart. Several major characteristics of the selected supermarkets are shown in Table 2.6.

Of the two multinational supermarket chains, Aeon is a new entrant with 4 stores, while BigC has operated in Vietnam for approximately 20 years and owns 32 stores. As for the domestic chains, Fivimart has been in business since 1997 and has 26 stores in Hanoi, whereas Vinmart got its start in 2014 and has 80 outlets that cover the whole country. On the other hand, of the four chains, only Fivimart is concentrated in the Hanoi market, while the remaining three have expanded their brands and plan to dramatically increase their number of stores nationwide. Generally, supermarkets are equipped with up-to-date facilities, especially the spraying systems in the Aeon and Vinmart chains that ensure the best temperatures to maintain the freshness of their vegetables. BigC, Fivimart, and Vinmart chains have set up distribution centers to supply their stores, while it is necessary for Aeon to do direct store-deliveries because it has only one store in the Hanoi market.

⁶ Fivimart belongs to Nhat Nam JSC, one of the pioneers in supermarket development in Vietnam. In 2015, Fivimart cooperated with Aeon-Japan and was renamed Aeon Fivimart. However, Fivimart remains independent in its business and its procurement regime. Therefore, in this study, we use the name Fivimart to identify Fivimart as a domestic supermarket.

Table 2.6. Some characteristics of the case studies

	Aeon	BigC	Fivimart	Vinmart	
Ownership	100% owned by Aeon group (Japan)	100% owned by Central group (Thailand)	Share-holding company (Aeon Japan and Fivimart Vietnam)	100% owned by Vincommerce Jsc, a member of Vingroup	
Year of opening	2014	1998	1997	2014	
Retail format	Hypermarket	Hypermarket/ Supermarket	Supermarket	Supermarket	
Number of outlets	Hanoi	1	6	26	14
	Whole country	4	32	26	80
Facilities	Cold storage	+	+	+	+
	Spraying system	+	--	--	+
	Refrigerated trucks	--	Using service of ABA Cooltrans	5	Not available
	Distribution center	--	+	+	+ (Executive from other company)
Expansion plan	20 new malls by 2020	Double existing stores by 2021	Not available	100 stores by 2018	

Source: Field survey, 2017

Note: 1) -- Not covered + Covered

2) "Spraying system" is used to provide moisture for vegetables

Table 2.7 provides major characteristics of vegetables distributed in Hanoi supermarket chains. In an effort to meet the varied demands of consumers today, supermarkets seek to provide numerous kinds of vegetables, especially off-season vegetables. In order to ensure large purchase volumes and a diversity of vegetables, retailers must therefore deal with many suppliers, both local suppliers (Hanoi) for main-season vegetables and suppliers from other areas, especially those in the Da Lat highland and Moc Chau plateau, for off-season vegetables.

Table 2.7. Some characteristics of vegetables distributed in supermarkets

	Aeon	BigC	Fivimart	Vinmart
Type of vegetable	Main-season Off-season	Main-season Off-season	Main-season Off-season	Main-season Off-season
SKU (Stock Keeping Unit)	200	500	Not available	Not available
Average selling volume of vegetables (tons per day)	0.6-0.7	2-3	5-6	4-5
Total number of vegetable suppliers in Hanoi outlets	7	19	6	VinEco + 2 + α
Suppliers in Hanoi (Local supplier)	4	8	4	VinEco + 2

Source: Field survey, 2017

4.2. Standard structure for safe vegetables in supermarkets

Most retailers agreed that VietGAP, at the present time, can be seen as the most popular standard and is widely accepted by stakeholders as being the standard for vegetable safety and quality. This is due to the fact that the government has encouraged the development of vegetable production under the VietGAP standard. However, the adoption of vegetable standards differs among the four supermarket chains (see figure 2.2).

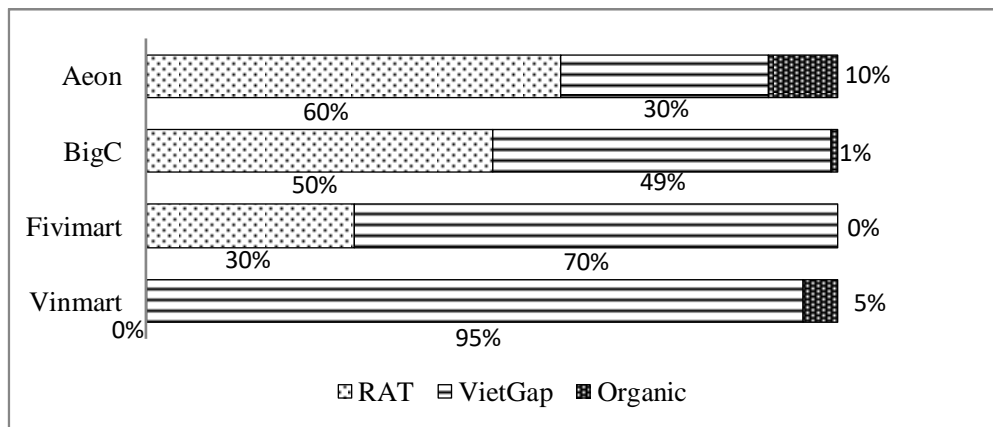


Figure 2.2. Vegetable standards in supermarket chain

Source: Field survey, 2017

All of the vegetables in the four chains are procured using one of the three standards. Specifically, half or more of the vegetables procured by Aeon and BigC are under RAT standards, followed by 30% by Fivimart. In contrast, the two domestic supermarket chains rely strongly on the VietGAP standard, with over 70% of their procurements under this system; the figure for the two multi-national chains is under 50%. The difference between the domestic and multinational supermarket chains can be explained by the observation that, since domestic supermarkets are more susceptible to government pressures, and want to be seen as showing strong support for local government policies, they would be highly influenced by the government’s encouragement of VietGAP vegetable production standards. Furthermore, long-term relationships and connections with dedicated suppliers make it easier for the two domestic chains to connect with and procure from growers and farmers’ cooperatives using the VietGAP standard. By comparison, competitive prices and the availability of large quantities of produce are the reasons the two multinational chains choose the RAT standard. The ratio of organic standard produce is negligible in these chains because of the high price and inadequate volume.

4.3. Safe vegetable procurement channels

4.3.1. Supplier selection criteria

Buyers in the four supermarket chains rank quality and price as being the most important in making procurement decisions, followed by supply availability and variety (see figure 2.3).

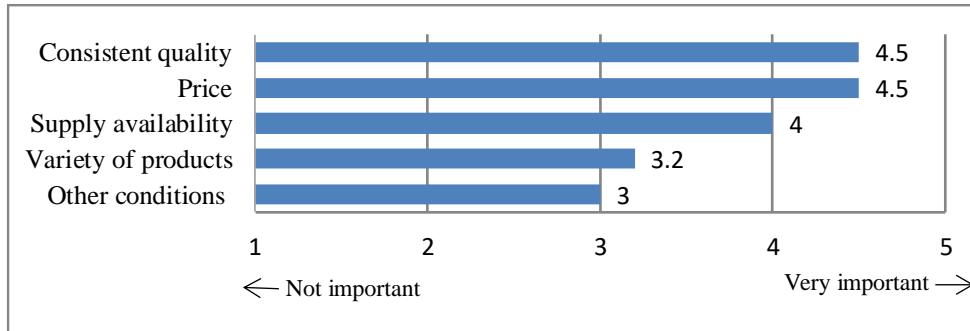


Figure 2.3. Ranking of supplier attributes

Source: Field survey, 2017

Note: Other condition: promotion, loss rate, payment etc.

In order to participate in a retailer's supply chain, suppliers are required to provide the full necessary paperwork to prove their supply capacity and their reliability as well. Generally, the supplier profile includes:

(1) Quality certification: the certificate of compliance with food safety regulations for RAT standards, a VietGAP certificate for VietGAP standards, and an Organic certificate for organic standards;

(2) Sample test results;

(3) Legal status: business registration;

(4) Other documents: tax code registration, invoice, bank account, product origin, list of members in cooperative, certificate of training for food safety.

In addition, conditions related to price, payment, transportation or product quality related to freshness, size or shape of vegetables are imposed by retailers via formal contract in order to get their suppliers to be more responsible.

4.3.2. Supply sources for safe vegetables in supermarkets

As shown in figure 2.4, supermarkets diversify their procurement methods in order to reduce risk and to acquire a wider variety of vegetables to meet changing consumer demands.

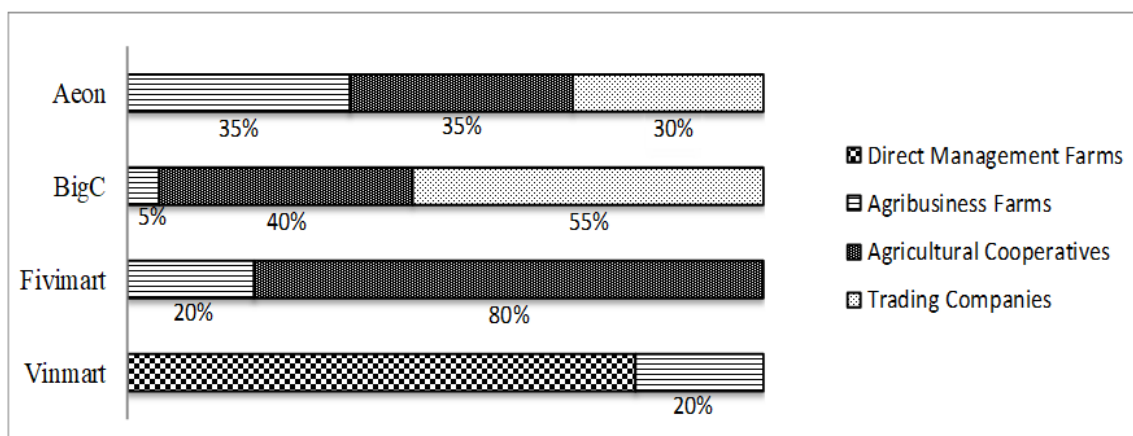


Figure 2.4. Safe vegetable procurement channels in supermarket chains

Source: Field survey, 2017

Several procurement channels were mentioned by the supermarket chains in Hanoi, including direct management farms, agribusiness farms, agricultural cooperatives and trading companies.

For Aeon, one-third of their vegetables come from agribusiness farms and two-thirds come from agricultural cooperatives and traders. This chain emphasizes quality, so Aeon chooses agribusiness farms because they offer produce of standardized quality and invest in technologies (e.g. greenhouse growing technology, mesh houses, or automated irrigation) to cut down on the effects of seasonality. Despite the fact that agricultural cooperatives meet the chain's requirements concerning quantity and product variety, their ability is limited (they often lack adequate distribution capability such as transportation or packaging, require prompter payments than other suppliers, and often have poor processing facilities or lack required documents). On the other hand, traders provide product in all seasons, therefore, Aeon still relies on traders in its procurement regime. Nevertheless, Aeon has to trace the quality of the vegetables that come from traders on its

own because these come only as RAT standard produce, which lack a production process certificate.

Similarly, for BigC, 55% of its vegetables come from traders, 40% come from agricultural cooperatives and only 5~6% from agribusiness farms. Product availability and low prices are important for BigC because it deals in large volumes and pursues a “low price” strategy. In this case, traders can provide a steady supply at a reasonable cost that meets the supermarket’s demands. As BigC’s purchasing executive noted, “The products from traders are always available and they always survive after storms while those from farmers in cooperatives may not”. Although the respondent complained that it was difficult to integrate dealings with agricultural cooperatives because of differences in thinking, their lack of business professionalism (change prices easily, break contracts, supply competitors), this chain believes that they can advertise the quality and safety of vegetable and improve the trust of consumers when distributing vegetables from agricultural cooperatives. In addition, since the supermarket must monitor quality as well as trace the origin of the vegetables purchased from traders, BigC also relies on agricultural cooperatives in its procurement regime.

For Fivimart, 80% of its vegetables come from farmers’ cooperatives and 20% come from agribusiness farms. This procurement is influenced by the government policy of promoting agricultural cooperatives within Vietnam. In addition, gaining experience in the local retail sector and getting to understand the way agricultural cooperatives do business has helped Fivimart build a long-term relationship with their suppliers. Supporting farmers and developing local agriculture are also set forth as Fivimart’s objectives for choosing to procure from agricultural cooperatives.

As for Vinmart, 100% of its procurements are through direct purchasing: 80% from their direct management farms (VinEco company - detailed in chapter 3) and 20% from agribusiness farms. Vinmart has pointed to safety as the most important procurement factor. It has developed a specialized brand, VinEco, and distinguishes itself from its competitors by selling under this brand that promises high quality and strict standards. The Vinmart chain has subsequently become the template for supermarkets that pursue a “farm to fork” strategy to secure quality vegetable qualities within their chain.

Establishing this procurement sequence from production to distribution has helped Vinmart secure a steady, safe and stable supply of vegetables. Moreover, since they source almost exclusively from VinEco, traceability is nearly complete.

4.3.3. Evaluations of supply channel and safety levels

Respondents were asked to compare their procurement channels with regards to safety levels (see table 2.8). Aeon, BigC, and Fivimart respondents expressed their belief in the quality and safety of vegetables from agribusiness farms and agricultural cooperatives. While agribusiness farms have standardized quality and built their reputations in the market place, the agricultural cooperative model has been encouraged and supported by the government, leading to the feeling that they are backed by a government guarantee. In contrast, trading companies place their priorities on profit and because it is hard to trace their vegetables back to responsible producers, this leads to difficulties in controlling fresh vegetable quality and safety, as indicated by respondents from Aeon and BigC.

