Activity 1.4

This summary 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: Market assessment

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Summary

This market assessment study provides the foundation understanding for the ACIAR project 'Improving smallholder farmer incomes through strategic market development in mango supply chains in southern Vietnam'.

Two research methods were employed to acquire information and analyse main issues across the segments of mangoes in Hanoi and HCMC markets: (1) semi-structured, in-depth interviews with key stakeholders; and (2) direct observational approaches.

This report provides evidence that Cat Hoa Loc and Cat Chu are the most popular mango varieties in Vietnam. Information about Cat Hoa Loc and Cat Chu and other mango varieties has been categorised for discussion. The three most significant categories are *mango trade*, *challenges and barriers* to developing the Vietnamese mango market, and respondents' *recommendations*.

A number of key insights into the southern Vietnam mango trade emerged from this research.

- When purchasing mangoes, the requirements can be broadly categorised into three main groups: (1) appearance, including size, skin, and shape of mangoes; (2) quality, including sweetness, fragrance, and being low in fibre; and (3) production certification (GAP certificates).
- Mango purchase prices are influenced by: (1) on season or off season; (2) purchase quantity; (3) types of suppliers (i.e. place in the value chain); and (4) additional options (e.g. whether damaged mangoes can be returned or not).
- The main packing sizes of mango, when purchasing directly from planting areas, are plastic bags of either 20kg or 40kg. If mangoes are bought from trading companies, they are packaged in polystyrene boxes, with holes that allow the mangoes to breathe.
- Trucks (not refrigerated) are the main transportation method of mangoes favoured by suppliers. If the quantity of mangoes is small, suppliers will transport them by motorbike.
- Similar to purchase prices, the average sales price of each variety depends on both season and size.
- For domestic retailers, mangoes are placed in plastic bags or fruit gift baskets, as chosen by customers.
- Vietnamese consumers particularly enjoy sweet, pleasant-smelling mangoes with a good appearance.

Six key *challenges and barriers* to developing the Vietnamese mango market were also identified:

- High quantity and quality losses
- Mango shortage during the off season
- Dealing with smallholder farmers and issues related to the conventional supply chain
- Higher productivity resulting in lower quality mangoes
- Lack of market information for both domestic and international markets
- An emerging competition with imported fruits.

The interviewees' main recommendations for improving the domestic mango market were to:

- Apply technologies that can improve the effectiveness of processes
- Use reality television for marketing, whereby contestants attend the planting areas to both work and introduce mangoes to the public
- Establish and strengthen associations in Vietnam to sponsor farmers in agricultural production and promote product development programs

- Seek to align standards of pesticide residues requirements in Vietnam with other countries, according to international standards
- Build mango planting areas with traceable origin codes, as well as mango planting areas used by exporters
- Promotion of certifications and accreditations related to production and post-harvest, to select farmers to supply retailers to encourage development and engagement of industry standards
- 'Organise a distribution system for mangoes from the South to the North', as one Hanoi fruit store recommended.

In summary, this market assessment study contributes to the broader research project and reveals the potential to increase both demands on and value of the Mekong River Delta (MRD) mango trade by applying a range of interventions to current mango supply chains.

Contents

1 Introduction

Fruits and vegetables (F&V) are gaining a prominent role in Vietnam's overall agricultural exports. The sector increased its export value from USD306 million in 2007 to US$3.55 billion in 2017 – equivalent to a compound annual growth rate of 27% over the same period. Furthermore, the F&V sector's share in total agricultural export value has increased to around 10% in 2018. The F&V sector is forecast to significantly contribute to Vietnam's total agricultural export value target of USD43 billion in 2019 (MARD 2019).

According to findings from ACIAR (2014), an opportunity exists to raise incomes, and thus living standards, for a large number of poor smallholder farmers by improving market access for a range of tropical fruits in southern Vietnam, which is where such fruits are traditionally grown. Currently, distribution is locally structured and stakeholders would benefit from a greater understanding of the issues and constraints in the chain. Although limited information is available regarding market dynamics, there are opportunities for industry development. This situation affords the opportunity to develop an understanding, in collaboration with local stakeholders, about the prospects in domestic and export markets for fresh and processed mangoes. Local stakeholder consultations in 2013 from the scoping study that preceded this project identified mango as one of the government-nominated priority fruits, with significant potential for economic benefit to the Mekong River Delta (MRD) region. Acting on these priorities to increase the net income of poor smallholder farmers could enhance the contribution of the mango trade to rural livelihoods in major production areas of southern Vietnam.

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 87.6 thousand hectares in 2009 to around 83.7 thousand hectares in 2015, it rose sharply between 2016 and 2018 to 99.6 thousand hectares. Overall, between 2009 and 2018, the total production area of mango has experienced an increase of around 12,000 hectares, at an average annual growth rate of 1.4% (MARD 2019). 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 may be more than 70,000 mango-farming households across the MRD with a primary income source of VND105.4 million per annum (USD4,464)—substantially more than rice (ADB 2013). The processed mango sector's value more than doubled from USD2.1 million in 2016 to USD5.2 million in 2017, and reached more than USD10 million in 2018 (MOIT 2019).

Despite this rapid growth, information regarding consumer preferences for mangoes is lacking, and communication between the market and production sectors is limited. Specifically, market systems and consumer buying motivations are not fully understood and the market is largely confined to local consumers. A longer-term assessment of mango purchasing across key local and distance markets, linked to demand, is needed.

The aim of this report is to examine market segments in order to provide evidence of pro-poor agribusiness development opportunities for mango in southern Vietnam, particularly in the two largest cities of Hanoi and Ho Chi Minh City (HCMC). It is intended that the field research into market segments will provide a better understanding of the key issues as well as capture market and customer insights, including information about seasonality, supply, logistics and economics, and fruit quality parameters for both fresh and processed mango products.

2 Study objectives

The overarching aim of this study was to analyse the market structure in Hanoi and HCMC in order to obtain an in-depth understanding of key issues and market and consumer insights (e.g. from retailers, food service companies, manufacturing and ingredient processors, and exporters), including information about seasonality, supply, logistics and economics, and fruit quality parameters for both fresh and processed mango products.

The specific objectives of this study were to:

1. Report the current situation in terms of market segments, product flows, and the demand for mangoes within the two largest cities of Hanoi and HCMC
2. Analyse information around seasonality, fruit quality parameters, and requirements from consumers—particularly for local mango varieties such as Cat Hoa Loc and Cat Chu
3. Understand the current level of processing, range of products, demand, and supply of processed mango products
4. Understand the current development of logistics and economics supporting the mango sub-sector, especially for domestic consumption.

3 Study design and method

Hanoi and HCMC were selected as the key domestic markets for mangoes. The study employed semi-structured, in-depth interviews with key stakeholders, as well as direct observational approaches, to examine key issues, challenges, and opportunities across the market segments of domestic-grown mangoes in Hanoi and HCMC.

First, key informants were identified, including mango producers, collectors, traders and wholesalers, retailers in conventional and modern chains, foodservice enterprises, processors, and exporters. Furthermore, extensive reviews of industry and government publications were conducted to capture the general background and key statistics related to mango production, market segments, and consumption across Vietnam.

Second, interviews were conducted with 26 key informants involved in mango distribution and consumption, including wholesalers, retailers (wet markets, supermarkets, grocery stores, and fruit stores), food service companies (hotels, restaurants, catering and coffee shops), processors, and exporters. The interview feedback provides information on market intelligence relating to mango procurement and distribution, buyer requirements and preferences, selling and pricing, logistics, marketing, consumption trends, quality issues, product damage, and other challenges and opportunities, to gain a comprehensive understanding of the mango sector in Vietnam, particularly for the two key markets of Hanoi and HCMC. To ensure the consistency of information captured, a checklist of key questions was used to support the interviews, with small variations depending on the interviewee type (see Appendices).

Finally, a detailed analysis of interview transcripts was conducted to examine key issues and identify challenges and opportunities from each respondent group, along with the sector as a whole. Findings from this analysis include project recommendations and the proposed development of market linkages in future years.

4 Key results and discussion

This section focuses on assessing and analysing information obtained from the interviews. The structure of this section does not strictly follow that of the checklists; instead, it is based on the process undertaken by the research team to ensure a more cohesive and logical information flow. Therefore, this section includes the following areas:

- General information
- Mango trade
- Future market potential
- Challenges and barriers to developing the mango market, and recommendations for addressing these.

4.1 General information

Business types

Twenty-six enterprises participated in this research. Among them, one company was an e-commerce provider, whereby supermarkets/fruit stores can register to sell their agricultural products via the company's website. The remaining participants can be classified into one of three groups:

- **Group 1 – Retailer**: supermarkets (online supermarkets are also included), convenience store chains, fruit stores, and retailers in wet markets.
- **Group 2 – Food service enterprise/Processor**: hotels, restaurants, coffee shops, and catering services. These enterprises process mango into smoothies, beams fruit, and mixed fruit boxes for their customers.
- **Group 3 – Exporter/Trader**: processors who are also exporting their products to international markets, along with fresh mango exporters and traders.

