
Activity 1.4

This report forms part of the ACIAR Project AGB/2012/061
*Improving smallholder farmer incomes through strategic market
development in mango supply chains in southern Vietnam*

Study: A literature review of mango markets and
consumption in Vietnam

Date: 30 May 2019

Prepared by:
Alec Zuo, The University of Adelaide
Manh Hung Do, SCAP

Summary

This report presents the findings of a literature review of mango markets and consumption in Vietnam. Desktop research was undertaken in Australia and Vietnam between January and May 2019 in order to provide an overview of the Vietnamese mango trade, as a basis for further research. The following three areas are explored in detail:

- Production, including main producing areas (in particular, the Mekong River Delta), seasonal market variations, developments in mango flowering manipulation (for enabling and off-season harvest), and Good Agricultural Practices certification
- Market segments, including retail channels, the food services sector (and implications on domestic consumption), exporting, and fruit processing capacity
- Consumer characteristics, consumption behaviours, and preferences

The findings indicate that, in recent years, the mango sector of Vietnam's agricultural industry has developed rapidly. Mango production areas and outputs reached peaks of around 100,000 ha and 800,000 tonnes, respectively, in 2018, with mango ranked second in terms of total production area for fruit and vegetable production.

Among popular mango varieties, Cat Hoa Loc still dominates in terms of price and domestic consumer preference. However, Taiwanese variety and Cat Chu mangoes from the largest producing areas are emerging as key varieties in the Mekong Delta region—in terms of both domestic consumption and exports. The volume of fruit consumption in Vietnam markedly increased during the period 2006–16, particularly for mango. The rapid expansion of production areas, outputs, and consumption all imply significant potential for the development of the mango sector.

Key issues and opportunities for this development identified in this report include mango flowering manipulation, GAP certification and food safety, export value (especially for processed mango), importer demand and preferences, and e-commerce.

Contents

Summary	ii
1 Introduction	1
2 Production	2
2.1 Mango production and geographic distribution.....	2
2.2 Varieties and seasonality	4
2.3 Price patterns	6
2.4 Flowering manipulation and crop management practices	9
2.5 GAP application	10
3 Market segments	11
3.1 Retail	11
3.2 Food services.....	15
3.3 Manufacturing and ingredient processors.....	15
3.4 Exporters.....	16
4 Consumer studies	21
4.1 Consumers' characteristics.....	21
4.2 Food consumption and expenditure.....	27
4.3 Trend of fruit consumption	28
4.4 Mango preference and quality indicators	30
4.5 Shopping places.....	32
5 Conclusion	35
6 References	36

List of Figures

Figure 1. Mango: Spatial distribution of production area in the Mekong Delta region, 2017	3
Figure 2. Share of key mango varieties in the MRD.....	4
Figure 3. Monthly nominal mango prices by variety, 2016–18	7
Figure 4. Average monthly price of Cat Hoa Loc mango, 2008–18.....	9
Figure 5. Hanoi and Ho Chi Minh City, wet markets and supermarkets, 2009–17	12
Figure 6. Comparison of areas and population between Hanoi and HCMC	13
Figure 7. Development of e-commerce in Vietnam, 2014–16	15
Figure 10. Vietnam agriculture and F&V exports, 2007–18.....	16
Figure 11. Monthly export value of fresh mangoes (USD '000), 2016–18.....	17
Figure 12. Processed mangoes exports, by month, 2016–18.....	17
Figure 13. Population's characteristics of Hanoi and HCMC (2017).....	22
Figure 14. Annual per capita income, Vietnam, 2006–16	24
Figure 15. Vietnam, per capita income and expenditure, 2006–16	25
Figure 16. Vietnam, share of annual per capita expenditure, 2006–16	25
Figure 17. Food Price Index, 2000–19.....	26
Figure 18. Per capita expenditure share, six major food categories, 2006–16.....	28
Figure 19. Vietnam average annual fruit consumption by regions, 2006–16.....	29
Figure 20. Average annual fruit consumption (kg/person) in Vietnam by five income quintiles, 2006–16	29
Figure 21. Vietnam, average annual consumption - orange, banana, and mango, 2006–16	30
Figure 22. Consumers' criteria for choosing fruit	31
Figure 23. Consumers' preference of mango quality, 2009.....	32
Figure 24. Favourite shopping place of interviewed households in Hanoi and HCMC	33
Figure 25. Consumers' reasons for choosing supermarkets as a shopping place.....	34
Figure 26. Share of main reasons for choosing supermarkets for fruit purchasing.....	34

List of Tables

Table 1. Mango planted area, Vietnam, 2009–18	2
Table 2. Planned area of mango to 2020 by province and harvest schedule	2
Table 3. Mango planted area, MRD, Vietnam, 2005–17	3
Table 4. Mango production, MRD, 2005–17	4
Table 5. Main MRD, Vietnam mango varieties, 2019.....	5
Table 6. Main mango producing countries by seasonality, 2019.....	6
Table 7. Implementation of mango flowering manipulation, MRD, 2015	10
Table 8. Current valid VietGAP certified producers in Vietnam, April 2019	11
Table 9. Modern retailers in Vietnam, 2018	14
Table 10. Key export markets, fresh and processed, Vietnam mangoes, 2018.....	18
Table 11. Vietnam mango exports by destination, 2018	19
Table 12. Main registered Vietnam mango exporters	20
Table 13. Price elasticity of demand of some key products in Vietnam.....	21
Table 14. Annual per capita income, Vietnam, by region, 2006–16	23
Table 15. Annual per capita income, Hanoi and HCMC, 2016.....	24
Table 16. Vietnam, Annual per capita expenditure by region, 2006–16	26
Table 17. Vietnam, annual per capita expenditure for food by region, 2006–16.....	27
Table 18. Factors influencing consumers' choice of selected fruit in Hanoi and HCMC ...	31

Abbreviations and acronyms

ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
CAGR	Compound Annual Growth Rate
DARD	Department of Agriculture and Rural Development
FAO	Food and Agriculture Organization of the United Nations
F&V	Fruit and Vegetables
GAP	Good Agricultural Practices
GFAR	The Centre for Global Food and Resources, University of Adelaide
GU	Griffith University
HCMC	Ho Chi Minh City
ITC	International Trade Centre
MARD	Ministry of Agriculture and Rural Development of Vietnam
MRD	The Mekong River Delta
SCAP	Southern Centre for Agricultural Policy and Strategy
SIAEP	Southern Institute of Agricultural Engineering and Post-Harvest Technology
SOFRI	Southern Fruit Research Institute
SRA	Small Rapid Appraisal
USD	American dollars
VND	Vietnam Dong (Vietnam's currency)

1 Introduction

In 1986, the Vietnamese government initiated significant economic and political reforms (known as ‘Doi Moi’). These reforms were aimed at transitioning the country from an impoverished, closed economy to a socialist-oriented market economy (Do & Park, 2018). In the subsequent decades, and particularly during the 2000s, conditions have continued to improve. The annual per capita income increased from 7.6 million Vietnamese Dong (VND) in 2006 to VND37.2 million in 2016, with a compound annual growth rate (CAGR) of 17% over the same period. As a result of these economic reforms, Vietnam’s overall agricultural export value has significantly increased in recent years. Fruit and vegetables (F&V) are gaining prominence within this industry: the sector increased its export value from USD306 million in 2007 to USD3.55 billion in 2017—equivalent to a CAGR of 27%. This reflects a dramatic increase in the F&V sector’s share in total agricultural export value in recent years to around 10% in 2018. The F&V sector is forecast to significantly contribute towards Vietnam’s total agricultural export value target of USD43 billion in 2019 (MARD, 2019).

Despite these increases, market access remains limited for a significant number of smallholder farmers, particularly those growing tropical fruits in southern Vietnam. Distribution in this region is locally structured. Restricted access would mean farmers, suppliers, and retailers may benefit from greater understanding of the issues and constraints in the chain. While limited information is available regarding market dynamics in this region, opportunities exist for industry development. Consultations conducted with local stakeholders in 2013 identified longan, pomelo, and, in particular, mango as government-nominated priority fruits with significant potential for economic benefit to the region. Working collaboratively with local stakeholders to develop their understanding of the prospects in domestic and export markets for fresh and processed tropical fruit (especially those identified as economic priorities) could improve market access and thus raise incomes and standards of living for many smallholder farmers in major production areas of southern Vietnam.

Mangoes are the second-most popular fruit in Vietnam (after banana) and are grown across many provinces. While the mango sector has developed significantly in recent years, approximately 94% of mango farms are smaller than 0.5 ha. On this basis, there could be more than 70,000 mango-farming households in the Mekong River Delta (MRD) that have a primary income source of VND105.4 million (USD4,464) per year—substantially more than rice (ADB, 2013). The aim of this report is to examine the production and market segments of mangoes in Vietnam in order to provide an overview of mango trade as a basis for further research. It also studies consumer trends in key urban markets in Vietnam in order to assess behaviours and preferences, and thus to identify opportunities for mango trade growth and further research.

2 Production

2.1 Mango production and geographic distribution

In terms of production area, mango is the second-most popular fruit in Vietnam (after banana) and is grown across many provinces. Although the production area of mango decreased from 87,00 ha in 2009 to around 83,700 ha in 2015, it rose sharply between 2016 and 2018 to 99,600 ha. Overall, between 2009 and 2018, the total production area of mango has increased by around 12,000 ha, at an average annual growth rate of 1.4% (Table 1).

Table 1. Mango planted area, Vietnam, 2009–18

Region	Hectares (per annum)						Average annual growth rate (%)
	2009	2010	2015	2016	2017	2018	
Whole country	87,600	87,500	83,700	86,600	92,700	99,600	1.4
Red River Delta	1,900	1,800	2,200	2,200	2,400	2,400	2.5
Northern midlands and mountain areas	8,500	8,400	8,300	8,700	12,200	15,900	7.2
North Central and Central coastal area	14,200	13,800	14,200	14,200	14,700	15,200	0.8
Central Highland	2,100	2,200	2,700	2,400	2,900	3,200	4.9
South East	17,400	18,100	17,400	17,200	17,800	17,800	0.3
Mekong River Delta	43,500	43,200	39,000	41,900	42,700	45,100	0.4

Source: MARD, 2019

The Ministry of Agriculture and Rural Development (MARD) defines 12 key fruits for national focus (Decision No 1648/QĐ-BNN-TT). These include dragon fruit, mango, rambutan, durian, star apple, pomelo, longan, banana, pineapple, orange, mangosteen, and tangerine. These fruits will receive government support to establish large-scale plantations. For mango, 31,600 ha of concentrated production areas were planned for 2020 in the MRD. (Concentrated areas refer to regions where farmers grow a single crop on their farms.) MARD also outlined areas and a schedule to achieve productive distribution in the MRD. The Decision set a 2020 target for 50% of mango to be harvested in MRD provinces during the period of May to June, and the remaining 50% harvested between October and March (Table 2).

Table 2. Planned area of mango to 2020 by province and harvest schedule

Province	Planted concentration area (ha)		Area by harvest season (ha)	
	Actual 2012	Planned 2020	Main season (May-Jun)	Off season (Oct-Mar)
MRD region	40,307	31,600	19,100	12,500
Dong Thap	9,031	9,000	4,500	4,500
Tien Giang	4,608	5,000	2,500	2,500
Vinh Long	4,797	4,000	2,000	2,000
Hau Giang	3,896	3,000	1,500	1,500
Can Tho	2,521	2,500	1,250	1,250
Tra Vinh	2,181	1,500	750	750
Others	13,273	6,600	6,600	-

Source: Author's analysis

The MRD is the key region for tropical fruit production in Vietnam. In 2018, it was the largest mango production region in the country, with 45,100 ha, or 45.2% of the national total (Table 1). Within the region, the largest mango areas are in Dong Thap and Tien Giang. (It is important to note that data at the provincial level is only available for the year of 2017; therefore, the following analysis for provinces in the MRD will employ the 2017 data.) These two provinces account for around 32% of total production area in the MRD, and almost 50% of total mango output (Table 3). The two key mango varieties in these provinces are Cat Hoa Loc and Cat Chu.

Table 3. Mango planted area, MRD, Vietnam, 2005–17

Region	Hectares (ha) per annum					
	2005	2009	2010	2015	2016	2017
Whole country	80,100	87,600	87,500	83,700	86,700	92,700
MRD total	38,200	43,500	43,190	39,000	41,900	42,725
Dong Thap	6,143	8,892	9,300	8,656	8,768	9,128
Tien Giang	6,072	6,612	6,657	4,574	4,693	4,710
Other 11 provinces	25,985	27,996	27,233	25,770	28,439	28,887

Source: GSO, 2018

The other large provinces within the MRD are An Giang and Vinh Long, which have mango areas of 8,878 ha and 5,159 ha, respectively. However, An Giang mostly grows Ghep, Thanh Ca and, in particular, Taiwanese varieties of mangoes, with only a small amount of Cat Hoa Loc. Furthermore, this province is not mentioned in Decision No. 1648/QĐ-BNN-TT concerning the distribution of harvest periods in the MRD.

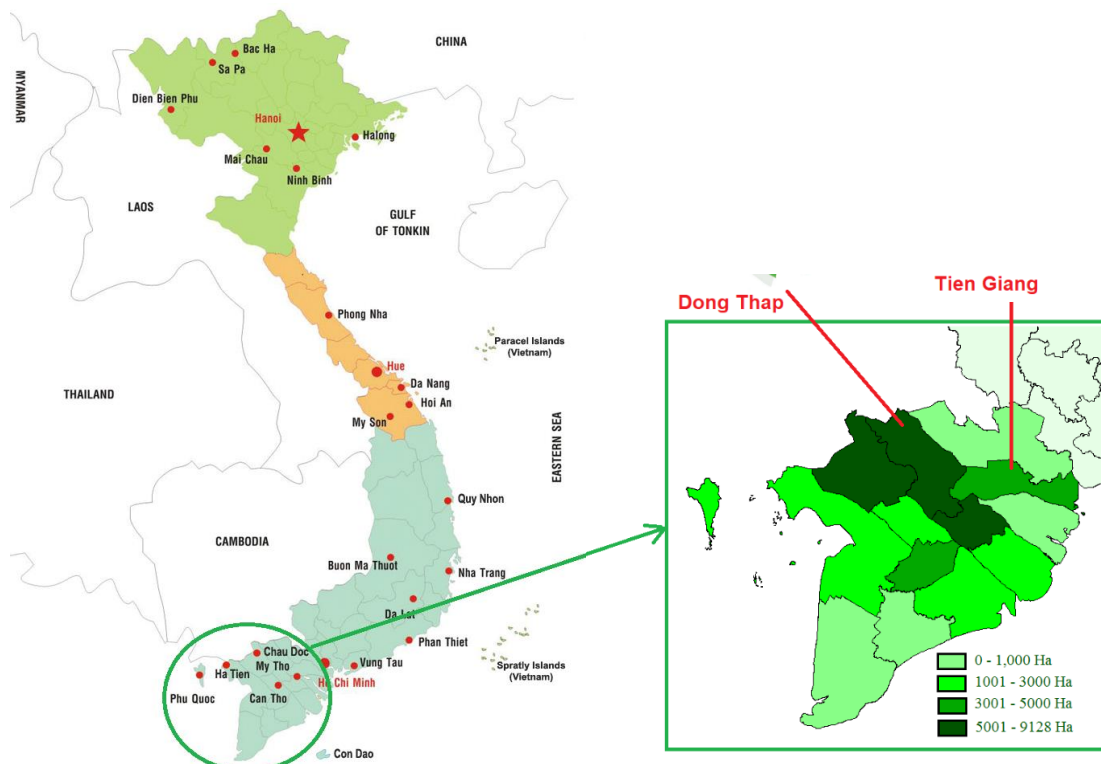


Figure 1. Mango: Spatial distribution of production area in the Mekong Delta region, 2017
Source: Author's analysis

Due to its ideal natural conditions and effective farming techniques, the MRD has the largest share of mango production in Vietnam, with more than 50% of total production (although it accounts for only 45% of total area) (see Table 4). The region also has the highest overall productivity level in Vietnam and plays a key role in government’s flowering manipulation policy (as outlined under Decision No. 1648/QĐ-BNN-TT).