Table 2.8. Evaluation of retailers regarding procurement channel and safety levels

	Direct Management Farm	Agribusiness Farm	Agricultural Cooperative	Trading Company
Aeon	-	①	②	③
BigC	-	①	②	③
Fivimart	-	①	①	-
Vinmart	①	②	-	-

Source: Field survey (2017 -2019)

Note: Evaluation score indicates reliable level, ① highest, ③ lowest

Vinmart, with its direct management farm and its own VinEco brand, offers a strong guarantee of quality and safety due to its investment in advanced technology, its commitment to full production under the VietGAP standard, and the reputation of the VinEco brand that has earned a high reputation in the Vietnam vegetable market. Moreover, respondents from Aeon, BigC, and Fivimart also consider VinEco as a reliable

source for vegetables. This suggests the reliability of direct management farms in guaranteeing the quality and safety of fresh vegetables.

4.4. Quality control activities for safe vegetable in supermarket chain

4.4.1. Auditing the supplier

Aeon, BigC, and Fivimart commonly audit their suppliers. First of all, before establishing a relationship with a supplier, retailers seek out detailed information and inspect the supplier's profile to confirm the supplier's capacity. For agricultural cooperatives and agribusiness farms, the detailed information that will be checked relates to production conditions, land under cultivation, vegetable varieties, and other conditions (farm diary, crops grown, a list of cooperative members) will be checked. Similarly, for trading companies, their processing facilities will be given priority when it comes to checks. Secondly, retailers may send vegetable samples to a third-party quality inspection body to verify the safety of the products they are receiving from their suppliers. Suppliers, then, are evaluated and compared with others to determine who is the most reliable. Lastly, even after having established a partnership, retailers implement audit activities in order to better monitor the supplier. Specifically, for agricultural cooperatives and agribusiness farms, retailers may visit the supplier's production and distribution sites as a regular part of their business plan, or they may do so irregularly. By field checking or discussing production issues and methods with farmers or workers, retailers may detect whether pesticides or fertilizers are being administered correctly or not. For trading companies, control activities are implemented via auditing processing facilities, tracing back the origin of vegetables based on the trade invoice, or by sending a vegetable sample to a third-party quality inspection body. Because of limited resources, these inspection activities can be implemented only lightly by supermarkets. Nevertheless, these measures still help enhance the supplier's sense of responsibility regarding food safety. The respondents from the multinational chains also indicated that trading companies have been monitored more strictly than cooperatives and professional growing companies.

Vinmart stands out because of its strict audits, from harvest to processing, that are a part of its direct management of the 14 VinEco farms. This is done to make sure all

products meet VietGAP standards. Participants in the “Accompanying, supporting and promoting Vietnamese agricultural production” program are also audited carefully. Three control teams have been established by VinEco to monitor all activities of contracted farmers, contributing further to the assurance of the quality of vegetables supplied to the Vinmart chain.

4.4.2. Vegetable quality acceptance process

Vegetables are mainly accepted or rejected by the supermarket during the various stages of the receiving process. Figure 2.5 shows that controlling levels for vegetables entering store are different each of the four chains.

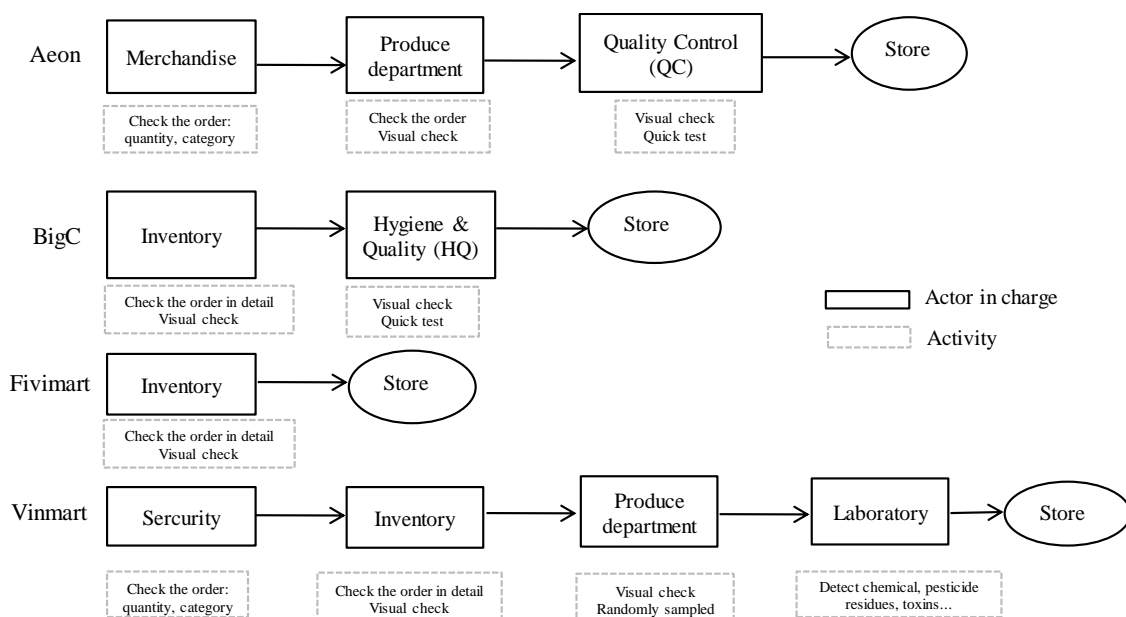


Figure 2.5. Quality control activity in receiving stage

Source: Field survey, 2017

For Aeon, vegetables from suppliers are checked strictly under the monitoring of three departments. They check the order in detail, performing a visual quality inspection on vegetable appearance that includes cleanliness, color, spots and freshness. Finally, they do sample testing for safety using test devices to detect any chemical residue on the vegetables. To guarantee the safety and quality of the vegetables even after they have

reached the supermarket, Aeon sends its QC team to inspect them after they have been displayed on the shelves. As for BigC, although the HQ team is responsible for testing, this activity takes place infrequently because of limited human resources. Quality assessment is still widely based on strict visual inspection at the inventory stage, and if visible external problems like blue dots are found, the vegetables will be tested by quick test equipment or sent to a government lab for testing, after which the suppliers will be audited again. Because the quick test equipment only detects pesticide and nitrate residues and shows the results below or above the MRLs and has a high margin of error, the respondents in BigC expressed little trust in this equipment due to the fact that the test results were similar in every quick test. The respondent from Fivimart indicated that the safety of vegetables depended greatly on the grower's consciousness, and for this reason Fivimart pays more attention to the source of its vegetables by establishing long relationships with the cooperatives rather than using test devices. The acceptance of vegetables in Fivimart depends greatly on visual checks and the experience of the person at the receiving end, and since there is no testing equipment, the safety of the vegetables cannot be confirmed. If they do find a problem, they have to rely on government labs for testing, which involves a high cost of around several million VND per sample test. Conversely, Vinmart has strict procedures to control for vegetable safety. After the security staff checks the order, quality is checked through visual inspection by staff from the warehouse and from the produce department. In order to guarantee the safety of the product, random samples are sent to Vinmart's own laboratories that are equipped with modern advanced testing equipment to detect pesticide and nitrate residues as well as other chemicals, thus ensuring that its vegetables will not compromise the health of its customers. It may also perform audits on suppliers when products are received.

5. Conclusion

Vietnam vegetable market is dominated by traditional supply chain with the increasing development of supermarket supply chain because of consumers more concern about food quality and safety. Supermarket supply chain differentiates with traditional supply chain by the imposition of certification standard for vegetables under three major

standards RAT, VietGAP, organic. Generally, supermarkets tend to shorten the supply chain by moving to direct procurement with farmers via agricultural cooperatives, or working through secure trading companies. Case study analysis indicated that the domestic supermarket chains choose to engage in more direct procurement on account of its use of the VietGAP standard, while multinational supermarket chains engage in high levels of indirect purchases from traders using RAT, the minimum standard for safe vegetables. The major quality control measures in supermarket chains are those based on regular or irregular inspections of supplier, visual checks for quality and random sample testing for safety. Amongst the four chains, Vinmart offers the strongest guarantees regarding the quality and safety of its vegetables due to the strict testing carried out in its own laboratories. The guarantees provided by Aeon and BigC are more moderate, whereas there is little quality monitoring in Fivimart due to its lack of a testing room or testing devices and the infrequency of its supplier audits.

To sum up, the distribution route of safe vegetables differs greatly between the traditional and modern supply chain, where supermarkets stand on the leading position. While the traditional market deals mainly with RAT, supermarket supply chain distribute not only RAT but also the higher standards including VietGAP and organic. In addition, the supply chain of safe vegetable differs between the domestic supermarket chains and multinational supermarket supply chains. While domestic supermarket chains choose to engage in more direct procurement on account of its use of VietGAP standard, the multinational supermarket chain engage in high levels of indirect purchases from trading companies using RAT, however, they have achieved sufficient quality control levels regarding food quality and safety via their strict quality control activities such as supplier inspection, visual checks or sample testing.

Chapter 3. Marketing channel for safe vegetable by participants within supermarket direct channel

1. Introduction

This chapter aims to understand the structure of distribution channel for safe vegetable by certified organizations including direct management farm of supermarket, agricultural cooperatives and agribusiness farms and their overall evaluation of using certification system for safe vegetable. The chapter is structured into six sections. Following the introduction, methods and data are described in section 2. Section 3 provides some information about direct farm program and certification standard. Section 4 discusses about the distribution channel for safe vegetables by agricultural cooperatives and agribusiness farms. The evaluation about certification standard by agricultural cooperatives and agribusiness farms are detailed in section 5. In the final section 6, a summary of the chapter is mentioned.

2. Methods and data

The findings of this chapter are based on primary data from in-depth interview with the leaders of seven agricultural cooperatives and two agribusiness farms located in urban (Hanoi City) and mountainous areas (Moc Chau District - Son La Province) in Northern Vietnam. These organizations apply the certification for safe vegetable, pay the certification fee and hold the certification. In addition, we also examine the implementation of standard and certification system in direct farm program of Vinmart supermarket chain with their own brand VinEco.

As for agricultural cooperatives, this study focuses on two type of cooperatives: (i) The agricultural service cooperative model that transformed themselves from old type of cooperative (three interviewed cooperatives located in Hanoi City); (ii) The new type of cooperative model whose major function is distributing of agricultural products (four agricultural cooperatives located in Moc Chau District).

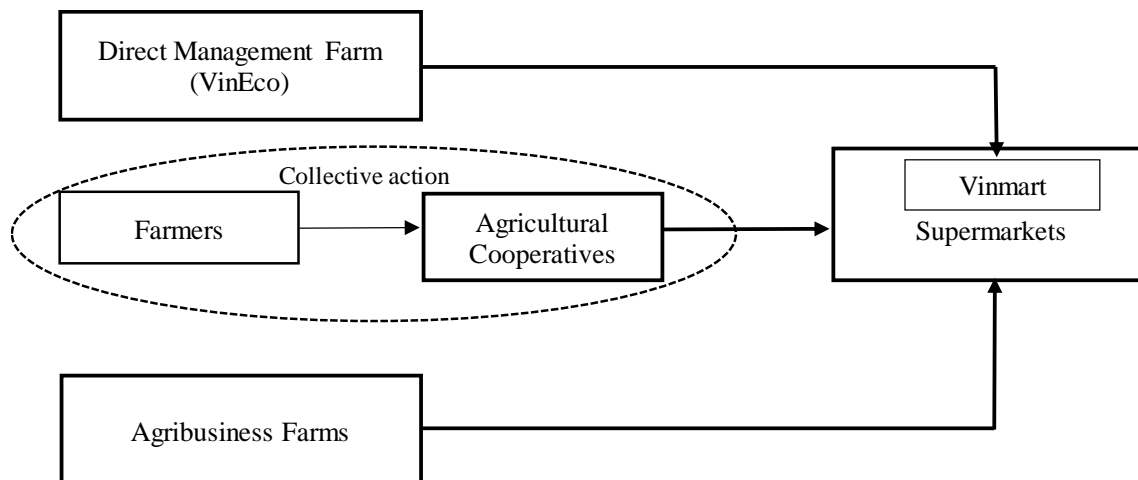


Figure 3.1. Typology of supermarket direct channel for safe vegetable

Source: Own elaboration

In order to have the information about agricultural cooperatives and agribusiness farms within the supermarket direct channel, we first began with interview the major supermarket chains in Hanoi in order to understand the supermarket supply chain for safe vegetable. The agricultural cooperatives and agribusiness farms who participate supermarket supply chains was identified and chosen to interview.

Characteristics of certified organizations in study areas

This study covers a total of 9 certified organizations, of which 4 are in Hanoi (3 agricultural cooperatives for both RAT and VietGAP standards; 1 agribusiness farm for organic - TCVN standard) and 5 in Moc Chau District - Son La Province (4 agricultural cooperatives for both RAT and VietGAP; 1 agribusiness farm for VietGAP). Table 3.1 provides a short description of the organizations that were investigated and table 3.2 describes some characteristics of certification standards in these organizations.