The research team conducted a number of interviews with fruit stores; however, in the case of HCMC, fruit stores were not willing to participate in this project due to undisclosed reasons. Furthermore, the majority of fruit stores in HCMC only sell imported fruits and a small proportion of domestic seasonal fruits. Two fruit stores and one convenience store chain in Hanoi participated in this research.

The majority of the responding enterprises had at least five years of experience in the fruit sector. A small number of food service enterprises had less than five years of experience, while some retailers in HCMC had up to twenty years of experience (the latter is uncommon given HCMC is a highly competitive retailing market, particularly for fruit and vegetable products).

Respondent locations

Among the 26 enterprises, 16 were operating in HCMC and eight were operating in Hanoi. For HCMC, almost all responding organisations were based within HCMC itself (i.e. headquarters or main branches) except for one wholesaler and one exporter, which were located in Tien Giang province and Ben Tre province respectively (see Figure 1 and Figure 2). Supermarket chains have a large distribution channel containing supermarkets and convenience stores, while online food service companies only have a store in the same location as their headquarters for preparing orders and delivering directly to customers. Exporters and processors usually have a representative office or headquarters based in HCMC and factories in production areas such as Dong Thap, Tien Giang, and Long An provinces. Some food service companies are starting to focus more on internet platforms and/or smartphone applications, allowing customers to place an order directly and easily.

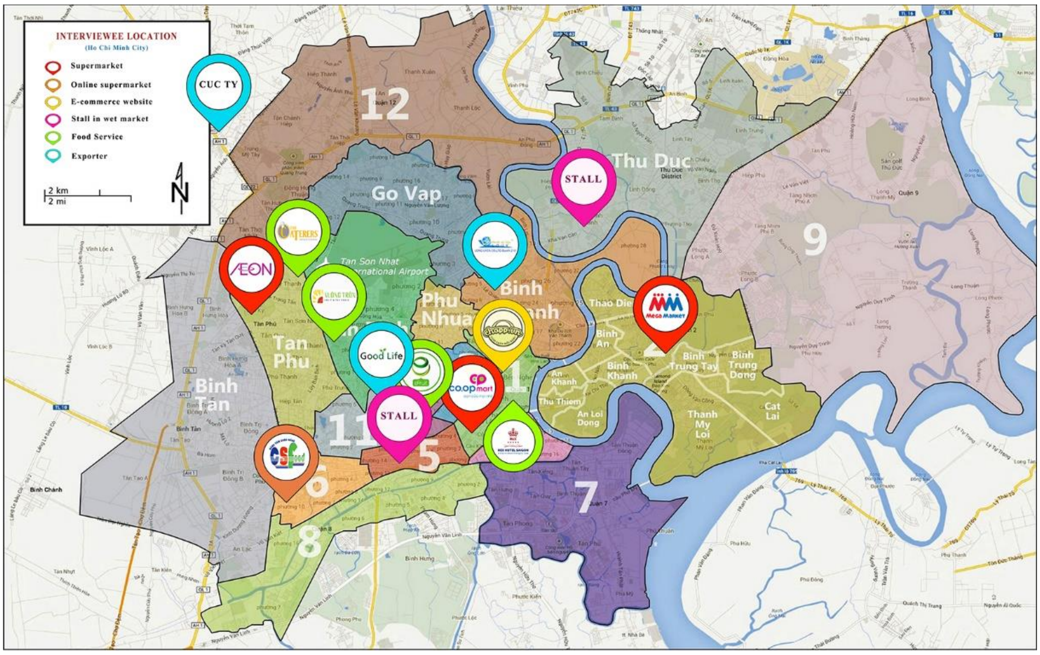

Figure 1. Map of respondent locations in Ho Chi Minh City

Source: Author's analysis

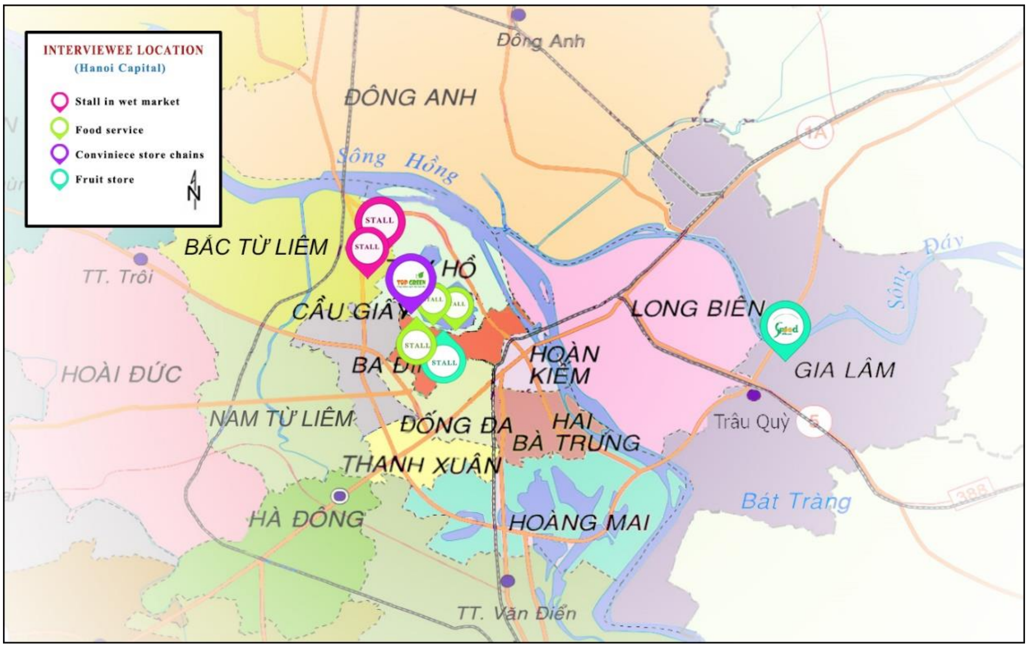

Figure 1. Map of respondent locations in Hanoi

Source: Author's analysis

4.2 Mango trade

Mango as a business

Information collected from the interviews shows evidence that mango products are gaining a more prominent role within the business of the participating enterprises. Although their portfolios contained a wide range of fruit, mangoes were one of the most important products during the main fruit-growing season in both domestic and international markets. One food service company in HCMC said that ‘since our starting date, fresh mangoes are distributed to our customers (schools, restaurants, and hotels), our business has been growing since and now we have mango orders almost daily’. Generally, mango is a nutritional and delicious fruit, which is favoured by consumers. However, some varieties are preferred to others, and these play a more important role for businesses. For example, one food service company said that ‘both Vietnamese and foreigners like fresh-cut mangoes and mango smoothies, especially the Cat Hoa Loc mango’. Another hotel in HCMC stated: ‘Cat Hoa Loc mango is consumed by guests at the hotel but only when they are VIP guests’. Compared to Cat Hoa Loc, Cat Chu is the main trading variety and is exported to Japan, Australia, and the US. Other than exporters, all domestic fresh mango sellers interviewed did not have their own brand or trademark for their mangoes.

Mango varieties and trading

Mango varieties

Cat Hoa Loc, Cat Chu, and Keo were the three mango varieties frequently mentioned by interviewees in HCMC. Meanwhile, interviewees in Hanoi stated that Cat Chu, Nha Trang, and Keo were three popular types. Green-skin Taiwan mango and Tu Quy mango were quite popular in the HCMC market, and in Hanoi green-skin Thailand mango and green-skin Taiwan mango were also popular (but not as popular as the aforementioned varieties). In addition, interviewees also traded Cat Bo mango, Tuong mango, Australian mango, Mien mango, Doc Nghe mango, and red-skin Taiwan mango. However, these varieties have a low trade volume.

In the opinion of HCMC respondents, Cat Hoa Loc and Cat Chu mangoes are best when they are eaten at the optimum ripeness. Alternatively, consumers prefer to eat Keo and Taiwanese mangoes when they are still green. Tu Quy mango can be eaten either ripe or green.

The peak season of Cat Hoa Loc and Cat Chu varieties are from April to June and from March to May respectively. Cat Hoa Loc’s off season is from July to November while Cat Chu’s off season is from November to December. However, experienced farmers have successfully applied off-season techniques in order to harvest Cat Hoa Loc and Cat Chu all year round. Taiwan and Tu Quy varieties are all-year-round mangoes. Each mango variety has its own advantages and disadvantages (see Table 1). Different views also emerge between respondents in HCMC and Hanoi.

