Chapter 6
Vietnam's Lychee and Dragon Fruit Exports to China: Studies of the Production and Value Chain

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Abstract

This Chapter illustrates the current status of the export of fresh fruit, in particular for lychee and dragon fruit, from Vietnam to China. The Chapter also identifies the features of the value chains from the producers to the Chinese traders who transport the fruits to the Vietnam-Chinese border. This research discovered that the export volume and value are increasing, especially since 2010, and the Chinese market is dominant for the producers. However, the farmers face risks of some level of unpredictable purchasing behavior by the Chinese traders. Value chain structure is ineffective, comprising many small-scale fragmented producers and buyers, and neither a buyer-driven nor supplier-driven quality control to the standard food level functions efficiently or effectively.

Keywods

Vietnam, China, Lychee, Dragon Fruit, Value Chain, quality and safety standard, VietGAP

1. Introduction

Recent "global value chain" literature suggests an increasing prevalence of private and (in a lesser sense) public food quality and safety standards of agricultural produce are being established by buyers in the importing countries. Food quality standards have functioned as "catalysts" to improving the capability of the exporting farmers often

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located in developing countries. This is a somewhat revolutionary phenomenon in the sense that it demonstrates that capability improvement in the farmers can be achieved by imposing effective quality standards (individual company standards by multi-national supermarkets, or collective standards such as the GlobalGAP) throughout the value chain.

However, this trend does not seem to apply to the importation of agricultural produce by China, although we can assume that the awareness of food quality and safety by Chinese consumers must have been raised, having recognized the increasing number of richer or middle-class population. We even read news that the fruit and vegetable production for the Chinese market has polluted the local environment due to overuse of chemical fertilizers and pesticides[3].

This paper aims to explore the current status of the growing export of fruits from Vietnam, one of China's biggest suppliers of agricultural produce[4]. This paper in particular, examines the features of (or at least part of) the value chain for two fruits, namely lychee and dragon fruit, exported from Vietnam to China. The question is whether the value chain structure can influence the local farmers' production methods, and thus contribute to improving the production capability of the farmers in Vietnam. Another question is what are the advantages and disadvantages for Vietnamese farmers by participating in the value chain of Vietnam-China fruits trade.

In recent food value chain literature, the increasing power of the consolidated retailers is emphasized (Reardon et al. 2009). These multinational retailers systematically integrate small farmers in developing countries into their value chain, which need close vertical coordination along the chain in order to control the quality of the product (Dolan and Humphrey 2004). The food standards are developed (to complement the public regulations) to reduce the costs and risks incurred by quality and safety control in complicated global food value chains (Hammoudi, Hoffmann and Surry 2009).

One important factor influencing the characteristics of food value chains, along with the power structure between the suppliers (farmers, food processors) and the buyers (supermarkets, other retailers) of the agricultural produce, is the degree of

[3] For example, in October 2016, three local governments (in Bokeo, LuangNamtha and Oudomxay provinces) in Laos banned the creation of new banana plantations due to the excessive use of pesticides in Chinese-run banana plantations. (The Laotian Times, 16 May, 2017. https://laotiantimes.com/2017/05/16/chinas-investments-costing-people-laos/)

[4] According to the Global Trade Atlas data, Vietnam is ranked 3rd among countries exporting vegetables (HS07) to China and the 4th exporter of fruits (HS08) in 2017.

concentration of suppliers and buyers in the market (Gerefii and Lee 2009; Lee, Gereffi and Beauvais 2012). If both the suppliers and buyers are fragmented geographically and institutionally, traditional market-type spot transactions are likely to occur. In such a value chain, price rather than quality or safety is the transaction determinant. However, if the buyers are more concentrated, they are motivated to control the suppliers and establish the required standards of quality and safety of the produce. When the suppliers concentrate (e.g. by forming cooperatives) but the buyers do not, suppliers are motivated to establish suitable food processing standards. If both the suppliers and buyers concentrate, "bilateral oligopolies" likely emerge where comprehensive food standards well function.

Although it is difficult to evaluate the power structure between Chinese retailers and the Vietnamese producers of agricultural produce, their level of concentration may be observed at least in some part of their value chains. We can assume that the level of concentration is a suitable indicator worth analyzing as a factor to determine the characteristics of such value chains.

We may hypothesize that since both the suppliers and buyers in the value chains of fruits export from Vietnam to China are not concentrated, neither side has the motivation to govern the value chain, resulting in the price-governed spot market transactions. Therefore, no control of quality and safety control is imposed by the buyers, and suppliers do not have any incentive to pursue production capability improvement.

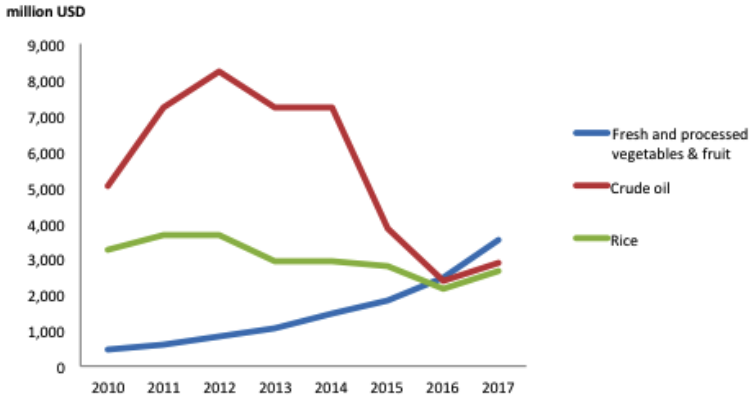
However, we also observe some Chinese buyers' non-standard type control over the quality, although the standard of such quality control differs from that implemented in the developed countries. We also examine the quality and safety control modes in their trade practices, and evaluate their function and efficiency. We further assess if joining a value chain that impose such trade practices would benefit the local Vietnamese farmers in the shorter and longer terms.

2. The Overall Status of Fruit Exports from Vietnam To China

The export of fruit and vegetables from Vietnam has increased significantly during the last decade. According to data of the General Statistics Office (GSO), in 2016, the value of "fruit and vegetable" exports (2,457 million USD) has exceeded, for the first time since reliable trade data has been available, that of more "traditional" primary

commodities, such as rice (2,159 million USD) and crude oil (2,347 million USD)[5]. Moreover, the year-end preliminary report by the GSO in 2017, shows that fruit and vegetable exports have increased further by 43% to 3,517 million USD, and rice exports recovered by 23%, but only achieved 2,649 million USD (Figure 1).