Table 3.1. Main characteristics of the selected case studies

	Head office	Year established	Number of members/ workers	Output (tons/day)	Production cycle
Yen My AC	Thanh Tri, Hanoi	1990s	150	15	Year-round
Van Duc AC	Gia Lam, Hanoi	1997	108	98	Year-round
Linh Nam AC	Hoang Mai, Hanoi	1997	751	11.5	Year-round
Tue Vien farm (Viet Lien Co., Ltd)	Long Bien, Hanoi	2005	Not available	0.2	Year-round
Tu Nhien AC	Moc Chau, Son La	2013	38	3	Off-season
An Tam AC	Moc Chau, Son La	2016	19	2	Off-season
Hoang Hai AC	Moc Chau, Son La	2016	15	5	Off-season
Dung Tien AC	Moc Chau, Son La	2016	9	2	Off-season
Greenfarm (GF., JSC)	Moc Chau, Son La	2012	10-70	3	Off-season

Source: Field survey, 2018

Note: AC - Agricultural Cooperative

Table 3.2. Some characteristics of certification standards for safe vegetable in the case studies

	Area in certified vegetables (ha)			Year certification standards began			Certification status		
	RAT	VietGAP	Organic	RAT	VietGAP	Organic	RAT	VietGAP	Organic
Yen My AC	50	20	-	1998	2011	-	X (2017)	O	-
Van Duc AC	235	15	-	2002	2010	-	O	X (2018)	-
Linh Nam AC	66	10	-	2004	2009	-	X (2017)	O	-
Tue Vien farm	-	-	1.7	-	-	2008	-	-	O
Tu Nhien AC	11	14	-	2011	2013	-	O	O	-
An Tam AC	5	5	-	2011	2015	-	O	O	-
Hoang Hai AC	18	2	-	2016	2017	-	O	O	-
Dung Tien AC	8	2	-	2016	2017	-	O	O	-
Greenfarm	-	10	-	-	2015	-	-	O	-

Source: Field survey, 2018

Note: AC - Agricultural Cooperative

X - Expired

O - Not expired

a. Agricultural cooperatives

In Hanoi, three cooperatives, located in Thanh Tri District, Hoang Mai District and Gia Lam District, were chosen. These are major pilot areas for the production of safe vegetables in Hanoi. In Moc Chau, we conducted surveys on four cooperatives located in Dong Sang Commune, Muong Sang Commune, Tan Lap Commune, and Phieng Luong Commune. These communes were those practicing safe vegetable production in Moc Chau District, Son La Province.

Three interviewed cooperatives in Hanoi have developed over a relatively long period of time with an average of 337 farmer members per cooperative, while the cooperatives in Moc Chau have been established in recent years with the average number of members per cooperative at only 21. Regarding the role of the cooperatives, the agricultural cooperatives in Hanoi transformed themselves under Cooperative Law 2012 and operate under a model of agricultural service cooperatives that mostly provide base service in stages for production such as input suppliers, irrigation services, or plant protection services. Members therefore have to pay a fee (from 10 to 65 USD/sào/year). From the increasing of public certification standard and strong supported from the government, agricultural cooperatives in Hanoi also tend to improve the structure by cutting out the number of member and focus more on distributing agricultural products. However, their efficiency in marketing of products is still low. Two of three investigated agricultural cooperatives in Hanoi play the role in distributing safe vegetables to modern retailer including supermarkets (Aeon, Mega Market) or safe vegetable stalls. However, the volume of safe vegetable via agricultural cooperatives to modern retailers is still low (15-20% of the total volume safe vegetable produced by cooperatives' members). The agricultural cooperatives in Hanoi, therefore, act the key role as the middlemen for transferring government supports to farmers.

Table 3.3. Comparison between two types of agricultural cooperative model

	Agricultural service cooperative model (located in Hanoi City)	New type of cooperative model (located in Moc Chau District)
Number of years on operating	20.7 years	2.5 years
Number of members	337	21
Scale	Comune	Comune
Capital and assets	Members contribute share (500 thousand VND to 1,000 thousand VND/share Member's fee is around 200 thousand to 1,300 thousand VND/sào (1 sào=360m ²))	The share is mostly contributed by the leader and they operate the cooperative as their own business Members have not to pay member's fee
Production cycle	Year-round	Off-season (largely from April to November)
Model	Model of agricultural service cooperative	New type of cooperative model
Main operation fields	Cultivation	++
	Supply of materials (Input)	++
	Service in stage of agricultural production	++
	Distribution of agricultural products (Output)	+

Source: Field survey, 2018

Note: -- Not covered + Covered ++ Strongly covered

In contrast, interviewed cooperatives in Moc Chau operate as a new type of cooperative model whose major function is the distribution of agricultural products. All agricultural cooperatives in Moc Chau have contracts with and have created strong linkages with supermarkets in Hanoi (or the VinEco company). Up to 70% of safe vegetables collected from farmers are through agricultural cooperatives via formal contracts with modern retailers. This shows that cooperatives in Moc Chau have become the key actors for supplying safe vegetables to the Hanoi market.

b. Agribusiness farm

Two enterprises that are leaders in the implementation of the VietGAP standard in Moc Chau and the organic standard in Hanoi were selected. Their agribusiness farms were established as an enterprise, rented land and recruited laborers to produce vegetables, after which they decided to adhere to one certification standard (VietGAP or TCVN).

Greenfarm was established in Moc Chau in 2012 with two large fields seeded and producing safe vegetables. They follow VietGAP standards and focus on off-season production to supply the Hanoi market. Tomatoes and cabbages are the major vegetables grown, accounting for 70% of all vegetables grown by Greenfarm.

Tue Vien farm in Hanoi adheres to organic - TCVN standards, although production is still small with only 1.7 hectares under cultivation and output at around 200 kilograms per day.

Adopting a single standard has helped make production more transparent and thus, these firms have achieved a strong reputation in the market. Moreover, modern retailers, compared with other channels, have become the preferred destination for the produce of agricultural enterprises because of the stable quantities they purchase and the higher prices they offer.

3. Direct farm program and certification standard for vegetable

In this section, we examine the implementation of standard and certification system in direct farm program of Vinmart supermarket chain with their own brand VinEco.

3.1. Production base formation

Modern retailers namely Vinmart joined Vietnamese retail market from 2014 (detailed in chapter 2). In 2015, the eco-agriculture brand, VinEco, a member of Vingroup Joint Stock Company (Vingroup), entered the agricultural industry on March 2015 that focuses on the production of safe and high quality products. All VinEco’s vegetable is only available in Vinmart supermarket chain and Vinmart+ convenience stores chains.

VinEco’s vegetables come from 2 sources: 40% from VinEco farms and 60% contract farmers/farms in a program named “Accompanying, supporting and promoting Vietnamese agriculture production” (figure 3.2).

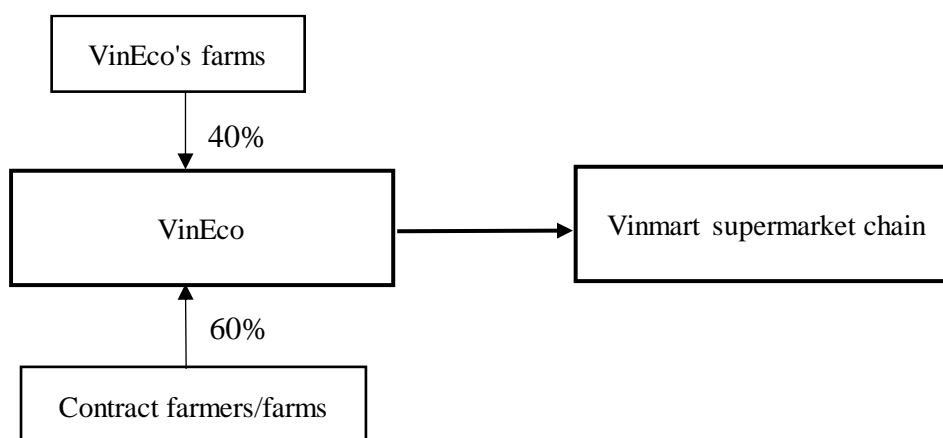


Figure 3.2. Source of VinEco’s vegetable

Source: Field survey, 2017

From VinEco’s farms (table 3.4): Cultivating nearly 3,000 hectares, 14 VinEco’s farms are located throughout Vietnam, applying modern technologies and modern greenhouses for best efficiency in production and the best quality.

Table 3.4. VinEco’s farm system

Region	Number of farm	Area (ha)
Central highland	4	1,100
Southern	4	1,000
Northern	6	750
Total	15	2,850

Source: Field survey, 2017

In order to diversify products as well as promote enterprises, farmers and society as a whole forward green and the long term sustainable agriculture, VinEco ran a program “Accompanying, supporting and promoting Vietnamese agriculture production” from September, 2016. The condition to participate the program includes:

- ✓ Households or organization with more than 1 ha cropped
- ✓ Commitment to produce clean and safe agricultural products
- ✓ Acquire VietGAP or GlobalGAP certification is priority
- ✓ Ability in processing, transporting

After over 6 months, VinEco contracted with 500 households, 300 of these introduces their products in Vinmart’s shelves. After two years, around 800 qualified contract producers have cooperated with VinEco to supply in Vinmart supermarket chain.

Participants in this program will be provided technical assistance regarding pesticide use especially the type, quantities and timing, cultivation advice, quality control systems, VietGAP certification process as well as marketing, promoting agricultural brands and financial support. The program provides maximum interest-free loans of 300 million VND per household in order to improve production conditions.

3.2. Standard implementation for food safety and quality

VietGAP standard is applied in direct farm program of Vinmart supermarket chain because VietGAP is most popular standard for the safety and quality of vegetable in the domestic market. With VinEco's farms, all 14 farms comply strictly with VietGAP standard, and these farms are certified with VietGAP standard. Before harvesting, vegetables from these farms are controlled strictly especially about regulations on fertilizers and pesticides. Vegetables are tested, checked and analyzed regularly.

As for contract farmers/farms in program “Accompanying, supporting and promoting Vietnamese agriculture production”, the quality certification is unnecessary because VinEco establish the strict control from cultivation to harvest with their contract farmers/farms, expressed in figure 3.3.

The company established three groups to monitor all activities of contract farmers. Sourcing monitoring group who spend their time to work with farmer every day. They

follow up all farmer's activities especially at the time prepare harvesting to ensure the vegetable safety. Control team is responsible for checking participants in production process and farmer records regularly to make sure growers produce well from the first step. The last is standards team in receiving area. They will check the harvest records as well as visually inspection and test the pesticide residues.

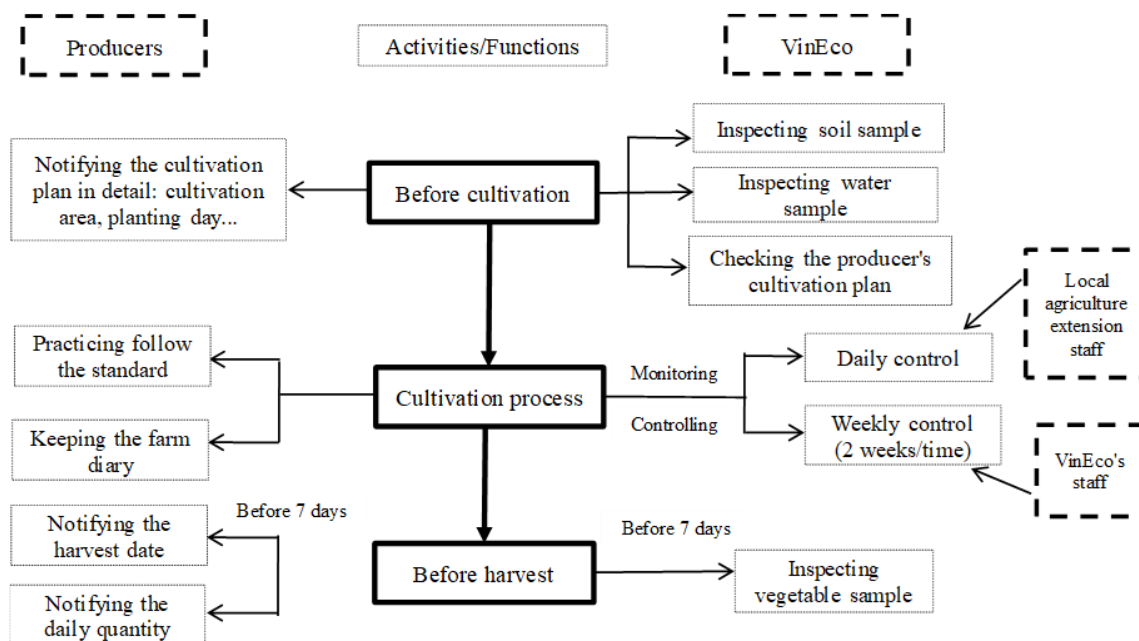


Figure 3.3. Internally control of VinEco and their partner in direct farm program

Source: Source: Field survey (2017 - 2018)

Strict punishment comes with attractive rewards are used to improve producers' sense of good practice from VinEco policy. For example, in case of stable and large supply, and there are no substandard samples, once producers reach the value of over 100 million VND in the contract with VinEco per month, 20% added value will become the prize money for producers. Producers who meet the strict quality and safety requirement from VinEco can become their partner even producers have the quality certification or not. This suggests that strict control from VinEco ensure fully the safety and quality of vegetable without the certification. However, loss of control, loss the own brand, and buyer pressure are the main barriers for cooperating with VinEco in the direct farm program. Moreover,

this integration requires producers have detail and effective plan in production which is difficult for small-scale farmers.

4. Distribution channel for safe vegetables by agricultural cooperatives and agribusiness farms

The marketing pattern for safe vegetable of agricultural cooperatives and agribusiness farms is shown in figure 3.4 and table 3.5.

The agricultural service cooperative model: Yen My cooperative, Van Duc cooperative, Linh Nam cooperative (Hanoi City).