Table 4. Mango production, MRD, 2005–17

Region	Tonnes per annum					
	2005	2009	2010	2015	2016	2017
Whole country	368,000	554,000	580,300	702,900	724,400	788,200
The MRD, incl.	209,046	312,327	325,800	416,800	438,700	507,550
Dong Thap	36,766	64,529	61,357	94,728	95,631	144,794
Tien Giang	64,785	85,222	87,103	104,872	105,593	106,192
Other 11 provinces	107,495	162,576	177,340	217,200	237,476	256,564

Source: GSO, 2018

2.2 Varieties and seasonality

Vietnam has many mango varieties. Commercial varieties include Cat Hoa Loc, Cat Chu, Thanh Ca, Chau Nghe, Thom, Xiem, Ghep (Buoi), Cat Trang, Cat Den, Canh Nong, R2E2 and Taiwanese. In the south-east of the MRD, Cat Hoa Loc is the most popular, followed by Cat Chu (Figure 2). Canh Nong and Australian R2E2 varieties are popular varieties in the central coastal area.

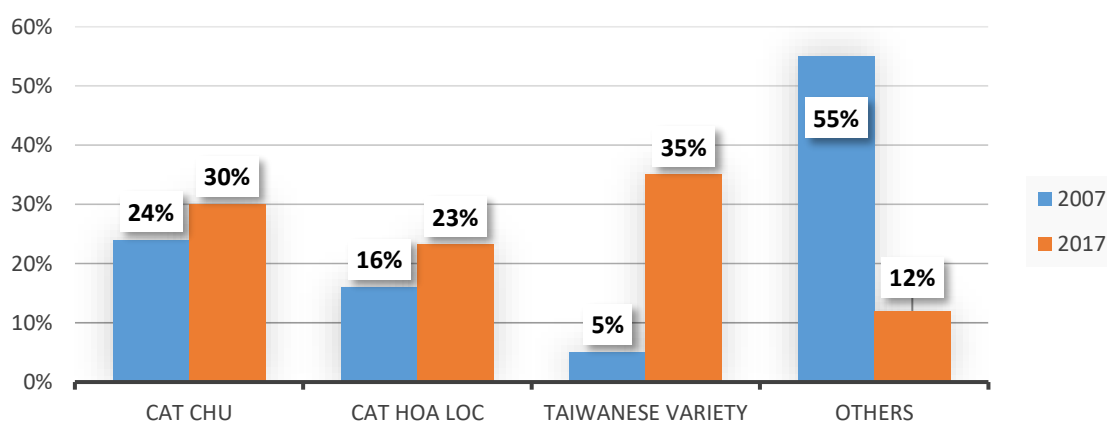


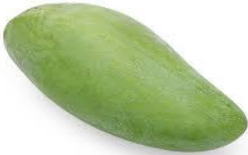


Figure 2. Share of key mango varieties in the MRD

Source: Roberts, 2014; MARD, 2019

Table 5 presents characteristics of the key mango varieties in the MRD: Cat Hoa Loc, Cat Chu, and Green Taiwanese. Cat Hoa Loc is recognised as the best mango variety in Vietnam due to its taste, aroma, sweetness, quality, and appearance. It was first grown in the Cai Be district of Tien Giang province. The yield of this variety is lower compared to other varieties, at around 10–12 tonnes per ha (at 10 years old). Cat Hoa Loc trees bear fruit after three to four years of growth, and the main harvest season is from April to June. Recently, farmers in the Mekong Delta have been able to manipulate flowering to achieve an off-season harvest between August and March.

Table 5. Main MRD, Vietnam mango varieties, 2019

			
Variety	Cat Hoa Loc	Cat Chu	Green Taiwanese
Shape	Oval, round cheeks, pointed tip	Oval, rounded tip	Oval, long, pointed tip
Weight	400–600 g	300–400 g	1,000–2,000 g
Skin/flesh colour	Yellow/yellow	Yellow/yellow	Green/white
Taste	Sweet and scented	Sweet	Lightly sweet
Yield /tree (at 10 yrs)	10–12 tonnes/ha	~25 tonnes/ha	20–25 tonnes/ha
Main seasons	April–June	March–May	March–May
Flower manipulation	Yes August–March	Yes August–February	Yes August–December
Flesh (%)	70–82	78	90
Brix level (%)	22	18	10–15

Source: Author's analysis

Cat Chu is also a popular and productive mango variety. It is grown in Dong Thap, Tien Giang and Vinh Long provinces, with trees bearing fruit after three to four years of growth. Its main harvesting season is from March to May; however, flowering manipulation can again produce an off-season harvest from August to February. This variety is suitable for both fresh and fresh-cut consumption in both domestic and export markets.

Vietnam's primary harvest period coincides with that of Thailand (the third-largest exporter of mango in the world) and the Philippines (the twelfth-largest exporter) (Table 6). However, with government plans to further promote flower manipulation, Vietnam can achieve a harvest between October and March, which is the off-season for most northern hemisphere producers (although Thailand and the Philippines are also developing flower manipulation for off-season production).

Table 6. Main mango producing countries by seasonality, 2019

Country	Peak harvesting months											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
China												
India												
Thailand												
Pakistan												
Philippines												
Vietnam												
Mexico												
Indonesia												
Australia												
Brazil												
Peru												
Venezuela												

Source: Roberts, 2014

2.3 Price patterns

Cat Hoa Loc mangoes have the highest price among the popular varieties throughout the year (Figure 3). In HCMC, this mango variety achieves an average price of VND80,000–100,000/kg, (reaching as high as VND130,000/kg in 2017). In 2018, Cat Hoa Loc prices were around three times higher than other mango varieties, such as Cat Chu, Taiwanese, and Ghep.

Cat Chu and Ghep mangoes were not available in the Thu Duc wholesale market in the period of November to February, while Cat Hoa Loc mangoes always achieved their peak price during this period. Cat Hoa Loc mango prices between 2016 and 2018 were almost three times higher than those during the period of 2008–12. This implies that consumer demand for this variety has increased significantly over a ten-year period.

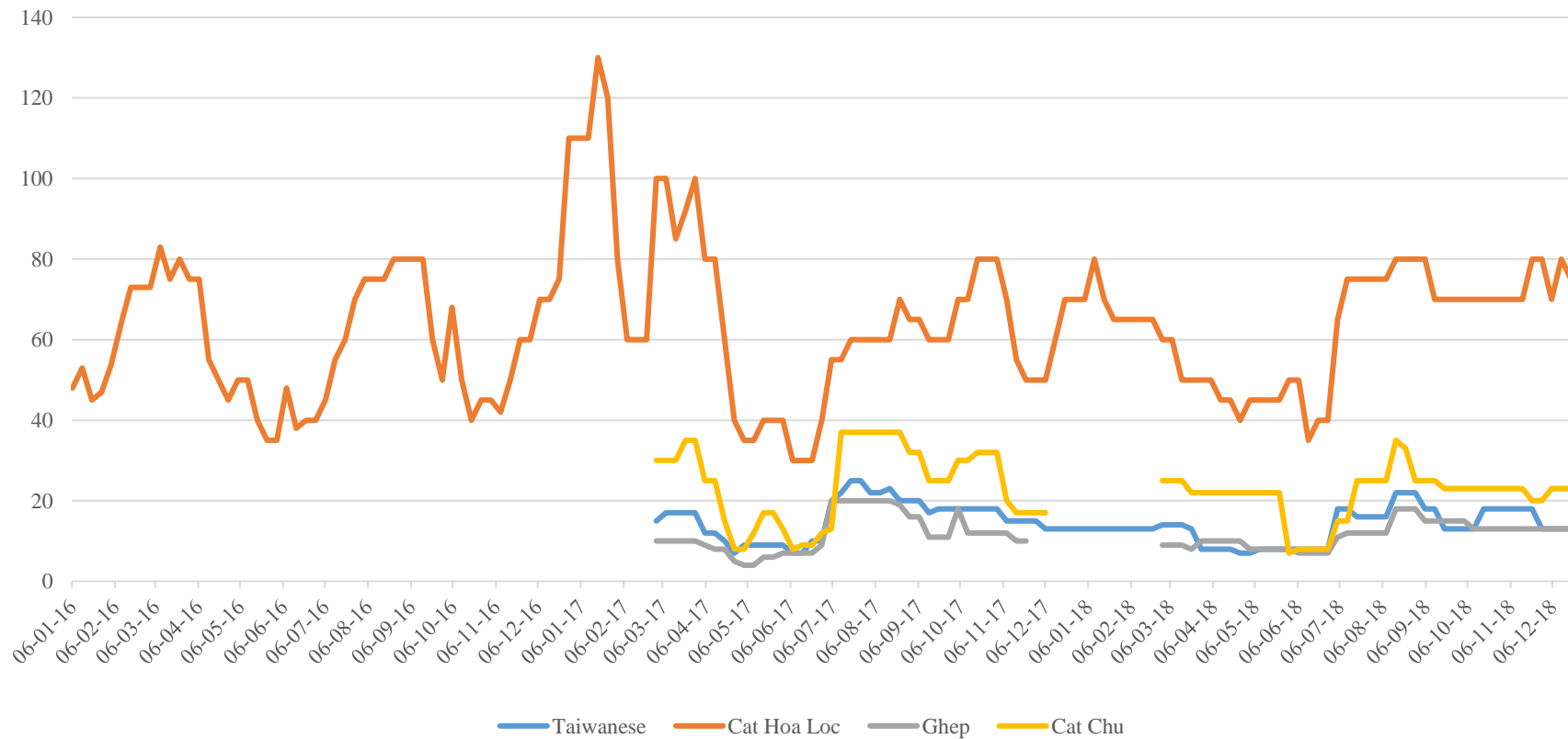


Figure 3. Monthly nominal mango prices by variety, 2016–18

Source: TDMU, 2019

Note: Y-axis = Price (VND '000/kg)

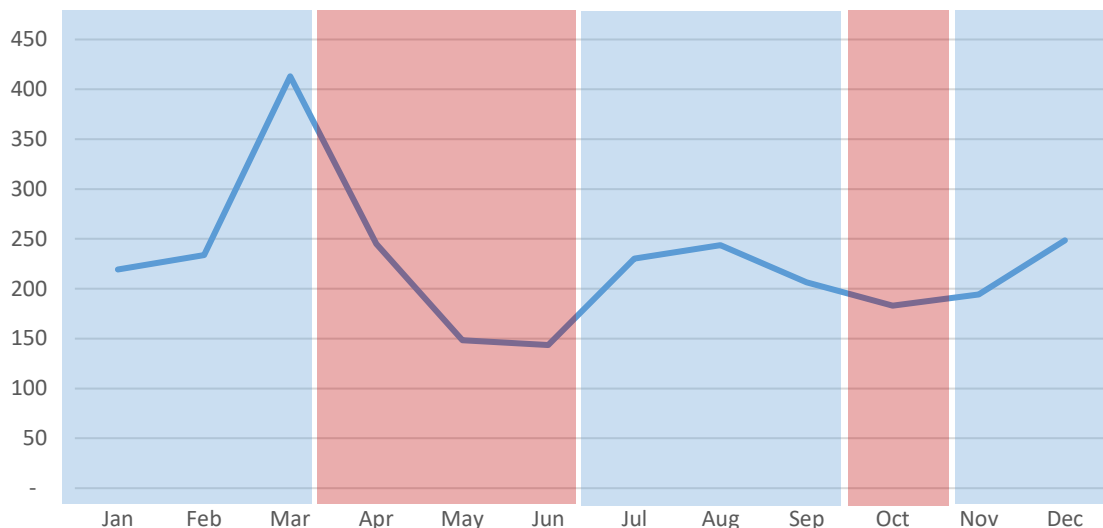


Figure 4. Average monthly price of Cat Hoa Loc mango, 2008–18

Source: TDMU, 2019

Note: Blue = off-season period, red = on-season period; inflation adjusted, price index 2008 = 100

2.4 Flowering manipulation and crop management practices

Most mango farmers in the MRD have significant experience in crop management, and the knowledge and practice of flower manipulation is widespread. While the natural season is from April to June, farmers manipulate flowering as a strategy to obtain higher prices during the Lunar New Year and Mid-Autumn Festival, achieving a first harvest in October–December and a second harvest from late-January or early-February. Crop manipulation involves some additional costs; however, by harvesting mangoes during the off-season, farmers can achieve a price that is up to three times higher than during the peak season. Despite these benefits, mango flower manipulation can be risky, largely due to the following reasons (DARD, 2016):

- Manipulation is usually conducted during the rainy season, when the weather can affect flowering (flower set and disease problems can be more serious).
- Chemical application in this period is also much higher than usual to combat higher pest and disease loads. This can affect the quality (in terms of residue level) and associated risks may have negative impacts on the environment.

Decision No. 1648/QĐ-BNN-TT states that farms in the MRD will attempt to implement flowering manipulation for up to 12,500 ha per season in order to produce a harvest in the off-season (October–March). Observations revealed that the region achieved some impressive results, but it is still facing many constraints to conducting manipulation effectively, including:

- Flowering manipulation depends heavily on the weather, which makes it unstable and inefficient, and results in lower yield than the on-season, with higher production costs.
- The current manipulation practice relies on high application rates of stimulating chemicals.
- There are currently no flowering manipulation plans for each province/city, which causes many difficulties in coordinating between provinces, linking with buyers, and production.
- The government is considering banning the use of paclobutrazol, used for flowering manipulation; currently there are no substitute chemicals.

According to Dong Thap’s Department of Agriculture and Rural Development (DARD, 2016), the total flowering manipulation area in the MRD was 8,714 ha in 2015 (an increase of 2,480 ha from 2014). Dong Thap was the leading province in mango flowering

manipulation with around 2,800 ha, followed by Vinh Long province with 1,963 ha. Tien Giang province, was in third position with 1,610 ha, followed by Can Tho city and Hau Giang province with about 1,163 ha and 995 ha respectively (Table 7).

Table 7. Implementation of mango flowering manipulation, MRD, 2015

Province/City	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dong Thap	←→			On-season			←→ 2,800 Ha					
Vinh Long				On-season			←→ 1,963 Ha					
Tien Giang	←→			On-season						←→ 1,610 Ha		
Can Tho	←→ 1,163 Ha			On-season								
Hau Giang	←→			On-season						←→ 995 Ha		

Source: Dong Thap DARD, 2016

2.5 GAP application

Dong Thap and Tien Giang are leading provinces in applying the Vietnamese Good Agricultural Practices (VietGAP) standard for mango production. According to VietGAP (2019), there are currently 12 mango producers with certified VietGAP throughout the country. Five of these are based in Dong Thap, two in Tien Giang, and five are in other provinces (see Table 8).

In Dong Thap province, the total VietGAP-certified areas comprise around 81 ha, and production is an estimated 1,310 tonnes annually. Certified producers work in production groups, and the two largest cooperatives in Dong Thap (My Xuong and Tan Thuan Tay) are not listed in the VietGAP's register. The two largest cooperatives hold the brand name Cao Lanh mango and are notable for their effective organisation of mango producers.