Table 1. Vietnam consumer insights, by mango variety, Ho Chi Minh City and Hanoi

Variety	Quality advantages	Quality disadvantages	Price & demand	Market
 **Cat Hoa Loc**	Sweet; fragrant; good appearance; good reputation in Vietnam	Expensive; short season and supply shortage; unstable quality in off season; often presents with sap burn & significant defects	High/high	HCMC only
 **Cat Chu**	Good for juice and smoothies; low in fibre	Sourer in taste than Cat Hoa Loc	Medium/ high	HCMC
	Sweet and fragrant (more than other varieties); long shelf life	Price is high; sometimes get fungal infections.	High/high	Hanoi
 **Keo**	Cheap; sweet; good for salad; good for green eating	Not as delicious as Cat Chu; high in fibre.	Low/high	HCMC
	Cheap; fragrant	Big seed.	Medium/ medium	Hanoi
 **Taiwanese**	Not sour; good for green eating	Less sweet; often suffer from defects; unstable prices	Medium/ medium	HCMC
	Sweet; small seed	Not mentioned	Medium/ medium	Hanoi
 **Tu Quy**	Big size; small seed with a lot of flesh; low in fibre	Not mentioned	Low/ medium	HCMC only
 **Nha Trang**	Reasonable price; fragrant; suitable for making smoothies	Short preservation time	Medium/ high	Hanoi only

Source: Author's analysis

From the market research, it can be seen that although Cat Hoa Loc is the renowned mango variety in HCMC, it is not as popular in Hanoi as Cat Chu (among eight interviewees in Hanoi, none sold Cat Hoa Loc). Cat Chu is often used for juice and smoothie products in HCMC, whereas in Hanoi it is the most desirable variety for fresh consumption. Hanoi consumers likely prefer the taste of fresh Cat Hoa Loc to Cat Chu mangoes. However, since Cat Hoa Loc has higher purchase prices and further transport distance (and, therefore, higher transportation and preservation costs), retailers in Hanoi prioritise selling fresh Cat Chu mango. In the peak season, it is relatively easy to find Cat Hoa Loc mangoes at any HCMC mango seller (including supermarkets, fruit stores and wet markets), whereas some fruit stores in Hanoi (two from this research) do not sell Cat Hoa Loc mango and it is difficult to find Cat Hoa Loc in any Hanoi wet market. Regarding the place of origin, except for Nha Trang mangoes from Nha Trang province, varieties such as Cat Hoa Loc, Cat Chu, Tu Quy, Thai, and Taiwanese mangoes originate from southern Vietnam (Dong Thap, Tien Giang, Can Tho, Hau Giang, An Giang and Ben Tre provinces). In particular, Cat Hoa Loc and Cat Chu predominantly come from Tien Giang province and Dong Thap province respectively. In addition, Keo mangoes are imported directly from Cambodia.

Fresh mangoes are mainly sold to consumers in Vietnam via retailers (e.g. supermarkets, wet markets, and fruit stores) in either HCMC or Hanoi. In addition to the domestic market, mangoes are exported to Japan, the EU, Australia, and the US. Food service companies only focus on domestic markets, offering fresh mango products such as fresh-cut fruit, smoothies, fruit beams, salad, sauces, and juices supplied to conferences/events, schools and customers working in office buildings.

Retailers indicated that it generally took one to four days (three days on average) to sell their mangoes. For mangoes damaged or not in sale condition, supermarkets in HCMC that also sell ready-to-eat food would use these mangoes as ingredients in salad or fresh-cut fruits. Stalls in wet markets would sell them at discounted prices, while other respondents indicated that they would dispose of them. Interviewees in Hanoi indicated that mangoes became ripe after three to four days, and ripe mangoes would be stored in a refrigerator for longer preservation.

Mango trading

Purchase activities

A number of respondents were not willing to share detailed information about their suppliers, as they considered this confidential information. Overall, exporters/traders and some of the larger retailers indicated they buy mangoes from collectors, agricultural cooperatives, and farmer groups; smaller businesses (foodservice companies, wet market stalls) bought mangoes from traders or wholesalers. Only one respondent sourced the majority (70%) of their mangoes directly from farmers.

In HCMC, large and well-known enterprises did not have to find mango suppliers since farmer groups, agriculture cooperatives, and traders approach them to introduce their mangoes. New companies found suppliers via friends' recommendations and the internet, and suppliers also contacted them to showcase their mangoes. In Hanoi, most respondents found suppliers by themselves at the wholesale market, and one enterprise engaged suppliers through trade fairs.

Small businesses that purchased low quantities of mangoes (such as food service companies and wet market stalls) did not have formal contracts with their suppliers, whereas larger businesses such as exporters and supermarkets tended to have formal contracts. One important comment from a retailer was that although their suppliers have formal contracts with farmers, 'the situation is challenging as these formal contracts are broken by farmers operating opportunistically to achieve the best price for their mangoes'. In other words, when collectors set a mango purchase price higher than the price in the contract (especially in the off season), farmers are willing to break the signed contracts and sell their mangoes to these collectors.

Companies that had long-term relationships with suppliers were very confident about the quality standards of their suppliers. One retailer in HCMC said: ‘I am very confident about the quality of products from this company because we have a long-term relationship and the supplier company is very reputable. Moreover, I still check each mango on arrival and no serious problems have happened ever. I believe in the supplier's food safety certification.’ Furthermore, a trader in HCMC highlighted: ‘We are very confident with the quality from our suppliers because we have a long-term relationship with them’. The other remaining companies had only a reasonable level of confidence in their suppliers’ quality standards. In addition to supplier relationships, interviewees in Hanoi felt confident about the quality of mangoes if they could verify their place of origin. Only one respondent (among eight respondents in Hanoi) was not entirely satisfied with their supplier’s mango quality.

When purchasing mangoes, the respondents’ requirements can be broadly categorised into three main groups: appearance, quality, and production certification.

1. Appearance: includes size, skin, and shape of mangoes. For some enterprises, good appearance was the most important requirement. Size was also a key requirement for supermarkets, fruit stores, and exporters. For example, some supermarkets had their own definition of mangoes’ size, such as for Cat Hoa Loc (450g each); Cat Chu and Keo (350g each); and Taiwanese (500g each). Some exporters (particularly to Japan and EU) preferred medium-size mangoes (around 230g each). Further, mango skin should be smooth and free from blemishes. A number of firms set a high level of defect areas to reject mangoes from suppliers.
2. Taste: in particular sweetness, fragrance, and being low in fibre. Notably, food service companies who use the flesh of mango for their smoothies, mixed fruits, and fruit beams pay much more attention to these quality requirements.
3. Production certification: exporters, supermarkets, and some fruit stores also require Good Agricultural Practices (GAP) certification from suppliers. Exporters to the domestic market required VietGap certificates, whereas exporters to international markets required a GlobalGap certificate. However, as one exporter mentioned, ‘if some farmers follow GlobalGAP procedures but do not have the formal certificate (not willing to pay the fees for the certification), we still accept their mangoes, but we will check the soil, water, maximum residue level, aesthetics – colour and smell’. One fruit store in Hanoi requires its suppliers to ‘have a stamp attached to the product (with a QR code if possible)’.

Respondents use the three categories defined above for their quality assessment of mangoes. First, they assess mango skin for colours and blemishes. Second, based on their experiences, they assess mango aroma. Lastly, they check if the size is big and relatively consistent. For some respondents, mango skin was not important whereas weight was; for example, a single mango must be no less than 230g (or for some enterprises, no less than 300g). After checking for appearance, several enterprises manually cut and taste the mangoes for sweetness (Brix meter is used by some), flesh firmness, and fibre content. Large companies (particularly exporters) also check for pesticide residues and mango maturity. Some fruit stores in Hanoi require fully ripe mangoes.

Large enterprises have their own standards and indicate these clearly in their formal contracts with suppliers. Respondents who use mango flesh (foodservice companies, processors) are willing to pay a higher price in order to obtain a premium quality standard, and can return mangoes to suppliers one by one if the fruit does not meet their strict standards. One food service company said: ‘Sometimes, when I cut mangoes to check, the inside colour is white and is not up to the standard. I will reject them and request new ones’.

With regards to the annual purchase volume of fresh mango, among respondents the exporters/traders purchase the largest volume of mangoes. The remaining respondents only purchase a moderate to small amount of mangoes for their daily businesses. For instance, on average, a wet market stall purchases less than one tonne per year.