Since these cooperatives operate under a model of agricultural services cooperatives that mostly provide base service in stages for production, the role in marketing activities for safe vegetable is still weak. Only 10-20% of safe vegetables are collected by agricultural cooperatives to distribute to different type of buyers. Generally, both RAT and VietGAP vegetable are distributed to supermarkets and small safe vegetable stalls, while RAT vegetable is sold to kitchens or to trade intermediaries/distribution companies.

New type of cooperative model: Tu Nhien cooperative, An Tam cooperative, Hoang Hai cooperative, Dung Tien cooperative (Moc Chau District).

These cooperatives play the key role on distributing of vegetables, therefore, up to 70% of safe vegetable collected from farmers are through agricultural cooperatives to distribute directly to modern retailers. Supermarkets and safe vegetable stall chains located in Hanoi City are the key destination for RAT and VietGAP vegetable of these cooperatives (42.5% of sale volume). Especially, more than 70% of safe vegetables collected of Tu Nhien and An Tam cooperatives are sold to supermarket and safe vegetable stall chains in Hanoi City. Other significant important marketing channel for VietGAP vegetable is to VinEco company that develop direct farm program and distribute vegetable in Vinmart supermarket chain (account for 35% sale volume of cooperatives). Specifically, 100% VietGAP vegetable collected from Hoang Hai cooperative are distributed to VinEco.

Agribusiness farm

As for VietGAP farm (Greenfarm): 60% of their vegetables are supply to supermarket chain in Hanoi, of which 20% in domestic supermarket chain (Fivimart), 40% in three multinational chains (Aeon, BigC, Lotte). The remaining of their vegetable (40%) are sold to VinEco company to distribute in Vinmart supermarket chain.

As for organic farm (Tue Vien farm): 20-30% of organic vegetables are distributed in supermarkets (before 2017: Lotte, Vinmart, Aeon; from 2017: Aeon). The remaining of their vegetable are sold directly to local consumers.

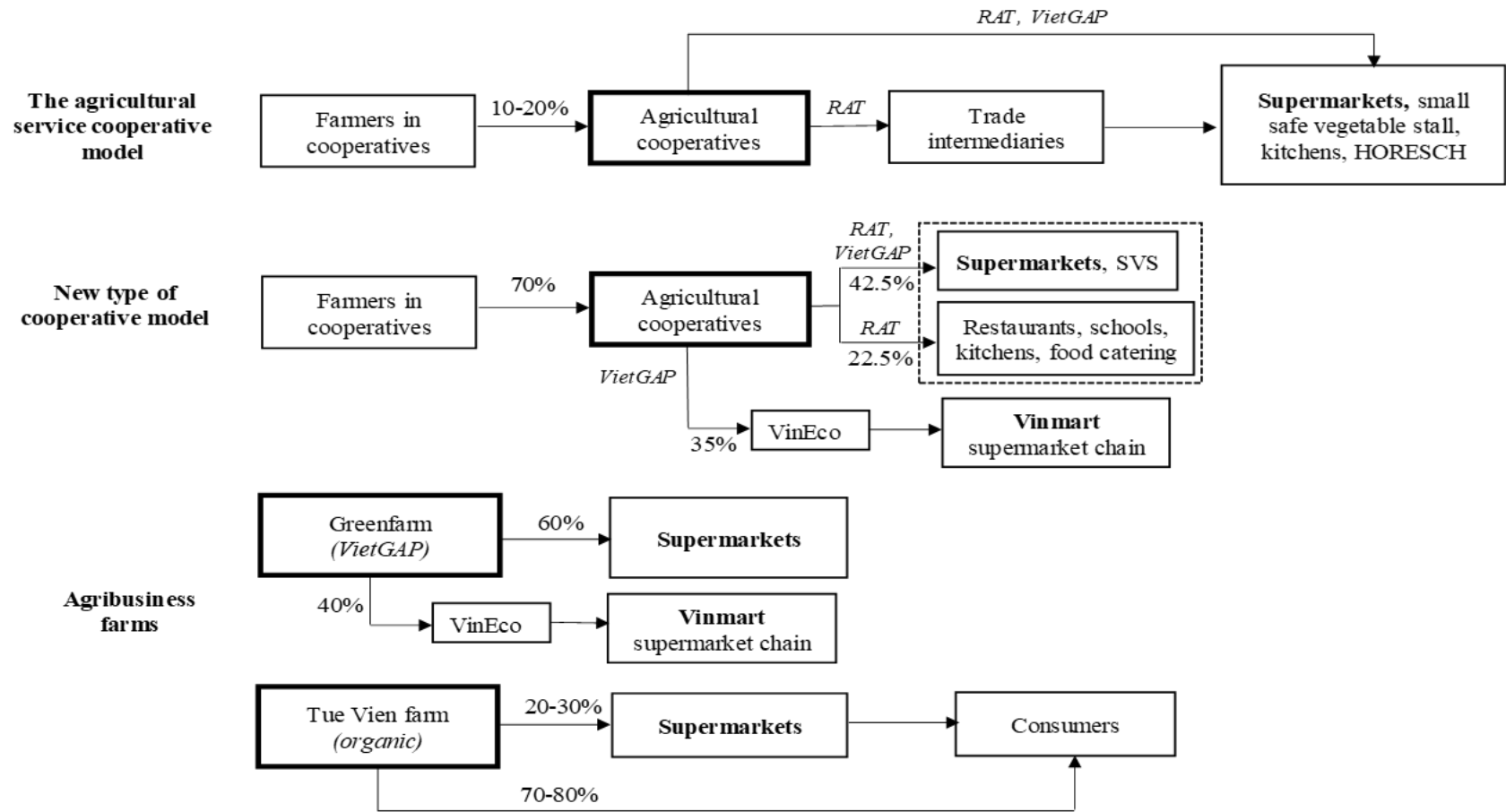


Figure 3.4. Marketing pattern for safe vegetable of agricultural cooperatives and agribusiness farms

Source: Field survey, 2018

Note: HORESCH stands for Hotels, Restaurants, Schools

SVS: Safe Vegetable Stall

Table 3.5. Detail of distribution channel for safe vegetables from interviewed organizations

		Direct channel (%)			Indirect channel via trade intermediaries (%)
		Supermarket, Safe vegetable stall	Others (restaurant, school, kitchen, food catering)	VinEco	
The agricultural service cooperative model	Yen My	✓	-	-	✓
	Van Duc	✓	✓	-	✓
	Linh Nam	✓	✓	-	-
New type of cooperative model	Tu Nhien	70	30	-	-
	An Tam	90	10	-	-
	Hoang Hai	-	-	100	-
	Dung Tien	10	50	40	-
Agribusiness farm	Tue Vien (organic)	30	-	-	-
	Greenfarm (VietGAP)	60	-	40	-

Source: Field survey, 2018

5. Evaluation about certification system by agricultural cooperatives and agribusiness farms

5.1. Motivation and implementation of quality standard

The rationale for implementing quality standards comes from different perspectives (see table 3.6). Generally, the key motivation is the desire to secure stable markets and premium prices, as indicated by 75% of the respondents in Hanoi and all respondents in Moc Chau. Instead of growing vegetables conventionally with uncertain markets and prices based on a verbal agreement between farmers and private collectors, farmers who grow according to standards that lead to certification are motivated by the expectation that they will get higher prices and better markets via a formal contract with modern retailers, especially large supermarkets.

75% of the respondents in Hanoi and 80% of those in Moc Chau indicated that in order to meet the requirements set by supermarkets or other modern channels it was important to adhere to the standards and secure certification. This is sensible in light of the fact that modern retailers have separated themselves from the traditional market by their selling of safe and high quality fresh vegetables. However, because modern retailers still lack insight into growers' production methods, they must depend on formal certification systems in order to offer proof of good practice as well as the quality and safety of the vegetables they sell. Therefore, certification is mandatory for suppliers who want to be engaged with the supermarket supply chain.

As for cooperatives, all 7 agricultural cooperatives interviewed revealed that the initial benefits gained from government supports, especially those which covered or offset the cost of VietGAP has become a key reason to obtain certification. Cooperative members gain direct financial benefits that cover certification costs and production inputs as well as indirect financial benefits such as technical training to help them meet VietGAP standards. In addition, the government supports the marketing efforts of certified agricultural cooperatives. These certified agricultural cooperatives may also find it easier to secure funds from NGOs or foreign organizations.

Table 3.6. Reasons for adopting certification for safe vegetable

Category	Motivation	Total (N=9)		Hanoi (N=4)		Moc Chau (N=5)	
		Number	Percent	Number	Percent	Number	Percent
Economic benefit & market access	To have more stable market	8	89	3	75	5	100
	To sell with a stable and premium price	8	89	3	75	5	100
	To meet the procedure and paperwork from the modern retailers	7	78	3	75	4	80
	To improve the quality of product and ensure food safety	5	56	2	50	3	60
	To improve the reputation	4	44	3	75	1	20
	Follow other producers (they adopt the certification)	3	33	-	-	3	60
	To expand the distribution channel	2	22	-	-	2	40
	To meet the local market requirement and tend to meet the international market requirement	2	22	1	25	1	20
	To improve productivity and reduce cost	1	11	1	25	-	-
To improve production management capacity	1	11	1		-	-	
Encouragement & support from government	Benefit from government's support:						
	- Technical training						
	- Input subsidies (fertilizer, pesticide, agricultural machine...)	7	78	3	75	4	80
	- Supporting for certification cost						
Social & environment benefits	- Supporting for marketing and distribution						
	Follow the local government orientation	4	44	3	75	1	20
	To protect environment, health	4	44	2	50	2	40
	To develop agricultural production sustainability	1	11	1	25	-	-
	Tend to the sustainable development	1	11	1	25	-	-

Source: Field survey, 2018

For the agribusiness farm that follows VietGAP standards in Moc Chau, the motivation for adhering to the standard and certification comes from the increased awareness about food safety issues in the Vietnam market and the heightened demand for high quality products. Agribusiness farm engaged in and complying with organic - TCVN standards do so with the aim of achieving sustainable agricultural production and protecting the environment and the health of consumers.

5.2. Implementation of quality standards

5.2.1. Cooperatives

The cooperatives in Hanoi under agricultural service cooperative model that were surveyed adhere to both RAT & VietGAP standards. Rather than introducing these standards on their own initiative, their decision to do so was greatly influenced by programs for safe vegetable production promoted by local governments. The cooperatives therefore seem to have been passive in their transition to certified production. The leaders interviewed in all three cooperatives said that they had received local government funds that covered the transition to RAT & VietGAP certification. They said that their local government subsidized the certification fees for a certain area for one time, although certification would have to be renewed and the cost borne by the cooperative after it expired. The cost for VietGAP certification is high. Therefore, the cooperatives continue to apply for public funds to cover VietGAP certification by shifting uncertified cropland into areas that will be cultivated under VietGAP standards. However, it has been difficult for these cooperatives to receive these funds more than once because these government funds have to cover many other cooperatives. All three cooperative leaders revealed that although VietGAP requires more information, cooperative members follow the same practices for both RAT and VietGAP standards. The difference in the implementation between RAT and VietGAP is that VietGAP growers must keep a farm diary, while there is no farm diary requirement for RAT. This implies that they are not fully in compliance with VietGAP standards. At the time of our study, RAT certification of two agricultural cooperatives and VietGAP certification of one agricultural cooperative had been expired for more than 6 months and they had not renewed the certification because of the cost of

certification for VietGAP and the procedures for RAT. However, these cooperatives continued to use the expired certification for marketing purposes. Regarding internal controls, the director of Yen My agricultural cooperatives explained that the cooperative played a key role in communicating government policy to farmers and that it bore minimal responsibility for monitoring the actual production of its members. In the interview held with Van Duc and Linh Nam AC leaders we found that these cooperatives had established a group for monitoring farmers' production. However, it was still difficult for them to control the production and distribution of vegetables from all of their members due to the limitations of the capacity of the cooperative staff, the large number of members and the low level of engagement regarding quality and safety management amongst its members.

The 4 cooperatives interviewed in Moc Chau under the new type of cooperative model have real motivation to engage in certification standards due to their local government's focus in recent years on safe production. The cooperatives have therefore become more active in the implementation of the standards. All four of the cooperatives investigated secured financial support from the provincial government to implement the standards. Like the cooperatives in Hanoi, Moc Chau cooperatives also received one-time support to cover certification costs. However, after the certification expired the cooperatives seemed to be willing to pay for certification renewal. For example, Tu Nhien agricultural cooperatives paid more than US\$1,500 to renew its VietGAP certification, while An Tam agricultural cooperatives, with partial support from the provincial government, paid around US\$500 for its VietGAP re-certification. The compliance with certification standard requirements in the Moc Chau cooperatives seems to have been assured because the cooperatives had effective operational mechanisms. In addition, the limitations of their members and pressure from buyers have resulted in a high level of quality management by the Moc Chau cooperatives. Generally, members (farmers) only have to comply with the standards; the cooperative handles all other activities and manages product safety by developing a detailed production plan for each farmer, offers technical support, and engages in internal controls. Specifically, Hoang Hai and Dung Tien agricultural cooperatives are better able to guarantee compliance because they

provide and control the inputs (pesticides, fertilizer). Moreover, the production of these cooperatives is monitored by the buyer (VinEco company).