In Tien Giang, the Hoa Loc cooperative has developed a strong reputation for producing Cat Hoa Loc mango. This cooperative has 1,935 ha that is VietGAP-certified and used to hold a GlobalGAP certification for their mango. The other producer that is certified by VietGAP in Tien Giang is the Tan Thanh mango production group, which has 13.3 ha and an estimated production of approximately 160 tonnes annually.

The current information from GlobalGAP's (2019) database shows that there is only one mango producer in Vietnam still holding the certification, Red Dragon Co. Ltd., which has around 1 ha of mango production area.

Table 8. Current valid VietGAP certified producers in Vietnam, April 2019

STT	Name of producer	Type	Location	Certified area (ha)	Estimated production (tonnes)	Valid until
1	Hoa Long	Production Group (PG)	Dong Thap	17.8	270	19/06/2020
2	My Long	PG	Dong Thap	7.5	75	31/07/2020
3	Tan Thuan Dong	PG	Dong Thap	21.26	425.2	25/09/2020
4	Tan Thuan Tay	PG	Dong Thap	9.4	160	25/09/2020
5	Tinh Thoi	PG	Dong Thap	24.8	380	28/08/2020
6	Hoa Loc	Cooperative	Tien Giang	1935	N/A	05/07/2020
7	Tan Thanh	PG	Tien Giang	13.3	160	12/12/2019
8	An Son Bay Nui	Association	An Giang	33	165	11/03/2020
9	Nguyen Thi Tia	Individual Farm	Dak Lak	N/A	N/A	28/12/2019
10	Huong Xoai	Cooperative	Son La	17.8	45	18/06/2019
11	Doan Ket	Cooperative	Son La	12	N/A	04/07/2020
12	Chieng Hac	Cooperative	Son La	12	N/A	04/07/2020

Source: VietGAP, 2019

Historically, VietGAP was designed for domestic markets and engineered to follow global regulations. However, it is not generally sufficient for access to international markets. GlobalGAP certification is required by European countries, which collectively imported as much as USD1.3 billion (the largest importer) of fresh or dried guavas, mangoes, and mangosteens in 2017 (ITC, 2019b). For other markets, such as the US, Japan, or South Korea, GlobalGAP is not compulsory; however, it does provide a foundation for fulfilling these markets' quality requirements.

3 Market segments

Data from Vietnam's Ministry of Industry and Trade (MOIT, 2019) show that the country's export value for both fresh and processed mangoes is less than 1% of the global total. The majority of mango produced in Vietnam is consumed in its home market (Roberts, 2014). This section presents an overview of the four main sources of consumption: retail, food services, manufacturing (for domestic market), and export (for international markets).

3.1 Retail

The retail market of goods and services in Vietnam is estimated to reach USD160 billion in 2017, with a CAGR between 2007 and 2017 of 18% (ABCS, 2018). Hanoi and HCMC make up about one-third of this total market value. Although e-commerce is a recent development, this channel accounts for around 3% (equivalent to USD5 billion) of all retail markets. Market information for agricultural products, and mango products, are not available; however, data from the Vietnam General Statistics Office shows that total expenditure on fruit was approximately USD2 billion in 2016 (GSO, 2016).

3.1.1 Retail by channels

The retail market in Vietnam has changed dramatically in the last decade, with the emergence of modern channels and the participation of international operators. Since Vietnam officially became a member of the World Trade Organisation (WTO) in 2007, its economy has developed significantly and has experienced a rapid expansion in retail markets. Modern channels including supermarkets, grocery stores, and online shopping/e-

commerce have become more prominent in cities such as HCMC, while traditional channels such as wet markets and street vendors still play a role in Hanoi (Figure 5).

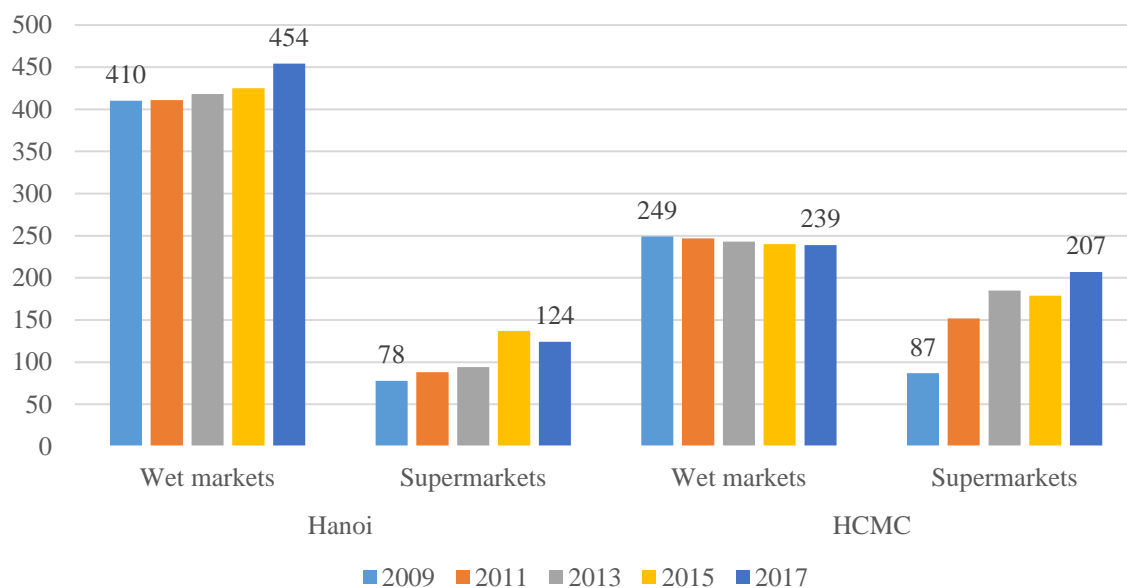


Figure 5. Hanoi and Ho Chi Minh City, wet markets and supermarkets, 2009–17

Source: GSO, 2018

Ho Chi Minh City has experienced the strongest development of modern distribution channels. The number of supermarkets increased from 87 in 2009 to 207 in 2017 (138% increase), while that of wet markets decreased from 249 to 239 over the same period. This is mainly due to consumer concerns about food safety, which has resulted in a shift from traditional to modern channels, in which products can be certified and traced, and must adhere to food safety standards. In wet markets, products are not packaged or labelled, and do not include any indication of production standard (thus it can be difficult to trace any food safety issues). According to the Southern Centre for Agricultural Policy (SCAP, 2009), consumers in Hanoi and HCMC are concerned about the safety standards of the F&V they consume. Generally speaking, the higher the income of a consumer, the greater their concern.

In contrast to HCMC, retail in Hanoi relies strongly on traditional markets. The number of wet markets in Hanoi City increased from 410 in 2009 to 454 in 2017, while that of supermarkets increased from 78 to 124 in the same period. In 2018, the number of fruit stores in Hanoi (both individual shops and company store chains) reached 1,036 (these shops are different from grocery stores in which consumers can buy other goods such as meat or fish).

3.1.2 Retail by operators

Although retail markets are comprised of a diverse range of operators, only a few operators are involved in distributing F&V in Vietnam. The 16 most popular retailers own 292 supermarkets and 2,462 stores (GSO, 2018); of these, five operators manage only supermarkets and seven operators run only stores. The other four operators own both supermarkets and stores (Table 9).

Whether a retail operator sells F&V generally depends on whether they run stores or supermarkets, and the legal status of their ownership. Foreign direct investment (FDI) operators focus on convenience stores, which sell fast-moving consumer goods (FMCG), such as packaged foods, beverages, toiletries, and over-the-counter drugs. Some convenience stores might also stock perishables such as dairy products, fast foods, and baked goods, but not meats, fruits, or vegetables.

Domestic operators such as Saigon-Coop, SATRA, Vin-commerce, and Bach Hoa Xanh are developing ‘mini-supermarket’ stores targeted at supplying both fresh food (fruit, vegetables, meat, and fish) and FMCG. Among these operators, Saigon-Coop and SATRA are state-owned and Vin-Commerce and Bach Hoa Xanh are joint-stock companies. Most of the stores run by Saigon-Coop, SATRA, and Bach Hoa Xanh are in HCMC and its neighbouring provinces (Vin-Commerce develops in both Hanoi and HCMC). This is largely due to the differences in consumer behaviour and population density in urban areas between HCMC and Hanoi (Figure 6).

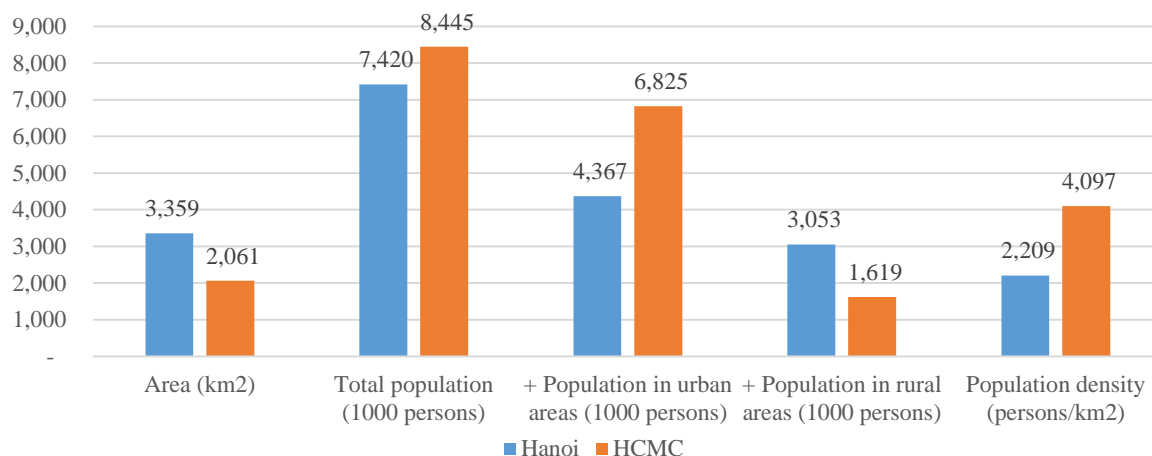


Figure 6. Comparison of areas and population between Hanoi and HCMC

Source: GSO, 2018

Table 9. Modern retailers in Vietnam, 2018

No	Operators	Store chains	Location	Legal status	No. of super-markets	No. of stores	Fruit included in stores
1	Saigon-Coop	CoopFood, CoopSmile, Coopmart	Across the country but mostly in HCMC	State-owned	109	286	Yes
2	SATRA	Satra, SatraFood	Mostly in HCMC	State-owned	3	170	Yes
3	Hapro	Hapromart, HaproFood	Mostly in the north (Hanoi)	Joint stock	10	2	Yes
4	Vin-commerce	Vinmart, Vinmart+	Across the country	Joint stock	73	804	Yes
5	Lotte mart	Lotte Mart	Across the country	Korean FDI	14	0	N/A
6	Big C	Big C Supermarket	Across the country	Thai FDI	36	0	N/A
7	MM Mega Market	MM Mega Market	Across the country	Thai FDI	19	0	N/A
8	Bach Hoa Xanh	Bach Hoa Xanh	Mostly in HCMC	Joint stock	0	361	Yes
9	AEON	AEON Shopping Mall	Mostly in the south	Japanese FDI	4	0	N/A
10	AEON Citimart	AEON Citimart	Across the country	Joint stock	24	0	N/A
11	Family Mart	Family Mart	Only in HCMC	Japanese FDI	0	166	No
12	Circle K	Circle K	Mostly in HCMC and Hanoi	USA FDI	0	262	No
13	B's mart	B's mart	Only in HCMC	Thai FDI	0	157	No
14	7 - Eleven	7 - Eleven	Only in HCMC	Japanese FDI	0	11	No
15	Shop & Go	Shop & Go	Mostly in HCMC and Hanoi	Singaporean FDI	0	87	No
16	Ministop	Ministop	Only in HCMC	Japanese FDI	0	104	No

Source: Author's analysis

3.1.3 Retail by e-commerce

Online shopping is an emerging trend in Vietnam, particularly in metro cities such as Hanoi and HCMC. The expenditure per capita via e-commerce increased from USD145 in 2014 to around USD170 in 2016 (see Figure 7). Fruits are not among the most popular products traded online, which are clothing, footwear, cosmetics, electronic devices and equipment, books, and stationery. In the short-term, therefore, e-commerce is unlikely to be a major channel for fruit distribution; however, in the long-term there is the likelihood of significant potential for a fresh food platform.

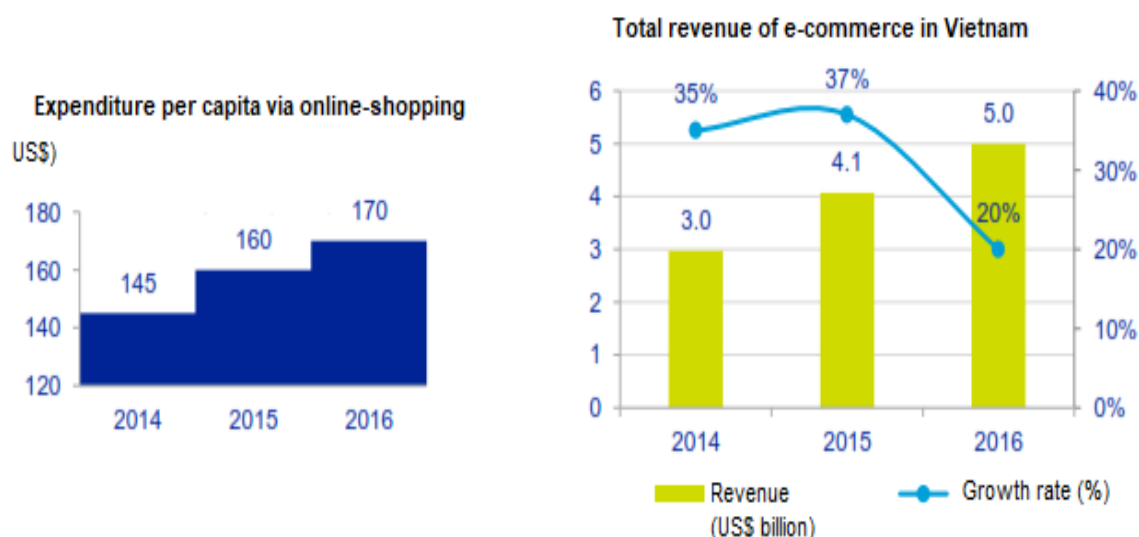


Figure 7. Development of e-commerce in Vietnam, 2014–16

Source: ABCS, 2018

3.2 Food services

The food services sector in HCMC and Hanoi comprises thousands of hotels, restaurants, and facilities that provide entertainment and catering (such as hospitals and schools). According to GSO (2017), the number of food services and accommodation businesses has increased in HCMC and decreased in Hanoi over recent years (Figure 8). Between 2014 and 2016, the number of these businesses in Hanoi dropped from 49,000 to 38,000, while in HCMC it rose from around 65,000 to 83,000 (more than double that of Hanoi). Data are not available for these facilities; however, local authorities estimate that the daily demand for fruit in Hanoi and HCMC is approximately 1,700 tonnes and 2,500 tonnes, respectively (Decision No 5848/QĐ-UBND). This difference is likely due to the higher population and more highly developed tourism industry (and thus increased emphasis in the food services sector) in HCMC.