Figure 1: Vietnam's exports of the major primary commodities



(Source) GSO website (http://www.gso.gov.vn/Default_en.aspx?tabid=491)

In particular, fruit export has been increasing rapidly, which can be attributed to the expanding demand by the Chinese market. A news article, cited as a report by the Ministry of Agriculture and Rural Development in Vietnam, stated that China consumed more than 73% of the fruits and vegetables exported from Vietnam in the first quarter of 2017[6].

In this section, we show the macro status of Vietnam's fruit exports to China from two different on-line databases, the UN Comtrade and the Global Trade Atlas. The former includes Vietnam's export data, but is confined to data from 2011 to 2015 and to HS 6-digit data. The latter does not include Vietnam's export data but includes China's 9-digit import data from the 1990s.

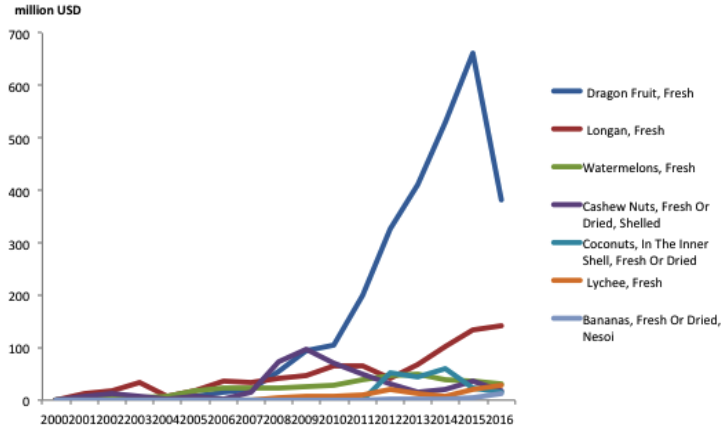
By combining such incomplete data, two characteristics can be explored. Firstly, the influence of the Chinese market is becoming prominent, but only a limited selection of fruit types has increased the exports to China. Secondly, the rapid growth of export started recently during the early 2010s.

[5]GSO website (http://www.gso.gov.vn/default_en.aspx?tabid=780)
This is due partly to a sharp decline (-22.8%) in rice export due to a drought in the Mekong Delta region in 2016.

[6] China Daily Europe, 18 April, 2017.
(http://europe.chinadaily.com.cn/business/2017-04/18/content_28981006.htm)

Figure 2, shows the shift of China's import values for seven fruit types whose export value exceeded 10 million USD in 2016. Among the fruit types being imported from Vietnam to China, the increase in dragon fruit imports by China is prominent. Although the value dropped sharply in 2016, it still achieved slightly less than 400 million USD. The peak 2015 import value achieved 662 million USD, 6.3 times more than five years before, and 92 times more than 10 years before. The second major imported fruit types is longan, with an import value exceeding 100 million USD.

Figure 2: China's import of various Vietnamese fruit types



(Source) The Global Trade Atlas

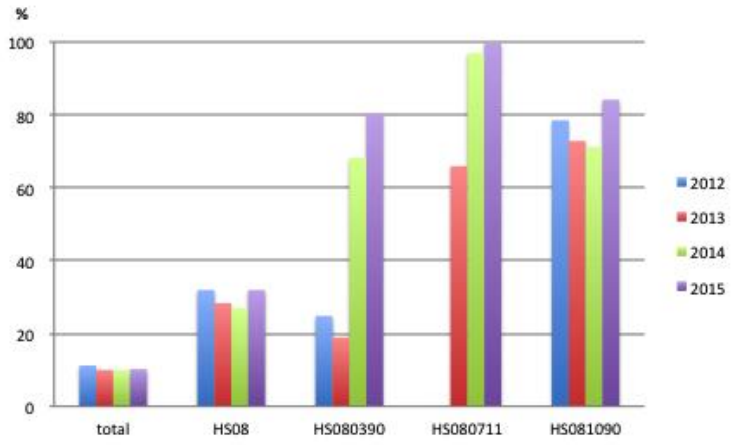
The import of longan and watermelon from Vietnam started relatively earlier in the early 2000s, and a sudden increase in the import of certain fruit types was observed, such as coconuts since 2010, and banana since 2016.[7] However, the sharp drop of dragon fruit imports also indicates, Chinese market for imported fruit can be unstable.

On the other hand, Figure 3 shows the share of the Chinese market by export value of the total exports of fruits (HS 08), and the group of fruits types including bananas (HS 080390), watermelons (HS 080711), and lychees, longan, and dragon fruit (HS 081090). As Figure 3 indicates, the portion of the Chinese market for these three major fruit groups is quite high and increasing compared with other commodities. In particular, almost all (99.8%) of the fruit group including bananas, is exported to

[7]There might be some reasons for this phenomenon, including improvement of Customs Dept. records, changes in statistical categorization, and sudden shifts in the export market from Vietnam.

China[8].

Figure 3: Share of exports to China



(Source) UN Comtrade (https://comtrade.un.org/data)

As these fruit types are exported extensively and increasingly to the Chinese market, the production process and value chain structure differ from those of other fruit types. The following chapters illustrate the recent changes through surveys conducted at the production sites, and the trade practices of lychee and dragon fruit in Vietnam.

3. Export of Lychee from Bac Giang Province

3.1 Lychee production in China and Bac Giang Province

The lychee originated in China. Historically, lychee was grown commercially in Guangdong, Guangxi, Hainan, Fujian, and Yungnan province. Lychee from the southern part of China is preferred to Vietnamese lychee by the Chinese market. China produced 12 million tons of lychee in 2015[9]; in the same year, Vietnam produced 721,000 tons of

[8] The Sudden increase in banana exports to China, in addition to the poor harvest due to the record-low cold spell in the northern region, caused sharp increase in the domestic banana price in Vietnam in 2016. According to an English news article, from the beginning of 2016, the prices increase started suddenly started, shifting the price of one kilogram of bananas from 5,000-6,000 VND in late 2015 to 12,000-14,000 VND by the early 2016. (Vietnam News, 11 March, 2016, http://vietnamnews.vn/economy/293585/price-of-vn-bananas-soars-as-demand-rises.html#uScH6fVGJTvoLc3a.97)

[9] Trademap(https://trademap.org/Index.aspx)

lychee[10]. Although lychee production in China is expected to decrease, China is still the biggest lychee producer in the world. Despite a decline in domestic fruit production in China, the Chinese fruit market is growing rapidly.

