Activity 1.5

This case study forms part of the *2018–21 ACIAR Improving smallholder farmer incomes through strategic market development in mango supply chains in southern Vietnam* project

Activity:	Value chain study – Fresh
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1 Study objectives

1.1 Overview

The objective of this study was to gain a clear understanding of the current value chains for fresh mango from Dong Thap and Tien Giang, through a study of existing literature and semi-structured interviews. The study has primarily focused on Cat Hoa Loc and Cat Chu varieties to domestic markets in Ho Chi Minh City (HCMC) and Hanoi.

1.2 Methodology

The following activities were undertaken as part of this study:

- The value chain participants (and interviewees) with Vietnamese partners for collaboration in the project were defined and confirmed.
- Draft value chain checklists to capture information with the chains were prepared. Two checklists—one for collectors/traders and another for packhouse, retailer, wholesaler, and exporter (see Appendix 2)—were developed.
- A workshop to train researchers in how to undertake semi-structured interviews for value chain research activities was conducted.
- Field research for fresh value chain studies from three packhouses in Dong Thap and Tien Giang was undertaken.
- A value chain map resulting from the data captured in value chain studies was developed and analysed. After interviewing, group discussions were held to review the information gathered, missing information was identified, and follow-up information was collected from interviewees by phone.
- An update was provided by engaging with individual stakeholders to share value chain mapping insights, highlight the key opportunities identified, and discuss capacity and willingness to implement an intervention.

2 Background

2.1 Production in Dong Thap and Tien Giang provinces

Southern Vietnam is a key mango growing area, accounting for 81% of the area and 92% of the national production. The concentrated planting area in the Mekong Delta (accounting for 57% of the area compared to the whole region 6), followed by the Central Coast (17%), the South East (22%), and the Central Highlands (4%). After a period of strong growth in area and output (from 2001 to 2009); From 2010 to the present, the area of mango has stabilized over 70 thousand hectares, with a current annual output in excess of 600,000 tons. The localities with the largest mango planting areas are Dong Nai, An Giang, Dong Thap, and Tien Giang. Many places have formed concentrated growing areas, such as for Cat Chu mango (Dong Thap), Cat Hoa Loc mango (Tien Giang), "Siem Num" (Vinh Long), R2E2 mango (Khanh Hoa), and Green Tuong mango (An Giang) (MARD, 2019).

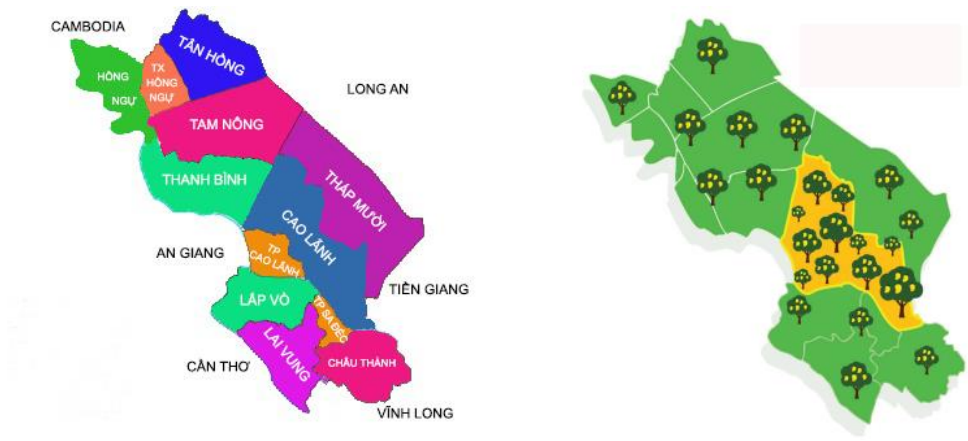

Figure 1. Administrative maps and mango distribution maps in Dong Thap

Source: Author's analysis

The total area of production in Dong Thap in 2018 was estimated at 9,680 ha, with output at approximately 126,585 tons. The main mango varieties were Cat Chu, accounting for 44.5% of the area, Cat Hoa Loc, (21.3%), and green Elephant mango (17.6%), with other varieties making up the remainder of 16.6%. Production was distributed throughout Dong Thap province but mainly concentrated in Cao Lanh district and Cao Lanh city (Dong Thap Dard, 2019).

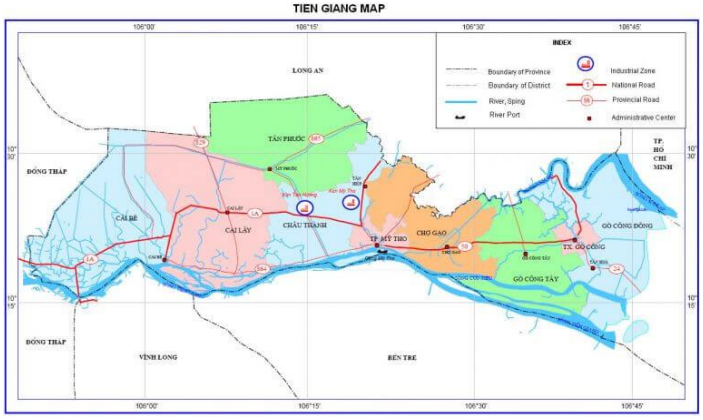

Figure 2: Administrative maps and mango distribution maps in Tien Giang

Source: Author's analysis

Production area in Tien Giang is approximately 4,710 hectares, accounting for 11% of the total production area in the Mekong Delta. The estimated production (106,192 tons) in this area accounts for 20.9% of the total production in the Mekong Delta. This is significantly higher than Dong Thap on a production per ha basis. This may be partly attributed to the varied mix in the province. Production is mainly concentrated in Cai Be and south of Cai Lay districts (DARD of Tien Giang, 2019).

2.2 Retail market

Most of the mango consumed in Vietnam are distributed through traditional markets. About 80% of Vietnamese consumers still buy fresh fruit, including mango, from these traditional markets. The remaining 15% is sold through supermarkets and small retail shops across the country, mostly in the larger cities. Modern distribution channels (such as premium shops) supply to a small number of consumers who demand high quality products. This mostly occurs in Hanoi and HCMC (*Marketing report for Australia Mango and Solutions for promoting to export Vietnamese mango to Australia, 6 - 2016*).

The domestic retail market can be divided into four market segments:

1. Supermarkets that are more than 250m^2 in size and selling both consumer goods and fruit and vegetables.
2. High-class fruit shops that are retailers specialising in selling high quality fruit and vegetables only.
3. Retail markets that are fruit and vegetable retailers selling fruit and vegetables in a general market (traditional as well as wet markets retailers).
4. Pushcart, sidewalk shops, and travelling street vendors.

In recent years, both the per capita income and living standards of Vietnamese people have improved significantly. However, buying habits (particularly with fresh fruit) have not kept pace with the western trend of supermarket domination. Rather, traditional markets and street vendors are still the major sellers of fruit and vegetables in Vietnam.

In 2010, the country had about 8,500 markets, more than 500 supermarkets, and nearly 100 shopping centres. By 2017, there were 8,539 markets, 957 supermarkets, 189 commercial centres, and thousands of convenient/specialised stores. The traditional retail channels still dominate, accounting for 83% of the market, while modern retail channels account for about 17%. However, the modern retail chains are growing rapidly (particularly in the big cities) in Vietnam, with 7,012 stores, including 4,541 minimarts and food stores. This shows a shift in the trend of small stores in recent years. Vietnam's retail market has great potential for development due to its large population size (more than 93.7 million people) and young population structure (60% of the population is aged 18-50). According to the reports of the local Department of Industry and Trade, it is forecasted that household spending will increase by 10.5% per year on average and will reach USD 714 per month by 2020, while the coverage of the modern retail system will be lower than many countries in the region.

For the domestic market, mangoes are mostly sold to traders in other provinces like HCMC, Vinh Long, KienGiang, and Hanoi through the sale of primal mangoes (not categorized). Farmers sell directly to local traders, which are then on-sold to traders from outside provinces. A percentage of the fruit is sold to resellers in region or sold directly to consumers.