3.3 Manufacturing and ingredient processors

In 2018, Vietnam had more than 145 industrial F&V processing factories, with a total design capacity of 830,000 tonnes per year. However, due to a shortage of raw materials, most of these factories only fulfilled 50% of their capacity (approximately 440,000 tonnes per year). Relative to global standards, Vietnam's processing capacity (especially in-depth processing technology) is very limited. The number of F&V processing enterprises accounts for just 2.2% of businesses operating in the agricultural sector, and their total processing capacity accounts for only 3.8% of the annual national F&V production volume—much lower than that of other countries in the region or, indeed, globally. For instance, processed F&V comprises 28% of total agricultural output in the Philippines, 30% in Thailand, 65% in the US, 70% in Brazil and France, and 80% in Malaysia. Most of the processing factories are small- or medium-scale and do not have their own contracted material areas. The linkage between production, storage, transportation and processing still has many limitations. Processed F&V accounts for 37% of the total value of F&V traded worldwide, and this is expected to increase from USD270 billion in 2016 to USD317 billion in 2021, with an annual growth of 2.7%. Developing Vietnam's capacity for processing will be important for helping it to overcome the technical barriers of importing countries, create more jobs, and improve the added value in production.

3.4 Exporters

F&V are gaining a prominent role within Vietnam’s overall agricultural exports. The sector increased its export value from USD306 million in 2007 to USD3.55 billion in 2017 (with a CAGR of 27%), and its share in total agricultural export value increased in recent years to around 10% in 2018. Studies anticipated that the F&V sector would significantly contribute towards Vietnam’s total agricultural export value target of USD43 billion in 2019 (MARD, 2019).

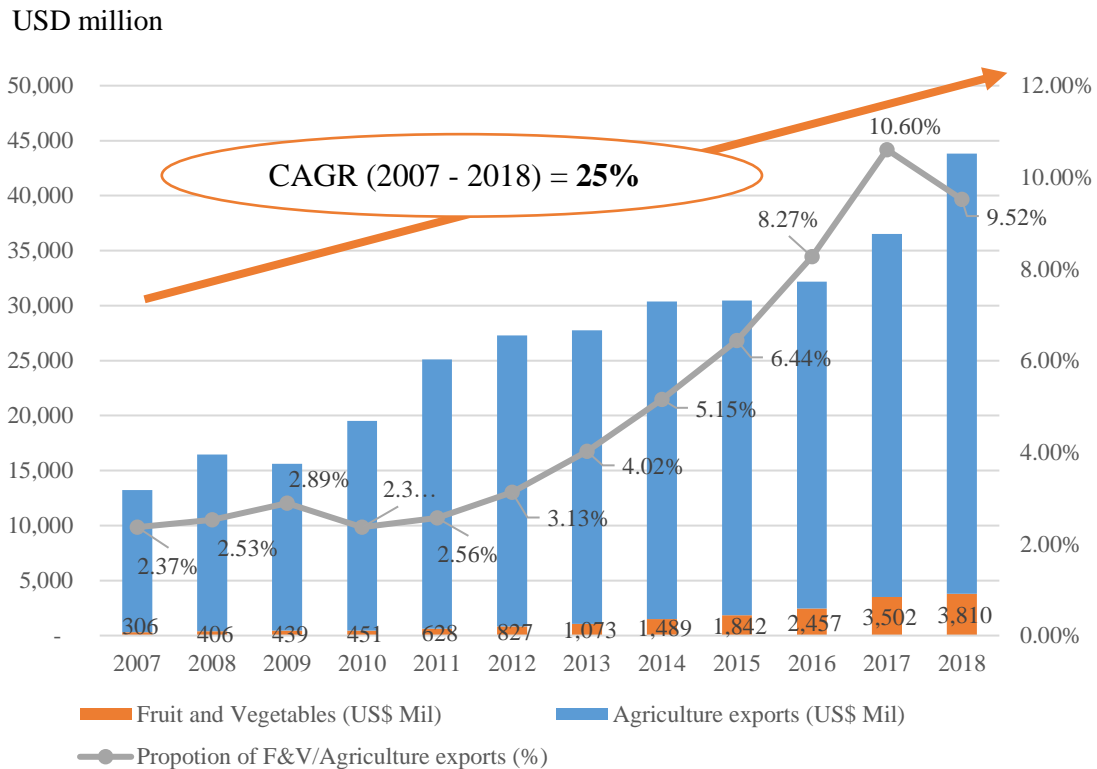


Figure 8. Vietnam agriculture and F&V exports, 2007–18

Source: MARD, 2018

Fresh fruit exports account for more than 70% of the total F&V export value and will likely maintain this level in the short term. Although dragon fruit currently has the largest influence on fresh fruit export value, mangoes have emerged as a high-potential commodity in boosting exports. In 2016, fresh and processed mango export values were about USD68 million and USD2.1 million, respectively; these figures rose to USD186.6 million and USD10.1 million in 2018. In 2019, mango products gained access to high-value international markets such the Republic of Korea, Japan, Singapore, and the United States, which is likely to result in further opportunities for local mango varieties.

According to data published by the Ministry of Industry and Trade (MOIT, 2019), the two peak periods of mango exports are from January to May and October to December (Figure 11). The distribution of fresh mango exports follows mango seasonality in Vietnam, which is typically from February to May (normal season, with peak period from March to April) and October to December (flower-manipulated season).

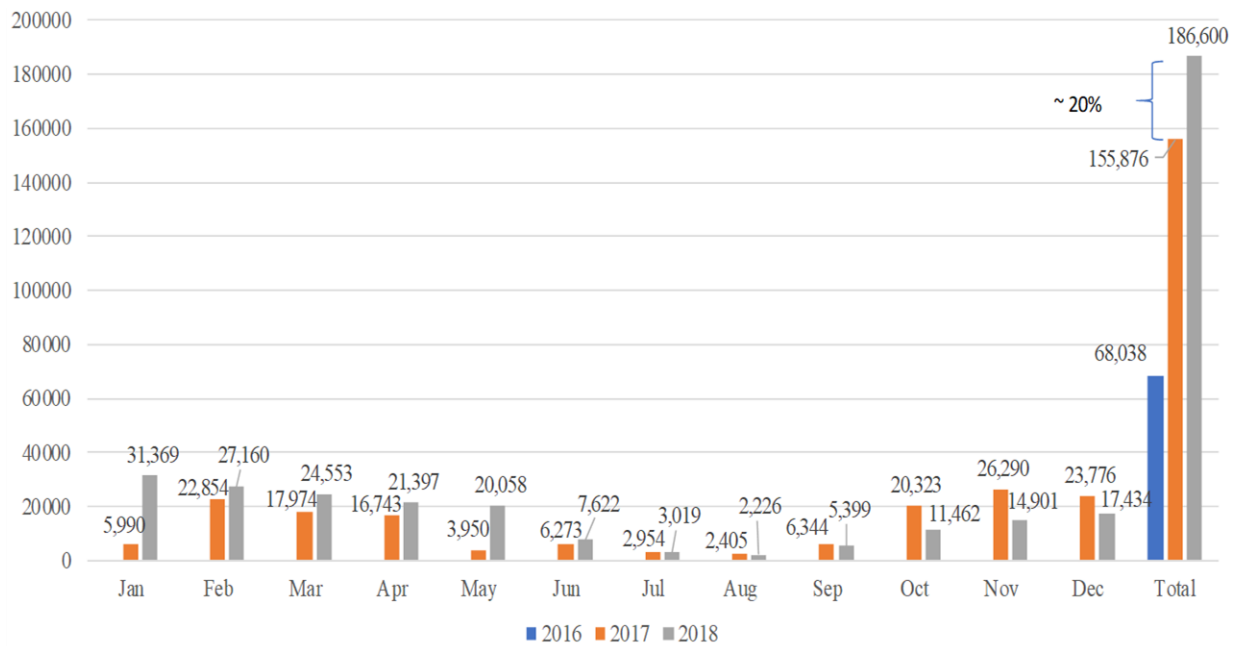


Figure 9. Monthly export value of fresh mangoes (USD '000), 2016–18

Source: MOIT, 2019

Processed mango exports rapidly increased over the period 2016–18. Their value more than doubled from USD2.1 million in 2016 to USD 5.2 million in 2017 and reached USD10 million in 2018 (Figure 12).

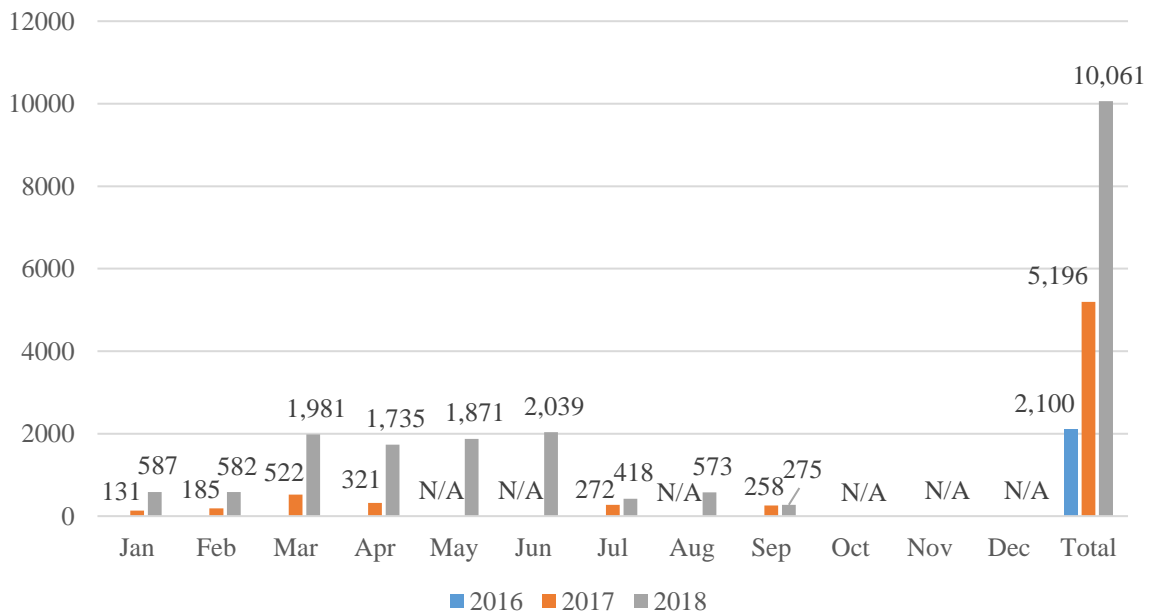


Figure 10. Processed mangoes exports, by month, 2016–18

Source: MOIT, 2019

Note: N/A = data not available

China is the key market for Vietnamese mango exports, accounting for nearly 85% of their total value (Table 10). This increased by 27% between 2017 and 2018 and was valued at USD163.4 million in 2018. The other main destinations for Vietnam’s mangoes include South Korea, Australia, Japan, Russia, Germany, Thailand, Netherlands, and France, listed in descending order. The share of traditional markets such as Korea, Australia, and

Japan decreased between 2017 and 2018, though they still have relatively high export figures.

Markets in European countries such as Russia, Germany, Netherlands, and France are dramatically increasing their imports of mango products from Vietnam. This trend is in line with the research presented in 2014 for Vietnam's tropical fruit (Roberts, 2014).

Table 10. Key export markets, fresh and processed Vietnam mangoes, 2018

Market	Total export value 2018 ('000 USD)	Market share 2017 (%)	Market share 2018 (%)
Total	193,221	24%	100.00%
China	163,375	27.10%	84.55%
South Korea	8,958	-8.60%	4.64%
Australia	4,019	-2.70%	2.08%
Japan	2,949	-20.80%	1.53%
Russia	2,038	336.30%	1.05%
Germany	1,589	186.10%	0.82%
Thailand	1,315	-12.10%	0.68%
Netherlands	1,288	13.20%	0.67%
France	1,034	96.50%	0.54%
Others	6,656	-	3.44%

Source: MOIT, 2019

Table 11 shows that the cross-border trade of mangoes between Vietnam and China is significant in terms of volumes and number of transactions. This could in large part be due to the informal border trade that occurs between these two countries, which was identified at the border (Roberts, 2014). Table 11 also highlights another trend: fresh mangoes exported to China had the lowest prices, while those exported to Russia achieved the highest prices. Notably, Cat Chu mango (mostly produced in Dong Thap province) was exported to Russia at an average price of USD4.64/kg (equivalent to VND106,720/kg based on an exchange rate of VND23,000 per USD). Other markets such as the US, Belgium, South Korea, Australia and Canada only imported processed mangoes (frozen, sliced, and dried), and these achieved a wide range of prices.

The relatively low export price of fresh mangoes to China highlights an information gap in mango varieties. At these prices, the exported mangoes could not be Cat Hoa Loc, which earn a premium price of around USD2/kg to USD3/kg in domestic markets. These mangoes could be Cat Chu, which obtain a price of under USD1/kg.

Table 11. Vietnam mango exports by destination, 2018

Products	Volume (Kg)	Price (US\$)	Market	Port/Gate	Sending conditions	Referenced date
Fresh mangoes	5,000	0.44	China	Lào Cai	Delivered At Place	02/1 - 10/01/2018
Fresh mangoes	1,000	0.88	China	Lào Cai	Delivered At Place	9/1 - 17/01/2018
Fresh mangoes	12,000	0.44	China	Lào Cai	Delivered At Place	23/1 - 31/01/2018
Fresh mangoes	15,000	0.66	China	Thanh Thủy	Delivered At Frontier	20/2 - 28/2/2018
Fresh mangoes	15,000	0.66	China	Thanh Thủy	Delivered At Frontier	27/2 - 7/3/2018
Fresh mangoes	15,000	0.70	China	Thanh Thủy	Delivered At Frontier	27/3 - 4/4/2018
Fresh mangoes	20,000	0.44	China	Lào Cai	Delivered At Place	10/4 - 18/4/2018
Fresh mangoes	30,176	0.78	China	Móng Cái	Delivered At Frontier	01 - 09/5/2018
Fresh mangoes	29,140	0.28	China	Tân Thành	Delivered At Place	08 - 16/05/2018
Dried mangoes (30 boxes/package/16 kg)	390	5.71	Taiwan	Cát Lái	Free On Board	08 - 16/05/2018
Fresh mangoes	15,000	0.44	China	Lào Cai	Delivered At Place	15/5 - 23/5/2018
Fresh mangoes	2,000	0.44	China	Lào Cai	Delivered At Place	29/5 - 6/6/2018
Fresh mangoes	462	2.00	Russia	Cam Ranh	Carriage Paid To	5/6 - 13/6/2018
Vinamit soft-dried mangoes (100 gr)	200	12.58	China	Cát Lái	Free On Board	12/6 - 20/6/2018
Frozen mangoes (IQF)	24,000	1.69	Belgium	Phước Long	Cost & Freight	03/7 - 11/7/2018
Sliced/Frozen mangoes	17,680	2.01	USA	Phước Long 3	Cost, Insurance, Freight	24/7 - 1/8/2018
Fresh mangoes	160	4.90	Russia	Cam Ranh	Delivered At Place	31/7 - 8/8/2018
Sliced/Frozen mangoes (20x20mm/IQF)	18,000	2.10	Canada	ICD Transimex	Cost & Freight	7/8 - 15/8/2018
Soft-dried mangoes	20,000	2.02	China	Thanh Thủy	Delivered At Frontier	7/8 - 15/8/2018
Frozen mangoes	6,000	2.08	Australia	Cát Lái	Cost & Freight	14/8 - 22/8/2018
Fresh mangoes	190	4.90	Russia	Cam Ranh	Delivered At Place	21/8 - 29/8/2018
Cat Chu fresh mangoes (19Kg/box)	3,002	4.64	Russia	HCM	Carriage Paid To	28/8 - 5/9/2018
Cat Chu fresh mangoes (19Kg/box)	2,375	4.64	Russia	HCM	Carriage Paid To	4/9 - 12/9/2018
Dried mangoes (impregnated with sugar)	100	13.50	Republic of Korea	Cát Lái	Free On Board	4/9 - 12/9/2018
Fresh mangoes	45,000	0.43	China	Cốc Nam	Delivered At Frontier	11/9 - 19/9/2018
Cat Chu fresh mangoes	1,425	4.64	Russia	HCM	Carriage Paid To	11/9 - 19/9/2018
Fresh mangoes	106	4.90	Russia	Cam Ranh	Delivered At Place	9/10 - 17/10/2018
Fresh mangoes	100,000	0.21	China	Cốc Nam	Delivered At Frontier	23/10 - 31/10/2018
Fresh mangoes	100,000	0.21	China	Tân Thành	Delivered At Place	11/12 - 19/12/2018

Source: MOIT, 2019

Approximately 94 major companies are involved in fresh, dried, and frozen exports of F&V in Vietnam. Among them, there are eight exporters located in HCMC (southern markets) and Tien Giang (producing area) using mangoes in their products (Table 12). Fresh mangoes play the biggest role in exports, followed by dried mangoes. Frozen mangoes are also listed in the export category, while export of mango juices is still under development.