Officially, Vietnam exports eight types of fruit to China, including lychee, longan, dragon fruit, banana, rambutan, jack fruit, and mango. Compared to the other fruit types, lychee has a relatively long export history. Lychee is one of Vietnam's most important fruit exports to China; 90% of the lychee that Vietnam exports to China is fresh, and only 10% is processed (dried).

Bac Giang Province is Vietnam's main lychee production area. It is located in the northern part of Vietnam, 60km north of Hanoi. In this mountainous area, historically, farmers have focused mainly on paddy rice. Lychee was introduced by migrants from the Hai Duong Province in the 1990s, and is a relatively new crop for Bac Giang's farmers, although it is well known as a Bac Giang product. It is well suited to the environment in that province, so production spread quickly after its introduction in Bac Giang province. As Table 1 shows, over 25% (185,800 tons) of Vietnam's total lychee production is grown on 31,100 hectares in Bac Giang Province. Around 6,000 hectares (26,000 tons) are early varieties, and the rest are normal varieties. Hai Duong, Province, where the Vietnamese lychee originated, is far behind Bac Giang Province's production volume (it grows only 6.7% of Vietnam's lychee but is Vietnam's second largest lychee production province center), but even Hai Duong Province has the reputation as a lychee production area.

The main lychee production areas are Hong Giang commune, Giap Son commune, and Chu town, which is located in the Luc Ngan District in the east of Bac Giang Province near Hai Phong city. In 2015, Luc Ngan produced 52.5% of Bac Giang's lychee (118,000 tons out a total of 185,8000 tons); however, the amount and area of production have been decreasing since 2014. In 2017, 17,500 hectares (2014) of lychee fields decreased to 16,293 hectares. Production also declined significantly, from 130,000 tons in 2014, to 52,170 tons in 2017. This was partially due to the poor weather conditions in 2017 (Table 2).

[10] GSO

Table 1 Production and Harvested Area of Lychee and Rambutan in Vietnam

			2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Amount	whole country	(1,000t)	370.3	257.1	314.8	507.5	398.6	386.7	672.9	686	557.4	522.3	725.3	648.5	629.2	696	721.6
	Hai Duong	(1,000t)	17.0	37.0	29.9	47.6	20.0	17.1	62.9	69.0	39.7	17.3	66.1	62.3	45.7	48.2	48.4
		(%)	4.6	14.4	9.5	9.4	5.0	4.4	9.3	10.1	7.1	3.3	9.1	9.6	7.3	6.9	6.7
	Bac Giang	(1,000t)	33.8	59.8	57.3	158.8	69.0	67.2	228.6	206.6	123.8	116.3	218.3	155.3	135.4	189.6	185.8
		(%)	9.1	23.3	18.2	31.3	17.3	17.4	34.0	30.1	22.2	22.3	30.1	23.9	21.5	27.2	25.7
Harvested area	whole country	(1,000ha)	114.4	53.2	73.5	84.8	89	94.7	102.8	100.1	96.6	97.2	95.6	90.2	88.5	85.1	87.4
	Hai Duong	(1,000ha)	8.0	8.2	11.4	12.6	12.7	12.9	13.1	12.8	12.9	12.7	12.5	8.7	8.6	8.9	10.6
		(%)	7.0	15.4	15.5	14.9	14.3	13.6	12.7	12.8	13.4	13.1	13.1	9.6	9.7	10.5	12.1
	Bac Giang	(1,000ha)	20.1	23.5	25.4	30.7	33.4	35.5	39.2	38.5	35.4	35.8	35.4	34.4	33.3	31.3	31.1
		(%)	17.6	44.2	34.6	36.2	37.5	37.5	38.1	38.5	36.6	36.8	37.0	38.1	37.6	36.8	35.6

source:statistical yearbook of agriculture and rural development

As Table 2 shows, nearly half of the lychee produced in the Luc Ngan District is exported to China. Luc Ngan's share of the domestic market increased from 35.5% in

2013, to 52.2% in 2017. In 2013, 45,800 tons of lychee (64% of the total production) was exported from Luc Ngan, but only 24,460 tons (46.9%) was exported in 2017. In 2013, approximately 4500 tons of lychee was exported to other international markets (6.3% of the total production). However, this number is also decreasing dramatically: In 2016, only 380 tons was exported (0.7% of total production).

Table 2: Sales and market share of Luc Ngan lychee

	Sales by market (tons)				Share of total production (%)			Share of total exports (%)	
	Total	Domestic	China	Others*	Domestic	China	Others*	China	Others*
2013	71,000	25,200	41,300	4,500	35.5	58.2	6.3	90.2	9.8
2014	130,000	61,100	65,500	3,400	47.0	50.4	2.6	95.1	4.9
2015	118,000	56,600	58,875	2,525	48.0	49.9	2.1	95.9	4.1
2016	91,508	43,400	44,303	3,805	47.4	48.4	4.2	92.1	7.9
2017	52,270	27,430	24,460	380	52.5	46.8	0.7	98.5	1.5

*Other international markets, include the US, the EU, Japan, Dubai, Malaysia, and others.

Source: Luc Ngan District's report "Evaluation of Lychee Production and Market" (2014–2017) (*in Vietnamese*).

China's market share has weakened recently, but it is still dominant. For farming households, China's market share of the total sales by each farmers is different. The Chinese are willing to buy good quality lychees—large, brightly colored fruit—at a fairly high price, and farmers with high-quality produce have more opportunities to sell to the Chinese buyers.

In the Luc Ngan district, perennial crops are planted on 26,816 hectares of a total of 31,805 hectares of agricultural land (71.2%). Lychee are grown on 22,648 hectares, occupying 83.8% of perennial crop land and 71.9% of total agricultural land. Lychee is Luc Ngan District's most important agricultural product. It is produced by small family farms (average agricultural land area per agricultural worker in this district is only 0.74 hectares) whose primary income comes from lychee. During the labor-intensive harvest season, lychee farmers hire migrant seasonal workers from the mountains in the north. Farmers grow several varieties of lychee to increase the duration of the harvest, but the lychee harvest season lasts no longer than two months, from the middle of May to July. So far, no conservation technique to preserve fresh lychee has been developed, so farmers must sell all their lychees immediately after harvesting.