Table 1. Market for mango output

Trader	Percentage (%)
Collector	92,32
Retailer	4,11
Consumer	3,57
Total	100

Source: Author's analysis

In Tien Giang, 48% of production is supplied to the domestic market (mainly Cat Hoa Loc) and 52% is sent for export. Most (40.8%) Cat Chu variety mangoes are consumed domestically, partly through a value-added products processing company for export (23.5%) with the remainder mainly exported to China (35.7%). Taiwanese variety is mostly exported to China, with very small amounts going to the domestic market (Trinh Duc Tri, 2015).

2.3 Seasonality

Vietnam's main harvest period overlaps that of Thailand and the Philippines, which are both significant exporters. A floral manipulation program has allowed harvest from October to March. This practice is also common in other countries, such as Thailand and Philippines.

Table 2. Mango seasonality in Vietnam and some other main producers

	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: Author's analysis

Note: Off- season in Viet Nam Main season in Viet Nam Season in other countries

There are more than 20 varieties of mango in the South of Vietnam, including Cat Hoa Loc, Cat Chu, Thanh Ca, Chau Nghe, Thom, Xiem Núm, Ghep (Buoi), Dai Loan (Taiwanese), Cat Trang, Cat Den, Canh Nong, Tuong, Coc, Tu Quy, and Uc (Australian R2E2 variety). Among these, Cat Hoa Loc is the most well-known, followed by Cat Chu, "R2E2", and Dai Loan in the Mekong River Delta and Canh Nong and Australian varieties in the south-central coast.

Off-season flowering has helped farmers produce regularly throughout the year, which has gone some way toward helping smooth seasonal fluctuations and reducing the price lows caused by high seasonal production (Nguyen Thanh Tai (2018). However, this supply is not always regular and further research is required to improve its regularity (DARD of Dong Thap, 2018).

Lengthening mango production windows has broad government support. The Ministry of Agriculture and Rural Development issued Decision No. 1648 / QD-BNN-TT on July 17, 2013, approving the planning of scattered production for key fruit trees (including dragon fruit, mango, rambutan, durian, and longan) in the South of Vietnam up to 2020. Scattered production is becoming an important mode of production for fruit trees in the provinces, especially in the Mekong Delta provinces. By the end of 2018, the total area of five fruit-spreading trees was 122,352 hectares. So far, 59,374 hectares have been planted, accounting for 56% of the total harvest area. The total output of 1,086.047 tons accounts for 56.5% of total production. The harvested area of mango orchards is 46.4% of this area, of which 34.1% is recorded as production from this harvested area (MARD, 2019).

Prices average between 10,000 to 12,000 VND per kilogram during the on season and around 20,000 VND during the off season for Cat Chu, and up to 27,000 VND per kilogram for other varieties. The profit from off-season mangoes is up to 200-220 million VND/ha, while the on-season mango profit is from 150-160 million VND/ha (2019). Profitability of off-season production is 1.5-2 times higher than on-season production (Dong Thap Agriculture Department, cungcau.vn).

3 Mango value chain

3.1 Mango value chain review

Product flow

In 2013, Cat Chu mango accounted for 60% of total mango production in the Mekong Delta, of which some (61%) were exported to China via informal cross-border trade. The variety has strong market support in the Hanoi market, partly because they are cheaper than the Cat Hoa Loc variety. For similar reasons, Cat Chu mangos are very popular with processors (Vo Thanh Loc, 2014).

The Hoa Loc variety accounts for 23.2% of production in the Mekong Delta, of which 79.6% goes to the domestic market and 20.4% goes to export. The main domestic market is Ho Chi Minh City. In addition, the price of Cat Hoa Loc mango is usually twice as expensive as Cat Chu. Therefore, they are consumed mainly in fresh form rather than processed products. The main export destination is China, through unofficial border trade (Vo Thi Thanh Loc, 2014).

The key value chain actors include farmers/cooperatives, local collectors, traders, wholesalers in the city, regional traders, retailers (small and large retailers), processors, exporters, and domestic consumers (Nguyen Duy Duc, 2015). We identified seven different mango supply chain channels, described below.

Channel 1: Farmers/cooperatives to domestic consumers

Farmers and cooperatives selling directly to the consumers via local markets, or road-side stalls. By using this channel, they can achieve a 10-20% higher price than selling to collectors. However, this is demanding on time and has limitations on the quantity of fruit that can be sold. Approximately 3% of farmers in the three provinces are selling mango via this channel.

Channel 2: Farmers/cooperatives to Exporters

The data surveyed in 2013 by Duong Ngoc Thanh (Can Tho University) estimated no more than 5% of mango in Dong Thap was exported via this channel.

Channel 3: Farmers/cooperatives to Collectors to Processors to Domestic Consumers

There are few mango processors in MRD and other provinces as Dong Nai, HCMC. In this channel, the role of collectors is very important as they are responsible for sourcing and supplying the quality of the product that the processors require.

Channel 4: Farmers/cooperatives to Collectors to Processors to Exporters

This channel is similar to Channel 3 but mango products are mainly frozen or canned for export.

Channel 5: Farmers/cooperatives to Collectors to Retailers to Domestic Consumers

In this channel, fruit was graded by collectors after purchasing from farmers/cooperatives. Less than 25% of produce is estimated to follow this channel.

Channel 6: Farmers/cooperatives to Collectors to Wholesalers to Retailers to Domestic Consumers

In this channel, most fresh mango fruit (estimated up to 50%), including three selected mango varieties, were purchased by collectors then transported to wholesalers for grading and packaging and to retailers for domestic consumption in big cities, in supermarkets.

Channel 7*: *Farmers/cooperatives to Collectors to Wholesalers to Exporters

This channel model is used for only fresh fruit markets like China (fewer technical requirements) or New Zealand, Taiwan, Japan, and Korea (high technical requirements), with the estimation that less than 15% of total mango in the region goes through this channel. Main mango varieties in this channel are Cat Hoa Loc, Dai Loan, and Cat Chu.

Farmer

In Tien Giang and Dong Thap, the majority of farmers own areas from 0.5-1.0 ha (58.8% and 60%, respectively) while 12% farmers have areas greater than 1.0 ha. In Vinh Long, 53.3% of farmers have less than 0.5 ha of mango, with the smallest planting being 300m^2.

There are some examples of cooperatives consisting of small groups of growers, such as Cat Hoa Loc Cooperative. Collectively, these have farm areas greater than 100 ha.

According to Vo Thanh Loc (2014), farmers earn between 40% and 70% of total value added per kilogram in the whole in-country value chain, and carry all of the production risks.

Nissen et al (2008) found that 50% of farmers sold their fruit through the same channels each year, while the other 50% tended to seek change. Reasons for farmers selling to particular collectors were:

- A long-term relationship between farmer and collector.
- The collector bought the farmer's product at a higher price.
- There was a lower chance that fruit would be rejected by the collector.

Farmers' reasons for selling direct to a particular wholesaler included:

- A high price was paid for their fruit.
- There was a low rejection rate.
- There was a long-term business relationship (although this was less frequently cited compared to collectors).

Farmers' reasons for selling to retailers included:

- That there was a market for otherwise rejected fruit.
- They could gain a higher price.
- There were low transport costs.

Reasons for selling to the cooperative included:

- Farmers could gain a higher price for fruit and payment for the exact weight of fruit.

Table 3. Mango profitability received by farmers, per season, 2019

Variety	Early main season (VND per kg)	Peak season (VND per kg)	End of main season (VND per kg)	Off season (VND per kg)
Cat Hoa Loc	47,500	35,000	39,500	65,000 -70,000
Cat Chu	14,000-16,000	9,000-11,000	12,000-13,000	18,000

Source: Author's analysis

Production expenses for Cat Hoa Loc varied from VND 50- 70 million/ha, with profit varying from VND 60-130 million/ha (average VND 95 million/ha). Some farmers with larger plantations, which were able to get better economies of scale, reported profits of VND 200-230 million/ha. The production expenses for Cat Chu were lower, at around VND 40-60 million/ha with profit varying from VND 120-180 million/ha. Few farmers reported more than VND 200 million/ha but the average profit for Cat Chu was VND 150 million/ha (Nguyen Duy Duc et al 2015).

In Dong Thap, Tien Giang, and Vinh Long provinces, farmers obtained information regarding mango from clients (60%), local market (24%), and public communication such as newspapers and television (10%), and others (6%). Consequently, they could get the updated price of mango, fertilisers, chemicals, and materials at a different time in a whole year (Nguyen Duy Duc et al 2015).