Table 12. Main registered Vietnam mango exporters

No.	Name	Location	Remarks
1	Green World Co. Ltd.	HCMC	Fresh and Frozen F&V: mango included
2	Red Dragon Co. Ltd.	HCMC	Fresh F&V: mango included
3	Long Uyên Co. Ltd.	Tien Giang	Fresh and frozen fruits: mango included
4	Fruit and Vegetable Export of Tien Giang (VegeTiGi)	Tien Giang	A leading company in F&V export: mango included
5	Kim Nhung Company	HCMC	High potential mango exporter: Fresh mango
6	Vinamit	HCMC	A leading company in fruit processing. Mainly dried fruits. mango included.
7	Good Life	HCMC	Fresh and frozen fruits: mango included VHT owned. Currently export mangoes to Japan
8	COFIDEC	HCMC	Fresh and Frozen F&V: mango included

4 Consumer studies

Compared to general F&V consumption, there is a significant gap in understanding of consumer preference for mango. The literature highlights a difference in F&V consumer preferences between Hanoi and HCMC (SCAP, 2009), with a preference towards safe vegetables in HCMC (Hoang & Nakayasu, 2006; My et al., 2017). This finding is confirmed by food consumption and expenditure studies (UOA, 2019). These studies lay the foundation for understanding consumer behaviour and preference for F&V consumption in key urban markets in Vietnam.

A report from SCAP (2009) applied an AIDS (Almost Ideal Demand Systems) model to analyse the price elasticity of demand for several key foods in Vietnam. The results showed that price elasticity of demand was -0.94 for fruit and -0.88 for vegetables (absolute value less than 1) (see Table 13). This implies that F&V are essential consumer goods in Vietnam, which means any change in prices will result in a lesser degree of change to consumption volume of F&V. Thus, if safe and clean F&V are sold at an acceptable higher price, consumers will still purchase them and will not reduce consumption considerably.

Table 13. Price elasticity of demand of some key products in Vietnam

	Rice	Maize	Vegetables	Fruit	Pork	Beef
Rice	-0.41	1.55	-0.11	-0.41	-0.42	-0.37
Maize	0.01	-1.35	0.07	-0.02	-0.02	-0.16
Vegetables	0.02	1.53	-0.88	-0.10	-0.07	-0.18
Fruit	0.00	-0.13	-0.04	-0.94	-0.02	0.30
Pork	-0.02	-0.73	-0.10	-0.09	-1.01	0.24
Beef	0.01	-0.87	-0.03	0.15	0.04	-1.61

Source: SCAP, 2009

According to this report, cross-elasticity of vegetables and other food has relatively low value. This indicates that, when the price of other food products changes, consumers will not significantly change F&V consumption. This explains the relatively stable proportion of F&V spending within the overall expenditure of Vietnamese people in recent years (SCAP, 2009), and it can be concluded that F&V are not easily substituted by other competitive products. One remaining question is to what degree products can be substituted within the F&V category, such as domestic and imported products, certified and uncertified products, safe products, and traceable products. Hence, it is necessary to examine consumption trends and the characteristics of Vietnamese consumers to understand their preferences and behaviour.

4.1 Consumers' characteristics

4.1.1 Population

The total populations of Hanoi and HCMC (as of 2017) are 7.4 million and 8.5 million respectively; however, the density of the city centres in these two regions differs significantly. Hanoi has 2,200 people per km², whereas HCMC has 4,100. Rural and urban population data confirms this: around 59% of Hanoi's population lives in urban regions, while in HCMC this is more than 80% (Figure 13).

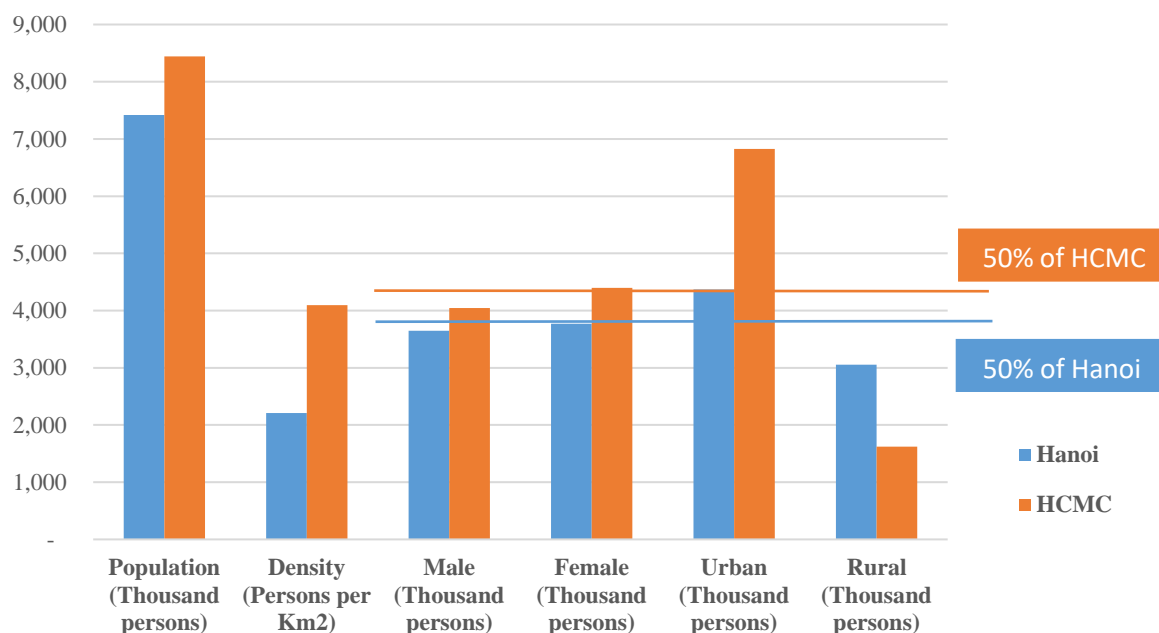


Figure 11. Population's characteristics of Hanoi and HCMC (2017)

Source: GSO, 2018

Both cities have more female than male residents (51% in Hanoi and 52% in HCMC). In Vietnam, women are traditionally the main decision-makers for food purchasing and shopping for their families, and fruit promotion strategies could focus on attracting the attention of those women who buy fruit for their family.

4.1.2 Income and expenditure

Income

Following the Doi Moi (the economic and political reform initiated in 1986), Vietnam's economy has improved significantly, shifting from an impoverished and closed economy to an open, socialist-oriented market economy—particularly during the 2000s (Do & Park, 2018). Annual per capita income increased markedly from VND7.6 million in 2006 to VND37.2 million in 2016, with a CAGR of 17% over this period. Furthermore, the income gap between urban and rural regions is narrowing, reducing from 2.08 times to 1.88 times greater over the same period (although this gap remains significant). The annual income in rural areas was around VND29 million in 2016 but was almost double this figure in urban regions at VND54.6 million (Table 14). However, the CAGR of income in rural regions was around 17% over the period of 2006–16, while in urban areas it was 15.7%. This may be evidence of increasing incomes, which might result in an upward trend of consumption in rural areas.

A significant difference was observed between gender income in 2016, with males earning VND41.2 million and females earning just over VND36 million. This gap has narrowed from males earning 1.3 times the income of females in 2006 to about 1.15 times in 2016. The rapid development of the industrial sector in this time has increased the role of female workers. For instance, female workers constitute almost 80% of the total labour force in the shrimp processing industry, and managers of processing factories have suggested that the role of female workers is critical because shrimp processing requires both the ability and scrupulousness of females (SCAP, 2015). Factories in agricultural and non-agricultural industries such as fruit, vegetable, pangasius, garment, and electronics also employ many female workers.

Table 14. Annual per capita income, Vietnam, by region, 2006–16

VND '000	2006	2008	2010	2012	2014	2016
Whole country	7,638	11,942	16,645	23,998	31,648	37,171
By regions						
Urban	12,701	19,262	25,554	35,869	47,574	54,616
Rural	6,068	9,146	12,845	18,953	24,461	29,072
By gender						
Female	7,162	11,251	15,857	23,159	30,304	36,001
Male	9,346	14,416	19,410	26,965	36,320	41,269
By income quintiles						
1st quintile	2,212	3,300	4,433	6,139	7,918	9,247
2nd quintile	3,827	5,726	8,026	11,809	15,767	18,198
3rd quintile	5,507	8,399	12,005	17,995	23,658	27,611
4th quintile	8,143	12,809	17,881	26,670	33,964	40,268
5th quintile	18,500	29,498	40,922	57,414	76,954	90,568
Differentiation between 1st and 5th group (times)	8.4	8.9	9.2	9.4	9.7	9.8
By income sources						
Salary or wage	2,616	4,146	7,469	11,077	15,038	17,840
Self-employment in agriculture–forestry–fishery	3,180	3,788	5,246	6,185	6,974	6,121
Self-employment in non-agriculture–forestry–fishery	1,741	2,706	3,930	5,308	7,088	8,971
Others	1,381	2,227	1,896	2,855	4,020	4,246

Source: GSO, 2016

Although the income gap between rural and urban regions has narrowed over time, the gap between the poorest and richest groups has increased (from 8.4 times in 2006 to 9.8 times in 2016 between the 1st (lowest) and 5th (highest) quintiles (Table 14). Annual income of the 1st quintile rose from VND2.2 million in 2006 to VND9.3 million in 2016 (with a CAGR of 15.4%), while for the 5th quintile this increased from VND18.5 million in 2006 to VND90.6 million in 2016 (with a CAGR of 17.2%). This indicates that the richest group is becoming richer at a faster rate than the poorest group.

Rural areas are home to more than 65% of Vietnam's population (GSO, 2016) and agriculture–forestry–fishery is the main income source of people living in these areas. However, self-employment in agriculture–forestry–fishery is no longer a major income source in Vietnam, having decreased markedly from 36% of total annual income in 2006 to 16% in 2016 (Figure 14). Despite this, absolute income from agriculture–forestry–fishery almost doubled between 2006 and 2016, and income sources such as salary or wage, non-agriculture–forestry–fishery, and others increased by 6.8 times, 5.2 times, and 3.1 times, respectively (see Table 14). This implies that industrialisation has increased the profitability of the agriculture–forestry–fishery industry, but has reduced the number of labourers required, fuelling urbanisation (and an increase in associated professions). As such, urban regions in Vietnam will increasingly become major locations for consumption.



Figure 12. Annual per capita income, Vietnam, 2006–16

Source: GSO, 2016

Annual per capita incomes of Hanoi and HCMC are slightly different. In 2016, the average incomes of the two metro cities were VND58.5 million and VND61.3 million, respectively (Table 15). The figures for income sources and income quintiles are similar between the two cities; however, the share of income from agriculture–forestry–fishery is greater in Hanoi (6%) than HCMC (1%), reflecting the greater urbanisation in HCMC.

Table 15. Annual per capita income, Hanoi and HCMC, 2016

VND '000	Hanoi	HCMC
Overall	58,495	61,309
By income quintiles		
1st quintile	16,678	21,949
2nd quintile	31,459	35,947
3rd quintile	42,908	45,304
4th quintile	58,285	59,738
5th quintile	143,288	143,825
Differentiation between 1st and 5th (times)	8.59	6.55
By income sources		
Salary or wage	36,241	35,874
Self-employment in agriculture–forestry–fishery	3,380	629
Self-employment in Non- agriculture–forestry–fishery	12,066	17,459
Others	6,815	7,352

Source: GSO, 2016

Expenditure

Overall, annual per capita expenditure in Vietnam rose from VND6.1 million in 2006 to VND25.9 million in 2016, with a CAGR of 15.5%. Figure 15 shows that the growth rate of expenditure is slightly lower than that of income (these amounts are nominal and have not been adjusted to inflation).

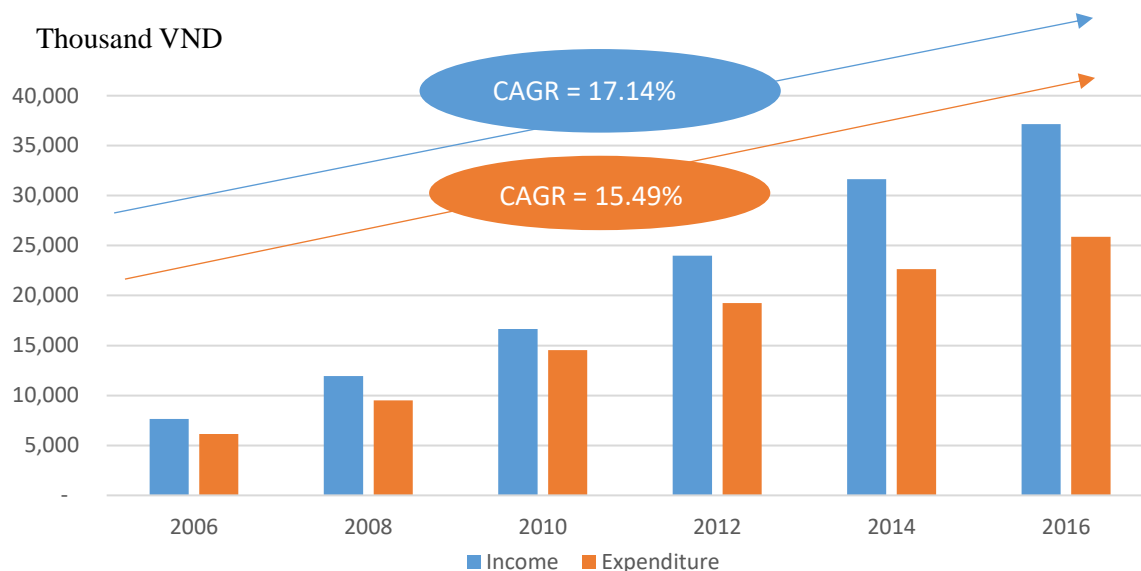


Figure 13. Vietnam, per capita income and expenditure, 2006–16

Source: GSO, 2016

In 2016, expenditure was VND36.7 million in urban areas and VND20.8 million in rural areas. This equates to a difference of 1.76 times for urban compared to rural areas; however, the CAGR of expenditure of people living in rural areas was roughly 15.8% between 2006 and 2016—about 1.5% higher than that of urban areas.