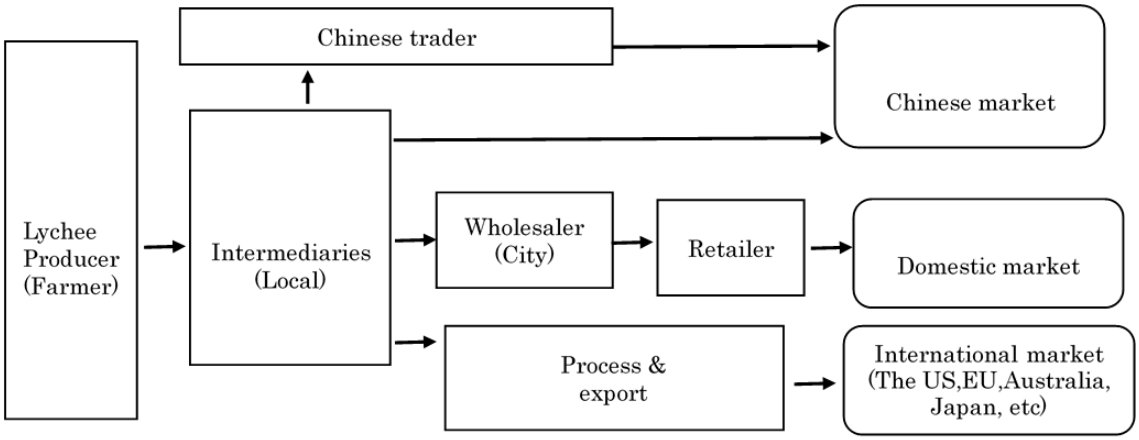
3.2 Survey

This study conducted qualitative interviews with stakeholders in the lychee supply chain in Luc Ngan District. The participants included two farmers, one Chinese merchant, one Vietnamese exporter, two Vietnamese local intermediaries who purchase lychee for the Chinese buyers, one Vietnamese business company which processing frozen food for export, and some local authority staff from the Department of Agriculture and Rural Development (DARD), the Department of Science and Technology (DOST), and the Department of Industry and Commerce (DOIC). The interviews were conducted in the middle of October, 2017.

3.3 Value chain for lychee produced in Bac Giang Province

Figure 4 shows the entire value chain for lychee from the Luc Ngan District.

Figure4: Value chain for Luc Ngan Lychee



Source : Authors

3.3.1 The Chinese market

Local farmers sell their products to local intermediaries. Although there are independent intermediaries who purchase lychee with their own capital and then transport it to the Chinese border to sell, most of them, especially the large intermediaries, are collecting agents for the Chinese buyers. The intermediaries working for the Chinese buyers are members of the local community. They usually have their own capital for collective action, and they usually own land that lies along the district's main road, Provincial

Road 31. They lease this land as lychee collection spots. They are usually small traders; the biggest intermediary in Luc Ngan collects 8,000 tons of lychee per year.

These local intermediaries are in charge of collecting the lychee and transporting it to the border. To avoid Customs duty, they hire Chinese residents living near the border to bring the lychee across the border, taking advantage of the exchange laws for border residents[11]. In this way, most lychee exported to China legally circumvents the official export procedure.

Chinese buyers send staff to receive the packages of lychee at the border. They re-package it in smaller parcels for shipping to the major cities. Some Chinese buyers work as collecting agents for larger wholesalers and supermarkets; others are independent traders who ship the lychee to the wholesale markets in the large cities, such as Beijing, Shanghai, and Qingdao.

Every morning during the harvest season, Road 31 is crowded with lychee farmers who want to sell lychee, the collectors and the intermediaries. The intermediaries start purchasing lychee early in the morning and continue until the transport trucks to the border are full. However, the farmers must sell each day's lychee harvest on the day it is picked, because the farmers have no cold storage system and cannot keep the fruit in its fresh condition. As a result, prices drop in the afternoon. Lychee prices fluctuate greatly—not only over the year, but also during one day.

According to the People's Committee of the Luc Ngan District, 147 Chinese buyers visited the Luc Ngan District to buy lychee in 2017[12]. During the harvest season, Chinese buyers set up transaction locations with the local intermediaries along Provincial Road 31. However, the number of Chinese buyers coming to Luc Ngan and setting up transaction locations is decreasing[13]. Chinese buyers are interested in lychee produced several communes in Luc Ngan district, and they only buy lychee during the first twenty days of the harvest season because this lychee has the highest quality. The buyers significantly reduce their purchases

[11]Residents living within 20km of the Chinese border are allowed to exchange goods according to certain regulations as long as the value does not exceed RMB 8,000 per day. In this form of exchange, Vietnamese lychee exchanged by Chinese residents is not subject to Customs inspection procedures or Customs clearance documents. Exchanges conducted by border residents are inspected and supervised by the local Customs Office. Border residents must declare such imports and exports to the Customs Office (Vietrade Report "Export guidelines for the Chinese lychee market"[in Vietnamese], 2017).

[12]Agricultural Department, Luc Ngan District's report "Evaluation of Lychee Production and Market" (*in Vietnamese*)

[13]Agricultural Department, Luc Ngan District's report "Evaluation of Lychee Production and Market" (*in Vietnamese*)

significantly over the last ten days of the season, because the later lychee harvest has lower quality, and also because the lychee harvest season in China begins at the end of the Vietnamese lychee season; thus, they start to buy from Chinese farmers at that time.

Luc Ngan lychees is graded according to an empirical standard that defines five grades for the lychee (see Table 3). Grades 1 and 2 are exported to China. Most grade 1 produce is sent to cities in mainland China; Grade 2 produce is sold and consumed near the Vietnamese border. The farm gate price of lychee exported to China is 25–40% higher than the price on domestic market. Grades 3 to 5 are sold to the domestic market, but Grades 4 and 5 are processed produce. Grade 3 lychee is sent to the major Vietnamese wholesale markets in Hanoi, HCM, and Da Nang. Grade 4 is used for dry processing, and Grade 5 is suitable for juice production. These uses are not officially designated, but these conventions are followed by most farmers and buyers.