Cooperative

Cooperatives play the role of purchasing fruit, transferring technology, liaising with domestic and foreign enterprises, and actively seeking markets for the fruit. Examples such as the Cat Hoa Loc Mango Cooperative has been formed for many years. This cooperative is oriented to enterprise operation. Current operation of cooperatives can be problematic, particularly in defining roles and responsibilities between the cooperative and the individual farmer.

In Cao Lanh district, My Xuong Cooperative has familiarised itself with the collective business model for many years, having many farmers to jointly cultivate and uniformly process to produce quality fruit meeting current food safety standards, while creating an economy of scale to access domestic and export market opportunities. The cooperative acts as a representative enterprise on behalf of its members to negotiate and sign contracts relating to the supply of fruit to customers. This eliminates the intermediary's stage and enables greater profit sharing for its members.

The procedures for establishing a cooperative are complicated and time consuming, so farmers will often opt for the establishment of the simpler model of a mango farmer group. In the farmer group, members can participate, link production, meet food safety and quality standards, and create a large supply base for accessing larger customers. The farmer group model is better developed in Dong Thap and Tien Giang. Many farmer group models have certificated VietGAP standard in Tien Giang and Dong Thap provinces. These include Hoa Long, My Long, Tan Thuan Dong, Binh Thanh, Tan Thuan Tay, Tinh Thoi, and Tan Thanh mango groups.

Collector

Fruit collectors buy and consolidate harvests from farmers. It was reported by local DARD or AEC that the numbers of mango collectors in Tien Giang, Dong Thap, and Vinh Long were estimated at about 100, 60 and 35 respectively. Above half (57.2%) of these had more than six years of fruit business experience. The business size of these collectors differed from as small as 80-100 t/year up to 3,000 t/year. 60% of collectors were private businesses and 40% were small household enterprises. A significant amount also handled other types of fruit as well as mango. Most collectors are local with a small proportion coming from other provinces (Nguyen Duy Duc et al 2015).

Wholesaler

Most wholesalers located at the Ho Chi Minh City wholesale markets purchased mangoes from provincial collectors. However, a few wholesalers purchased mangoes directly from growers, as their fruit was generally cheaper direct (Nissen et al 2008).

There are five food wholesale markets in Ho Chi Minh City but only Thu Duc and Binh Dien wholesale markets are related to fruit business. Thu Duc wholesale market is the biggest (more than 20 ha) in the south of Vietnam. The fresh mango daily trade in the main season is estimated at 150-180 t (5-6% total), including mango from the south central coast and south-eastern provinces.

The Cao Lanh wholesale market in Dong Thap and Cai Be wholesale market in Tien Giang province have about 100 traders at each.

Traders do not use any advanced postharvest treatment systems (such as ripening room, cooling room, labelling). 85.7% traders focused on the domestic market only and 14.3% participated in supplying to exporters. The maximum fruit loss reported for wholesalers is 5%,

mainly due to damage during transportation, loading, unloading, grading, and packing (Nguyen Duy Duc et al 2015).

Most wholesalers verbally agree to terms of trade with collectors and farmers. The purchase price, quantity purchased, and grades are all set during these verbal agreements. However, if a wholesaler purchases the farmer's entire crop, a contract is put in place. About 30% of the agreed purchase price is paid at the time of agreement or when the contract is signed, with the final 70% paid when the crop is received. All transactions undertaken by the wholesalers are in cash (Nissen et al 2008).

Retailer

Retailers purchase fruit from wholesalers, collectors/traders, or farmers to retail to consumers and fall into two categories:

1. Unorganized Retailers: The traditional format of low-cost retailing, including local corner shops, owner-managed general stores, and local markets.
2. Organized Retailers: Trading activities that are undertaken by licensed retailers—that is, those who are registered for sales tax, income tax, etc. These include the publicly traded supermarkets, corporate-backed hypermarkets, and retail chains, privately owned large retail businesses and retail chains, and privately-owned large retail businesses.

The size of retailers is varied across provinces and cities. They can purchase mangoes daily in quantities from a minimum of 5-20 kg (such as a small retailer in the province) up to a maximum of 300-800 kg (such as supermarkets in HCMC). Retailers may source fruit directly from the farmer, regional collectors/traders, and the wholesale markets in major centres. Most retailers source mangoes from main city wholesalers or provincial traders. Retailers are broadly split into supermarkets and small retailers but there is diversity in the market positioning by different supermarkets and small retailers. Some focus on very high quality, while others focus across the quality-price-variety spectrum. The price is also based on fruit quality and season.

Retailers at the end of the chain have to manage product loss, which is higher then than at any other point in the supply chain. Post-harvest losses (e.g. packaging/transport losses) and post-harvest disease are poorly understood. Most mango loss occurs with ripe fruit, so inevitably retailers and consumers end up with a loss that needs to be controlled at other points in the supply chain. The margin that retailers report is about 12-20% from wholesaler price. However, it may be higher during the 1st and 15th day of the Lunar calendar during a month, or some special day like Tet Holiday or national days. The loss reported in small retailers is from 10-12% (with an average of 11%), while the loss reported in supermarkets is about 8-10% (with an average of 9%). The overall average loss of retailers is considered to be 10% (Nguyen Duy Duc et al 2015).

Information

Information flow within the existing chains is problematic and farmers tend to be disconnected from the market and customers. Information flowing down the chain on quality, customer requirements, food safety, and—to a lesser extent—price tends to be poor. This scenario is not uncommon in traditional mango chains and is an impediment particularly in developing modern retail chains.

3.2 Input providers

Production

While farmers in Dong Thap and Tien Giang now have varying amounts of experience, there is still a range of challenges facing them in relation to production.

The density of mango trees in the production area varies. In some places the distance between the trees is about 8m, while in some other households this distance is only 5m to 6m. Due the typically higher density plantings, most trees are quite tall at more than 5m. Due to light competition, pruning to reduce canopy size is rarely practiced.

Irrigation water is sourced from the Mekong River. Some farms have pressurised irrigation systems but most use basic irrigation techniques.

Farmers are responsible for pest and disease management of the crop. Almost all farmers harvest the fruit themselves. If a collector/wholesaler harvests the fruit, the farmer must pay between 2-20% of the total price received for the harvested fruit. Fruit are either handpicked by climbing the tree or harvested using bamboo picking poles with a harvesting device attached (Nissen et al 2008). Although the propagation of production under GAP standards has been applied in many places, the efficiency is still low.

High market prices tend to encourage immature harvesting. However, Nissen, et al. (2008) found that if a grower/farmer harvests too early, only half the market price is paid for the fruit. Similarly, if they harvest too late or fruit are too advanced, only half the market price is paid for the fruit.

Communication

Previous surveys indicated that farmers obtain information via clients (including collector, trader, and packhouse) (60%), local market (24%), and public communication such as newspapers and television (10%) and others (6%). Additional information such as that regarding price updates, fertilisers, chemicals, and materials is sourced throughout the year (Nguyen Duy Duc et al 2015).

Farmers often depend on information about buying prices from traders and packhouses. This was also identified in the Nissen, et al. (2008) study, which found that most farmers find out the price of fruit in the market by asking many wholesalers, collectors, and other farmers. Some will call wholesale agents in the market and some send samples of fruit to the market or visit the market to find out. All farmers said that they share the information that they obtain with other farmers in their area. Most farmers do not know the current prices in the HCMC wholesale markets on any given day,

In some cases, farmers with large planting areas can negotiate with many collectors or traders to choose a good price to sell their mango. However, most farmers with small planting areas usually depend mainly on the buying price of collectors or traders. Therefore, the application of flowering techniques to help farmers be proactive in production, in order to choose a good time of the market to sell at high prices is essential. In addition, it is important for supporting market information on quality and price to be transmitted to farmers through communication channels (such as radio, television).

Finance

Farmers, traders, and packhouses find their own financial resources. This is partially due to the difficulty and barriers of borrowing money from banks and other financial institutions and a complex mortgage system. Many farmers still seek government support by loans at preferential interest rates or extend the payment period to buy inputs such as fertiliser, seed, etc. Traders and packhouses operate under the enterprise law, thus making it difficult to get financial support from the Vietnam government. Business such as input suppliers will often supply products on a credit system to farmers.