The purchase prices are influenced by: (1) on season or off season; (2) purchase quantity; (3) types of suppliers (i.e. place in the value chain); and (4) additional options (e.g. whether damaged mangoes can be returned or not). An important finding from the interviews was that the purchase prices of all mango varieties in Hanoi were higher than those in HCMC (sometimes double or triple). In HCMC, Cat Hoa Loc mangoes had the highest purchase prices (between VND45,000/kg and VND80,000/kg—double or triple the price of Cat Chu mango); Tu Quy and Taiwanese mango prices were comparable (around VND15,000/kg if bought from collectors, farmer groups or agricultural cooperatives); and Keo mangoes had the lowest prices among mango varieties in the market, at less than VND10,000/kg. Since no Hanoi interviewees in this research sold Cat Hoa Loc, Cat Chu mangoes had highest price (about VND30,000/kg if buying from wholesale markets and VND60,000/kg if buying from southern suppliers); Keo and Taiwanese mango purchase prices were VND25,000/kg to VND30,000/kg; and Nha Trang mangoes attracted the lowest prices at approximately VND20,000/kg. In this research, most stalls in Hanoi wet markets bought Cat Chu from the Long Bien wholesale market, whereas fruit stores bought from southern traders (e.g. My Xuong company, Chu Chin company from Dong Thap). Fruit stores require high quality mango (and they were more confident in the origin), so the price from traders is higher than from Long Bien wholesale market.

The main packing sizes of mango, when purchasing directly from planting areas, are plastic bags of either 20kg or 40kg. Suppliers chose plastic bags to pack mangoes since they are convenient to transport by both motorbike and truck. If mangoes are bought from trading companies, they are packaged in polystyrene boxes, with holes that allow mangoes to breathe, then placed into plastic or bamboo baskets (up to 20kg). Trucks (not refrigerated) are the main transportation method of mangoes favoured by suppliers. If the quantity of mangoes is small, suppliers transport them by motorbike. A number of suppliers use door-to-door delivery, while others use delivery companies from provinces (whereby buyers travel to a coach station to collect their mangoes).

Sale activities

Similar to purchase prices, the average sale price of each variety depends on both season and size (i.e. the bigger the size, the higher the price). When the supply of mangoes is low (during the off season) the price rises, and vice versa during the on season. However, traders in HCMC indicated that ‘in December–January, the price is also high even when the supply is high too because the demand of mango is high (especially for Cat Hoa Loc and Cat Chu variety as gifts or fruit displays for ancestor worship in the new year time)’. Every month, mango prices are higher on the 1st, 10th, and 15th day in the lunar calendar month (full moon days). An interesting finding from respondents in HCMC wet markets was that mango prices also depended on place of origin: ‘mangoes from Mekong delta provinces are normally VND10,000/kg higher than those from other provinces’. Compared to HCMC, interviewees from the Hanoi market were more open to sharing their average sale prices. Normally, stalls in Hanoi wet markets set fresh mango sale prices per kilogram to around VND5,000–10,000 higher than the purchase price (depending on the volume purchased by customers), while fruit stores add around VND30,000/kg.

Mango pack sizes from exporters are based on customer requirements (e.g. cardboard box, plastic container, socks placed around the mangoes), and range up to a weight of 20–30kg each. For domestic retailers, mangoes are placed in plastic bags or fruit gift baskets, as chosen by customers. Hanoi fruit stores also place fresh mangoes into carton boxes, if required by the customer. Some exporters apply QR codes to individual pieces of fruit. The majority of domestic retailers do not apply a QR code (in this survey only one retailer in HCMC uses QR codes to interact with their customers). Large supermarket chains have shown interest in developing QR technology for traceability, particularly *"traceable products have high quality, relatively identical in size, however, higher price. Traceable mango suppliers choose big mango consumption partners to cooperate, but supermarkets' sales are low so we are not their preferred target".* However, one respondent from Hanoi market stated, *"Hanoi customers are less interested in QR codes; and the reliability of QR codes is low, mainly only to verify the origin of products but the information has not been authenticated by the official agencies".*

Consumers and their preferences

Vietnamese consumers particularly enjoy sweet, pleasant-smelling mangoes with a good appearance. Customers in HCMC also like to buy Cat Hoa Loc mangoes (while Hanoi buyers prefer the Cat Chu variety) with the larger sizes used for worships, feasts, or as fruit gifts. A supermarket in HCMC commented: 'For the Cat Hoa Loc variety, customers prefer buying green skin ones and wait for a few days till they are ripe enough to eat. Customers usually choose good-looking green mangoes without blemishes. However, many customers do not know how to store/preserve them properly. As a result, the mangoes are ripe, they get blackened spots and wilted skin leading to unsatisfactory eating experience. Customers, in turn, feel the sellers do not have good-quality mangoes. For Keo mangoes, customers love to eat green ones, so, they often choose hard and heavy mangoes'.

Foodservice companies in HCMC indicated that consumers prefer Cat Hoa Loc mangoes for fresh-cut fruit compared to other varieties; Cat Chu for smoothies due to their lower prices; and Keo mangoes for salad or green cut fruit. Furthermore, exporters/traders stated they 'would prefer to buy more Cat Chu than Cat Hoa Loc for their customers since the former has a lower price'. HCMC supermarket respondents said their customers are mainly housewives and middle-income families, whereas customers of food service company customers are usually female, white-collar, with middle to high incomes and high education levels. Enterprises offering an online channel considered their online buyers as young to middle age, with middle to high incomes, and middle to high education levels.

Overall, interviewees described the important characteristics of mangoes as sweetness, good smell, beautiful appearance (no skin blemishes), and large size. A number of respondents stated that their buyers also considered place of origin, safety standards, quality, and price. One respondent in HCMC emphasised that 'customers love to eat green ones, so, they often choose hard and heavy mango' for the Keo variety. Furthermore, respondents in Hanoi also felt mango variety was important to consumers.

Mango Trade – domestic and international markets

Based on the analysis of respondent trading activities, two mango flow maps are presented below in order to depict the domestic and export market flows of Vietnamese mangoes. Both maps show that collectors, agricultural cooperatives, farmer groups and wholesalers/traders act as intermediaries between farmers and consumers. Among these groups, collectors act as the main intermediary in both domestic and export market flows. Virtually no farmers sell their mangoes directly to Vietnamese consumers; however, exporters can purchase mangoes directly from farmers.

In terms of the domestic market, after harvesting, farmers can sell their mangoes to collectors, traders and wholesalers. These intermediaries will then sell mangoes to wet market stalls or fruit stores before mangoes reach end consumers. Food service enterprises and processors buy fresh mangoes from intermediaries to make fresh cuts, smoothies, fruit beams, juice, dried mango and mango cakes. Farmers who are members of agriculture cooperatives (or members of farmer groups) may also supply their mangoes to the domestic market via these intermediaries.