Grades 1 and 2 lychees are sorted and categorized by experienced Chinese buyers. This process is not coded or ambiguous, but it is determined by the Chinese buyers. Chinese buyers designate the best fruits as Grade 1 or 2, and their intermediaries immediately purchase them from the producers. The Chinese buyers leave the procurement business to local intermediaries. However, they closely supervise the local intermediaries' sorting of the lychee for purchase and export and the actual transactions. The intermediaries usually have connections with the Chinese buyers, although the intermediaries rarely have contracts with the producers, even those they buy from regularly; most transactions are spot deals. Furthermore, the Chinese buyers and Vietnamese intermediaries rarely invest in the producers or the lychee production process. The differentiation of produce according to special agricultural practice, such as low-input agriculture, organic, or GAP is also not respected by the Chinese market.

Table 3: Grading of lychee produced in Luc Ngan and Bac Giang.

	Market	Use	Price in 2017 (1,000 VND/kg)
Special	International	Fresh	Variable
Grade 1	Urban China	Fresh	40–60
Grade 2	Rural/border China	Fresh	30–40
Grade 3	Domestic	Fresh	18–30
Grade 4	Domestic	Processed (dry)	-
Grade 5	Domestic	Processed (juice)	-

(Source) Authors

3.3.2 Domestic Market

The intermediaries in Luc Ngan working as collecting agents for the large domestic wholesalers located in the cities. Several local intermediaries are involved in the supply chain for large supermarkets. The Luc Ngan District helps connect local intermediaries with the domestic supermarket chains, such as Metro, Happro Mart, Big-C, and some others.

Low-grade lychee is allocated for processing. Lychee is mainly processed either by drying or pressing. Traditionally, lychee is dried by small local farmers; the government has invested in the pressing factories. Several state-owned pressing juice facilities recently purchased a freezing machine to increase the international export of lychee. The US, France, and Japan are the primary markets for frozen lychee. However, usually, these factories purchase lychee by dealing on the spot market. The quality of the ingredients is not inspected nor controlled during production process.

3.3.3 Other International Markets

A small percentage of the lychee produced in Luc Ngan can be exported to other international markets, such as the EU, the US, Japan, Australia, Dubai, and Malaysia. However, local companies cannot afford to trade with these international partners; lychee is exported to these countries by the Vietnamese companies in Hanoi or HCM. As described below, this movement started in 2014, and was driven by the local governmental authorities. This value chain is strongly regulated by the importing countries' policies or the specific retailer's policy. Since farmers must obtain third-party certification, and must register their orchards, and record their agricultural practices, only a limited number of farmers are involved in this distribution channel.

3.4 Shifting into new international markets and the changing production structure

3.4.1 Exploiting new markets

The Chinese market is the dominant buyer of Luc Ngan lychee. However, this market's demand and prices fluctuate day by day. The lychee market in Luc Ngan is not well organized, and it is significantly affected by the Chinese lychee harvest. Compared to China's own lychee production, the amount exported from Vietnam is small, and it only adjustment the lychee's supply and demand in Chinese market. If the Chinese lychee yield is good, the Chinese market has no interest in Vietnamese lychee. This significantly affects domestic lychee prices in Vietnam, because the lychee grown for export to China then flows into the domestic market.

Because of these issues, DOIC, DARD and DOST in the Bac Giang Province began to look for other international lychee markets in 2014. In addition to promoting lychee in the international market, DOIC developed a brand and trademark for Luc Ngan's lychee. To

implement these policies, the GlobalGAP, VietGAP, and Geographical Indication (GI) standards were implemented by some farmers' groups, led by the local government.

To promote lychee in the international market, several fruit exporting companies in Hanoi City and Ho Chi Minh City were attracted by DOIC. Local authorities intermediated between the local farmers' groups and the exporters that already have customers in the developed countries and had experience of exporting other fruits. Local farmers must complete several steps to enter the international market. Farmers who produce lychee for export to the EU must obtain a Global GAP certificate, and their products must be packed in 2kg parcels. To prevent deterioration, the lychee exported to Japan must be preserved using special techniques, and the production plots must be registered with the Japanese government who inspect several times during the production process. Producers must also follow the importing countries' guidelines regarding quarantine and quality. The fruits' destination is decided by the Vietnamese exporting companies, which means that these companies push lychee to their customers without conducting detailed market research. In 2015, 2,376 tons of Vietnamese lychee was exported to the US, 2.1 tons to France, 75 tons to Malaysia, and 90 tons to the UK and Australia, all with strong support from the local authorities[14]. However, in addition to the limited international demand for lychee outside China, the high transportation and logistical costs make it more difficult to make a profit from selling Vietnamese lychee in the international market. As a result, access to other international market has not developed. However, DOIC continues to seek opportunities to export to other international markets.

Farmers who produce lychee belong to the Lychee Farmers' Association instituted by the local authorities. This organization was founded in 2010 with 275 members, with its goal to develop a lychee brand[15]. In 2017, the Association established 30 groups by commune. The organization now has a total of 921 members. The farmers' association for Luc Ngan lychee has its own brand, *Vai Thieu Luc Ngan* (Luc Ngan Thieu[16] Lychee), with a registered trademark and a protected GI under the Vietnamese Government. This project was led by DOIC and started operating in 2010. The local authority help the Associations produce their own plastic bags and cartons printed with their logo that spreads awareness of Luc Ngan Thieu Lychee. To promote the trademark, DOIC helped the organization register a GI in 2015. According to the interview with DOST, approximately 200 related organizations can use this trademark and GI. Although Luc Ngan Thieu lychee was already well known in Vietnam when it started

[14]Agricultural Department, Luc Ngan District's report "Evaluation of Lychee Production and Market" (2014–2017) (*in Vietnamese*)

[15] Farmers do not have a sense of ownership because this organization was set up by the government, not the farmers directly.

[16]Name on specific lychee variety. "Thieu" is the most famous and preferred in Vietnam.

developing the brand, the local authority has helped its reputation grow[17].

While the Chinese market does not recognize any certifications, a third-party certification is necessary for farmers who deal with the domestic supermarkets and international exporters. To make citification effective, the smallholders need to work together. According to DARD, in 2017, there were six farmers' groups and cooperatives in Luc Ngan District, and almost 10,000 hectares of lychee production areas certified as VietGAP.

In the Hong Giang commune, 22 farming households form the Hong Xuan Cooperative, an organized cooperative with 35 hectares of lychee production land[18]. The local authorities select the members whose produce is of a high enough quality to supply the international market. The cooperative applied for the GlobalGAP certification, and 5 hectares of the 35 hectares were certified in 2016. In 2017, they decided not to continue applying for the GlobalGAP because the cooperative could no longer afford the certification expense.