5.2.2. Agribusiness farms

For agribusiness farms, implementation of certification standards (VietGAP and organic - TCVN) comes from their own initiative. They are high achievers with a sense that quality certification differentiates their product from other products on the market and offers consumers assurances of their safety. Their production is therefore at a high level of compliance with the certification standards. Specifically, Greenfarm in Moc Chau has been awarded VietGAP certification since 2015 and the certification was renewed after expiration. The manager revealed that the company paid around US\$1,500 for VietGAP certification and it is willing to pay for VietGAP standards because the certification is necessary when the company works with supermarkets. The up-to-date knowledge of production of the company's founder, the building of strong linkages with major supermarket chains, and the strict monitoring by the buyer (VinEco) have contributed to Greenfarm high level of compliance with VietGAP requirements, giving the farm a reputation for high standards for safety in the vegetable market.

Tue Vien Farm in Hanoi began organic production in 2008 and it took 5 years to pass through the transition period. The Tue Vien respondent revealed that it was very difficult for them to prove that their vegetables were being grown under organic standards during this transition period because they had not yet gained organic certification. In addition, in order to meet buyer (supermarket) requirements, the company had to acquire quality certification. They therefore applied for VietGAP certification in 2013 although they were already engaged in organic production. In 2016, the farm was awarded the IFOAM (International Federation of Organic Agriculture Movements) certification for organic production, a certification valid for 2 years. Thanks to a government policy that encourages organic farming under TCVN standards, the farm was chosen as a pioneer in the development of organic production under TCVN certification standards and received government support for the certification costs. It was awarded TCVN certification in 2018, valid for 3 years. Besides its compliance with certification standard requirements, the farm offers promotional farm tours and engages in other activities to show the consumer its

commitment to the environment. As a result, Tue Vien Farm has become a well-known brand for organic vegetables in the Hanoi market.

5.2.3. Certification standard practices by farmers in agricultural cooperatives

Our survey also included 11 randomly selected farmers in order to provide a representative picture of the level of compliance with standards at the household level (see table 3.7).

Table 3.7. Compliance with RAT and VietGAP standard at household level

	Farmers in the agricultural service cooperative model (Hanoi City)	Farmers in the new type of cooperative model (Moc Chau District)
Production area (soil, water...)	++	++
Crop management (fertilizers, pesticides on the registered list)	+	+
Pre-harvest intervals	--	+
Post-harvest (processing, storage, packaging...)	--	--
Labor (food safety training, pesticide use training)	++	++
Bookkeeping, production traceability	--	--

Source: Field survey, 2018

Note: ++ Strong compliance + Partial compliance -- Non compliance

Table 3.7 shows that compliance with production requirements and training in food safety as well as pesticide use was relatively high in both two types of cooperative in two areas. All interviewed farmers were aware of the necessity of using fertilizers and pesticides on the registered list. However, a lack of detailed knowledge about the registered fertilizers and pesticides that lead to crop management compliance was relatively low. Compliance with pre-harvest interval requirements in Moc Chau was rather low and it was found that it is difficult for farmers in Hanoi to comply with this category because of the fragmentation of land holdings and continuous crop production throughout

the year. The results show non-compliance for post-harvest, farm records and traceability in both areas.

Overall, it can be said that individual farmers do not produce fully under the standard requirements. Compliance with the standard requirements amongst farmers in the new type of cooperative model located in Moc Chau seems to be higher than those in the agricultural service cooperative model located in Hanoi.

5.2. Evaluation toward certification system for safe vegetable

5.2.1. Perceived costs and benefits of gaining certification

Table 3.8. Satisfaction with the costs and benefits of certification by selected certified organizations

	Certification costs			Certification benefits			Average ranking	
	RAT	VietGAP	Organic	RAT	VietGAP	Organic		
Hanoi	Yen My AC	2	4	-	2	2	-	2.5
	Van Duc AC	3	2	-	3	2	-	2.5
	Linh Nam AC	1	4	-	2	2	-	2.25
	Tue Vien farm	-	-	4	-	-	4	4
Moc Chau	Tu Nhien AC	4	3	-	4	4	-	3.75
	An Tam AC	4	4	-	4	4	-	4
	Hoang Hai AC	4	4	-	3	3	-	3.5
	Dung Tien AC	3	3	-	4	4	-	3.5
	Greenfarm	-	3	-	-	4	-	3.5

Source: Field survey, 2018

Note: AC - Agricultural cooperative

(1): Completely dissatisfied

(3): Neither satisfied nor dissatisfied

(5): Completely satisfied

(2): Somewhat dissatisfied

(4): Somewhat satisfied

Table 3.8 shows the satisfaction with the costs and benefits of certification for safe vegetable by agricultural cooperatives and agribusiness farms.

Certified organizations in Hanoi

Generally, three cooperatives under agricultural service cooperative model held negative attitudes toward RAT and VietGAP certification, while the agribusiness farm

was positive regarding the organic - TCVN standards. As for the certification costs, the fees and the hidden costs of certification and the time and effort required were mentioned as the major obstacles. Specifically, two of the three agricultural cooperatives expressed their dissatisfaction with RAT costs related to the complex administrative procedures that forced them to spend several months completing the documentation⁷ necessary for RAT certification renewal. Bureaucratic costs were also mentioned in the interview with one cooperative manager. This cooperative even had to hire a company for around US\$ 1.500 to fill out the documents necessary to renew the RAT certification. As for VietGAP certification, two of the three agricultural cooperatives in Hanoi expressed their satisfaction with VietGAP certification because they were still receiving government support for the certification fee, while the remaining AC expressed dissatisfaction because of the high certification fee (several thousand dollars).

With regard to certification benefits, most of the agricultural cooperatives expressed their dissatisfaction (66,7% for RAT certification and 100 % for VietGAP certification). The main reasons for this dissatisfaction were a low level of consumer recognition and the lack of a stable market, as certified vegetables are collected and distributed mainly by private collectors or through wholesale markets that command prices similar to conventional vegetables. Cooperatives, therefore, did not see any significant increases in income. Moreover, some dissatisfaction with the VietGAP standard was found, including the extra work involved in keeping a farm diary and reduced marketing flexibility. In contrast, the agribusiness farm that obtained organic - TCVN certification was somewhat satisfied with this certification due to government support for the certification fee and the benefits gained from the expansion of distribution channels and an enhanced reputation amongst consumers.

Certified organizations in Moc Chau

Analysis of the levels of satisfaction with the certification systems showed that certified organizations in Moc Chau were generally satisfied with the cost and benefits of

⁷ The necessary paperwork to apply RAT certification includes (1) Soil sample test result; (2) Water sample test result; (3) Health certification; (4) Certification on training for food safety.

certification. Particularly, most cooperative under new type of cooperative model have positive attitudes toward the RAT certification cost because of the strong support of the local government in converting to safe production. As for VietGAP, 40% of the respondents expressed satisfaction with the certification cost because of government support for the application fee, while 60% of the respondents held neutral attitudes towards VietGAP certification. Two of these organizations that had to pay the certification fee explained that the fee was acceptable and consistent with their business capacity, although they expressed their wish for a lower certification fee or government support for the fee, while the other organization voiced dissatisfaction with the time it took to transition from traditional production to VietGAP production, despite the fact that they had received government support for the certification fee.

Regarding the benefits, respondents were, for the most part, satisfied with certification (75% for RAT, 80% for VietGAP) because of the expansion of modern distribution channels (supermarkets) and better prices. For example, the sale price of certified vegetables is 1.000 to 2.000 VND (per kilogram) or 25-50% higher than the price for conventional vegetables in local markets (see figure 3.5).

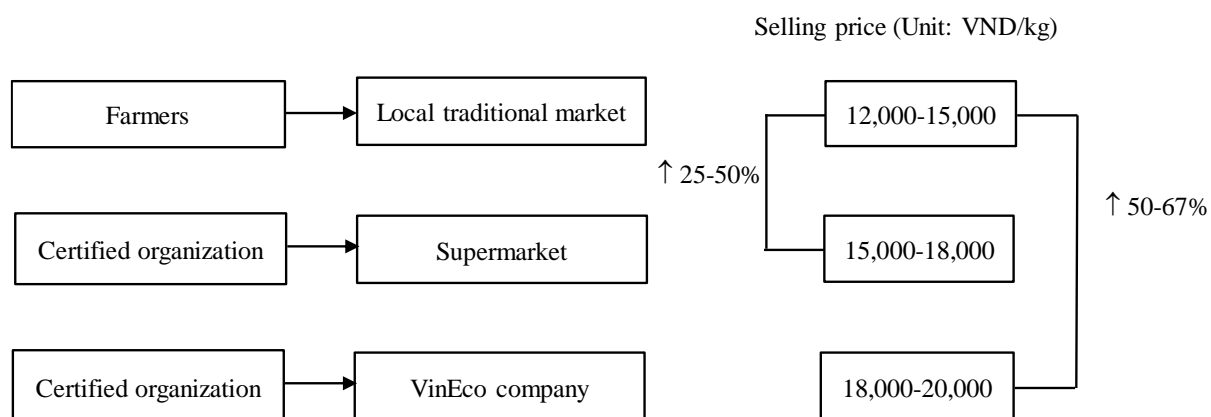


Figure 3.5. Selling price of safe vegetables of certified organizations in Moc Chau

Source: Field survey, 2018

Note: The price is for Mustard leaves in September, 2018

Only one cooperative is moderately positive regarding the merits of certification because it works with only one buyer (VinEco), which does not require certification, but

instead requires adherence to its own strict controls. In addition, representatives of organizations which have strong linkages to VinEco have explained that the certificates have no meaning if producers do not adopt fully to the certification standards. These organizations, although they are satisfied with the current certification system, pay less attention to the certificates because they follow the strict production standards imposed by VinEco.

5.2.2. Perceived reliability of certification systems

Table 3.9 shows that the certification bodies in eight of the nine organizations surveyed were public organizations, while only one agribusiness farm chose a private company for the certification process. It was found that up to 88.9% of the respondents believed in the certification's reliability and put their trust in the certifiers from the state because of their trust in and loyalty to the government. The perceived reliability of the certification system is not a significant determinant of organizations' satisfaction.

Table 3.9. Current certification bodies of the three certification standards for the organizations surveyed

	Certification body (CB)	Characteristic of CBs	Standard
Yen My AC	Hanoi Plan Protection Sub-department	State	RAT
Van Duc AC	Hanoi Agricultural Products Quality and	State	VietGAP
Linh Nam AC	Analysis Center		
Tuen Vien farm	Hanoi Agricultural Products Quality and Analysis Center	State	Organic (TCVN)
Tu Nhien AC	Son La Quality Management Department of	State	RAT
An Tam AC	Agriculture Forestry and Fishery Products		
Hoang Hai AC	National Agro - Forestry - Fisheries Quality	State	VietGAP
Dung Tien AC	Assurance Department - Branch 1		
Greenfarm	NHONHO Technology Company	Private	VietGAP

Source: Field survey, 2018

Note: AC - Agricultural Cooperative

As for the RAT standard, two of the three cooperatives in Hanoi who have had to renew their RAT certification expressed their dissatisfaction with the CBs. They raised questions about the experience and the professionalism of the CB after it changed from the Department of Plant Protection (under the Department of Agriculture and Rural Development) to the Economic Division (under the District People's Committee). The administrative procedures had become more complex and more difficult for the applicant to complete the documentation necessary to renew RAT certification. This explained why all expired certifications for the RAT standards of these cooperatives have not been renewed although they have expired. In contrast, cooperatives in Moc Chau, with local government support, had gotten RAT certification before the CB was changed (before 2017), which explains the positive attitude towards the CB on the part of the respondents.

As for VietGAP standards, most of the cooperatives received support from the local government to cover the first certification fee. The local government designated and introduced the certifier to the cooperatives. In these cases the objectivity of the selected CB was not taken into consideration. The cooperatives therefore lacked sufficient knowledge about the CBs to compare and choose the best one to meet their needs, with the result that their evaluations of the CBs drew mostly on their personal feelings. A high ratio of respondents in both Hanoi (66.7% of respondents) and Moc Chau (60% of respondents) were somewhat satisfied with the reputation of the CBs because they believed in the choice made by the local government. In contrast, Greenfarm paid the certification cost and chose the CB on its own and therefore placed less trust in the CB. They revealed that they renewed the VietGAP certification one time and changed the CB because the former CB had been caught up in a scandal related to the illegal granting of certifications. They claimed that the CBs were private organizations operating for profit, and thus their certification evaluation process is commoditized and has little substance. As for the organic - TCVN certification, due to the new directions for organic farming issued by the Vietnamese government, the CBs were now evaluated and selected strictly, and therefore the firm, Tue Vien farm, believed in the reputation of the CBs because they were vetted by the state.

5.2.3. Differences in the evaluation of certified organizations

Three clusters were detected based on the mean of evaluation regarding certification (see table 3.8). The groups can be characterized as “The Dissatisfied” (Cluster 1 - Mean < 2.6), “The Satisfied” (Cluster 2 - Mean > 3.7), “The Satisfied Who Pay Little Attention” (Cluster 3 - 3.4 < Mean < 3.7).

Cluster 1: “The Dissatisfied” (Yen My, Van Duc, Linh Nam agricultural cooperatives)

The organizations in this group are the cooperative under the agricultural service cooperative model that have converted themselves from the old type of the cooperative and have much experience with the certification standard. They have made efforts with government support to gain certification, but do not abide fully by the standards because of the large number of and the low level of engagement in quality and safety management practices of their members. Evidence that certification is a useful instrument for assuring vegetable safety is therefore lacking. Due to a lower level of or no governmental support, the agricultural cooperatives were leery of the high costs of and the amount of time they had to spend on the paperwork and other procedures for RAT certification as well as the high fees necessary for VietGAP certification. The marketing channel of safe vegetables especially RAT vegetable still involve in long supply chain through trade intermediaries. Moreover, consumer awareness of certified vegetables is still low. Therefore, agricultural cooperatives see few benefits from certification and are included in “The Dissatisfied” cluster.