The Government issued Decree No. 55/2015 / ND-CP, dated June 9, 2015, on credit policies for agricultural and rural development. It supports the restructuring process of the agriculture sector for enterprises and cooperatives and applying high technology in agricultural production, lending without security assets up to 70%-80% of the value of the linked project in the value chain. Cooperative unions join the linked value chain model (a form of co-operation and association on

the basis of a contract signed between individuals, households, business households, farm owners, cooperative groups and cooperatives, cooperatives and enterprises in a closed chain).

The State Bank has implemented many credit programs, creating conditions for producers and processing enterprises in the field of agriculture in rural areas to access capital with reasonable preferential interest rates and to reduce collateral pressure on agriculture. Commercial banks in co-operation with the Ministry of Agriculture and Rural Development and the Ministry of Science and Technology have been piloting loans to select enterprises to develop linkage models and high-tech applications in agricultural production.

Pesticide and chemical

Many chemical companies, such as Loc Troi Group, HAI company, and SPC company, have their own agronomists to supply advice on pesticide usage. Advice is also supplied from chemical companies, local extension officers, and research institutions. Chemical inputs are a significant part of the mango grower's production costs, with some farmers stating that this cost represents 50% to 70% of total expenses. Misuse of pesticides is widespread in the mango industry. Misuse comes in the form of over- or under-dosing a product, using the wrong (and sometimes banned) product, using counterfeit products, excessive usage, no adherence to withholding periods, poor application systems, and a lack of personal protective equipment for operators. While this is recognised as an industry problem at the government level, it is currently not being driven by the retailers so there is little incentive for farmers to change practices.

Infrastructure

Transportation: from farm to packhouses, motorbike or small trucks are commonly used. Produce from the packhouse tends to be sent in larger trucks (mostly unrefrigerated) or sometimes in containers. There are no industry standards for loading, transportation, and temperature management of the product.

Cool chain: Generally, for export the cool chain does not commence until after the packhouse or after phytosanitary treatment. No cooling standards are currently being applied to export consignments.

Export Infrastructure: The Mekong River Delta is well positioned for export development. It has adequate road systems to allow the product to be transported to packhouses in a timely manner. Service providers, vapour heat treated (VHT), and irradiation plants are readily accessible, and port and airfreight facilities are within less than a day's transportation.

Extension services

On March 1, 1993, the Government issued Decree No. 13 / ND-CP on agricultural extension through which the official agricultural extension system was formed and developed. After 26 years of operating in parallel with the renovation process of the agricultural sector, the agricultural extension organisation has constantly developed and grown. It has become a synchronous system directed by the central government through to the village, closely linked with farmers in rural areas. At present, all 63 provinces and cities directly under the Central Government have Agricultural Extension Centres (or Agricultural and Fishery Extension Centres) under the Department of Agriculture and Rural Development.

The main activities are training and hands-on practice, advice and extension services, information and communication, developing demonstration models, and dissemination. The extension system is in the process of transitioning from a production-oriented system to a market-oriented service system, which includes mango quality management, value chain development, and compliance requirements to support farmers to adapt to rapidly changing markets. At present, the number of agricultural extension staff of these centres is still limited due to budget constraints and technical competency is variable.

Relationships

Table 4. Supply chain actors along the southern Vietnam mango value chain

Actors	Influence	Comment
Farmers	Low	Generally, the farmers have short-term arrangements, or a low percentage have signed contracts with the collectors
Collectors	Moderate	Generally, have short-term arrangements with packhouses/processors, and a low percentage have signed contracts with the collectors
Packhouse	Moderate	Do not always have good control over product inputs, or supply. Finance collectors and farmers. Number of mango packhouses in the region is still limited.
Wholesalers	High	Can be disconnected from farmers, and collectors do not always have contacts with suppliers. Usually has the best communication networks in the chain.
Retailers	High	Often rely solely on wholesalers for information. Ultimately dictate the finances of the chain, and often will have contractual arrangements with wholesalers.

Source: Author's analysis

3.3 Logistics and distribution

Transportation

Motorbikes are the most used form of transport from farm to packhouses and/or consolidation points. Bamboo baskets are often used, although plastic crates and plastic bags are sometimes used. Three-wheeled vehicles are favoured by collectors and traders as they are capable of transporting larger volumes with low cost and flexibility. Small trucks with a capacity of less than 1.5 tons are mainly used by large packhouses, depending on road conditions and the need for transporting large volumes of mango.

A study on the export of mangoes from Tien Giang to China (Ta Minh Tuan, 2006) found that fruit is collected and transported to packhouses by the farmers during the day and sorted the same day. Consolidation will continue into day 2 and 3 to be able to fill the truck or container. This will happen on long-haul domestic consignment to Hanoi but on shorter distance markets such as HCM, confinements are often smaller and more frequent.

Postharvest at packhouse

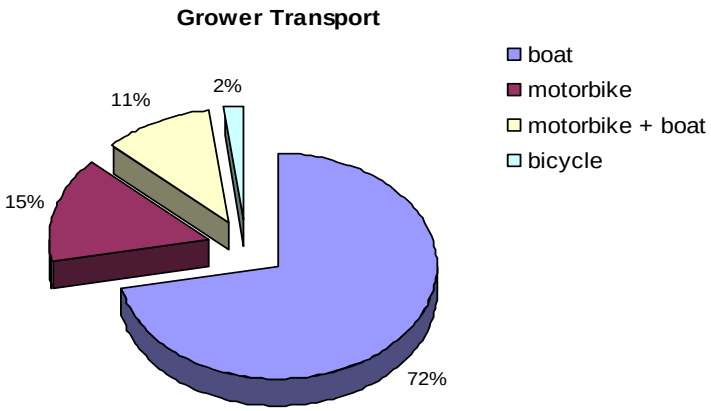

Figure 3. Breakdown of transport methods used by farmers

Source: Author's analysis

The previous supply chain studies have identified that most of the transport to the markets in Ho Chi Minh City was via 10-ton trucks. Boats were used for transporting mango fruit to the Ton That Thuyet floating markets when they were operating. Boats are also used sometimes to transport mango fruit to the Chon Lon markets. Trucks are often stopped on the way to the markets in Ho Chi Minh City and inspected by the police. This can occur several times. An inspection fee is charged, and this fee is paid on the spot by the transporter. This fee is then passed back down the supply chain to the farmer. Farmers pay for the transport cost, even to HCMC and this cost is then deducted from the farmer's final payments by the collector or wholesaler. Fruit are often collected during the day at local markets or collector houses. Trucks are packed to capacity and held until being transported to the wholesale markets at night. In Cai Be market, all traders receive fruit by boat, truck, and occasionally by motorbike delivery. The farmer or the collector pays for the transport.

Cooling

Currently, there are only a few packhouses able to store mango in low temperatures immediately after sorting and packing. This, however, is generally only used for export fruit.

Collectors and packers tend to transport fruit in the late afternoon or evening to reduce the impact of daytime heat.

Ripening and Storage

A few packhouses in Dong Thap and Tien Giang provinces have the capacity to ripen using ethylene generators. Some domestic fresh customers and processors require ripened fruit, although the main use is for export by air.

Certification and GAP

VietGAP was established in Vietnam by MARD in 2008 as a food safety inspection program. The intent was to bring Vietnam into the international GAP standards. VietGAP starts from the farm preparation, and cultivation to harvesting, post-harvest storage, and includes related factors such as the environment, chemicals, crop protection products, packaging, and even the working conditions and welfare of workers in the farm. To date, the uptake of VietGAP has been slow, with less than 10% uptake in some provinces (e.g. Tien Giang has 600 ha out of 5000 ha of mango and 10,000 ha of dragon fruit), with some growers not renewing their membership citing high costs. The issues are a little more complex than costs alone; the farmers are quite disconnected from their markets and do not necessarily understand the relevance of VietGAP. On the other hand, many customers in Vietnam are still not requesting this from their suppliers, so the farmers view it as just an added cost.

4 Results and discussion

4.1 The current fresh mango value chains

The value chains for each of the project packhouses are complex, as many have multiple suppliers and customer bases. Individual maps have been created to capture the main value chain information that was collected during the interviews.

Fresh mango value chain in CHL Packhouse

The CHL Cooperative was established in 2002 and has approximately 140 members from the Hoa Hung commune, Cai Be district, and Tien Giang province. With the support from local government, the CHL cooperative built a collection station in 2005. This has the role of consolidation, purchasing, linking, and distributing Cat Hoa Loc mango from farmers of the cooperative to consumers. CHL brings distinct advantages to farmers (as do other cooperatives), providing a mechanism for them to achieve economies of scale with production, access more customers, and develop uniformity in quality.