3.4.2 Changes in production: From lychee to mandarin

In the face of unstable production—because lychee production is highly influenced by weather conditions—oversupplies and price collapses occur almost every year. It is very important for the farmers to avoid such risks. Therefore, the lychee farmers in Luc Ngan are shifting towards orange and mandarin production. These products are sold primarily on the domestic market. Several varieties of mandarin and orange have been introduced as alternatives to lychee. To promote mandarin production, the local authorities designated three communes in the Luc Ngan District for mandarin production.

The local authorities have also tried to brand oranges. They helped the farmers register trademarks for oranges as well as lychee. With this trademark and brand, some local intermediaries succeeded to sell Luc Ngan Orange to the domestic supermarkets at a high price.

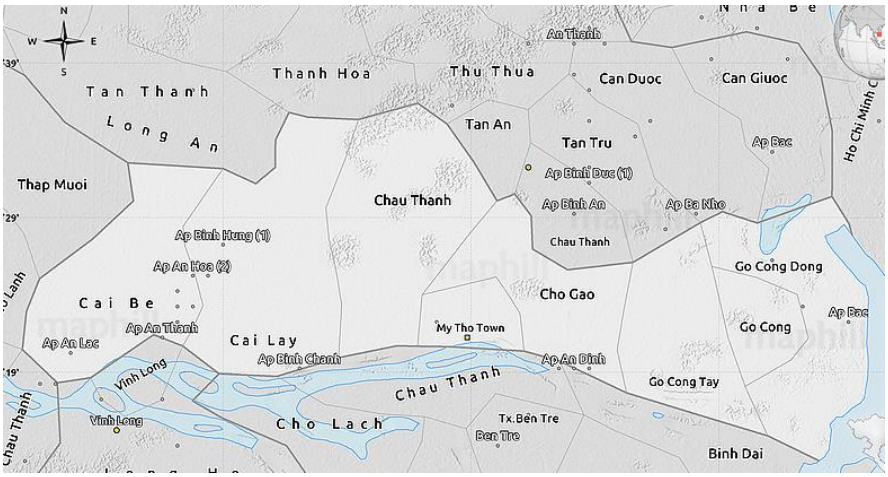
For the producers, mandarins and oranges have several advantages over lychee. Firstly, the mandarin harvest season is longer than that for lychee, allowing farmers to reduce the labor concentration during the harvest season. Secondly, mandarin is economically more efficient than lychee. The average lychee yield in Luc Ngan is 3–6 tons/hectare; but for mandarin achieves 25–30 tons/hectare. The market price is also relatively more stable because mandarins are sold as high-quality fruit by the supermarkets. Therefore, farmers are incorporating mandarin in their production mix in order to balance the labor requirement and to stabilize the income from farming activities.

[17]DOIC monitors and controls the quality of lychee farms in Luc Ngan.
[18]Luc Ngan Lychee was exported once to Australia once; this was done through a Vietnamese export company in 2015. The sales total was only 80 million VND.

4. Export of Dragon Fruit from Tien Giang Province

4.1 Dragon fruit production in Tien Giang Province

Tien Giang Provine



Tien Giang is traditionally well known for its fruit production; mango, coconut and pomelo are among the fruit types that bring Tien Giang nation-wide recognition. Although Tien Giang, neighboring Ho Chi Minh City, the country's biggest city, has a large share of the industrial sector in its economy (52% of Provincial GDP in 2016), its fruit productionis still growing. According to the Statistical Office of the province, the production area is increasing from 67,698 hectares in 2010 to 72,243 hectares in 2016, 6% annually. Total fruit production in volume terms is also increasing by 6% annually, from 976,020 tons in 2010 to 1,340,487 tons in 2016 (Statistical Office of Tien Giang Province 2017).

Tien Giang Province is one of Vietnam's three largest planted areas of dragon fruit, other than Binh Thuan Provine and Long An Province. Dragon fruit, traditionally considered as a decorative fruit, was grown on a small scale by local farmers until 2005 when commercial production started. The fruit's production for export has been developed widely since 2010.

According to the report by the Provincial Department of Agriculture and Rural Development (DARD), the total planted area was 5,042 hectares in 2016, out of 72,243 hectares of total fruit and vegetable growing land. The area planted with dragon

fruit in the province is growing rapidly. It has increased more than 2.6 times within 6 years, from 1,885 hectares in 2010. Out of 5,042 hectares of dragon fruit land, more than 15%, 774 hectares, are newly planted, un-fruited trees land (it takes 18 months to fruit after a dragon fruit tree is transplanted), reflecting the fact that dragon fruit production is newly and rapidly developed in this area. Among 5,042 hectares, 4,306 hectares are concentrated in one district, Cho Gao District.

In 2016, the province harvested 116,407 tons of dragon fruit. Production volume also shows a rapid increase: 3.5 times since 2010, when the production volume was 32,798 tons.

In Tien Giang, there are two cooperatives (hợp tác xã) and four cooperative groups (tổ hợp tác), accumulating 6,000 to 10,000 tons of dragon fruit in total from farming households. However, the major distribution channel for dragon fruit is the private sector, handling more than 100,000 tons. There are four private companies, other than small individual traders, in the province that purchase local fruits and package them to sell mainly to Chinese traders.

4.2 About the survey site and the surveyed households

The household survey was conducted in January 2018, in order to acquire information relating to dragon fruit growing. The survey was conducted in Quon Long Commune of Cho Gao District. Quang Long Commune has the largest production area of dragon fruit in the district, 920 hectares, 21.4% of the total dragon fruit area in the district. In Quon Long Commune, 1,987 households were growing dragon fruit at the time of survey.

One hundred households from Quon Long Commune were randomly selected for the survey. The profile of surveyed households is shown in Table 4. As Table shows, most of the producers of dragon fruit are smallholders. The average land area of the surveyed households is about 0.65 of a hectare. The number of households growing dragon fruit on more than one hectare of land is 18, and there is only one household that possesses more than two hectares of agricultural land.