Cluster 2: “The Satisfied” (Tu Nhien, An Tam agricultural cooperatives, Tue Vien farm)

This group is made up of two agricultural cooperatives in Moc Chau for RAT and VietGAP standards and an agribusiness farm that has earned organic - TCVN certification. They have positive attitudes toward the standards and the certification because of the benefits they see for their organization (market access, price and reputation enhancement). Because they were motivated to adopt and adhere to the certification standards, they were assured that the certification would work to their advantage in the marketplace. These organizations have also received local government support (technical training, government subsidies, certification fee). Their certified vegetables are distributed majority directly to supermarkets or safe vegetable stalls for VietGAP and directly to consumer for

organic. As a result, certification has been highly beneficial for them. These organizations were placed in “The Satisfied” cluster.

Cluster 3: “The Satisfied Who Pay Little Attention” (Dung Tien, Hoang Hai agricultural cooperatives, Greenfarm)

This group consists of the agricultural cooperatives with RAT and VietGAP certification and an agribusiness farm with VietGAP certification, all in Moc Chau. They were generally satisfied with the certification systems but pay less attention to them. These organizations are highly aware of good practices and their daily operations meet certification standards and requirements. These organizations adopt the certification as additional evidence of the quality and safety of their vegetables. Moreover, the marketing channel for vegetable of organizations in this cluster is to VinEco with the direct farm program and they are controlled strictly from VinEco. Although certification is unnecessary in its dealings with VinEco, it is still necessary for its transactions with other modern retailers. The strong reputation of the VinEco brand in the safe vegetable market offers certain advantages in enhancing the reputation of organizations in cluster 3 in the wider market place. Yet certification does not have a significant impact on their management decisions or business operations, and therefore they pay less attention to the certification than other organizations might. Moreover, the organizations in this group perceive certifications as a less useful tool for quality assurance since there is no auditing by the buyer and therefore a low consciousness of good practice. These organizations were labeled as being part of “The Satisfied Who Pay Little Attention” cluster.

6. Conclusion

Since the widespread of public certification standards for safe vegetable, agricultural cooperatives play more important role in the safe vegetable supply chain. The cooperative under model of agricultural service cooperative play a key role as middlemen for communicating public policy to or securing public funding for farmers. On the other hand, the new type of cooperative model has become key actors in the distribution of safe vegetables and the building of strong links to the modern retailers they supply.

The key motivation for the adoption of safe vegetable standards and obtaining certification comes from the desire to secure a stable market with higher prices through formal contracts with supermarkets, certification is therefore indispensable when starting to work with modern retailers. However, the implementation of certification standards is different from the cooperative under model of agricultural service cooperative and other organizations. While the agribusiness farms and the new type of cooperative model are in high compliance with the standards requirements due to their genuine desire to engage in safe vegetable production and pressure from buyers, the implementation of certification standards in the cooperative under model of agricultural service cooperative is relatively low because of the limited capacity of the cooperative management board, the large number of cooperative members and low level of engagement in quality and safety standards management by these members.

Marketing structure for safe vegetable is different amongst organizations that have been certified as safe vegetable. The cooperatives under the model of agricultural service cooperative who show their dissatisfaction with certification system still engage in long supply chain through trade intermediaries for RAT vegetable. By contrast, cooperatives under new type of cooperative model who are generally satisfied with certification system tend to shorten their marketing system by distributing their RAT vegetable for organizational customers, both RAT and VietGAP directly to modern retailers that may get price of 25-50% higher, and VietGAP vegetable to direct management farm of supermarket that may get price of 50-67% higher. In addition, direct management farm of supermarket and agribusiness farms strongly promote VietGAP and organic vegetable through short marketing channel that provide more guarantee about the quality and safety of vegetable. This indicated that the distribution channel for safe vegetable is different amongst certified organizations based on the standard adoption in their practices. While certified organizations that develop greatly RAT, the minimum standard for safe vegetable involved in long distribution channel, certified organizations that promote VietGAP and organic tend to adopt shorter distribution channel.

Chapter 4. Structure of procurement system by trade intermediaries and their attitude toward certification standard for safe vegetable

1. Introduction

The aim of this chapter is to understand the structure of procurement and marketing channel for vegetable by trade intermediaries in supermarket indirect channel and their attitude toward certification standard. The chapter is structured into five sections. Following the introduction, the methods and data and characteristics of traders interviewed is illustrated in section 2. Section 3 discusses the structure of procurement and distribution channels for vegetable by trade intermediaries. Attitude toward certification systems by trade intermediaries are described in section 4. In the final section 5, a summary of the chapter is mentioned.

2. Methods and data

The findings of this chapter are based on primary data that were collected through the market survey using face-to-face interviewing with selected trade intermediaries. The total numbers of respondents were 14 including personal traders in traditional supply chain (6 collectors, 3 wholesalers), and trading companies in supermarket supply chain (5 trading companies) (see table 4.1).

The term trade intermediaries as used in this study refers to those individual or business that are found in the market and buy vegetables from farmers or other actors then resale to retailers. We focus more on 5 trading companies that primarily supply vegetable to supermarkets (labelled from T1 to T5). These companies are typically small and medium-sized intermediary companies (under 100 labors). These companies are grouped into two types:

- ✓ Group 1 (T1 & T2): these companies have their own farm under VietGAP production.
- ✓ Group 2 (T3, T4, T5): these companies have their own farm but did not certified (T3, T4) or only commercial activities (T5).

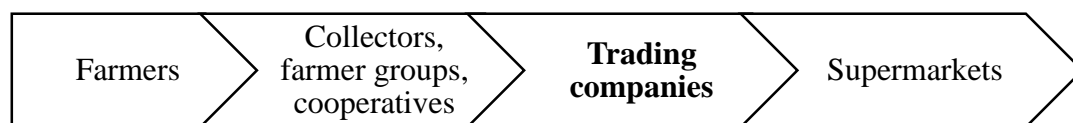


Figure 4.1. Typology of supermarket indirect channel for safe vegetable

Source: Own elaboration

In order to have the information about trading companies within the supermarket indirect channel, we first began with interview the major supermarket chains in Hanoi that was carried out from August 2017 in order to understand the supermarket supply chain for vegetable. The trading companies who participate supermarket supply chains was identified and chosen to interview.

Table 4.1. Sample description

	Description	Sample	Note
<i>Participant involved directly in supermarket supply chain</i>			
Trading company	In this research, we consider firm or enterprise who has activity in buying and selling vegetables to supermarket called trading company	5	T1, T2, T3, T4, T5
<i>Participant involved in traditional supply chain</i>			
	Collector (commune trader)	6	
✓ Traditional collector	Traditional collectors represent individual who buy majority conventional vegetable or partly RAT vegetable directly from farmer in local commune	5	C1, C2, C3, C4, C5
✓ VietGAP collector	VietGAP collector represents individual who collect and market majority of VietGAP vegetable and small party of RAT vegetable from farmer in local commune	1	C6
Wholesaler (regional trader)	Wholesalers represent individual who trade vegetables with big quantity (average of more than 0.5 ton/day) and buy the majority of the vegetables from collectors. They are often have vegetable stall in wholesale markets.	3	W1, W2, W3
Total		14	

Source: Own elaboration

The content relates to structure of procurement and marketing channel for vegetable by trade intermediaries. First covered general information such as experience in business, number of employee, facility, traded volume per day. Next content relates to the supplier of trade intermediaries and upstream relationship, the buyers and downstream relationship as well. Then, the certification level that exist in this channel, the attitude with certification have been accessed.

Characteristic of trade intermediaries

Collectors and wholesalers

Table 4.2 Profile of surveyed collectors

	Location	Gender	Age	Years of education	Experience in trading vegetables (years)	Quantity bought (ton/day)		Number of SKU trading	
						Min	Max	Min	Max
C1	Hanoi	Female	45	9	20	0.03	0.07	1	3
C2	Hanoi	Male	29	12	6	1	2.5	5	10
C3	Hanoi	Female	42	9	12	1	3	6	10
C4	Hai Duong	Male	35	12	12	0.1	0.15	3	5
C5	Hai Duong	Female	40	12	18	1	2	6	10
C6	Hanoi	Male	46	12	12	0.06	0.3	4	10

Source: Field survey, 2019

Note: SKU (Stock Keeping Unit)

Table 4.2 shows the socioeconomic profile of the surveyed collectors. Most of the collectors (66.7%) are farmers and members of the cooperatives. They not only have experience in vegetable production but also in transaction. Three of them had been running their trading activity for 12 years followed by 2 with more than 15 years and 1 with less than 10 years of experience. The surveyed collectors were from two areas Hanoi City (66.7%) and Hai Duong province (33.3%). The average commercialization volume is around 0.6 tonnes per day in summer crops (suitable for the period April to October) and up to 1.5 tonnes per day in winter crops (suitable for the period November to March). They often buy several kinds of seasonal vegetables in collection point of their village or farmers deliver vegetable to collectors' houses at the end of afternoon (from 4pm), then collectors used their own motorbikes or trucks to transport vegetables to selling points.

Table 4.3. Profile of surveyed wholesalers

	Location	Gender	Age	Years of education	Experience in trading vegetables (years)	Quantity bought (ton/day)		Number of SKU trading	
						Min	Max	Min	Max
W1	Hanoi	Female	43	12	20	1	2.5	200	300
W2	Hanoi	Female	60	6	30	0.5	1	20	40
W3	Hanoi	Female	38	12	8	1	4	30	60

Source: Field survey, 2019)

Note: SKU (Stock Keeping Unit)

Table 4.3 shows the socioeconomic profile of wholesalers. All surveyed wholesalers are female with the average age approximately 47 years and they have much experience in trading vegetable. Two of them had been running their trading activity for 20 to 30 years followed by 1 with less than 10 years of experience. All three interviewed wholesalers are located in Hanoi City and they have a small stall in wholesale market that take place their buying and selling activities. The average commercialization volume fluctuated from 0.83 tonnes to 2.5 tonnes per day. Wholesalers seek to buy numerous kinds of vegetables (up to hundreds of SKU) both main-season (Hanoi and neighbor provinces) and off-season vegetables (Da Lat, Moc Chau, China).

Trading companies

Table 4.4. Profile of surveyed trading companies

	Head office	Year of established	Number of labor	Characteristic of vegetable business	Facility		Quantity bought (ton/day)		Number of SKU	
					Processing house	Truck	Min	Max	Total	SKU delivery/day
T1	Hai Duong	2013	30	Production; Trading (10%)	+	+	1	5	70	30
T2	Bac Giang	2017	20-50	Production; Trading (70%)	+	+	2	4	45	30
T3	Hai Duong	1992 Trading agricultural product from 2014	20-100	Production; Trading (95%)	+	+(13)	15	200	n/a	n/a
T4	Hanoi	2010	20-50	Production; Trading (70%)	+	+	1	3	50	15
T5	Hanoi	2016	10-30	Trading (100%)	+	+(4)	3	8	267	30

Source: Field survey, 2019

Note: + Covered n/a: not available

Table 4.4 shows the profile of trading companies. Among five trading companies that were surveyed, three are new players in trading vegetables and two have much experience in trading vegetables (more than 5 years). Two of five companies located in Hanoi City, two in Hai Duong Province and one from Bac Giang Province where is around 60km² to Hanoi City. Since supermarkets tend to procure from producer, trading companies, therefore, tend to produce vegetable under VietGAP standard and adopt the certification beside the commercial activities in order to provide more guarantee about the quality and safety of vegetables. Among the 5 companies, 4 have their own production and one company focus only on commercial activities. Trading companies buy many types of vegetables both main-season vegetables and off-season vegetables with the average volume is around 4.4 tonnes per day in summer crop and up to 44 tonnes per day in winter crop. All trading companies have their processing house and their own truck to transport vegetable to buyers.

3. Structure of procurement and distribution channels for vegetables by trade intermediaries

3.1. Collectors and wholesalers

3.1.1. Collectors

Table 4.5. Procurement and distribution practices by collectors

Purchasing activities					Marketing activities			
	Source of vegetable	Vegetable type	Procurement channel (%)		Sale area	Distribution channel (%)		
			Farmer	Others		Wholesale market	Trading firm	Others (kitchen, food individual trader for events)
C1	Local commune (Linh Nam)	Traditional RAT	100	-	Local district (Hoang Mai)	100	-	-
C2	Local commune (Van Duc)	Traditional RAT	100	-	Neighbor province (Bac Ninh)	100	-	-
C3	Local commune (Van Duc)	Traditional RAT	100	-	Provincial capital (Hanoi)	100	-	-
C4	Local commune (Pham Kha)	Traditional RAT	100	-	Local district (Thanh Mien)	100	-	-
C5	Local commune (Pham Kha)	Traditional RAT	100	-	Neighbor province (Hanoi)	100	-	-
C6	Local commune (Tien Le)	VietGAP	100	-	Provincial capital (Hanoi)	-	95	5

Source: Field survey, 2019

Table 4.5 shows that collectors play a crucial role in the vegetable supply chain since they are the main vegetable buyer for the commune farmers and have close links with a lot of local farmers. Beside their own vegetables, they collect vegetables from other farmers in their commune and sell for traders. All traditional collectors who bought majority traditional vegetables with an additional of RAT vegetables indicated that, most part of vegetables collected are sold to wholesalers in wholesale market at the local district, provincial capital or in neighbor provinces, focus majority in Hanoi market. VietGAP collector that bough vegetables from VietGAP farmer sold 95% of their collected vegetables to middle trading firms and around 5% to the local food traders for events. The relation between traditional collectors and wholesalers generally based on verbal agreement. The price, trading volume, type of vegetable or payment are decided in this verbal agreement based on the trust between them. In contrast, formal contract is necessary when VietGAP collector deal with middle trading firms.