The CHL packers have some basic equipment such as drained tables, sinks, hot water, heat treatment tanks, cold storage, and a ripening chamber. The packhouse has the capacity of packing 4-8 tons/day. The main customer focus of CHL is within the domestic market, particularly Metro supermarket and HATCHANDO processing company. The current capacity of the cooperative is 100 tons/year due to small planting areas and irregular results with off-season flowering. This has limited its ability to supply consonant large volumes to either the domestic or export markets. The cooperatives buy directly from farmers, rather than through traders. As there are no collector members, farmers transport their products to the cooperative based on price and quality agreements. If the cooperative does not have the customers or if the quality is not up to standard, the farmer will sell to a collector or small traders in local wholesale markets.

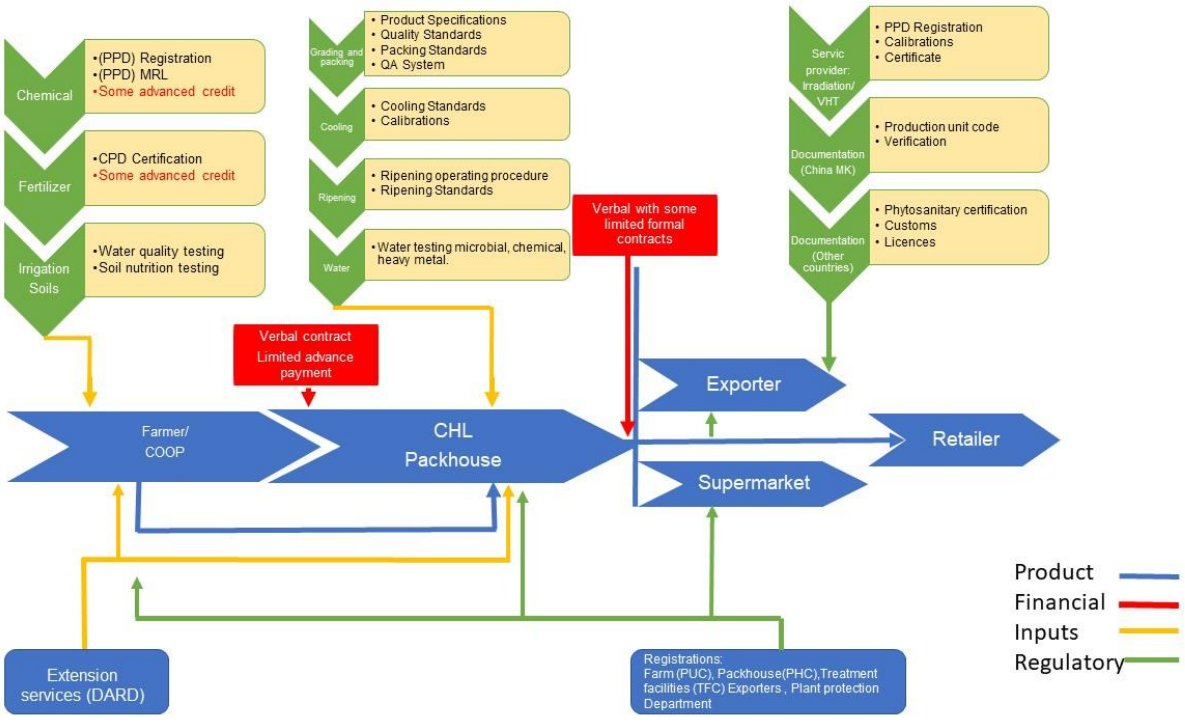

Figure 4. Current of fresh mango value chain, Cat Hoa Loc Packhouse

Source: Author's analysis

Fresh mango value chain – Packhouse

CL Company was established in 2017 based on a staging point at a collecting station in CL district, Dong Thap province. The CL packhouse is basic in its current equipment and packing stations. The packhouse has a handling capacity of 4-10 tons/day and reaches a maximum output of 485 tons/year.

The CL Packhouse has two to four employees, who work on a seasonal basis to collect mangoes from farmers. These mangoes account for half of its volume, where the remaining half is supplied via two main collectors/traders. The company is also supplying several exporting companies and has applied for GLOBAL.GAP, VietGAP, and an Area Production Code (required for export) for the three main mango varieties (Cat Hoa Loc, Cat Chu, and green Elephant mangoes).

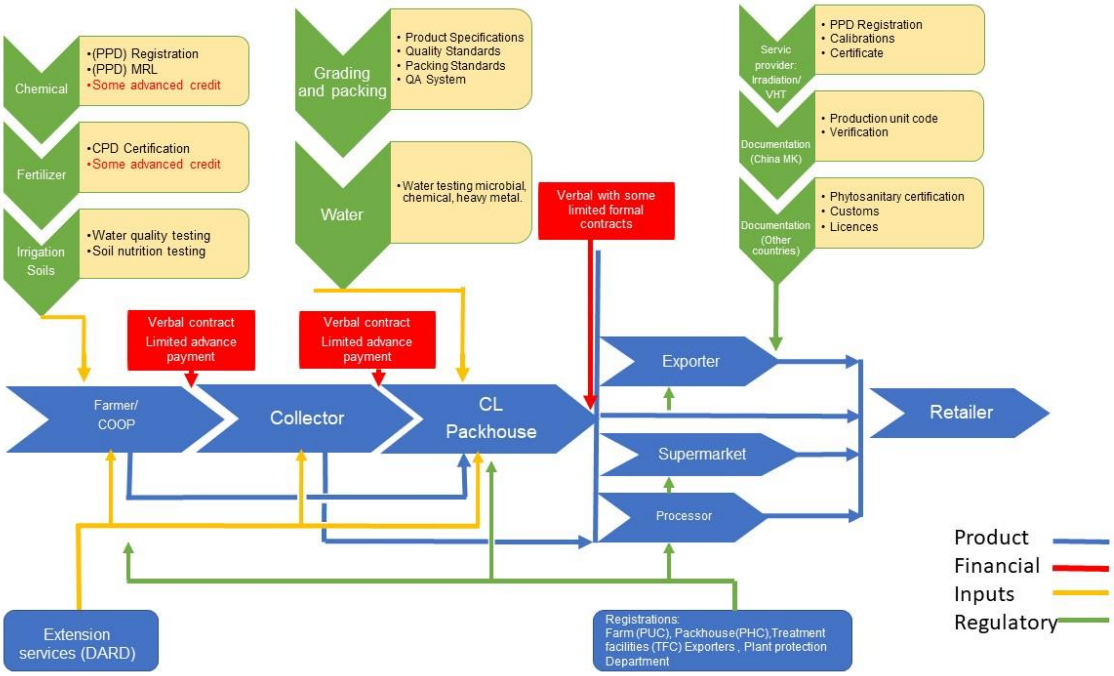

Figure 5. Current fresh mango value chain, CL Packhouse

Source: Author's analysis

Fresh mango value chain in BX Packhouse

BX Company was established in 2016 based as a collecting station in Cao Lanh Wholesaler in Dong Thap province. BX packhouse is similar to CL packhouse, with only basic equipment and packing stations. The packhouse has a handling capacity of 20-30 tons/day and reaches a maximum output of 5520 tons/year.

It has 20 employees working seasonally on collecting, sorting, and packaging. One third of the supply comes direct from individual farmers, with the majority being supplied through collectors.

The packhouse also acts as a wholesaler in the Dong Thap wholesale market. Its main customers are in the wholesale markets of Hanoi and China. In addition, the company sends fruit to exporting companies supplying to Korea and Hong Kong. The company also cooperates and collects mangoes from VietGAP growers as well as those that have Area Production Codes for Cat Hoa Loc, Cat Chu, Keo, and green Elephant mangoes.

The company wants to expand into processing, and has acquired a second establishment with an area of 1500m^2 to diversify local mango output.