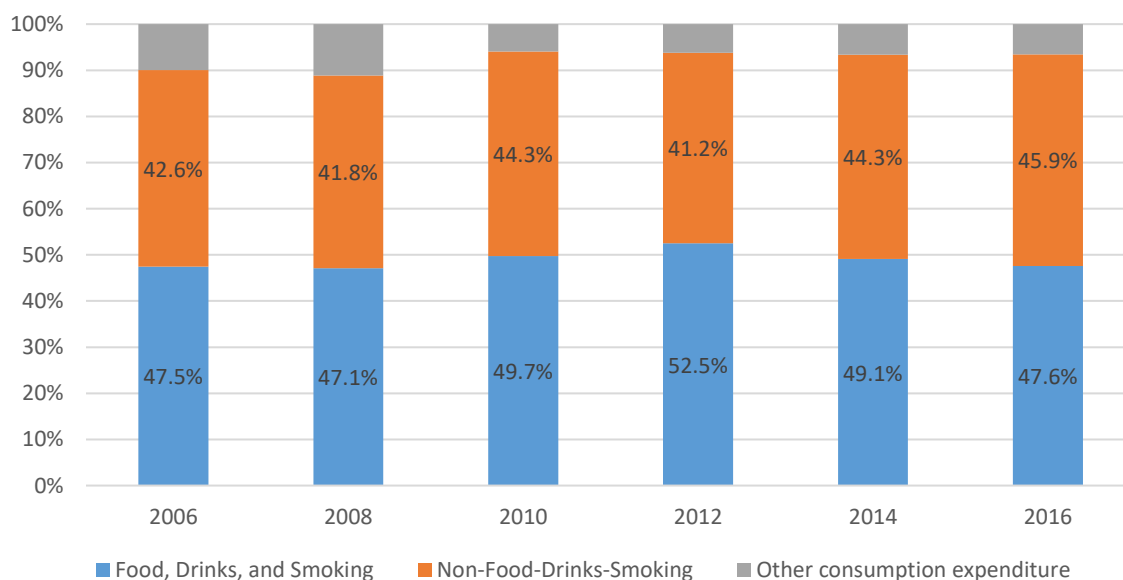


Figure 14. Vietnam, share of annual per capita expenditure, 2006–16

Source: GSO, 2016

Expenditure on food, drinks, and smoking comprises a large proportion of total expenditure in Vietnam (Figure 16). This proportion fluctuated around 48% between 2006 and 2016, rising from 47.5% in 2006 to a peak of 52.5% in 2012, and dropping to 47.6% in

2016 (Table 17). This fluctuation was not due to an increase in consumption, but rather a rise in food prices. According to the Food and Agriculture Organization of the United Nations (FAO, 2019), the Food Price Index reached a high point in 2008 (due to the food crisis in the same year) and peaked in 2011, significantly affecting consumers' expenditure on food. (The FAO Food Price Index is a measure of the monthly change in international prices of a basket of food commodities. It consists of the average of five commodity group price indices, weighted with the average export shares of each of the groups for 2002–04.)

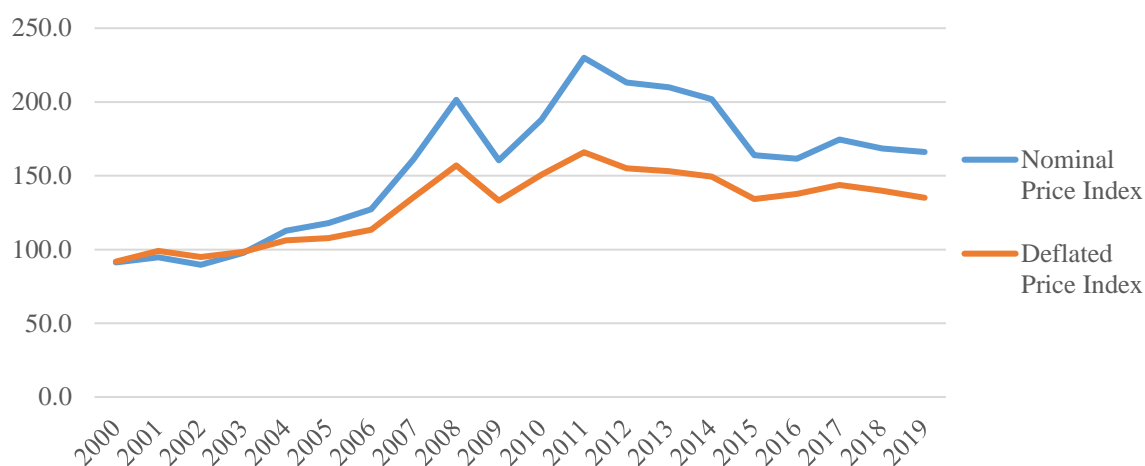


Figure 15. Food Price Index, 2000–19

Source: (FAO, 2019)

Note: 2002–04 = 100

Table 16. Vietnam, Annual per capita expenditure by region, 2006–16

VND '000	2006	2008	2010	2012	2014	2016
Whole country	6,132	9,504	14,532	19,236	22,656	25,884
By regions						
Urban	9,744	14,940	21,936	27,456	31,356	36,708
Rural	4,824	7,428	11,400	15,780	18,684	20,820
By expenditure categories						
Food, Drinks, and Smoking	2,916	4,476	7,224	10,104	11,124	12,324
Non-food–drinks–smoking	2,616	3,972	6,444	7,932	10,032	11,868
Other consumption expenditure	612	1,056	864	1,200	1,500	1,692
By income quintiles						
1st quintile	2,424	3,960	5,988	8,532	9,936	10,752
2nd quintile	3,432	5,520	8,640	12,360	15,012	15,816
3rd quintile	4,524	6,816	10,968	15,936	18,972	20,220
4th quintile	6,264	9,312	14,964	20,556	24,228	26,448
5th quintile	11,004	16,692	27,732	32,796	37,620	42,408
Differentiation between 1st and 5th group (times)	4.5	4.2	4.6	3.8	3.8	3.9

Source: GSO, 2016

4.2 Food consumption and expenditure

In Vietnam, annual per capita expenditure on food increased significantly between 2006 and 2016, from VND2.8 million VND11.6 million (with a CAGR of 15.5%). In 2016, people living in urban areas spent more on food (VND16 million) than those in rural regions (VND9.6 million), which reflects the higher cost of living in these areas.

Table 17. Vietnam, annual per capita expenditure for food by region, 2006–16

VND '000	2006	2008	2010	2012	2014	2016
Whole country	2,752	4,237	6,671	9,367	10,366	11,628
By Regions						
Urban	4,049	6,154	9,450	12,877	14,021	16,070
Rural	2,279	3,504	5,497	7,891	8,700	9,550
By income quintiles						
1st quintile	1,474	2,419	3,557	5,128	5,645	6,168
2nd quintile	1,963	3,167	4,769	6,859	7,897	8,287
3rd quintile	2,440	3,607	5,887	8,602	9,672	10,207
4th quintile	3,109	4,709	7,505	10,688	11,990	12,959
5th quintile	4,784	7,285	11,635	15,563	16,631	18,438
Differentiation between 1st and 5th group (times)	3.2	3.0	3.3	3.0	2.9	3.0

Source: GSO, 2016

A survey conducted by the General Statistics Office (GSO) in 2016 defines four main expenditure food groups, which contain 18 sub-categories:

1. Main food, which includes: rice, substitutes for rice (rice noddles, vermicelli and instant noddles), meat, oil, shrimp/fish, egg, tofu, sugar/milk/cake/candy, fish sauce, bean/pea, peanut/sesame, vegetables, and fruit
2. Drinks, comprising tea/coffee, wine/alcohol, and other drinks
3. Outdoor meals
4. Other types of food

This report focuses on the first group, with six main sub-categories: rice, substitutes for rice, meat, shrimp/fish, vegetables, and fruit. These types of food are essential for daily consumption and depend heavily on income. Vietnamese people consume less rice and more meat and F&V when their income increases. In urban regions, the share of expenditure on rice fell from 23% in 2006 to 15% in 2016, while that of meat increased from 39% in 2006 to 42% in 2016 (Figure 18). People living in these regions tended to spend more on fruit than vegetables: the share of expenditure on vegetables remained stable at around 8–9%, whereas expenditure on fruit increased from 8% to 11% between 2006 and 2016. Figure 18 also shows that urban populations tend to spend more on F&V than rural populations, consistent with findings that suggest urban populations are more concerned with healthy foods (SCAP, 2009).

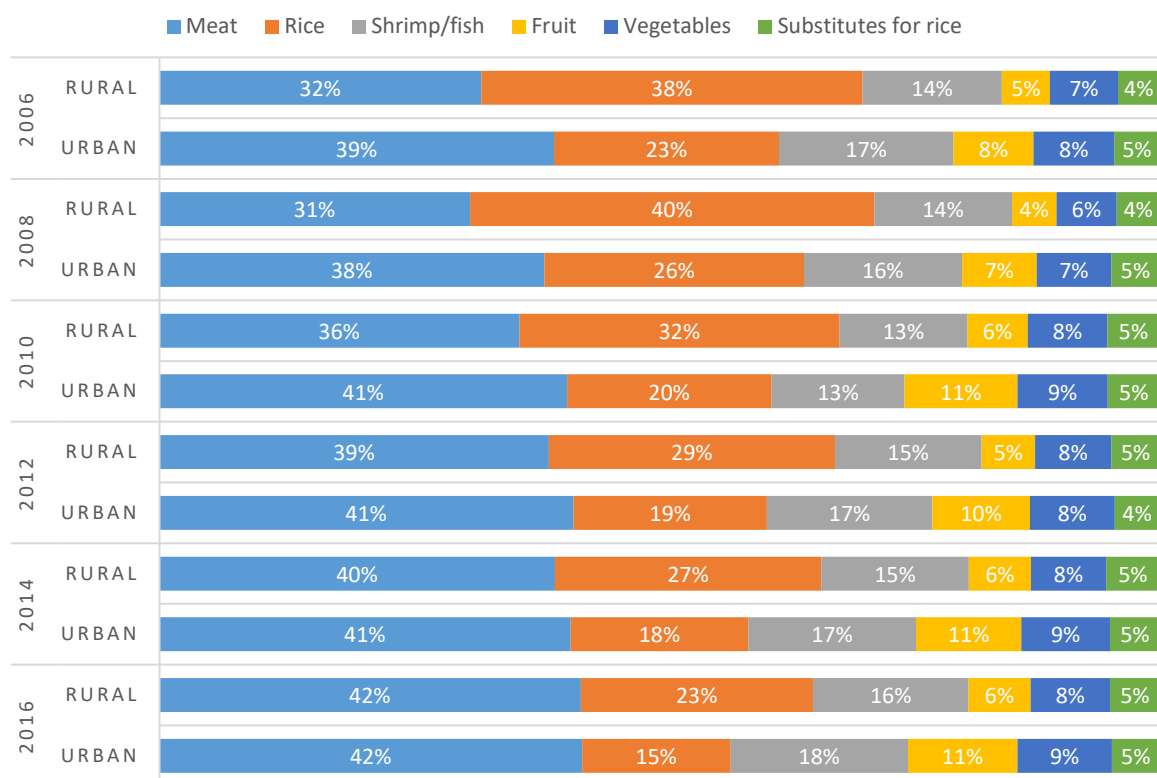


Figure 16. Per capita expenditure share, six major food categories, 2006–16

Source: GSO, 2016

The share of expenditure on rice also fell in regional areas between 2006 and 2016, from 38% to 23%. Expenditure on meat had a similar proportional increase to urban regions, rising from 32% in 2006 to 42% in 2016. This finding is confirmed by the Centre for Global Food and Resources (GFAR, 2019), which notes that expenditure on meat accounts for 37–44% of the monthly total in Vietnam. Expenditure on F&V in rural areas did not change much between 2006 and 2016. Overall, people in rural areas consume more meat and rice, and less fruit, than those in urban areas.

4.3 Trend of fruit consumption

In general, fruit consumption in Vietnam increased between 2006 and 2016. Consumption fluctuated between 10 and 12kg/person/year in this period, reaching its peak at 11.8kg/person in 2010, falling to 10.2kg/person in 2014, and rising to 10.8kg/person in 2016 (Figure 19). (The reason for this fluctuation is discussed in section 4.1.2 of this report.)

Rural and urban areas experienced a similar fluctuation in fruit consumption between 2006 and 2016; however, there were two majors. First, the consumption gap between the two areas was around 4.4kg/person/year, and this was almost unchanged between 2006 and 2016. Second, people living in rural areas had more stable habits of fruit consumption compared to those in urban areas. Urban people consumed more fruit than those in rural areas between 2006 and 2016, but their consumption fluctuated by around 15% (and increased by approximately 10% from 2014 to 2016). Urban areas, therefore, are potential targets for any interventions in the Vietnamese fruit sector, such as product quality and supply chain improvements, which would raise the product value, increase producer income and better satisfy urban consumer demand.

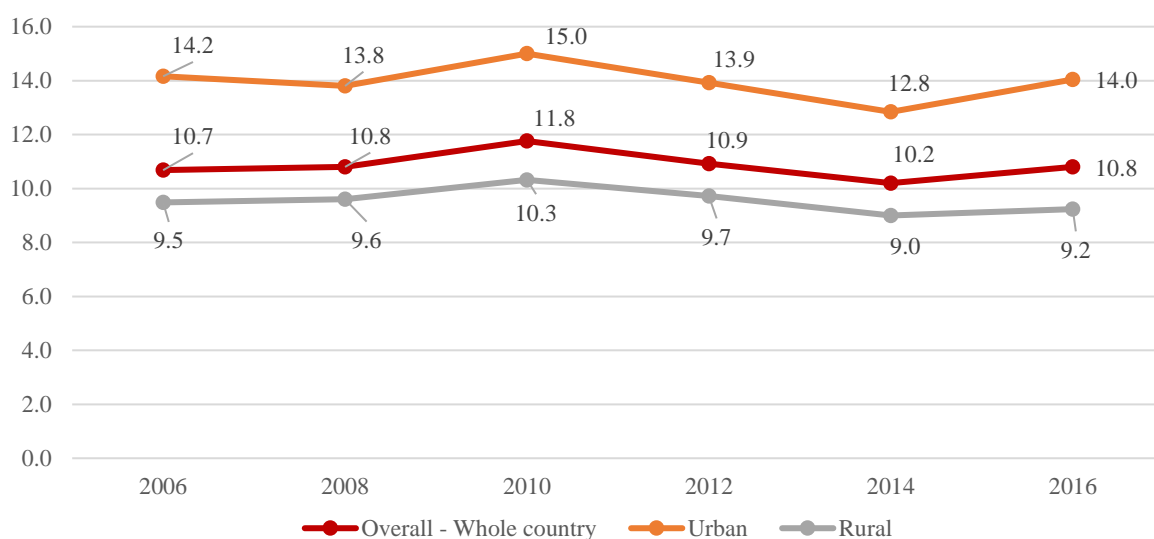


Figure 17. Vietnam average annual fruit consumption by regions, 2006–16

Source: GSO, 2016

Among the five income quintiles, the 5th quintile (the richest group) consumes the most fruit compared with the other four groups (Figure 20). Consumption for this quintile was 17.6kg/person in 2006, reached a peak of 19.1kg/person in 2010 and fell to a low of 15.7kg/person in 2014 before recovering to 16.2kg/person in 2016. Although this group exhibited a high fluctuation of fruit consumption, their consumed value was still 2.6 times higher than the 1st quintile, which only consumed 6.4kg/person of fruit on average between 2006 and 2016.