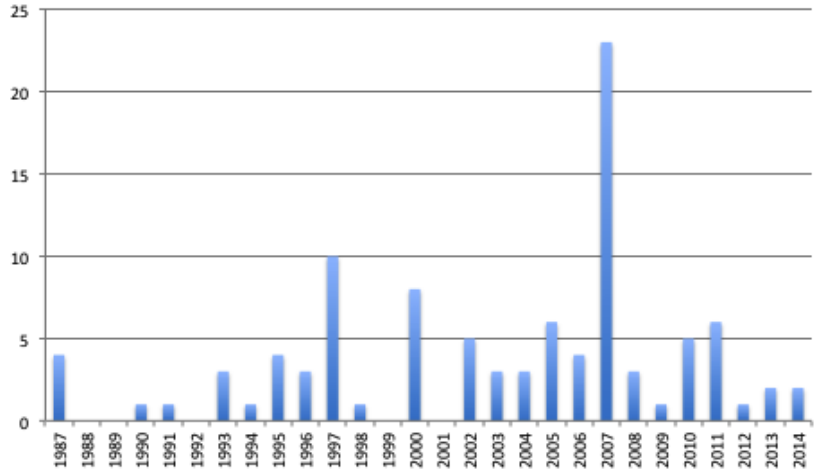
Table 4: Profile of surveyed households

	Household head's profile		Land size (m2)	Production
	Age	Schooing year		(ton)
average	53.8	7.4	6,491.7	18.4
standard deviatio	10.9	2.8	3,879.9	17.1
maximum	80	13	25,000	100
minimun	29	1	1,200	2

(Source) Authors

This commune has a long history of producing dragon fruit. However, recently the production area has expanded rapidly and there are many households newly starting to grow dragon fruit. In fact, as Figure 5 shows, all of the surveyed households started dragon fruit production after the *Doi Moi* economic reform was introduced (1986), and 72 households started after 2000. One of the reasons why many households (23 households) started dragon fruit production in 2007, is that the district government introduced the policy to promote dragon fruit production (to be elaborated later).

Figure 5: Year and number of households that have started dragon fruit production



(Source) Authors

When starting the dragon fruit production, the farmers needed investment in land preparation, seedlings, other inputs, concrete pillars, and (for some households) lighting equipment. The average initial investment was 39 million VND. This may not be a small amount of money for such smallholders. However, as shown in the next section, this amount is approximately one fifth of the average annual sales value of dragon fruit. The entry barriers to participation in dragon fruits production seem

relatively low, in regards to their financial returns. Moreover, access to finance does not seem a crucial difficulty for (at least most of the surveyed) the farmers. 57 households borrowed money (37 million VND on average) from the bank.

4.3 Economic features of dragon fruit gproduction

Sales of dragon fruit are relatively large. Mean production per year is 18.4 tons, and sales 200 million VND (about 8,800 USD for the period surveyed).

On the other hand, the production costs are also high, about 91 million VND, about 46% of the sales value on average. In particular, the costs of inputs are quite high. For example, farmers pay 39 million VND for fertilizer (43% of costs on average), 20 million VND for seedlings (22%) and 15 million VND for pesticides (16%). As most of the surveyed households are smallholders, the cost of labor is not high (11 million VND). Most of the employed laborers are seasonal workers who work only for harvest season (only three households employed year-round laborers). 21 households do not employ any outside labor.

One of the major expenses incurred for dragon fruits production, although not for all of the producers use, is electricity bill for lighting during nighttime. Lighting at night enables flowering and harvesting fruit all year round (usually three peak periods for harvesting per year). 33 out of the 100 surveyed households use lighting, spending 34 million VND on average.

Dragon fruit growers are monoculture farmers. Only one out of the 100 surveyed households diversify the produce grown (coconuts). On the other hand, as the majority of dragon fruit growers are smallholders, many of the surveyed households have additional income sources from non-agricultural sectors. Less than half (41 households) of the surveyed households rely solely on the income from dragon fruit production.

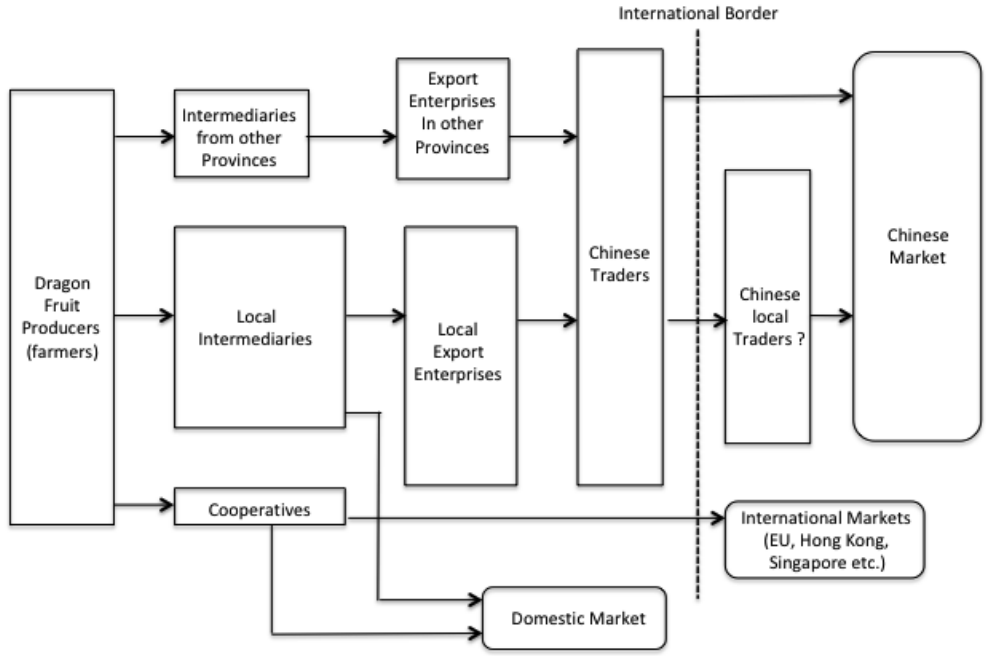
Although most of the surveyed households are smallholders, some households have expanded their production by purchasing land use rights or renting land. 31 households purchased land use rights, adding to their inherited land, and 13 households rent land. It seems that a land rental market has developed recently in this region. All of the 13 households renting agricultural land for dragon fruit production first rented the lands after 2010.

4.4 Value chain for dragon fruit exports and capability improvement

The dragon fruit value chain is quite fragmented (see Figure 6). Many small-scale

producers sell them to small intermediaries, who then sell the fruit to export enterprises for export them to China. Farmers sometimes also sell their produce to small individual intermediaries who sell to export enterprises in other provinces. Only a small portion of dragon fruit is sold to European and other Asian (e.g. Hong Kong, and Singapore) markets by special order.