3.1.2. Wholesalers

Table 4.6. Procurement and distribution practices by wholesalers

		Purchasing activities				Marketing activities				
		Vegetable type	Procurement channel (%)			Sale area	Distribution channel (%)			
Source of vegetable	Farmer		Collector	Private firm	Retailer		Restaurant	Minimart; Store	Consumer	
W1	Hanoi, Da Lat,	RAT	-	90	10	Hanoi	-	90	5	5
	China etc.	Traditional								
W2	Hanoi, Hai	RAT	15	85	-	Hanoi	60	35	5	-
	Duong, China etc.	Traditional								
W3	Hanoi, Vinh Phuc,	RAT	10	90	-	Hanoi	90	7	3	-
	Son La, Lang Son, China etc.	Traditional								

Source: Field survey, 2019

Wholesalers purchase RAT and traditional vegetables from three dominant sources 88.3% from traditional collectors followed by 8.3% directly from farmers and 3.4% from middle trading firm. Wholesalers are the main vegetable buyers for vegetables traded by collectors, they, therefore, play the big role in second level of the distribution on the traditional chain. For the distribution of their vegetables, 50% of the vegetables are sold to retailers at the different traditional markets located in the district centers, provincial capital followed by 44% to restaurants in Hanoi. Small percentage of vegetables traded by wholesaler are sold to minimart, vegetable stalls or directly to consumers in Hanoi market. Wholesalers dealt with collectors and retailers based on their trust that have been built for a long time.

3.2. Trading companies

3.2.1. Marketing channel for vegetables

Table 4.7. Downstream marketing patterns of trading companies

	Total sale quantity (ton/day)	Supermarket channel (%)			Other channel (%)				
		Domestic chain	Multinational chain	Export	Hotels; Restaurants; Schools	Others			
Group 1	T1	4	90	54	36	10	-	10	-
	T2	4	72	9	63	28	-	10	18
Group 2	T3	40	10	3	7	90	50	10	30
	T4	2.5	10	10	-	90	-	90	-
	T5	4	36	36	-	64	-	59	5

Source: Field survey, 2019

Table 4.7 shows the different marketing channels for vegetable of trading companies that were interviewed.

The result shows that trading companies sold the collected vegetable to different channels and supermarkets stand out as important client of trading companies, from 10%

to 90%. Good purchasing policy and huge bought volume are the major reasons for trade intermediaries to distribute the collected vegetables to supermarkets.

Specifically, supermarkets are the main buyers for companies in group 1 (T1, T2) with 90% and 72% of their sale volume, respectively, both domestic supermarkets and multinational supermarkets, but sold more to multinational supermarkets due to their flexible in purchasing policies. In contrast, small percentage of vegetables from companies in group 2 (T3, T4, T5) are sold to supermarkets. Specifically, supermarkets represent less important distribution channel for company T3 and T4 (only 10% of their sale quantity) since T3 company trade huge volume and focus more on three type of vegetables including potato, carrot, onion, while T4 focus target on schools because of less requirement than supermarkets. T5 company sold 36% of their collected vegetables to Vinmart supermarket chain that the quality and safety are controlled very strict, the company therefore use quick test equipment in their purchasing activities for guaranteeing the safety of collected vegetables. Trading companies in group 1 started as a VietGAP producer, it is, therefore, easy to them to establish the relationship with supermarkets that require more about standard and certification for vegetables.

Table 4.8 shows the supermarket chains that trading companies supply to, majority supplying to big chains such as Vinmart, BigC, Saigon Co.op or Mega Market. Good purchasing policy and huge bought volume are the major reasons for companies to choose these supermarkets. The relation between trading companies and supermarkets is implemented by formal contract which show the quantity, quality, type of vegetables, delivery, payment method or selling price.

Table 4.8. Characteristics of vegetable supplying in supermarket by trading companies

	Standard	Number of supplier			Name of Supermarket involved			
		Total	Regular	Mega Market	Vinmart	BigC	SaiGon Co.op	Others (Intimex, Dabaco etc.)
T1	VietGAP RAT	6	n/a	+	+	+	+	+
T2	VietGAP RAT	10	6	-	-	+	-	+
T3	RAT	100	n/a	-	-	+	-	-
T4	RAT	10	5	-	-	-	-	+
T5	VietGAP RAT	15	10	-	+	-	-	-

Source: Field survey, 2019

Note: - Not covered + Covered n/a: not available

3.2.2. Structure of procurement channel

Table 4.9. Procurement channels of trading companies

		<i>Unit: %</i>			
		Own production	Farmer groups, agricultural cooperatives	Collector	Others
Group 1	T1	90	10	-	-
	T2	30	55	-	15
Group 2	T3	5	80	15	-
	T4	30	70	-	-
	T5	-	-	100	-

Source: Field survey, 2019

In general, trading companies who involve in supermarket supply chain are high achievers with a sense that quality and safety of products are very important and differentiate supermarket with traditional market. They, therefore, priority procure from certain sources that can trace back the origin easily, majority from agricultural

cooperatives (up to 80%, work with around 5-10 regular suppliers (see table 4.9). In general, vegetable of T1 & T2 company in group 1 is majority from their own production⁸ (90% and 30%, respectively). In contrast, agricultural cooperatives and collectors become the major source of trading companies in group 2 (more than 70%).

Specifically, in case study 1 (T1), the company developed from production under safe vegetable production from 2013 and compliance with VietGAP standard from 2016. Therefore, up to 90% of vegetables come from their own farm with the crop land is around 20 ha. Other purchases (10%) are made from agricultural cooperatives (3-6 cooperatives) that are introduced by local government.

For case study 2 (T2), this company sources from three major channel: their farm (30%), cooperatives (55%) and private firm (15%). The company involved in VinEco program with the strict control from VinEco. The company, therefore, reach the high quality under VietGAP standard in their farm focusing on spinach production. Moreover, from the direct farm program from VinEco, the company has good relationship with many other partners in the program. Therefore, other vegetable sources come from cooperatives or private firm that also involved in the program in order to ensure the quality of vegetable they bought (6 regular suppliers, and 30% in local province - Bac Giang Province).

For case study 3 (T3), the company focus on three major vegetables that account for 70% of their vegetable traded, including potato, carrot and onion. The vegetable of this company comes from three sources: their own farm (5% only for “baro” onion production), contract farmers via cooperatives (80%), and collectors (15%). The company signed contract with around 100 cooperatives per year located in provinces with the geographical characteristics of vegetable production such as Thai Binh Province for potato, Thanh Hoa Province for onion, or Lao Cai Province for cabbages, radish.

For case study 4 (T4), the director of this company is a member in management board of an agricultural cooperative, therefore, 70% of their vegetables are procured from

⁸ Our result about trading companies has some similar characteristic with former traders who supply to processing company to export from China to Japan (Sakazume et.al, 2006). They develop and manage their direct management farm for supplying vegetables. It suggests more evidence on controlling the quality of vegetable even if retailers procure vegetable from trading companies

agricultural cooperative network (5 regular cooperatives, and 50% in local area - Hanoi City).

Lastly, T5 company source 100% from collectors (10 regular suppliers and 70% from Da Lat region in off-season) who are often VietGAP farmers since these collectors have good knowledge in VietGAP production and are trained about safe production. The quality and safety of vegetables, thus, will be guaranteed.

Generally, trading companies procure around 45% of vegetable in the local province, 55% came from other provinces with the geographical characteristics especially in mountainous area such as Ha Giang, Son La, Lao Cai province or Dat Lat highland for vegetable in off-season, the quality and safety of vegetable, therefore, become more guarantee.

4. Traders' attitude to certification standard and certification adoption level

4.1. Trader perception of certification standard

4.1.1. Perceived the name of each certification standard

Table 4.10 shows the awareness of traders regarding each certification standard. The result shows that most of the respondents have heard about certification standard (92.9% for RAT and VietGAP; 57.2% for Organic). However, some respondents only hear the name of certification standards from their sellers or consumers (28.6% for RAT, 21.4% for VietGAP and 28.6% for Organic) and they do not know or do not care the meaning of these certification standard.

Table 4.10. Awareness of certification standards for safe vegetable by traders

		Total sample (%) (N=14)	C (%) (N=6)	W (%) (N=3)	T (%) (N=5)
RAT	I have never heard of it	7.1	16.7	-	-
	I have heard of it, but I don't know what it means	28.6	33.3	66.7	-
	I know what it means	64.3	50	33.3	100
VietGAP	I have never heard of it	7.1	16.7	0	-
	I have heard of it, but I don't know what it means	21.4	16.7	66.7	-
	I know what it means	71.5	66.6	33.3	100
Organic	I have never heard of it	42.8	66.7	66.7	-
	I have heard of it, but I don't know what it means	28.6	33.3	33.3	20
	I know what it means	28.6	-	-	80

Source: Field survey, 2019

Note: C - Collector W - Wholesaler T - Trading company

Collectors and wholesalers in traditional supply chain have poor knowledge about certification standard, while all trading companies in supermarket supply chain have good knowledge about each certification standard (100% know about RAT and VietGAP certification, 80% know about organic).

This statement is easy to understand because trading companies work majority with buyers who require certification standard in their supply chains. They also practice under safe vegetable production especially VietGAP standard. All respondents mentioned that VietGAP certification can be seen as the dominant and best known certification standard for vegetables quality and safety at present because of the government's encouragement for VietGAP production and the requirement from buyers (supermarkets). Since VietGAP certification is the most popular and got the highest perception from traders (71.5%), the next paragraph, we provide in depth understanding of the role of VietGAP certification from perspective of traders who understood background of VietGAP certification.

4.1.2. Perceived the role of VietGAP certification in the food supply chain

Collectors perceived VietGAP certification plays the role on improving farmer's awareness on safe production, therefore protecting farmers' health and safe for consumers. Most of collectors are farmers, they agreed that the government provide support for applying VietGAP through cooperative by technical training for VietGAP production as well as other subsidies such as certification cost or input subsidies. From the training program, farmers' knowledge and skills on safe vegetable production improved especially on the use of safe and correct pesticides that not only protect producers' health but also safe for consumers. *VietGAP collectors* commented that VietGAP certification is important for food quality and safety. He indicated that each country needs its own standard to improve food quality and safety and VietGAP can be seen as the national standard for sustainable agricultural production.

Wholesaler considered VietGAP certification as a policy tool from government to improve food safety in Vietnam and raise farmer's awareness in safe production.

Trading company expressed that the purpose of VietGAP certification is to differentiate between VietGAP certified vegetable and traditional vegetables. Producer who have meet the requirement of VietGAP standard are recognized from other traditional producers. Without the certification, it is difficult to differentiate VietGAP and non-VietGAP vegetables. In addition, certification standard also helps retailers in product differentiation and benefit them because VietGAP vegetables are sold at premium price compared with non-certified vegetables.

4.1.3. Perceived benefits of sourcing certified vegetables

Some trading company (T1 & T2) can increase their reputation by moving in production and obtain VietGAP certification, and thus, may develop their market with more customers (see table 4.11).

Table 4.11. Expansion market and buyers via sourcing certified vegetable with certification

	Major market	Major buyer	New market	New buyers
T1	Hai Duong, Hai Phong, Quang Ninh, Hanoi	15 Supermarkets (BigC, Saigon Co.op, Intimex)	-	Aeon, Vinmart, restaurants
T2	Hanoi	Supermarkets (BigC chain), VinEco	Bac Ninh	Supermarket (Dabaco) Schools
T3	Domestic & export	~ 5 Exported companies, supermarkets (BigC)	-	-
T4	Hanoi	School, small supermarket	-	-
T5	Hanoi	Vingroup (Vinmart, Vinschool, Vinhospital)	-	Food catering Hotel

Source: Field survey (2017-2019)

Figure 4.2 shows the significant increase in selling prices of trading company to supermarket compared with other actors. They can get premium price around an average of 40-50% higher compared with traditional traders when they supply certified vegetables to supermarkets because of not paying higher prices for the producer's investment in certification. Specifically, the respondent indicated that, there is no different about the purchasing price between RAT and traditional vegetable.

This situation can be explained by the fact that trading companies supplying supermarket need to meet the quality requirement from supermarket by classifying, packing vegetable according to specific requirements.

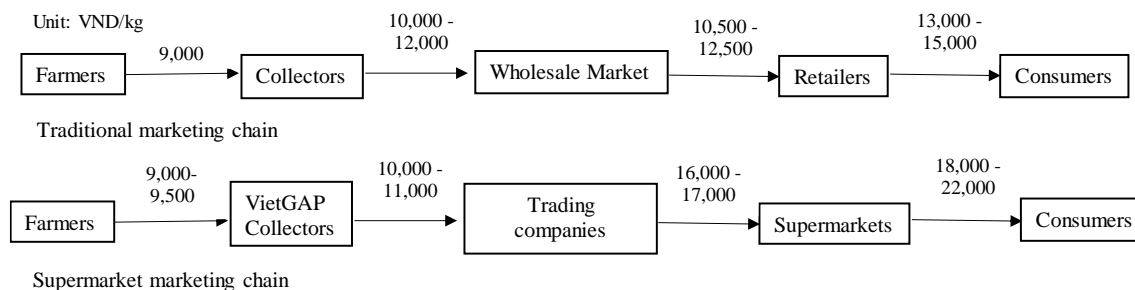


Figure 4.2. Changing price between actors in traditional marketing chain and supermarket marketing chain

Source: Field survey and observation at supermarket, 2019

Note: The price is for Malabar spinach in September, 2019

4.2. Traders' attitude to certification standard and certification adoption level

Collectors stated that the certification standard is not importance in their business since they did not see the real demand for certified vegetable in wholesale market. In wholesale market, there is no difference between certified vegetables and conventional vegetables and the buyers do not require any certification. They therefore did not seek to buy certified vegetable such as VietGAP, even traditional collector refuses to buy certified vegetables from farmers. In some cases of vegetable shortage, traditional collectors may buy both conventional and certified vegetables, but they treated certified vegetables as traditional vegetables. At collecting level, the market margin is often from 1,000-2,000 per kilogram.