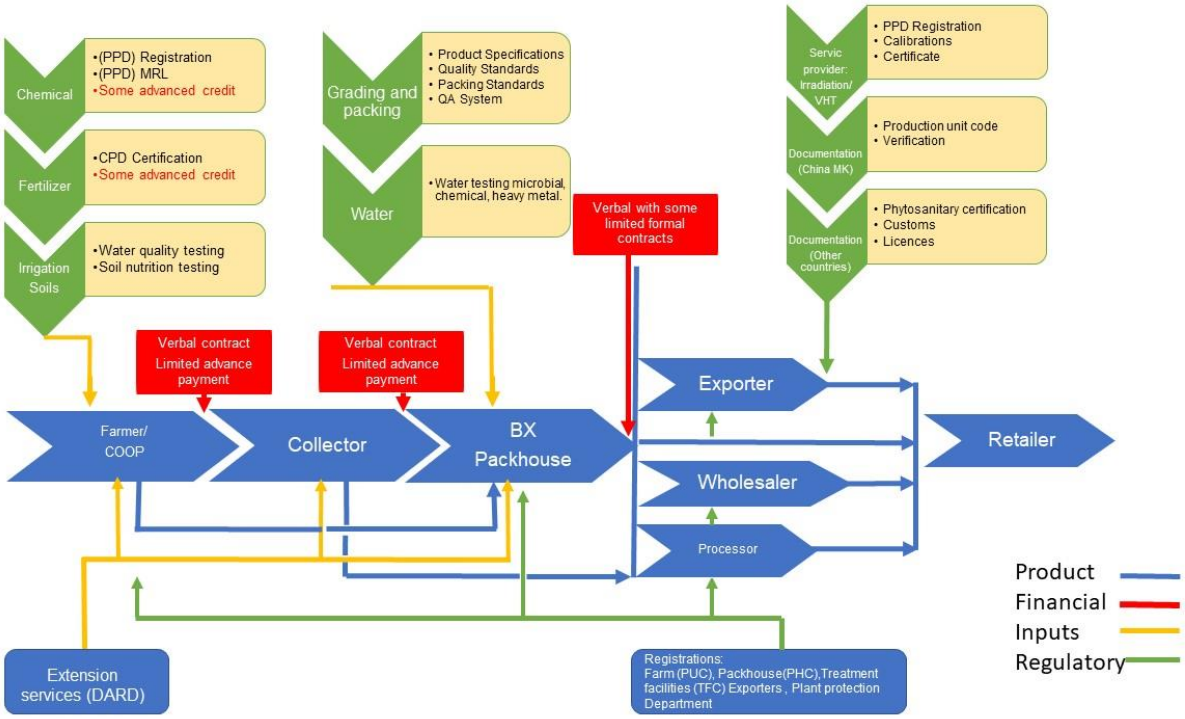

Figure 6. Current of fresh mango value chain, BX Packhouse

Source: Author's analysis

4.2 Product

Farmer/farmer group/cooperation

Findings from the interviews indicated that models of farmer groups and cooperatives are operating quite effectively. Examples include Cat Hoa Loc Cooperative, Tan Thuan Tay Cooperative, Mỹ Xuong Cooperative, Hoa An Cooperative, and Duy Tan Club. These groups and cooperatives have benefited farmer members through access to supply packhouses, which were then able to access supermarkets, retailers, mango export, and processing companies.

By practicing off-season floral manipulation, farmers have been able to spread production and achieve higher prices as well as better production efficiency, while reducing pressure on main-season production.

Farmers have often encountered pest and disease management problems in recent years and, with the support of the local government, have introduced fruit bag techniques—which is helping to reduce pesticide application and improve fruit quality. This practice is widely adopted by the farmers.

Poor harvest and transporting practices lead to significant post-harvest damage, particularly sap burn to the fruit.

Farmers are responsible for harvesting in the morning after negotiations between collectors/traders.

In Cai Be, Tien Giang province, farmers mainly grow Cat Hoa Loc variety, which are sold mainly to local collectors or to Hoa Loc sand cooperatives. These are usually type 1 and type 2 mangoes (see Table 5). The remaining poorer quality fruit is sold to wholesalers at the An Huu wholesale market. In Dong Thap, Cat Hoa Loc, Cat Chu, and Elephant mango are grown so farmers tend to have a wider customer base.

Collector/trader

Collectors purchase mangoes from farmers in two ways:

- With an average price, which is applied to the entire volume.
- Based on a preliminarily classification by farmers into three grades, primarily based on size and not necessarily skin quality. Grade 1 volume usually averages between 60% and 70%, grade 2 at 20% to 30%, and grade 3 at 7% to 9%. The severely damaged and/or sap-burned fruit averages at about 1%.

Table 5. Different mango classes used for purchasing between farmers and collectors in MRD

Variety	Class I	Class II	Class III
Cat Hoa Loc	Weight >400g, bright colour, good appearance	Weight 350-400g, bright colour, good appearance or weight >400g but partly blemished	Weight <350 g, or weight >350 g but poorer skin quality
Cat Chu	Weight >250g, bright colour, good appearance	Weight 200-250g, good appearance, or weight >250 g but partly blemished	Weight <200g, or weight >200 g but poorer skin quality

Source: Author's analysis

The interviews indicated that most collectors/traders come directly to the orchard to monitor and control the collection, classification, and transportation process. The remaining collectors exchange information by telephone for prices, quality, and collection time before sending their staff for classification and transportation to their packing station. Preliminarily classifications by the collectors is conducted on-site at harvest, followed by a second regrading occurring at the packhouse.

Collectors/traders do not have input in the decisions regarding agronomic practices such as fertiliser and pesticide use pre-harvest. They are responsible for sorting, wrapping with paper, placing on plastic containers, and transporting to collection stations and packing houses.

The majority (two thirds) of collectors interviewed have in excess of 100 farmer customers that they conduct business with. The remaining third have fewer than 100 farmers.

There are two types of collector/traders that supply the four packhouses:

- The first group is usually small-scale and purchases from a farmer near their collecting station and commune or province.
- The second group is usually purchasing mangoes from a much wider source—both local province and other provinces. This second group commonly supply KNDT and BX packhouses.

Almost all collectors rely on having a good business relationship with the farmers. They base their criteria for mango quality on fruit size, maturity, colour, weight, and price, which are provided by the packhouse. Issues such as pesticide residues are less important in their decision.

The collecting stations are quite simple and usually consist of a concrete floor, aluminium roof, and electric fans in the sorting areas.

It was found that while the collectors/traders are an important member of the chain, there was a distinct lack of awareness around food safety, harvest and post-harvest technology, and the impact that their practices can have on fruit quality and shelf life.

Packhouse

Role: The packhouse plays a key role in the mango value chains. They are well connected to their network of collectors/traders and farmers as well as wholesalers, exporters, and—in some

cases—retailers. The packhouses consolidate, process, pack, and distribute products to wholesalers, retailers, exporters, and processors. Packhouses have the advantage of having the financial capacity available for investment.

Purchasing product: CL, BX, and CHL packhouses engage in verbal supplier contracts. The majority are ongoing from year to year, with the same suppliers based on relationships. However, several suppliers will be more active in making decisions, solely based on price, and will regularly change packhouses.

Facilities: Facilities in CL, BX, and CHL are quite basic, consisting of sorting and packing areas and—in the case of CHL—de-sapping tables and a cool room. KNDT has a more sophisticated system, consisting of de-sapping tanks, brush units, hot water spray tunnels, and moving conveyor packing lines—as well as a forced air cool room, temperature-controlled holding room, and ripening room.

While the facilities vary between the packhouses, there is a common issue with lack of technical training for packhouse staff. Apart from KNDT, the packhouses are unaware of the impact that their various practices can have on the quality and post-harvest shelf life of the product.

Quality standards and post-harvest losses: Fruit is re-sorted again in the packing houses and final payments are determined on the weights of the various grades. There is no uniform grade standard but, rather, this is determined by the individual customer of the packhouses. Grade standards are mostly based on size, with blemishes being of lesser importance. Due to handling practices, the major blemish issue is mechanical damage and sap burn. The packhouses claim losses of only 1%; however, this is not taking into account the quality loss of a fruit being downgraded (i.e. from grade 1 to processing, this figure is much higher).

Traceability: In recent years, the government has been facilitating the implementation of a traceability system as demand for this is growing from international customers and some of the modern retail systems in the domestic market. Farms from certain areas are issued a production code and packhouses are issued a Packhouse Unit Code (PUC). Currently, this is a requirement for mangoes exported to China, US, and Korean markets. Only KNDT has a PUC currently.