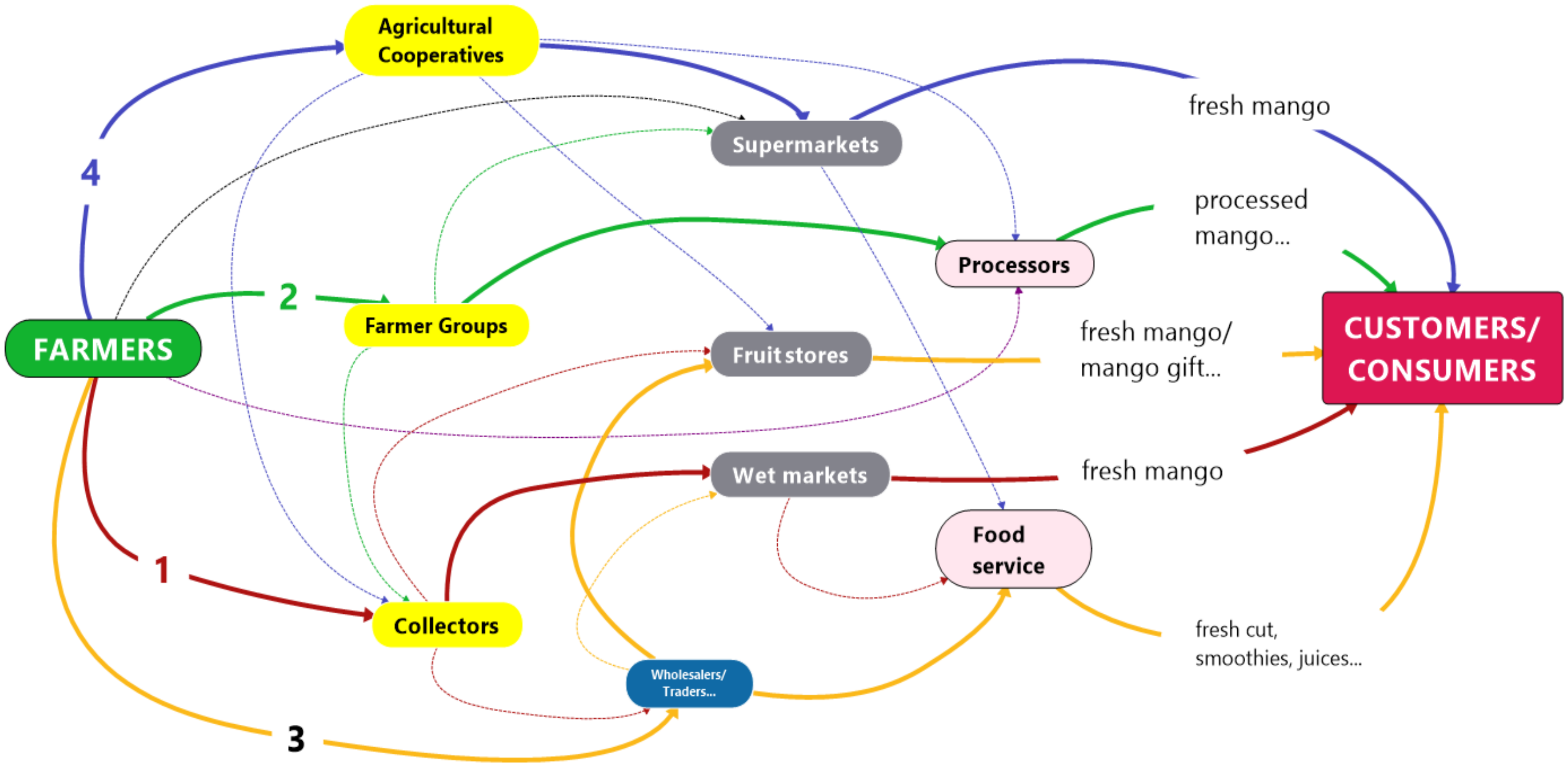

Figure 3. Domestic mango trade – domestic markets

Source: Author's analysis

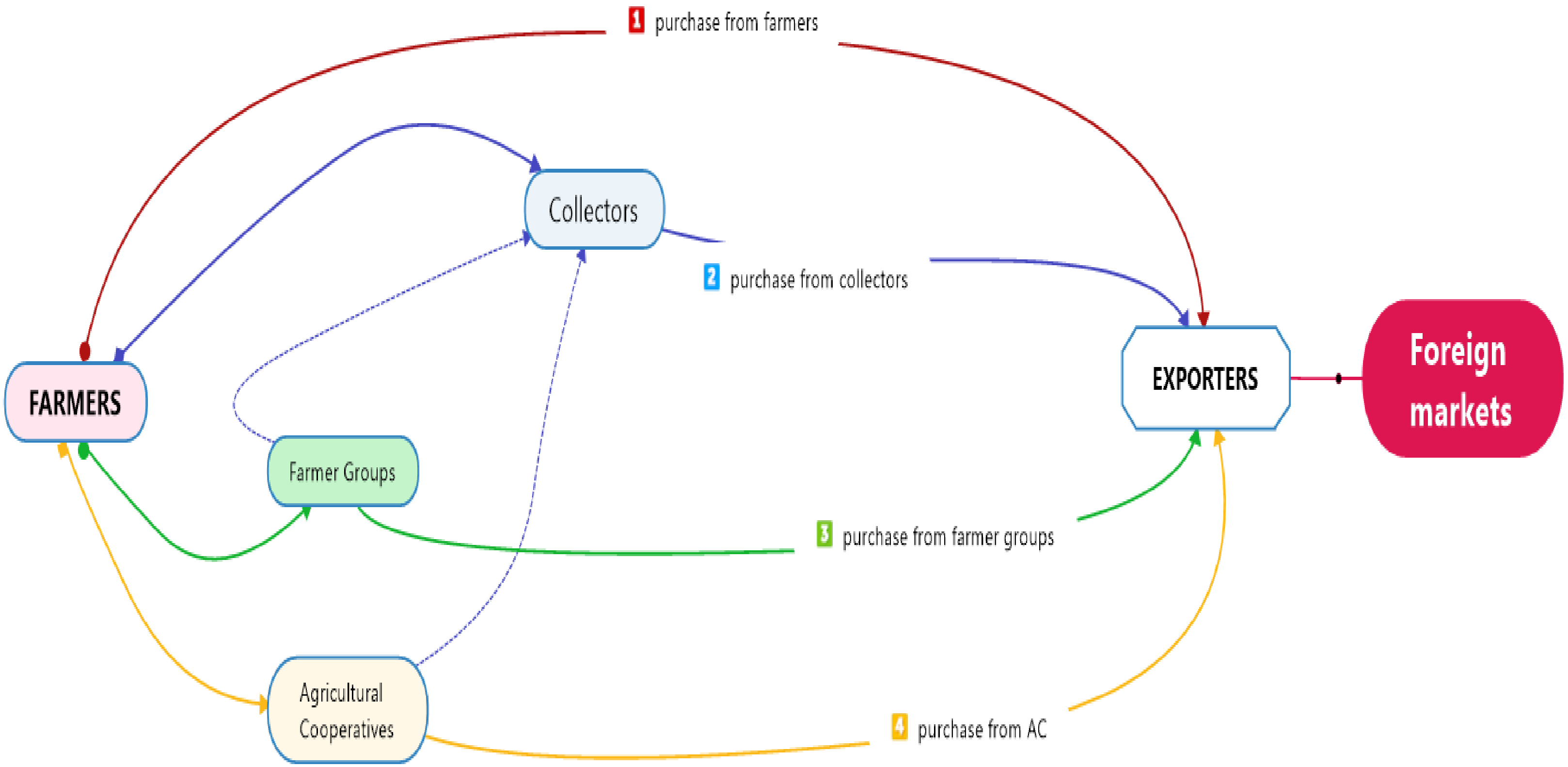

Figure 4. Domestic mango trade – international markets

Source: Author's analysis

Mango losses due to damage along the chain

The total percentage of mango losses (for both quality and quantity losses) along the value chain is high: between 13% and 19% on average in HCMC, and up to 40% in Hanoi. In HCMC, damage levels are around 4–6% at suppliers, 5% at selling or processing places, and between 4% and 8% at buyers. In Hanoi, the loss percentages vary considerably and can range from 0% to 20% (see Table 2).

Based on the views of respondents, losses are caused due to a number of reasons:

1. Physical damage can occur if mangoes collide during transportation.
2. Mango flesh (soft, thin skinned). If mangoes reach ripe levels when harvested, they continue to ripen quickly and are easily damaged without proper packing.
3. Quality issues such as mango flesh being too soft or dark spots visible on the skin of Cat Hoa Loc mangoes.
4. Mangoes harvested with too short a stem, resulting in damaging of the product, such as bruising, sap burn, or broken fruit.
5. Method of storage (i.e. within trucks, package houses).
6. Packing processes. One supermarket highlighted that a key factor causing significant damage was packing mangoes on-farm and sending them to the supplier (trader), then packing again at the supplier and sending them to the retailer. (It would therefore be more efficient to pack just once at the 'on-farm' stage.)
7. In the case of supermarkets, losses may occur due to inappropriate handling by customers.

Table 2. Mango percentage losses along the supply chain

Chain participant		**Loss at supplier level (%)**	**Loss at selling/processing point (%)**	**Loss to buyers (%)**	**Market**
Retailers		From 2% – 3%	About 5%	From 1% – 3%	HCMC
		From 0% – 20%	From 0% – 10%	From 0% – 10%	Hanoi
Foodservice companies/ Processors		About 5%	From 4 – 6%	About 5%	HCMC
		Not available	Not available	Not available	Hanoi
Exporters/Traders		From 5% – 10%	From 3 – 5%	From 5% – 10%	HCMC
Average	**~ 13% - 19%**	**~ 4% – 6%**	**~ 5%**	**4% – 8%**	**HCMC**
		Loss percentages vary considerably			**Hanoi**

Source: Author's analysis

4.3 Future market potential

More than 50% of respondents in this study believed there are opportunities for increasing the demand for Vietnamese mangoes in the future. Approximately 35% considered the future market for Vietnamese mango to have ‘high potential’, and 23% believed it will see ‘gradual growth’. Three survey respondents believed the mango market has reached a saturation point and will be relatively stable in the future. A few interviewees (mainly from wet stalls) did not express an opinion on the future market potential (see Table 3).

Table 3. Response to the views on the future market potential

Potential growth	Responses	Indication
High potential and will continue to grow (especially for Cat Chu variety)	9	“Mango trade is the last couple of years has been increasing – approximately 20% per year;” “Consumers’ demand for Vietnamese mangoes are still high since mango is easy to eat; mango is necessary for Five-fruit tray in Tet holiday; or offering for full-moon days; fruit gifts…”; “Mango market in Vietnam is very potential”; “On average, consumers’ need on mangoes increase 10%-15% yearly”; “Will increase in both fresh mango and process mango”; “Can boost demand on Cat Chu variety due to longer preservation time and good quality”
Continue to grow in the export market but stable in the domestic market	1	“Regarding the domestic market, we think that it could not absorb more because consumers’ demand has already reached its saturation point. In other words, it would not increase in volume in the short-term period. However, the export markets will still grow with high potential.
Gradual growth	6	“Domestic demand of Vietnamese mangoes will continue to grow in the future due to economic development”; “Domestic market will increase in both fresh mango and processed mango”; “Compare to our first established year, mangoes purchased has increased gradually and also many varieties”; “They have noticed the gradual increase, year on year, in mango supply”; “The domestic market for mangoes tends to increase, including both fresh and processed mangoes”.
Reached saturation point or stable	3	“The use of mangoes in their business is stable over the years”; “Regarding the domestic market, we think that it could not absorb more because consumers’ demand has already reached its saturation point”
No response/ No idea	7	-

Source: Author’s analysis

4.4 Challenges and barriers to developing the Vietnamese mango market

Regarding further developing the mango market in Vietnam, respondents were asked to identify specific challenges and barriers relevant to their own business. The interview transcripts were analysed and, overall, six key themes emerged. These themes provide a valuable framework for addressing current industry issues and enabling further development of the mango market in Vietnam.