Wholesalers who traded many types of vegetables that were sourced from different suppliers tend to be less concerned about certification standard because there is little market demand for certified vegetables. They underline that their buyers especially restaurants require more about the variety of vegetable. Regarding the quality, the buyers pay more attention on the appearance of vegetable. Although the buyers are concerned about the safety of vegetable but they do not require any certification standard. Wholesalers have been sourcing vegetables that have been grown conventionally and cropped safe production (RAT), however they did not differentiate these vegetable when they traded vegetables.

Trading companies who participate in supermarket supply chain perceived the certification is moderate. They purchase both certified vegetables (RAT & VietGAP) and non-certified vegetables in their business and the level of certification adoption by trading companies is medium (48%). The adoption level of VietGAP and RAT vegetable differs amongst two trading company groups (see table 4.12).

The adoption certification level of T1 & T2 company in group 1 is high (100% & 50%, respectively), while this percentage in group 2 is smaller, only from 5% to 55%. Regarding two certification standards VietGAP and RAT, companies in group 1 adopt high percentage of VietGAP vegetable (90% & 40%) in their business. In contrast, RAT vegetables are procured more than VietGAP vegetable by companies in group 2.

Table 4.12. Percentage of certified vegetable with certification traded by trading companies interviewed

Unit: %

	Own farm		Other sources			Total				
	Certification (VietGAP)	Non- certification	Certification		Non- certification	Certification			Non- certification	
			VietGAP	RAT		Total	VietGAP	RAT		
Group 1	T1	90	-	-	10	-	100	90	10	-
	T2	30	-	10	10	50	50	40	10	50
Group 2	T3	-	5	-	5	90	5	-	5	95
	T4	-	30	-	30	40	30	-	30	70
	T5	-	-	28	27	45	55	28	27	45

Source: Field survey, 2019

The difference between two trading company groups can be explained by the fact that the companies in group 1 started as a producer under VietGAP standard, their VietGAP vegetable, therefore, mainly come from their own production. The respondents in group 2 indicated that source of VietGAP vegetable is still small and only some main kinds of vegetables are certified under VietGAP production. Therefore, higher percentage of RAT vegetable was collected for safe vegetables because they can get cheap purchasing price of RAT vegetable but good selling price to supermarket. Some trading companies even support cooperative apply and get the certification for RAT vegetable, the cost is around 25 million VND/5ha/5 kinds of vegetables. It suggests that trading companies act in accordance with the attitude of their buyers with regard to certification. They provide the guarantee about food quality and safety by showing the contract between them and their suppliers as well as improving the interaction with their suppliers.

5. Conclusion

The marketing channel for collected safe vegetable in trading companies is various and supermarkets are one of the most important clients of trading companies. The procurement structure of trading companies become more transparency through purchasing from certain sources that can trace back the origin easily, majority from farmer groups and agricultural cooperatives. Trading companies who distribute lower percentage of vegetable to supermarket chains source more from agricultural cooperatives and collectors with low level of certification adoption and higher percentage of RAT vegetable than VietGAP vegetable. The reason is that the source of VietGAP vegetable is still small and they can get cheap purchasing price of RAT vegetable but good selling price to supermarket. In contrast, trading companies who supply more in supermarket chains procure more from their own production with high level of VietGAP adoption, their supply chain, therefore, is similar as the chain of agribusiness farms in supermarket direct channel.

Conclusion

1. Key conclusion for each chapter

Chapter 1 shows that a large number of food voluntary standards are implemented in Vietnam safe vegetable market, both on a public and a private basis. The key public voluntary standards for safe vegetable include RAT, VietGAP and organic. Of these standards, RAT is minimum standard, organic stands on the highest position and VietGAP at present can be seen as the most popular and widely accepted standard for the safety and quality of vegetables in the Vietnamese market.

Chapter 2 indicates that as a result of the increasing voluntary standards for safe vegetable in domestic market, new distribution channels and players are emerging to develop and promote safe vegetable supply chains. Although traditional marketing chain still dominate, supermarkets chains is emerging alternative channels of traditional marketing channels for safe vegetables, contains fewer participants and tend to shorten by shifting to direct producer-buyer relationships.

The distribution route of safe vegetables differs greatly between the traditional and modern supply chain, where supermarkets stand on the leading position. While the traditional market deals mainly with RAT, supermarket supply chain distribute not only RAT but also the higher standards including VietGAP and organic. In addition, the supply chain of safe vegetable differs between the domestic supermarket chains and multinational supermarket supply chains. While domestic supermarket chains choose to engage in more direct procurement on account of its use of VietGAP standard, the multinational supermarket chain engage in high levels of indirect purchases from trading companies using RAT, however, they have achieved sufficient quality control levels regarding food quality and safety via their strict quality control activities such as supplier inspection, visual checks or sample testing.

Chapter 3 highlights that although agricultural cooperatives play the important role in distributing safe vegetable in modern marketing channel, there is difference role of each type of agricultural cooperatives. Research on two type of agricultural cooperatives showed that, the agricultural service cooperative model with a large number of

cooperative member play the key role as middlemen for communicating public policy to or securing public funding for farmers. In contrast, the new type of cooperative model plays the key actors in the distribution of safe vegetable and the building of strong links to the modern retailers.

There are differences on distribution channel for safe vegetable from organization that have been certified as safe vegetables. The cooperatives under model of agricultural service cooperative who show their dissatisfaction with certification system still involved in selling to trade intermediaries channel for RAT vegetable. In contrast, the new type of cooperative model who are generally satisfied with certification system tend to shorten their marketing system by distributing safe vegetable especially VietGAP vegetable directly to modern retailers and to direct management farm of supermarket. In addition, direct management farm of supermarket and agribusiness farms strongly promote VietGAP and organic vegetable through short marketing channel that provide more guarantee about the quality and safety of vegetable. This indicated that the distribution channel for safe vegetable is different amongst certified organization based on the standard adoption in their practices. While certified organizations that develop greatly RAT, the minimum standard for safe vegetable involved in long distribution channel, certified organizations that promote VietGAP and organic tend to adopt shorter distribution channel.

Chapter 4 indicates that trading companies focus on distributing their collected safe vegetables to supermarkets, their procurement structure, therefore, become more transparency through purchasing from certain sources, especially from agricultural cooperative. Trading companies who engage in low level of supermarket chain procure more from agricultural cooperatives, majority for RAT standard because they can get cheap purchasing price but good selling price to supermarket. In contrast, the supply chain of trading companies who supply more in supermarket chains is similar as agribusiness farms in supermarket direct channel since they develop and manage the own farm under VietGAP standard.

2. Final conclusion

The development of safe vegetable in Vietnamese vegetable market with three key certification standards RAT, VietGAP, organic has created the changes in the vegetable supply chain structure from traditional channel to supermarket channel. Although supermarkets engage in both direct and indirect procurement system for safe vegetable, they, however, have achieved sufficient quality control levels regarding food quality and safety. While long distribution channel for safe vegetables especially for RAT via trade intermediaries was remained in cooperatives under the model of agricultural service cooperatives, shorter marketing channel was promoted for VietGAP and organic vegetable in direct management farm of supermarket, the new type of cooperative model and agribusiness farms. The procurement system of trading companies who involved low level of supermarket supply chain depends more on agricultural cooperatives and collectors with RAT vegetable, while trading companies who engaged in higher level of supermarket supply chain change to their direct management farm under VietGAP vegetable, suggested the better monitoring in quality and safety of their vegetable.

To sum up, my findings illustrate that safe vegetable supply chain of supermarkets tends to be longer for adopting lower certification standard (RAT) and shorter for adopting higher certification standard (VietGAP, organic) since shorter supply chain can have better monitoring and reduce risks related to the quality and safety of vegetable. Government efforts should impose direct enforcement in production under the basic standard (RAT) of safe vegetable for the safety of vegetable and attempt to improve the vertical coordination along the supply chain in order to improve food quality and safety in Vietnam.

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Annex

Annex 1. RAT certificate

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

GIẤY CHỨNG NHẬN
CƠ SỞ ĐỦ ĐIỀU KIỆN AN TOÀN THỰC PHẨM
CERTIFICATE
OF COMPLIANCE WITH FOOD SAFETY REGULATIONS

CHỈ CỤC QUẢN LÝ CHẤT LƯỢNG NÔNG LÂM SẢN VÀ THỦY SẢN
QUALITY MANAGEMENT DEPARTMENT OF AGRICULTURE FORESTRY
AND FISHERY PRODUCTS

CHỨNG NHẬN
Certifies

Cơ sở/Establishment: **Hợp tác xã rau an toàn Tự Nhiên**
Mã số/Approval number:
Địa chỉ/Address: **Bản Tự Nhiên, xã Đông Sang, huyện Mộc Châu, tỉnh Sơn La**
Tu Nhen village, Dong Sang commune, Moc Chau district, Son-La province.
Điện thoại/Tel: **01695.438.180** Fax:

Đủ điều kiện an toàn thực phẩm để sản xuất, sơ chế, kinh doanh sản phẩm:
Has been found to be in compliance with food safety regulations
for following products:

1. Rau an lá (Bắp cải, cải chíp, cải ngồng, cải mè, cải thảo, cải ngọt, hành lá, ngon su su, xà lách, rau thơm, rau muống, rau rền, mồng tơi, cải Đông Du, cải Bó Xôi)/ *Leaf vegetables (Cabbage, chinese cabbage, broccoli, H'Mong vegetables, tianjin-pickled shredded cabbage, kale, scallion, chayote vegetable, salad, aromatic vegetable, water spinach, spinach, malabar spinach, Dong Du vegetable, bina)*
2. Rau ăn củ (Su hào, cà rốt)/ *Root vegetables (Kohlrabe, carrot)*
3. Rau ăn quả (Bí đỏ, bí xanh, cà chua, đậu Cove, dưa chuột, su su, ớt chuông, mướp hương)/ *Pumpkin, squash, tonatoes, green bean, cucumber, chayote, bell pepper, edible luffa)*
4. Súp lơ/ *Cauliflower*

Số cấp/Number: 206/2016/CCQLCL - Sơn La
Có hiệu lực đến ngày: 01/07/2019
Valid until (date/month/year): 01/07/2019

Sơn La, ngày 01 tháng 7 năm 2016
Son La, July 1st 2016

CHỈ CỤC TRƯỞNG

Ngày: 15-07-2016

CHỦ TỊCH UBND XÃ ĐÔNG SANG

PHẠM THẾ CƯỜNG

CHỦ TRƯỞNG BAN SẠO ĐUNG VỚI BAN CHỈNH

Số chứng thư: 604 Quyển số: 01.5678

Annex 2. VietGAP certificate

CỤC QUẢN LÝ CHẤT LƯỢNG NÔNG LÂM SẢN VÀ THỦY SẢN TRUNG TÂM CHẤT LƯỢNG NÔNG LÂM THỦY SẢN VÙNG 1	NATIONAL AGRO-FORESTRY-FISHERIES QUALITY ASSURANCE DEPARTMENT BRANCH 1
 VietGAP-TT-13-07	
GIẤY CHỨNG NHẬN VIETGAP Certificate of VietGAP Số: 342/VietGAP-TT	
Tên cơ sở: HỢP TÁC XÃ RAU AN TOÀN TỰ NHIÊN <i>(Danh sách thành viên tại Phụ lục kèm theo Quyết định số 69/QĐ-TTCLI ngày 26/3/2018)</i>	
Địa chỉ trụ sở: Bản Tự Nhiên, xã Đông Sang, huyện Mộc Châu, tỉnh Sơn La	
Địa điểm sản xuất: Bản Tự Nhiên, xã Đông Sang, huyện Mộc Châu, tỉnh Sơn La	
Diện tích sản xuất:	14,4 ha
Sản phẩm:	Rau tươi
Sản lượng dự kiến:	1142 tấn/năm
MÃ SỐ CHỨNG NHẬN VietGAP: VietGAP-TT-13-07-14-0009	
<i>Chứng nhận sản phẩm được sản xuất phù hợp Quy trình thực hành sản xuất nông nghiệp tốt cho rau, quả tươi an toàn tại Việt Nam (VietGAP) ban hành kèm theo Quyết định số 379/QĐ-BNN-KHCN ngày 28/01/2008 của Bộ trưởng Bộ Nông nghiệp và Phát triển nông thôn.</i>	
Giấy chứng nhận và dấu chứng nhận có giá trị từ ngày 26/3/2018 đến hết ngày 25/3/2020.	
Hải Phòng, ngày 26 tháng 3 năm 2018	
GIÁM ĐỐC	
 VietGAP-TT-13-07-14-0009	 TRẦN THẾ PHONG
NAFIQAD1- Số 51, Lê Lai, Q. Ngô Quyền, TP. Hải Phòng; Tel: 0225.3837124; Fax: 0225.3837507 BM.QT04-NAF11.17.1 01.120917	