Table 6. The current practices of the four packhouses

Packhouse	Equipment available	Practices (export)	Practices (domestic)		Practices (China)
			HCMC	Hanoi	
CAT HOA LOC	De-sapping table, hot water treatment tank, drying table, cool room	Re-sorting, packing, and transporting to export company	Re-sorting, packing, and transporting (hot transport)	Re-sorting, packing, and transporting (hot transport)	None
CAOLANH	Plastic tank wash and Umikai	Re-sorting, packing, and transporting to export company	Re-sorting, packing, and transporting (hot transport)	Re-sorting, packing, and transporting (hot transport)	None
BA XOAI	Collector station in wholesale market	Re-sorting, packing, and transporting to export company	Re-sorting, packing, and transporting (hot transport)	Re-sorting, packing, and transporting (hot transport)	Re-sorting, packing, and transporting (refrigerated transport)

Source: Author's analysis

Wholesaler/exporter/retailer

Through interviews, it was determined that the four packhouse supplied a range of domestic and foreign markets (see Table 7). CHL packhouse is the only one that is domestic market dominated. The other packhouse range from 10% to 25% domestic-focus, with the remaining to export mostly to the Chinese market.

The domestic market is mainly concentrated in two major markets in HCMC and Hanoi, through wholesale markets such as Thu Duc, Hoc Mon, Long Bien, and supermarkets such as Co-opmart, Vinmart, An Nam, Lotte, Big C, AEON - Citimart, Emart Shopping Center, and Saigon Center Shopping Mall, etc.

Table 7. The packhouse provides processing facilities in the supply chain

Packhouse	Domestic (HCMC, Hanoi, other) (%)	Processing (%)	Export (%)	China (%)
CAT HOA LOC	100		Little (2019)	
CAOLANH	25	8.4	33.3	33.3
BA XOAI	20		10	70

Source: Author's analysis

Traders at wholesale markets (Hocmon and LongBien) in HCMC and Hanoi have basic facilities, with no cool chain or ripening facilities. These wholesalers focus on the domestic market. One CUC TI trader undertakes some exporting.

Wholesalers receive fruit from growers' collectors and packhouses. Some simple fruit grading and packing is used in wholesalers in Dong Thap and Tien Giang. In HCMC and Hanoi, wholesalers undertake minimal grading to remove damaged or rotten fruit. The fruit loss of fruit at wholesalers is under 5%. This loss is mainly due to damage when transportating, loading, unloading, grading, and packing.

They operate on a 10-15% commission of sale price, paid by the seller.

The role of the retail actor is the important connection of the produce to the customer. There are two levels of retailers:

- Small-scale retailers are local in the wet market of province or street vendors in HCMC, Hanoi. They can purchase daily, from a minimum of 5-20 kg/day.
- Large-scale retailers are fruit shops, supermarkets, the market central in big towns of provinces or in big cities. They can purchase daily from 200-1,000 kg/day.

Retailers are currently not using traceability, adhering to MRL standards, or requiring compliance certifications from suppliers.

The maximum fruit loss reported for the retailer is 20-30%, mainly due to rots such as anthracnose, over-ripe fruit, and transportation damage.

4.3 Socio-demographics

The interviews found that 80% of the household heads are male and the remaining 20% are female. The head of household is usually the one who decides on the selling price, the time of and method for selling, fertilisers, and who participate in training courses organised by the agricultural institute. Most (about 90%) of men in households undertake the heavy work, such as soil preparation, spraying, fruit picking, and pruning. Women do lighter and more detailed tasks such as packaging and classifying. For investing or purchasing expensive equipment, tools, or facilities, both husband and wife will discuss together first and then make decisions.

Table 8. The gender ratio among collectors and packhouse owners

Participant	Gender	
	Female (%)	Male (%)
Collector/trader owners (13)	30.76	69.24
Packhouse owners (4)	25	75

Source: Author's analysis

The number of workers participating in the production activity varies by season, handling capacity, and processing technology of each packhouse. Men are mostly responsible for sorting, loading, and weighing products whereas females work mostly at the packing stations.

4.4 Communication

Technical information: The interviews identified a lack of network information among growers in the rural areas. When asked about technical issues, they responded very differently, indicating a lack of a common message—particularly with production and marketing information.

Fruit quality information tended to flow down to the farmers last or at not at all.

Official information channels from government and research organisations is often disseminated slowly and not necessarily targeted at all members of the chain (such as collectors).

Financial Information: Collectors play an important intermediary role between producers and customers. They will often be the main source of price information to the farmers. Packhouses, however, tend to be less reluctant to pass on market information down the chain.

Table 9.

Actors	Influence	Comment
Farmers	Low	Generally, the farmers have short-term arrangements, or a low percentage have signed contracts with the collectors
Collectors	Moderate	Generally, have short-term arrangements with packhouses/processors. Low percentage have signed contracts with the collectors

Packhouse	Moderate	Do not always have good control over product inputs or supply. Finance collectors and farmers.
Wholesalers	High	Can be disconnected from farmers and collectors. Do not always have contacts with suppliers. Usually has the best communication networks in the chain.
Retailers	High	Often rely solely on wholesalers for information. Ultimately dictate the finances of the chain. Often will have contractual arrangements with wholesalers and/or packhouses.

Source: Author's analysis

4.5 Finance

Mango farmers are paid by cash after selling mango to the collector/trader.

All collectors/traders pay cash immediately to the farmer on receival. When supplying to packhouses, they are paid in cash, while a few are paid by bank transfers.

Collectors/traders purchase mangoes at mango farm as per the steps below:

- Receive quality requirements and prices of mango variety from packhouse during the day via phone.
- Evaluate the grading rate of weight and colour of fruits, then negotiate the price with a verbal contract with the farmer.
- Payment for the farmer is made by cash after sorting and transporting to collecting station or packhouse.
- Collector can earn an average net profit of VND 500-1,000/kg after deducting labour, packaging, and transporting costs.

Packhouses purchase mangoes at mango farm/collector as per the steps below:

- The transactions between collectors/traders and their packhouses are made through verbal contracts.
- Sometimes, the packhouse owner pays an advance (rarely) for small-scale collectors (about 20-50% of the value of the estimated crop).
- The packhouse will pay the farmer/collector by cash after re-sorting and scaling at the packhouse.
- Packhouses can earn an average net profit of VND 500-1,000/kg after handling with re-sorting, packaging, and transporting costs.

4.6 Distribution

When purchasing from farms, traders often use only baskets or a plastic woven basket buffer with newspaper to transport by small trucks to consumers or processing companies.

From harvesting to revival at the packhouses, harvesting, packing and putting into baskets, and transporting to packing houses in the local province can take up to 10 hours.

Handling at the packhouses (sorting, handling after harvesting, packing, boarding) can take 6-10 hours.

Transport from Dong Thap to Ho Chi Minh City can take 5 hours by a non-refrigerated truck, then to the wet or retail market for 5-10 hours.

Transport from Dong Thap to Hanoi can take 54-60 hours by a non-refrigerated truck, then to the wet or retail market for 5-10 hours.

5 Conclusion and Recommendations

5.1 Conclusion

Mango plantations are small, with an average cultivated area of 0.5-1 ha. This leads to a fragmented production system, which makes it difficult to disseminate information, coordinate technological improvements, produce markets to execute larger-scale orders, and generally achieve economy of scale, etc. Some of these challenges have been met by the organisation of producers into structures, such as cooperatives or cooperative groups.

Generally, there is a basic level of technical expertise within the value chains, although there are some exceptions. Production technical training for the farmer is rather good in the two provinces but there is a lack of training on harvesting, postharvest and market information, and agribusiness knowledge for all other actors in the mango value chain.

The value chains for all packhouses are what one would expect to find in a traditional fruit chain. Contracts are mostly verbal and long-term relationships are important. Credit is not commonly given in advance, although there are exceptions to this. Communication within the chain is strong between the direct member either up or down the chain but is poor beyond that. There is still a reluctancy to share some critical information.

Producers are very disconnected from the markets, particularly the modern retail section.

Of the chains examined, all supply the domestic market but have exports as the main part of the business (with the exception of Cat Hoa Loc Cooperative).

Currently, there is very little incentive from the domestic retailers to drive change in areas such as trackability, MRL's, post-harvest technology, certifications, or cool chains. Although some of the larger modern retailers are now asking for VietGAP, it is not clear how much of the product is certified due to the limitations on VietGAP certified farms.