High quantity and quality losses

Most respondents highlighted the high percentage of losses as one of the major barriers to expanding the Vietnamese mango market. As discussed above, mango losses occur due to damage along the chain, which is caused by physical damage during transportation, inadequate post-harvest storage or handling, and quality issues in the mangoes themselves. Suppliers try to limit physical damage during transportation by harvesting green mangoes ‘because mango is quite soft when ripe and they ripen quickly once reaching the ripening stage’. However, this practice can lead to another problem: immature mangoes, the quality of which is not recognised due to their different appearance.

Stakeholders within the chain tend to transfer financial losses to upper streams along the supply chain (for example, by returning sub-standard or damaged mangoes to suppliers). Some interviewees recommended solutions to the problem of losses, including ‘transport refinement’; ‘packing improvement’; ‘research to overcome mango flesh’s problems’; ‘investment in shipping system and preservation process’; ‘training in best harvesting practice for farmers’; ‘better fruit packing material’; and ‘better post-harvest handling methods’.

Mango shortage during the off season

The majority of respondents are forced to cope with a shortage of mangoes at particular times during the off season. However, demand for mango occurs throughout the year. In every lunar month, the demand for mango is high on certain days. Furthermore, there are number of special days, such as during Lunar New Year and Mid-Autumn Festival, when consumers seek mangoes as gifts or for worship purposes. These annual events occur mainly during the off season, when production is reliant on flowering manipulations. Despite the high demand, mango supply during the off season period is low. This is mainly because flowering manipulation practices do not have a high success rate, particularly for Cat Hoa Loc and Cat Chu mangoes (ACIAR 2014). To overcome mango shortage issues during the off season, research on flowering manipulations or new mango varieties that can boost supplies is recommended. Some respondents in this research stated that they ‘build material areas for themselves, such as link to farmers via cooperatives/group of farmers’ or ‘connecting to mango growers through local mango development programme’ in order to purchase mangoes from several suppliers and to overcome their mango shortage issue in the off season. Other respondents recommended that farmers should ‘grow mango all year round’.

Dealing with smallholder farmers and issues related to the conventional supply chain

Few respondents purchased mangoes directly from farmers. One reason for this is that ‘it is really difficult to make a fixed contract with farmers. When price in the market is higher, farmers will change their minds and sell their mangoes to the open market (e.g. local collectors or traders).’ Relying on the supplies of traders also poses a threat to mango quality, given that the collection system is poor and can mix up mangoes from different growers and of different quality levels. Therefore, some exporters still ‘want to make contracts and collaborate directly with the growers, but to date, this has not been possible'. Furthermore, 'selecting the right mango growers to supply needs to be managed carefully because growers do usually not follow standards strictly'.

Companies that wish to make contracts with farmers (or groups of farmers) believe they need assistance from the government to organise agreements. There may also be other applicable solutions here such as vertical integration of exporters or processors into the production stage, which means exporters/processors can cooperate with farmers from the cultivation stage (for instance, by investing in agricultural inputs like fertiliser). Large-scale retailers can also select a number of good-quality growers as designated direct suppliers and offer sufficient economic incentives for the growers to comply with quality standards.

Higher productivity results in lower-quality mangoes

According to interviewees, the mango trade has been increasing by approximately 20% annually over recent years. However, the quality of mango during this time has decreased, and many believe this is due to farmers over-cropping and not following the production standards. According to one interviewee, 'mangoes' quality is not actually good due to overuse of inputs to achieve a high yield or using less inputs than what mango trees need. I have visited Australia and found that Australian mango trees only bear fruits once a year, so they can have about nine months to rest. In Vietnam, farmers force the trees to bear fruits for up to 10 months a year. This might affect fruit quality.' Furthermore, 'in order to increase profits, producers use chemicals for fruits indiscriminately, affecting the quality, reputation, and consumers' health'. As another interviewee put it, 'mangoes, in general, do not taste as good as before due to unnatural production method'.

An important finding made by ACIAR (2014) is that flowering manipulation always occurs during the rainy season, which can be risky because rain can affect flowering, flower set, and diseases. 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 levels) and result in negative impacts on the environment. Respondents recommended production certification (such as VietGAP and GlobalGAP) as an approach to control the use of chemicals in growing mangoes.

Lack of market information for both domestic and international markets

A significant gap exists in understanding consumer preferences for general fruit and vegetable consumption and for mango in particular. In retailing markets, 'different groups of customers require different varieties of mango'; however, this information is currently unavailable so retailers do not generally know their customer preferences towards mangoes. Therefore, there is a need to conduct a 'consumer study as ranking of preferences, tasting/sensory to understand consumers' demand on mangoes'. Furthermore, it is difficult to obtain consumer needs information from countries that import Vietnamese mangoes, particularly key markets such as South Korea, Japan, the US, and China.

An emerging competition with imported fruits

According to a number of retailers, Vietnamese consumers are increasingly consuming imported fruits, and 'a number of fruit shops specialised in imported fruits are emerging in Ho Chi Minh City'. If domestic suppliers cannot 'get back Vietnamese's trust on Vietnamese fruits by supplying better quality, better standards products', it would represent a major challenge for the Vietnamese fruit industry in general and especially for Vietnamese mango growers into the future.

5 Conclusion and recommendations

5.1 Conclusion

Mango is one of the most prominent tropical fruits in Vietnam, and its production generates a large amount of income for growers and stakeholders in the value chain. The Vietnamese government intends to further increase both mango production and consumer demand in the future, which will be beneficial to smallholder mango growers across Vietnam. However, current information on issues such as market and consumer insights (e.g. retailers, food service companies, manufacturing and ingredient processors, and exporters) including information about seasonality, supply, logistics and economics, and fruit quality parameters, for both fresh and processed mango products, is poorly understood, and this severely inhibits the sustainable growth of mango markets in Vietnam.

This study used qualitative research methods to undertake 26 in-depth interviews with key stakeholders in the Vietnamese mango value chain, and to analyse the market structure in Hanoi and Ho Chi Minh City (HCMC). The results provide an in-depth understanding of market segments, product flows, seasonality, fruit quality parameters, requirements from consumers, mango processing, and mango losses along the chain.

It is evident that Cat Hoa Loc and Cat Chu are the most preferred mango varieties within the HCMC and Hanoi markets respectively. Prices of Cat Hoa Loc and Cat Chu mangoes (along with other mango varieties) depend on season, variety, and a number of quality parameters. Purchase prices in Hanoi are significantly higher than in HCMC.

Given most farmers are smallholders, retailers do not source mangoes directly from them; instead, agricultural cooperatives, farmer groups, collectors, and wholesalers/traders act as intermediaries between farmers and consumers. Current practices in terms of storage and transportation along mango supply chains have resulted in high levels of damage. In conclusion, there are opportunities to develop the MRD mango value chain in the future by implementing a range of interventions, as outlined above, to increase both mango demand and value.

5.2 Recommendations

After identifying challenges and barriers related to mango buying and selling activities, respondents were also asked to giving recommendations to overcome these challenges and barriers. While a number of retailers, exporters, traders, and food service companies who have their own product quality standards stated that they didn't require further quality assessment information, others needed more information regarding pesticide residues and maturity of mango, mango flesh quality and ingredients, and mango varieties and origin. In addition to quality information, all respondents were keen on information about the production area within the MRD (to assist with sourcing the product) and market information (consumer tastes and needs), while exporters required access to information about targeted markets.

Many respondents recommended applying a QR code to mango in the future. One retailer in HCMC said: 'In my opinion, when having QR code (logo), customers will feel more secure when buying.' Another retailer in HCMC confirmed that 'customers will feel more secure when buying products that have QR code'. One retailer in HCMC recommended QR code contents should contain the product name, planting process, place of origin, weight, Brix degree, sowing date, harvest date, and expiration date. One exporter suggested that QR codes should contain producer information, production standards, and the products' outstanding features; however, another exporter did not believe that farmers were able to work with technologies such as QR code or blockchain because 'it's too complicated for them'. A retailer also believed that QR codes would help build customer trust; however, QR codes would add cost and the majority of customers are not concerned with traceability (because they trust retailers). Therefore, as highlighted by one retailer, 'in order to introduce traceable products effectively, suppliers should send their staff to introduce traceable products (how to scan code…) to customers (especially on weekends when there are a lot of customers)'.