Figure 6: Value chain for Tien Giang Province's dragon fruit



(Source) Authors

Dragon fruits are transported in bamboo baskets from the farmers to the export enterprises, and packed in carton boxes for export. The export enterprises have a large yard for sorting and packing, and warehouses with refrigeration facilities. The Chinese traders often visit the premises of the export enterprises in Tien Giang Province to inspect the quality of the dragon fruits and to sort them in the packing yard. They also provide the carton boxes (designed for the Chinese markets but produced and printed in Tieng Gian Province).

The export enterprises in the province sell dragon fruit to the Chinese traders who come from various places in China including Shanghai, Beijing, Guangdong, Guangxi, etc. Dragon fruits are transported by container trucks to the Vietnam-Chinese border at Lang Son, Lao Cai, Mong Cai, or other small non-international level borders crossing where the dragon fruits are transshipped by other trucks or ships. Some dragon

fruits are sold as fruits produced in other provinces, i.e. Binh Thuan Province and Long An Province.

Although the dragon fruit production is exclusively for export, the research did not find any cases of exclusive sales contracts with certain traders or contract farming arrangements. 23 households replied that they had received, when they started to grow dragon fruit, technical guidance from the intermediaries or traders who buy the fruits. However, these people do not establish long-term purchase contracts, and the farmers do not have to sell (although some did) their fruits to the buyers who provided such technical guidance.

The sales transactions are market-bases spot deals. The survey did not witness any binding contracts, whereby inputs, such as fertilizers and pesticides, are provided by the buyers and the farmer pays for the inputs with the fruit. All the surveyed households purchase the inputs from local shops at the market price. 73 out of the 100 surveyed households sell their fruit to the local (within the commune) intermediaries, only two sell directly to the export companies, and none sell directly to the Chinese traders (others sell to intermediaries and traders outside their commune). There is only one household that has signed a written contract with an intermediary.

4.5 Local government policy

A factor for the development of dragon fruit in Cho Gao District is the government's efforts to promote dragon fruit production. The district started to introduce the policies to promote dragon fruit production in 2007, by formulating annual and five-year development plans, and providing farmers with financial and technical assistances. Financial and technical assistances included the provision of seedlings of new varieties, and support for the initial investment (for example, support for 30% of the amount when purchasing concrete pillars). The district also established a 1.3-hectares experimental farm for the promotion of new varieties. The district has also organized training programs to provide technical guidance on safety and organic production.

In addition, the district has promoted the "Cho Gao Dragon Fruit," brand by exhibiting the district's produce at agricultural fairs within and outside the province every year. Moreover, the district has promoted farmers to acquire the GlobalGAP and VietGAP certificates (nine of the surveyed households have acquired VietGAP certificate). The district has promoted to acquire VietGAP certification through the cooperatives and cooperative groups, and the dragon fruits are produced according to the VietGAP standard on more than 100 hectares of land by the cooperatives and

cooperatives' group members[19].

5. Conclusion

This Chapter illustrates the features of production and value chain of lychee and dragon fruit exported to China. Lychee is mainly grown in northern Vietnam, which is closer to the Vietnam-Chinese border, and the dragon fruit for export to China is concentrated in southern Vietnam. The main market for these two types of fruits is China. Although lychee has a longer history of export to China, dragon fruit has recently relied more heavily on the Chinese market than lychee, which has a larger domestic market.

Contrary to the observed differences in the production process and value chain as a whole, there are similarities in the value chains for the export of these fruits to China. We can conclude that the Chinese buyers do not govern the value chains tightly. They do not directly control the quality by integrating the whole value chain, by conducting contract farming, or by negotiating binding contracts with the farmers. The Chinese buyers do not purchase directly from the farmers, but from local traders or export enterprises. Furthermore, the Chinese buyers do not seem to be consolidated: many buyers from various provinces in China come to Vietnam, and face harsh competition by other Chinese traders.

We can therefore (tentatively) conclude, that in accordance with the analytical framework of the value chain structure and the degree of concentration in the market regarding supply and demand, quality control in value chain may not function effectively for fruit exports from Vietnam to China, because the suppliers (Vietnamese farmers, intermediaries and traders) and buyers (Chinese buyers) are both fragmented, at least institutionally. Since the level of concentration cannot be the sole indicator governing the structure of the value chain, we must further conduct more subtle researches on the structure of the value chain and trading practices. Moreover, we need to reveal the value chain's features after the fruits cross the Vietnam-Chinese borders.

Although private standard-type quality control in buyer-led value chains may

[19]However, some interviewed farmers noticed that acquisition of VietGAP certificate have little benefit to sales. The price of VietGAP dragon fruit does not differ from non-VietGAP fruit, and the price of dragon fruit exported to the European market, which prefers certified fruit, is often lower than in the Chinese Market. The interviewed farmers expressed difficulties in maintaining the subtle production processes stipulated in the certificate, and the financial return was negligible.

not function, Chinese traders also value the quality of the fruit. At harvest time, many Chinese traders spend much time to select and sort the fruits at the local traders' yards, although the evaluation methodologies may not be that scientific, relying more on buyers' experiences. This status is not beneficial for Vietnamese farmers in terms of capability improvement, since information on the criteria of marketable produce is embedded in the uncoded knowledge of the Chinese buyers, and not easily transferred to and shared with the Vietnamese farmers. There seems little room for technological upgrading by participating in transactions with the Chinese traders (as Global Value Chain literature suggests).

The value chain structure for the lychee and dragon fruit exports can be evaluated as ineffective: the chain is long and populated by fragmented actors, and the quality of the fruits is unsystematically evaluated and controlled with costly arrangements (Chinese traders' travel expenses should be borne by the Chinese consumers or Vietnamese producers). Participating in the value chains of lychee and dragon fruit exports to China must have benefitted some local producers because they have been able to access bigger markets. However, the value chain could be more beneficial to more people if it was structured more effectively.

One policy implication that can be drawn is enhancement of the farmers' consolidation so that they can take the initiative to control quality, which will improve marketability of their produce. Cooperatives and cooperative groups can play crucial roles. Branding of local products, which must be confirmed by institutionalized quality certification, is one strategy that more consolidated farmers, cooperatives, and local authorities could achieve collaboratively.

Another policy implication is to further promote the acquisition of standard certificates such as GlobalGAP and VietGAP. Producers' acquisition of these certificates in the long run will help to make the value chains more effective, by reducing the risk and costs of quality and safety assurance. Acquisition of certificates will also help producers to diversify the markets for their produce through more effective value chains.

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