Retailers are focused on size of the fruit rather than skin quality or shelf life. This is leading to poor presentation and high losses. Fruit rots, sap burn, and poor shelf life (which is exacerbated by the lack of cool chain) are common issues.

5.2 Recommendations

It is recommended that communication through the chain be improved by connecting the producers and other value chain actors with the markets/retailers and vice versa. This will help develop an understanding of quality requirements, compliance, and production/supply constraints.

Training with each segment of the value chains is also recommended. This will help them develop an understanding of the impact that their current practices are having on the quality and shelf life of their product. Across the entire chain, interventions that seek to inform all stakeholders (such as a 'Walking the Chain' activity) would be beneficial for capacity building.

An intervention that seeks to monitor quality from the farm through to the retailer and or distributor in HCMC in Year 2 would enable the mapping of the current trading parameters. This could be followed by the development of a specific Year 3 activity that would look to a change at specific points in the chain, then document the learnings to scale up and out in the following main harvest season. Specific actions are recommended below.

Farm: Pesticide and fertiliser cost reduction study to understand potential benefits at farm/community level. Understand and examine bagging, MRL's, harvesting practices, fruit de-sapping, and food safety to seek to deliver improved fruit quality.

Collector: Developing grading standards, MRL's, harvesting, food safety, de-sapping and fruit transportation.

Packhouse: Developing grading standards, handling procedures, temperature management, packing procedures, fruit transportation, ripening procedures, food safety, certifications, and standards.

Wholesaler: Developing grading standards, food safety, temperature management, ripening procedures, and fruit transportation.

Retailer: Developing grading standards, food safety, temperature management, and development of product specifications.

Development of agribusiness skills with farmers so they can make better financial decisions regarding crop inputs, practices, and fruit sales.

Develop a network where current accurate market information is available to all actors in the chain this could then be expanded to include crop forecasting.

Development of a model best-practice chain to a modern retail system in the domestic market of either Hanoi or Ho Chi Minh City. This would incorporate post-harvest handling procedures that would extend the shelf life and reduce quality loss within the chain.

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7 Appendices

7.1 Collector and trader checklist

Investigation date:……/……/…. Interviewer:……

1. GENERAL INFORMATION.

1. Name of business:..... .....

2. Address of company/ packhouse: ....

3. Number of employees: .....

Section 2. BUSINESS PROFILE/OPERATION

Can you talk us through how your business operates?

……

……

How many farmers do you deal with?

……

……

How do you select the farmers?

……

……

Do you change farmers very often if so why?

……

……

How do you decided where to send your fruit?

……

……

Contract, relationship, speculative, price, logistics.

……

……

Where do your responsibilities with the fruit begin and finish?

……

……

Pre harvest spraying, fertilizing etc

……

……

Harvest process:

……

……

Section 3: HOW THE VALUE CHAIN OPERATES

(Interviewer - we need to understand how the chain works from when collectors take responsibility to pack-house (as applies).

Including - inputs, methods, financial flow, information flow and decision makers/controllers with in the chain.

Also, we need to identify any issues that they are having problems with and what they see that needs improving.)

Question: If you are responsible for harvest? Can you describe your harvest process from just before picking to fruit being delivered to the pack-house/sorting.

(Who does this *where does their responsibility start/ finish*)

……

……

Question: Can you describe the packing/grading procedures (if any) that happen you are responsible for? If you are not involved who is responsible for this.

……

……

(Interviewer – enquire regarding….

who decides the grading standards?

……

……

Reject rates for what reason, is there fruit that cannot be sold

……

……

Who makes the decision for processing grade fruit?

……

……

Question: From your experience where does the most damage of your fruit happen to fruit still in your control?

……

……

Question: How do you decide where to send your fruit?

Ask the farmer how often they change and why

……

……

Do you get feedback from the buyer eg quality, customer needs etc.

……

……

Question: How do you transport your fruit to your buyers?

……

……

Can you explain how your finances work for the payments for your fruit?

We need to know if money has been advanced for their crop and how and when payment decisions are made.)

……

……

Question: What is your greatest issue with the current way you harvest/collect and market your fruit?

(Finish your section with this question – 'what is keeping them up at night – what are their worries – one question please)

……

……

Section 5: PROCESSING

Screening Question

PR1: Consider for a moment… the fruit that you can't sell as fresh whole fruit, do you supply these mangoes to a processor? (tick yes or no) **YES**… OR **NO**…. (Stop if NO, proceed to next question if YES)

(If they supply processing… ask them to describe how this function operates and if they are continuing or not to supply for processing)

……

……

PR2: Can you describe to us the way you engage with a processor who wants to buy your fruit.

(We need to understand how their business model works from theperspective of who is driving supply – ask how the payment system works)

……

……

PR3 Do you see processing as a viable option for some of your fruit

Level of enthusiasm for processing?

Barriers for sending to processors?

*Are they willing to participate in processing activitie*s?

……

……

Other Processing comments:

……

……

Sincerely thank the person for their time. Should they have any questions, please contact:

SIAEP, Ho Chi Minh City, Vietnam
Director: Dr Hung
Telephone:

7.2 Packhouse and wholesaler checklist (collector, trader)

Interview date……/……/…Interviewer……..……

Section 1. GENERAL INFORMATION.

1. Name of packhouse: ....

2. Address of packhouse:..... .....

3. Director/ Owners: .....……

Section 2. BUSINESS PROFILE

Q1 We are excited to be working together we are keen to know your company's business journey Can you tell me about how your business developed and its structure.

Years established:.....

Type of business enterprise:

……

……

Company, family run business, cooperative.

Capacity of the plant (total and current operational capacity)

……

……

Organizational Structure

(Makeup of workforce involved in management, technical, general,labour, QA,etc)

(Are employees determined by seasonality - high /low season)

……

……

Section 3. STRUCTURE OF BUSINESS.

Q2 To help me understand your business can you describe to me how your packhouse works

……

……

Main customer profile (Farmer, direct customers, collector,etc)

……

……

Fruit products (Varieties, Seasons)

……

……

Purchasing source / Mango type	Supply from farmers/collectors	
	Quantity (tons)	%
Cat Chu		
Cat HoaLoc		
Taiwan Mango		
Keo Mango		
Thai Mango		

Volumes

……

……

Operations that happen in the pack-house (sorting, washing,packing)

……

……

Where the fruit is sent?

Domestic

……

……

Wholesale

……

……

Retail

……

……

Export

……

……

If the business is growing or stable? (include comments related to fruit volumes)

……

……

Section 4. Supply Chain

(Interviewer - we need to understand how the chain works from when the fruit arrives and leaves the pack-house (as applies). Who takes responsibility for the fruit.

Including - ***inputs, methods, financial flow****,* ***information flow and decision makers/controllers with in the chain****.*

Also, we need to identify any issues that they are having problems with and what they see that needs improving.)

Question: Can you talk us through the process of how the packhouse procures its fruit?

(Who does this *where does their responsibility start/ finish*)

……
……

How do you decide on a supplier?

……
……

Question: Can you describe the receival and grading procedures that happen you are responsible for?

(Interviewer – enquire regarding….

who decides the grading standards?

……
……*Reject rates for what reason, is there fruit that cannot be sold*
……
……*Who makes the decision for processing grade fruit*?
……
……

Question: From your experience where does the most damage of your fruit happen to fruit?

……

Question: How do you decide on your quality standards?

Customer specifications?

……

QA system (Global Gap)

……

How do they monitor quality?

……

Feedback from customers?

……

Question: How do you decide where to send your fruit?

Ask the packhouse how often they change and why ?

……

What is the process that happens if they buyer indicated there is a problem with the fruit?

……

Question: What do you see as essential criteria when deciding to sell to a new buyer?

……

Terms of trade, market access, reputation, prior relationship.

……

Question: How do you transport your fruit to your buyers?

……

Type of vehicle, cool chain

……

Question: Can you explain how your finances work for the payments for your fruit.

We need to know if money has been advanced for their fruit and how and when payment decisions are made.)

……

Question: Where do you see the greatest growth potential with your business:

……

Question: What is your greatest issue with the current way you Receive/sort and market your fruit?

(finish your section with this question – 'what is keeping them up at night – what are their worries – Only one answer please)

……

Sincerely, thank the person you are interviewing for their time and the information to help this project.