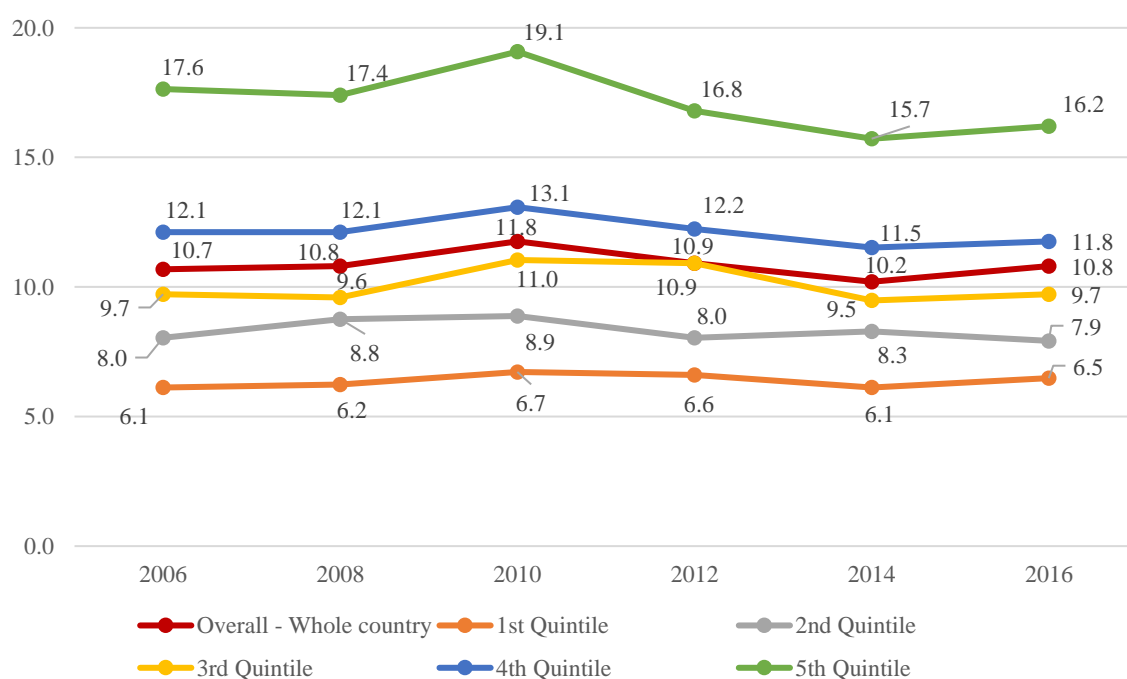


Figure 18. Average annual fruit consumption (kg/person) in Vietnam by five income quintiles, 2006–16

Source: GSO, 2016

In terms of consumer preference and production area, oranges, bananas, and mangoes are the three most popular types of fruit in Vietnam and are grown in many provinces throughout the country. Banana has been the dominant of these three fruits, with consumption almost doubling from 6.4kg/person in 2006 to 12.4kg/person in 2010, and levelling off at 10.9kg/person after 2014 (with a CAGR of 5.4% over the period 2006–16) (Figure 21). The main reason banana is so popular is that it can be grown all year round, and consumers can easily find it at street vendors, wet markets, or supermarkets. Furthermore, banana has the largest production area in Vietnam, with more than 140,000 ha in 2017.

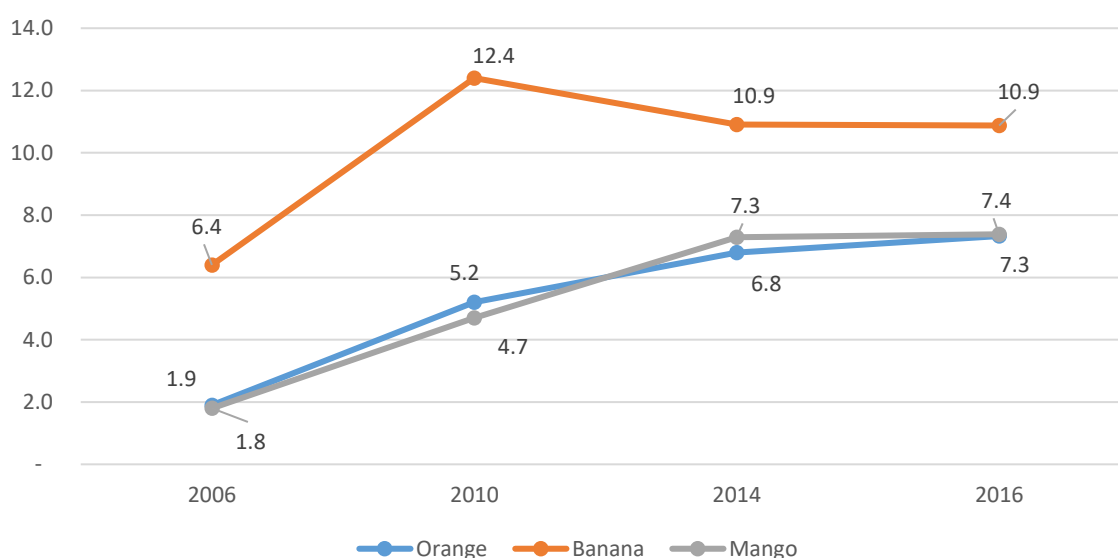


Figure 19. Vietnam, average annual consumption - orange, banana, and mango, 2006–16

Source: GSO, 2016

Expenditure on banana only accounts for 8.9% of total fruit expenditure in Hanoi and 13.2% in HCMC (GFAR, 2019). GFAR indicates that expenditure on orange/citrus comprises the largest proportion of total household fruit expenditure. This could be explained by the rapid increase in citrus producing areas in Vietnam in 2016, making the fruit more popular across the country. In addition, an upward trend of imported oranges from Australia, South Africa, and the USA has recently demonstrated a consumer preference for this product.

Orange consumption increased in volume from 1.9kg/person in 2006 to 7.3kg/person in 2016. This amount is almost the same as mango, which also rose from 1.8kg/person in 2006 to around 7.4kg/person in 2016. GFAR (2019) fact sheets indicate that orange and mango were ranked in first and third position, respectively, in terms of total fruit expenditure in Hanoi and HCMC, confirming that they are becoming important fruits in the Vietnamese consumer diet.

4.4 Mango preference and quality indicators

Few studies have been undertaken on fruit consumption preferences in Vietnam. However, available research highlights that freshness, appearance, taste, and food safety certification are among the top priorities when consumers choose fruit. These priorities have remained unchanged between 2009 and 2018. In 2008, consumers in Hanoi were more concerned with freshness, taste/aroma, skin colour, shape, and flesh colour, while

those in HCMC paid more attention to shape, freshness, taste, and skin colour (Figure 22).

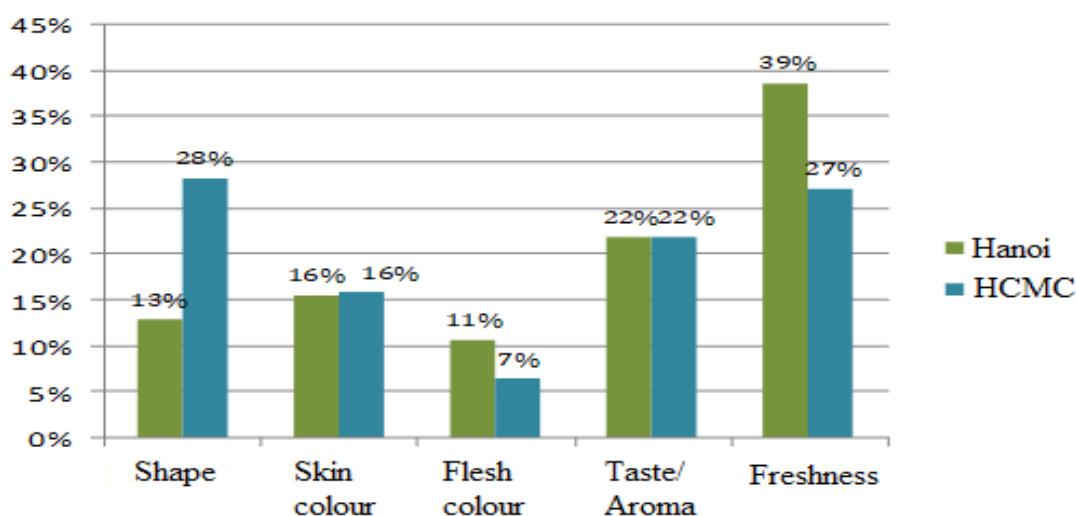


Figure 20. Consumers' criteria for choosing fruit

Source: SCAP, 2009

A 2018 GFAR survey shows the same priorities in freshness and taste, as well as a third important factor: safety (Table 18). Food safety is becoming a crucial factor for consumption preferences because of unsafe farming methods. On the production side, high application of chemicals such as pesticides and herbicides can have negative impacts on consumer health due to chemical residues; however, safety products have not been able to gain consumer trust because of flaws in the certification system.

Table 18. Factors influencing consumers' choice of selected fruit in Hanoi and HCMC

Factors influencing choice	Hanoi				Ho Chi Minh			
	Mango	Peach	Pear	Plum	Mango	Peach	Pear	Plum
Food safety	35.4%	37.1%	41.3%	33.8%	17.3%	13.4%	18.0%	13.8%
Freshness	13.3%	12.1%	10.4%	15.9%	27.1%	13.3%	24.9%	18.5%
Taste	21.6%	11.1%	10.8%	19.2%	18.6%	7.5%	8.2%	12.0%
Origin	13.7%	22.8%	19.5%	17.6%	9.2%	7.1%	11.2%	13.2%
Nutritional content	8.5%	8.8%	7.5%	3.9%	12.2%	6.4%	11.7%	6.3%
Price	1.6%	0.9%	1.4%	1.2%	6.2%	6.2%	9.1%	7.9%
Easy to prepare	1.6%	1.3%	1.4%	2.5%	0.5%	0.4%	0.6%	0.7%
Others	4.2%	5.6%	7.5%	3.5%	8.2%	2.6%	4.1%	6.1%
Never purchase this item	0.1%	0.3%	0.1%	2.6%	0.6%	43.1%	12.0%	21.5%

Source: GFAR, 2019

Consumers in Hanoi and HCMC had a clear perception of good quality in terms of six categories: appearance/shape, skin colour, flesh colour, taste, freshness, and weight. The optimum combination of these six categories was found to be mangoes with an oval/egg shape, yellow skin and flesh, high sweetness, sleek skin and weight of 300–400g each (Figure 23). The preference for yellow skin, yellow flesh, and sweet mangoes imply

characteristics of Cat Hoa Loc mangoes, which is why this variety still dominates the domestic market and obtains the highest price. However, the SCAP study referred to in Figure 22 was conducted in 2008, when many current varieties were not available, including Cat Chu (which is similar to Cat Hoa Loc), Cambodian Keo mangoes, Australian R2E2, and Taiwanese varieties.

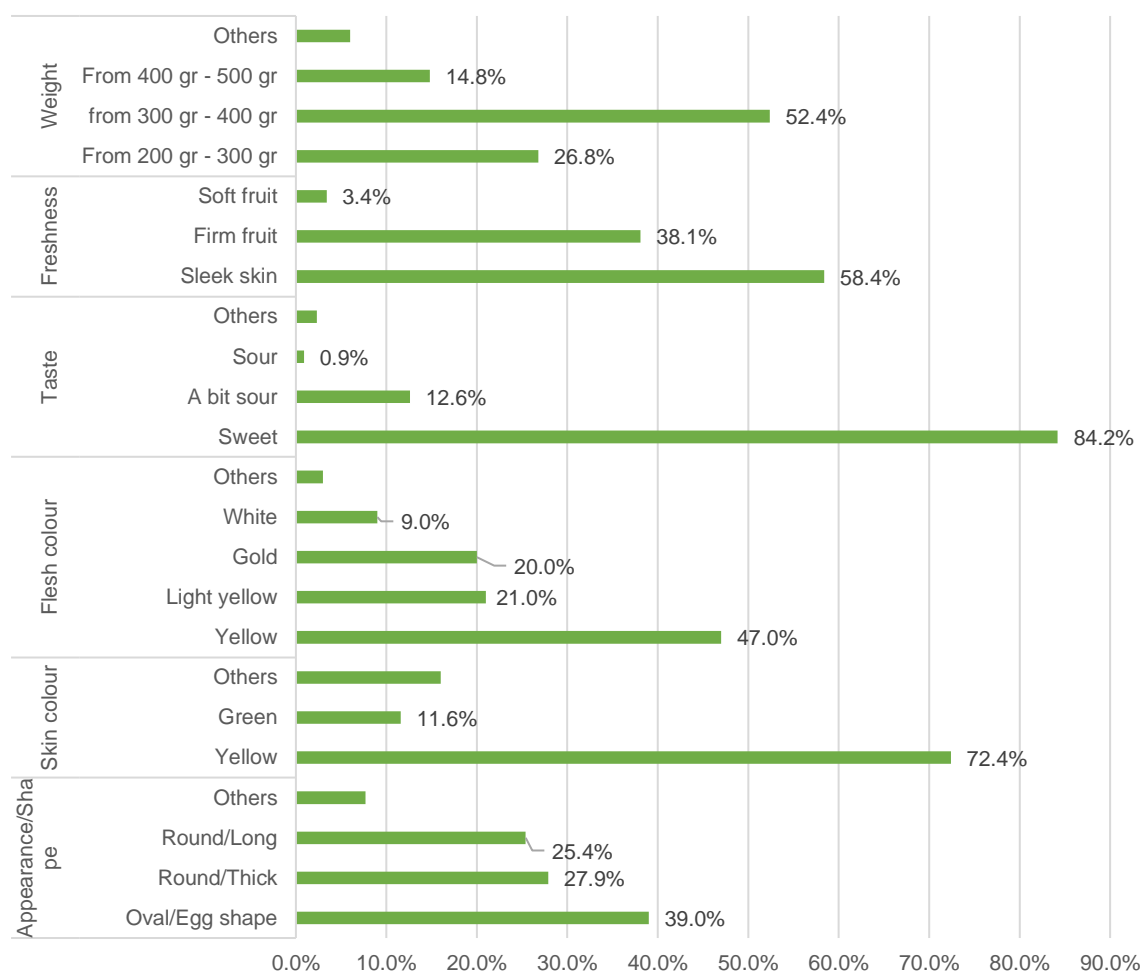


Figure 21. Consumers' preference of mango quality, 2009

Source: SCAP, 2009

4.5 Shopping places

The development of contemporary retail channels has significantly changed the landscape in terms of consumers' preferred fruit shopping locations. In 2009, formal wet markets played a dominant role in supplying F&V to households in Hanoi and HCMC, with 60% and 81% of total supply, respectively (SCAP, 2009). In 2018, these figures had fallen to 18.6% and 23.5% (Figure 24). New and modern channels such as supermarkets, convenience stores (minimarts), and speciality shops have become much more prevalent in these two metropolitan areas, and gained a large share of fruit purchases between 2009 and 2018.