Interestingly, the recommendations made by Hanoi interviewees about the QR code strategy were different from HCMC. Regarding the question 'Do you think a mango QR code strategy could better connect consumers with mango growers?', no respondent in Hanoi answered 'yes'. Three answered 'maybe' and one wet market stall answered 'no'. Conversely, interviewees in Hanoi paid much more attention to information on Vietnamese mangoes. Specifically, seven out of eight Hanoi respondents confirmed that 'it would be beneficial to their business to have access (online or other) to more information about Vietnamese mangoes'. Origin, market price, and quality were the three areas of information that mango sellers in Hanoi sought most. Based on their experiences, respondents in this survey also provided a number of recommendations to promote the domestic mango market. These were:

- Apply technologies to improve the effectiveness of processes. For example, some traders 'still do grading by hand, which is labour-consuming and might not be consistent'.
- Use reality television for marketing, whereby contestants attend the planting areas to both work and introduce mangoes to the public.
- Establish and strengthen associations in Vietnam to sponsor farmers in agricultural production and promote product development programs.
- Align standards of pesticide residues in Vietnam with other countries, according to international standards.
- Build mango planting areas with traceable origin codes, as well as mango planting areas used by exporters.
- Promote organisations of harvesting and post-harvest handling 'to ensure quality, safety and appropriate ripeness when mangoes are shipped to distribution channels' (Hanoi fruit store); when selecting mango farmers to supply, retailers need to better manage them, as farmers do not always follow standards.
- 'Organise a distribution system for mangoes from the South to the North', as one Hanoi fruit store recommended.

6 References

ACIAR. (2014). Evaluation of agribusiness research and development opportunities for tropical fruit in southern Vietnam (AGB-2013-018). Small research and development activity (SRA). Australian Centre for International Agriculture Research (ACIAR).

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).

7 Appendices

7.1 Retail interview checklist

(The following information can be filled before or after the interview)

- Company name:______________ Retailer name (for wet market stall): __________
- Address: ____
- Respondent name:__________________________ Position:
- Email/social media/phone：

Interviewer note:

- Remember to have **a formal introduction**: provide project Information Sheet and Informed Consent documents to be signed.
- Briefly explain the project, the institutions (SCAP, SIAEP, Griffith University, University of Adelaide), and introduce the people who are in the interview team.
- Thank the respondent/s for their time and advice we will be happy to share the information from the final study.
- Kindly ask the respondent/s if they are willing to be contacted again regarding the final report:

  1. YES □ 2. NO □

- Kindly explain that to help the team write up this interview and prepare our report, may we record this interview? Please know we will delete the recording after the transcript has been completed:

  1. YES □ 2. NO □

*If yes, please say "**THANK YOU**" and if NO again say thank you and we will not record.*

I. GENERAL INFORMATION

Q1. Can you share with me the role of mango in your business and the history or journey? Do you have a trademark/brand for the mango you sell?

For example: When did your business start trading mangoes ………….

How many stores do you have…….

Q2. What views do you have regarding the mango market in Vietnam?
(Increase/decrease/saturation…)

Do you see opportunities for increasing demand by consumers for Vietnamese mangoes in general and any particular variety? In which market segments do you think these mangoes in Vietnam will be most successful? *(For example, Domestic market? Supermarket? Specialty high-end fruit store chain? E-commerce? Traditional retailing?)*

Q3. In your opinion, what are the biggest challenges and barriers to the growth of domestic mangoes in HCMC/Hanoi market? Can you recommend priorities or strategies to address them?

Record a maximum of two challenges/barriers. Use the following items to prompt the respondent if needed:

> *Quality; Seasonality; Appearance; Price; Taste and smell; Competing domestic mangoes; Transport and cold chain logistics; place of origin authenticity; post-harvest treatment, etc.*

Value chain	Challenges/barriers	Recommendations
Retailers	1.	1.
	2.	2.

II. TRADING INFORMATION

Q4. The company's annual purchase volume of processed/fresh mango: Fresh: ________ (tonnes) Processed: ________ (tonnes)

Variety	Volume (%)	Average purchase price (VND/kg)	Main suppliers and their percentage	Main sources *(Province if domestic or Country if international)*		Variety's specific quality problems	Competitive advantages/ disadvantages with other varieties available in the domestic market
				Purchase	**Selling**		
1.							
2.							
3.							
4.							
5.							
	100.00%						

Q4.1 How did you find your current suppliers of local mangoes? Do you have formal contracts with them? How confident are you with the quality standard of mangoes from your suppliers? What specific quality requirements do you have for your suppliers?

Q4.2 What are the main packaging sizes for your mango purchase and sale?

Q4.3 What are the main transportation means for mangoes you purchase from the suppliers?

Q5. What are the average sale prices of local mangoes for your business during the year (please indicate in the following graph for each month)?

Q6. Could you please describe how you assess mango quality?

Q6.1 Do you think it would be beneficial to your business if you have access to more information such as a quality assessment manual, guide or checklist provided by researchers or industry bodies?

Q6.2 If yes, in which area of quality assessment do you need most?

Q7. Where in the value chain do you think mangoes incur the most damage? How does the damage happen? Could you please estimate the percentage of losses for your business?

From your suppliers to you _____ %?

From you to your buyers _____ %? or At your shop/selling places ______%?

Q8: In general, how long does it take to sell all of your mangoes (between the buying date to all sold date)? If it takes longer than normal, how do you store them?

Q9: What did you do with damaged mangoes, over-ripe mangoes, wasted mangoes… (which cannot be sold)?

III. CONSUMPTION INFORMATION

Q10. What are the major demographic characteristics (age, gender, occupation, income, etc.) of your customers buying the mangoes?

- Age: 1. Young □ 2. Middle age □ 3. Old □
- Gender: 1. Female □ 2. Male □
- Occupation: 1. Blue-collar □ 2. White-collar □
  - 3. Students □ 4. Housewives □
- Income: 1. High income □ 2. Middle income □ 3. Low income □
- Education: 1. High level □ 2. Middle level □ 3. Low level □

Q11. In your opinion, what characteristics are important to consumers when they buy mangoes in your store (only provide hints if necessary: price, variety, size, aroma, sweetness, ripeness, etc.)?

Q12. Does your business use QR Codes to interact with fruit consumers? If no, please tell us the reason.

Q12.1 If yes, can you describe this activity?

Q12.2 Do you think a mango QR code strategy could better connect consumers with mango growers?

Q12.3 If yes, do you have any advice on what content in the QR code might work? (e.g. production place, how long to stay fresh, production standard, etc?)

IV. OTHER INFORMATION

Q13. Do you think it would be beneficial to your business to have access (online or other) to more information about Vietnamese mangoes? If yes, what information would be helpful to your business?

Q14. Do you have any final comments or questions regarding Vietnamese mangoes?

Q15. In the near future, how could our project work with your firm/organization?

For example, would you consider-marketing/showcasing Đồng Tháp/Tiền Giang mangoes in your business, such a special dessert/drink/cocktail promotion?

________________END OF THE CHECKLIST________________

<u>Interviewer note:</u>

- Advise this now concludes the discussion (turn off the recorder, if necessary) and stand up.
- Thank the person/s for their time, shake hands with the people you have been interviewing.
- **IMPORTANT!!!**
  + Go to a coffee shop with your research partner.
  + Sit quietly and review your notes, complete any sentences and add additional thoughts that come to mind from the interview.
  + Staple the business card to the interview sheet.
  + Within 24hours – please type up your notes to solidify your thoughts and recollections from the interview.

7.2 Processor/food service interview checklist

(The following information can be filled before or after the interview)

- Company name:
- Address: ____
- Respondent name:__________________________ Position:
- Email/social media/phone：

Interviewer note:

- Remember to have **a formal introduction**: provide project Information Sheet and Informed Consent documents to be signed.
- Briefly explain the project, the institutions (SCAP, SIAEP, Griffith University, University of Adelaide), and introduce the people who are in the interview team.
- Thank the respondent/s for their time and advice we will be happy to share the information from the final study.
- Kindly ask the respondent/s if they are willing to be contacted again regarding the final report:

  1. YES □ 2. NO □

- Kindly explain that to help the team write up this interview and prepare our report, may we record this interview? Please know we will delete the recording after the transcript has been completed:

  1. YES □ 2. NO □

*If yes, please say "**THANK YOU**" and if NO again say thank you and we will not record.*

I. GENERAL INFORMATION

Q1. Can you share with me the role of mango in your business and the history or journey? Do you have a trademark/brand for the mango you USE?