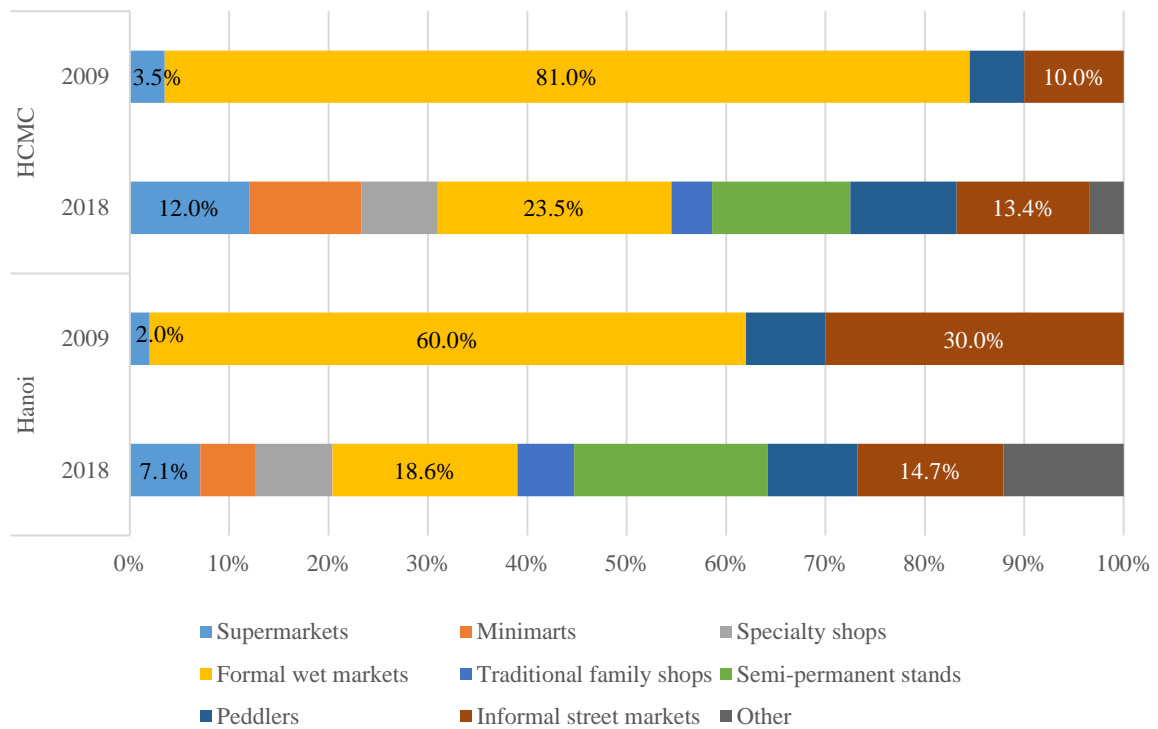


Figure 22. Favourite shopping place of interviewed households in Hanoi and HCMC

Source: SCAP, 2009; GFAR, 2019

Note: 'Other' includes phone orders, online shopping and restaurants/cafes

Consumers in Hanoi and HCMC consider supermarkets to sell safer food. SCAP (2009) identified safety as the most important reason why consumers choose supermarkets as their favourite fruit-purchasing place (Figure 25). GFAR's (2019) more recent report confirms this finding, showing that around 30% of consumers in Hanoi and HCMC choose supermarkets as their preferred fruit-purchasing place (Figure 26). Furthermore, GFAR fact sheets also indicate that consumers' perception of fruit sold in supermarkets was of being 'high quality'. These results highlight the importance of supermarkets in supplying fruit to households, given the current context of a fruit supply chain and certification system that are not considered wholly reliable.

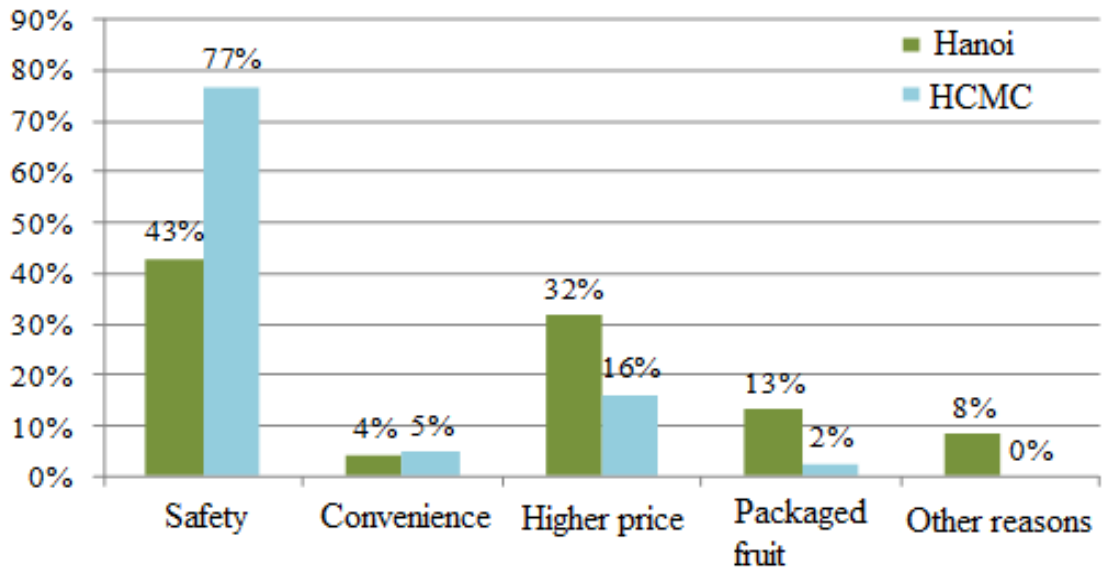


Figure 23. Consumers' reasons for choosing supermarkets as a shopping place
 Source: SCAP, 2009

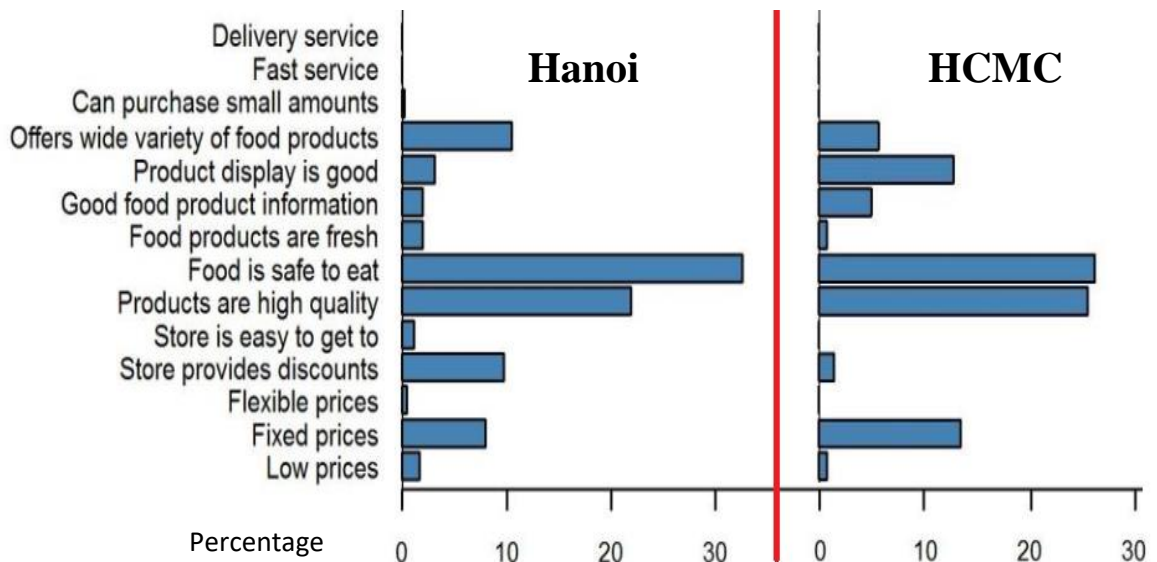


Figure 24. Share of main reasons for choosing supermarkets for fruit purchasing
 Source: GFAR, 2019

5 Conclusion

This report highlighted several improvements in Vietnam's mango sector:

- The sector has developed significantly in recent years. Mango production areas and total production output reached peaks of almost 100,000 ha and 800,000 tonnes, respectively, in 2018. Although Vietnam's fruit processing industry is not yet fully mature, several modern processing factories have been built during the last three years under a government strategy to stimulate investment in the industry.
- Among popular varieties, Cat Hoa Loc still dominates the market in terms of both price and preference of domestic consumers. However, Taiwanese mangoes and Cat Chu mangoes grown in the largest producing areas are emerging as key varieties in the Mekong Delta region for exporting.
- Hanoi and HCMC are two major markets for domestic consumption of mangoes.
- The volume of mango and overall fruit consumption has increased in Vietnam during the period 2006–16, indicating the high development potential of the mango sector.

Key issues and opportunities exist in Vietnam for domestic production, domestic consumption, and processing and exports. In particular, this report identified the following:

- Mango flowering manipulation is employed in the MRD region; however, it has not met the MARD goal of 12,500 ha (outline in Decision No. 1648/QĐ-BNN-TT). Flowering manipulation practices face a number of risks and constraints, and currently there are no regional/provincial plans for improvement and coordination.
- Not all mango producers have VietGAP certification. While there are issues with the certification process, improving standards and uptake could in turn improve consumer trust in products marketed as safe. This is particularly important given Vietnamese consumers are increasingly concerned about food safety.
- Agricultural exports from Vietnam have significantly increased in recent years, and F&V make up a large proportion of their total value. However, despite increases in the export value of processed mango products, most mangoes produced in Vietnam are consumed domestically. Improving understanding and uptake of GlobalGAP certification, further developing fruit processing capabilities (which are currently functioning at low capacity or, in the case of fruit juice, are still under development), and better understanding importer demand for mango varieties (especially in China) could help grow export trade.
- E-commerce is a relatively new development in Vietnam, especially for F&V. Long-term potential for this retail channel exists as consumer uptake spreads.
- Urban areas such as Hanoi and, in particular, HCMC are growing, as is the earning capacity of their residents. People in these areas are also higher consumers of fruit and are therefore potential targets for interventions such as product quality and supply chain improvements.
- Consumption of high-value fruits such as oranges and mangoes increased markedly between 2006 and 2016 and have high potential for future development.

Further research into these areas will provide a foundation for interventions to improve mango farmers' income and develop new and efficient mango farming methods and a more effective mango supply chain in southern Vietnam.

6 References

- ACBS. (2018). Overview of retail markets. ACBS Research Department. Retrieved from <[https://acbs.com.vn/upload/photos/post/CHUOI%20BAN%20LE%20TAI%20VN%20by%20ACBS_08.03.2018%20\(VN\)_105616.pdf#viewer.action=download](https://acbs.com.vn/upload/photos/post/CHUOI%20BAN%20LE%20TAI%20VN%20by%20ACBS_08.03.2018%20(VN)_105616.pdf#viewer.action=download)> (In Vietnamese).
- DARD. (2016). Report of Current Situation of Mango Flowering Manipulation in the Mekong Delta Region in 2015. Dong Thap's Department of Agriculture and Rural Development (DARD) (In Vietnamese).
- Do, M. H. and Park, S. Ch. (2018). New Rural Development and Hierarchical Governance in Vietnam: Impacts of government support on rural households' income using a Hierarchical Linear Modelling. *AGRIS on-line Papers in Economics and Informatics*, Vol. 10, No. 4, pp. 3-15. ISSN 1804-1930. DOI <10.7160/aol.2018.100401>
- FAO. (2019). FAO Food Price Index. Food and Agriculture Organization of the United Nations (FAO). Retrieved from <<http://www.fao.org/worldfoodsituation/foodpricesindex/en/>>
- GFAR. (2019). The Vietnam urban food consumption and expenditure study. The Centre for Global Food and Resources (GFAR), The University of Adelaide, Australia. Funded by Australian Centre for International Agricultural Research (ACIAR Project AGB/2015/029 and ACIAR Project AGB/2012/059). Retrieved from <<https://www.adelaide.edu.au/global-food/research/international-development/vietnam-consumer-survey/>>
- GlobalGAP. (2019). GlobalG.A.P certification database. Retrieved from <<https://database.globalgap.org/globalgap/indexJSF.faces>>
- GSO. (2016). Vietnam Household Living Standard Survey (VHLSS). General Statistics Office (GSO).
- GSO. (2017). Results of General Census of Non-Agriculture Businesses in Vietnam in 2016. General Statistics Office (GSO) (In Vietnamese).
- GSO. (2018). Statistical Yearbook of Vietnam. General Statistics Office (GSO) (In Vietnamese).
- Hoang, H., & Nakayasu, A. (2006). Study on the factors influencing the consumption of safe vegetables in HoChiMinh City, Vietnam. *Journal of Applied Sciences*, 6(9), 1986-1992.
- IASVN. (2019). Mango value chain in the Mekong River Delta region. Institute of Agricultural Science for Southern Vietnam (IASVN). Retrieved from <<http://iasvn.org/tin-tuc/Nghien-cuu-chuoi-gia-tri-xoai-vung-Dong-bang-song-Cuu-Long-7462.html>> (In Vietnamese)
- ITC. (2019a). International Trade Statistics: Number of exporting companies in Viet Nam, broken down by product categories. The International Trade Centre (ITC). Retrieved from <<https://www.trademap.org/CorrespondingProductsCompanies.aspx?nvpm=1%7c704%7c%7c%7c08%7c%7c%7c4%7c1%7c1%7c2%7c3%7c1%7c1%7c1%7c1>>
- ITC. (2019b). International Trade Statistics. The International Trade Centre (ITC). Retrieved from <<https://www.trademap.org/Index.aspx>>
- MARD. (2017). Report of current situation, development, and forecast of fruit and vegetable production in Vietnam. The Ministry of Agriculture and Rural Development (MARD) of Vietnam (In Vietnamese).

- MARD. (2018). Monthly report of agricultural export". The Ministry of Agriculture and Rural Development (MARD) of Vietnam. Retrieved from <<https://www.mard.gov.vn/Pages/bao-cao-thong-ke.aspx#>> (In Vietnamese).
- MARD. (2019). Yearly Summary Report of Agriculture Sector. The Ministry of Agriculture and Rural Development (MARD) of Vietnam. Retrieved from <<https://www.mard.gov.vn/Pages/nganh-nong-nghiep-phan-dau-dat-kim-ngach-xuat-khau-42--43-ty-usd-nam-2019.aspx>> (In Vietnamese).
- MOIT. (2019). Weekly report of International Trading. The ministry of Industry and Trade (MOIT) of Vietnam (In Vietnamese).
- My, N. H., Rutsaert, P., Van Loo, E. J., & Verbeke, W. (2017). Consumers' familiarity with and attitudes towards food quality certifications for rice and vegetables in Vietnam. *Food control*, 82, 74-82.
- Roberts, R.E. (2014). Evaluation of agribusiness research and development opportunities for tropical fruit in southern Vietnam, Final Report, AGB/2013/018, ACIAR.
- SCAP. (2009). Analysis of consumers' preference for fruit and vegetables in Vietnam. Southern Centre for Agricultural Policy (SCAP).
- SCAP. (2015). Baseline survey report On Shrimp value chain and gender transformation in Camau province. Southern Centre for Agricultural Policy (SCAP).
- TDMU. (2019). Price Information. Thu Duc Market Management Unit (TDMU) [Online]. Retrieved from the link <<http://thuducagromarket.com/gia-nong-san/>>
- VietGAP. (2019). National System for VietGAP certification management (VietGAP). Retrieved from <<http://www.vietgap.com/1400/san-pham/xoi.html>> (In Vietnamese).
- VNAT. (2019). National database of 3 – 5 starred hotels. Vietnam National Administration of Tourism (VNAT). Retrieved from <<http://vietnamtourism.gov.vn/index.php/cat/97>> (In Vietnamese).