For example: When did your business start trading mangoes ………….

How many factories do you have ………

Who are your main customers…..

Q2. What views do you have regarding the mango market in Vietnam? *(Increase/decrease/saturation…)*

Do you see opportunities for increasing demand by consumers for Vietnamese mangoes in general and any particular variety? In which market segments do you think these mangoes in Vietnam will be most successful? *(For example, Domestic market? Supermarket? Specialty high-end fruit store chain? E-commerce? Traditional retailing?)*

Q3. In your opinion, what are the biggest challenges and barriers to the growth of domestic mangoes in HCMC/Hanoi market? Can you recommend priorities or strategies to address them?

Record a maximum of two challenges/barriers per actor. Use the following items to prompt the respondent if needed:

> *Quality; Seasonality; Appearance; Price; Taste and smell; Competing domestic mangoes; Transport and cold chain logistics; place of origin authenticity; post-harvest treatment, etc.*

Value chain	Challenges/barriers	Recommendations
Processor/ Foodservice	1.	1.
	2.	2.

II. TRADING INFORMATION

Q4. The company's annual purchase volume of processed/fresh Mango: Fresh (Input): ________ (tonnes) Processed (output): ________ (tonnes)

Variety	Volume (%)	Average purchase price (VND/kg)	Main suppliers and their percentage	Main sources *(Province if domestic or Country if international)*		Variety's specific quality problems	Competitive advantages/ disadvantages with other varieties available in the domestic market
				Purchase	Selling		
1.							
2.							
3.							
4.							
5.							
	100.00%						

Q4.1 What are your main processed products of mangoes? How is your capacity of processing them?

Q4.2 How did you find your current suppliers of local mangoes? Do you have formal contracts with them? How confident are you with the quality standard of mangoes from your suppliers? What specific quality requirements do you have for your suppliers?

Q4.3 What are the main packaging sizes for your mango purchase and sale?

Q4.4 What are the main transportation means for the mango your purchase from the suppliers?

Q5. What are the average sale prices of local mangoes for your business during the year (please indicate in the following graph for each month)?

Q6. Could you please describe how you assess mango quality?

Q6.1 Do you think it would be beneficial to your business if you have access to more information such as a quality assessment manual, guide or checklist provided by researchers or industry bodies?

Q6.2 If yes, in which area of quality assessment do you need most?

Q7. Where in the value chain do you think mangoes incur the most damage? How does the damage happen? Could you please estimate the percentage of losses for your business?

From your suppliers to you _____ %?

From you to your buyers _____ %? or At your processing places ______%?

Q8. (*Ask this question if the respondent is a foodservice provider*), what are the major demographic characteristics (age, gender, occupation, income, etc.) of your customers buying the mangoes?

- Age: 1. Young □ 2. Middle age □ 3. Old □
- Gender: 1. Female □ 2. Male □
- Occupation: 1. Blue collar □ 2. White collar □ 3. Students □ 4. Housewives □
- Income: 1. High income □ 2. Middle income □ 3. Low income □
- Education: 1. High level □ 2. Middle level □ 3. Low level □
-

III. OTHER INFORMATION

Q9. Do you think it would be beneficial to your business to have access (online or other) to more information about Vietnamese mangoes? If yes, what information would be helpful to your business?

Q10. Do you have any final comments or questions regarding Vietnamese mangoes?

Q11. In the near future, how could our project work with your firm/organization?

For example, would you consider-marketing/showcasing Đồng Tháp/Tiền Giang mangoes in your business, such a special dessert/drink/cocktail promotion?

________________END OF THE CHECKLIST________________

Interviewer note:

- Advise this now concludes the discussion (turn off the recorder, if necessary) and stand up.
- Thank the person/s for their time, shake hands with the people you have been interviewing and present the small gift.
- **IMPORTANT!!!**
  + Go to a coffee shop with your research partner.
  + Sit quietly and review your notes, complete any sentences and add additional thoughts that come to mind from the interview.
  + Staple the business card to the interview sheet.
  + Within 24hours – please type up your notes to solidify your thoughts and recollections from the interview.

7.3 Exporter/trader interview checklist

(The following information can be filled before or after the interview)

- Company name:
- Address: ____
- Respondent name:___________________________ Position:
- Email/social media/phone：

Interviewer note:

- Remember to have **a formal introduction**: provide project Information Sheet and Informed Consent documents to be signed.
- Briefly explain the project, the institutions (SCAP, SIAEP, Griffith University, University of Adelaide), and introduce the people who are in the interview team.
- Thank the respondent/s for their time and advice we will be happy to share the information from the final study.
- Kindly ask the respondent/s if they are willing to be contacted again regarding the final report:

  1. YES □ 2. NO □

- Kindly explain that to help the team write up this interview and prepare our report, may we record this interview? Please know we will delete the recording after the transcript has been completed:

  1. YES □ 2. NO □

*If yes, please say "**THANK YOU**" and if NO again say thank you and we will not record.*

I. GENERAL INFORMATION

Q1. Can you share with me the role of mango in your business and the history or journey? Do you have a trademark/brand for the mango you sell?

For example: When did your business start trading mangoes …………

What market do you sell mangoes to? □ Domestic (%) □ Foreign market? (%)

If foreign, what are main countries?

……………………………………………………………………………

Major domestic buyers of the business?

1. □ Wet market retailers (%); 2. □ Supermarkets (%);

3. □ Specialty fruit stores (%); 4. □ Foodservice (restaurants, hotel…)(%);

5. □ E-commerce (%);

Q2. What views do you have regarding the mango market in Vietnam?
(Increase/decrease/saturation…)

Do you see opportunities for increasing demand by consumers for Vietnamese mangoes in general and any particular variety? In which market segments do you think these mangoes in Vietnam will be most successful? *(For example, Domestic market? Supermarket? Specialty high-end fruit store chain? E-commerce? Traditional retailing?)*

Q3. In your opinion, what are the biggest challenges and barriers to the growth of domestic mangoes in HCMC/Hanoi market? Can you recommend priorities or strategies to address them?

Record a maximum of two challenges/barriers per actor. Use the following items to prompt the respondent if needed:

> *Quality; Seasonality; Appearance; Price; Taste and smell; Competing domestic mangoes; Transport and cold chain logistics; place of origin authenticity; post-harvest treatment, etc.*

Value chain	Challenges/barriers	Recommendations
Exporters/Traders	1.	1.
	2.	2.

II. TRADING INFORMATION

Q4. The company's annual purchase volume of processed/fresh Mango: Fresh: ________ (tonnes) Processed: ________ (tonnes)

Variety	Volume (%)	Average purchase price (VND/kg)	Main suppliers and their percentage	Main sources *(Province if domestic or Country if international)*		Variety's specific quality problems	Competitive advantages/ disadvantages with other varieties available in the domestic market
				Purchase	**Selling**		
1.							
2.							
3.							
4.							
5.							
	100.00%						

Q4.1 How did you find your current suppliers of local mangoes? Do you have formal contracts with them? How confident are you with the quality standard of mangoes from your suppliers? What specific quality requirements do you have for your suppliers?

Q4.2 What are the main packaging sizes for your mango purchase and sale?

Q4.3 What are the main transportation means for the mango your purchase from the suppliers?

Q5. What are the average sale prices of local mangoes for your business during the year (please indicate in the following graph for each month)?

Q6. Could you please describe how you assess mango quality?

Q6.1 Do you think it would be beneficial to your business if you have access to more information such as a quality assessment manual, guide or checklist provided by researchers or industry bodies?

Q6.2 If yes, in which area of quality assessment do you need most?

Q7. Where in the value chain do you think mangoes incur the most damage? How does the damage happen? Could you please estimate the percentage of losses for your business?

From your suppliers to you _____ %?

From you to your buyers _____ %? At your warehouse ______%?

Q8. ***(Ask this question if the respondent also plays a processor role, if not skip to the question No.9),*** **what are your main processed products of mangoes? What is your mango processing capacity?**

Q8.1 Does your business use QR Codes to trace your products? If no, please tell us the reason.

Q8.2 If yes, can you describe this activity?

Q8.3 Do you think a mango QR code strategy could better connect consumers with mango growers/processors?

Q8.4 If yes, do you have any advice on what content in the QR code might work? (e.g. production place, product specifications, production standard, etc?)

III. OTHER INFORMATION

Q9. Do you think it would be beneficial to your business to have access (online or other) to more information about Vietnamese mangoes? If yes, what information would be helpful to your business?

Q10. Do you have any final comments or questions regarding Vietnamese mangoes?

Q11. In the near future, how could our project work with your firm/organization?

For example (for retailers and foodservices), would you consider-marketing/showcasing Đồng Tháp/Tiền Giang mangoes in your business, such a special dessert/drink/cocktail promotion?