

PRODUCTION AND CIRCULATION PROCESS IN THE AVOCADO VALUE CHAIN – A CASE STUDY IN BAO LOC CITY, VIETNAM

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Abstract

This study aims to analyze the avocado value chain in Bao Loc city to find out the existing challenges weakening the value chain. From there, answer how to enhance long-term, sustainable competitive position for the avocado value chain in Bao Loc city and maximize value and benefits for chain actors. Applying Michael Poster's value chain model, Kaplinsky, and Morris's analytical method and collected data, the study has exhaustively identified the actors involved in the chain and described the avocado value chain in detail. Research results have found four main market channels of the avocado value chain. To grow 1 hectare of avocado, the farmer has to invest a cost of 6,145.75 USD. Avocado was produced that reach the final consumer need to go through an intermediary stage, a collector. Traders who collect avocados from farmers needed an average money requirement of 8,847.82 USD/spell. This result showed that collectors are an essential player in the current avocado value chain.

Keywords: chain partners, farmer, the avocado, traders, value chain

1. INTRODUCTION

The economy of Bao Loc city today is mainly agriculture, in which agricultural sectors such as planting and processing tea, coffee, avocado, mulberry, and fruit trees must be mentioned. However, the value of fruit trees was currently facing many market challenges. The fragmented development in production, lack of sustainability was the biggest threat to the avocados tree of Bao Loc city in recent years. The avocado value chain was not fully understood; there had not been many in-depth studies on the common forms of linkage in the chain, the mechanism of profit-sharing among chain partners, to make added value. The partners in the chain include producers - traders - processors - consumers, who were still loosely linked. Besides, farmers had more and more output. Still, the product's value tended to decrease, showing that the value of avocado products shows signs of instability without solutions, reasonable measures. According to Fearne *et al.* (2009), the value chain represents a set of practical activities from construction, production, advertising, supply, and support to production and provision of services to promote competition in production. The importance in the value chain was to rely on the customer, understand the wants of the customer, and effectively deliver to the consumer. To effectively manage and find solutions to complex food supply chain problems, supply chain partners should create an environment for sharing information and data (Hvolby *et al.*, 2010; Verdouw *et al.*, 2011). One of the critical values for partners in the value chain was a close and close relationship (Batt and Rexha, 2000; Gary *et al.*, 2005; Gyau and Spiller, 2009; Musa *et al.*, 2014). According to Abdullah and Musa (2014), to strengthen the trust and commitment of chain partners, it was necessary to share benefits and risks between actors participating in the chain. That was one of the ways to link sustainably between partners in the value chain.

However, in Bao Loc city, no agent built a solid output market for avocado products, brand promotion was still weak, access to capital was still tricky and essential. Most importantly, it had not yet created a value-added chain for avocado products. The link in the chain was still loose. This made to low and precarious selling prices, and avocado growers are passive when the crop is ripe. As a result, the income of avocado farmers was not high, not creating a premise for sustainable development. Within the scope of this study, the actors participating in the chain will

be explicitly described and find out the logistics and circulation in the chain to clearly show the role of each actor participating in the avocado value chain.

2. RESEARCH METHODS

2.1 Time and location of the research

The study was conducted in 2019 in Bao Loc city, Lam Dong province, Vietnam.

2.2 Research methods

Approaching value chain analysis based on applying SCP (Structure - Conduct - Performance) model to study the avocado value chain case in Bao Loc City, Lam Dong province, Viet Nam.

The study also uses essential statistical math solutions to calculate investment value and describe costs for each actor participating in the chain.

2.3 Collected characteristics

Secondary data collection

Data were collected from documents published in the mass media related to avocado trees such as reference books, publications, press at provincial agencies: General Statistics Office, Department of Agriculture and Rural Development. This study's published data and information include the guidelines, Government, and local policies regarding avocado trees. On the other hand, the study also inherits the results and information published in reports and journals published in Vietnam and internationally. Along with the data from departments at all levels such as the Department of Finance and Planning, District Statistics, Agricultural Extension Station, Plantation and Plant Protection Station of the locality.

Primary data collection

Through group discussion PRA: semi-structured interviews, discussions with groups of households about the advantages and disadvantages, and recommendations of the households about avocado cultivation and consumption with high efficiency... Consultation: Through semi-structured interviews with staff of the district's Department of Agriculture and Rural Development, the horticultural association, local leaders, etc. Direct investigation of agents: The study investigates by building a questionnaire with the following principal contents:

- General information about surveyed households: full name of household head, age, educational level, demographic data, labor, information about a household business.
- Information on avocado production of farmers.
- Information on avocado consumption of farmers.
- Information on difficulties, advantages, and recommendations of farmers.

In addition, some other qualitative information is also used in the investigation process, collected by asking open-ended questions, then talking and discussing with the interviewees. The actors in the avocado value chain that need to be investigated include:

- Producers: 90 households
- Local traders: 30 persons
- Traders: 15 persons
- Wholesalers: 15 persons
- Retailers: 15 persons
- Other partners: including input service providers and consumers: 5 persons

2.4 Data analysis method

Using descriptive statistics method to analyze avocado production, processing, and consumer market status.

Analyze the product value chain according to GTZ's approach: map and describe the value chain, economic analysis of the value chain, analysis of chain logistics, risk analysis.

3. RESULTS AND DISCUSSION

3.1 Map of the avocado value chain in Bao Loc city

Based on the primary and secondary data collected about the actors in the chain. The avocado value chain in Bao Loc city can be described, including 06 functions, 09 participating actors, and chain supporters such as the Department of Agriculture and Rural Development, Agriculture & Rural Development, Department of Industry and Trade, Union of Cooperatives, Business Association.

The avocado value chain map of Bao Loc city is mainly consumed through the following four market channels:

Chanel 1: Farmers (Producers) – Local traders – Local processors – Wholesalers - Retailers – Consumers.

Chanel 2: Farmers (Producers) – Local traders – Traders (outside province) – Big processors - Big consumers.

Chanel 3: Farmers (Producers) – Local traders – Retailers – Consumers.

Chanel 4: Farmers (Producers) – Local traders - Traders (outside province) – Retailers – Consumers.

Basic functions in the avocado value chain in Bao Loc city

1. Input functions of avocado production included seed butter, fertilizers, and pesticides. The input function included participating partners such as traders/barn owners inside and outside the province supplying avocado seeds, kiosks/agents, and companies trading in agricultural materials providing fertilizers and pesticides.
2. The production function included planting, tending, and harvesting avocados, mainly undertaken by farmers or cooperative groups.
3. The trade function was an intermediary function to collect avocados from farmers to redistribute to processing facilities, traders outside the province, or retailers. Traders/owners perform this function.
4. Preliminary processing and processing functions include activities of establishments that preliminarily process fresh avocados into cake and candy.
5. The commercial function included buying and selling avocado from primary processors, traders inside and outside the province to restaurants, agents/wholesalers and retailers, and consumers—industrial (big consumers) use or export.
6. The consumer function consisted of buying and consuming or processing avocado into cake and candy to provide to the final consumer.

Corresponding to each function in the chain, at least one partner was participating in the chain. These actors were linked together into a mutual supply system from production to consumption.

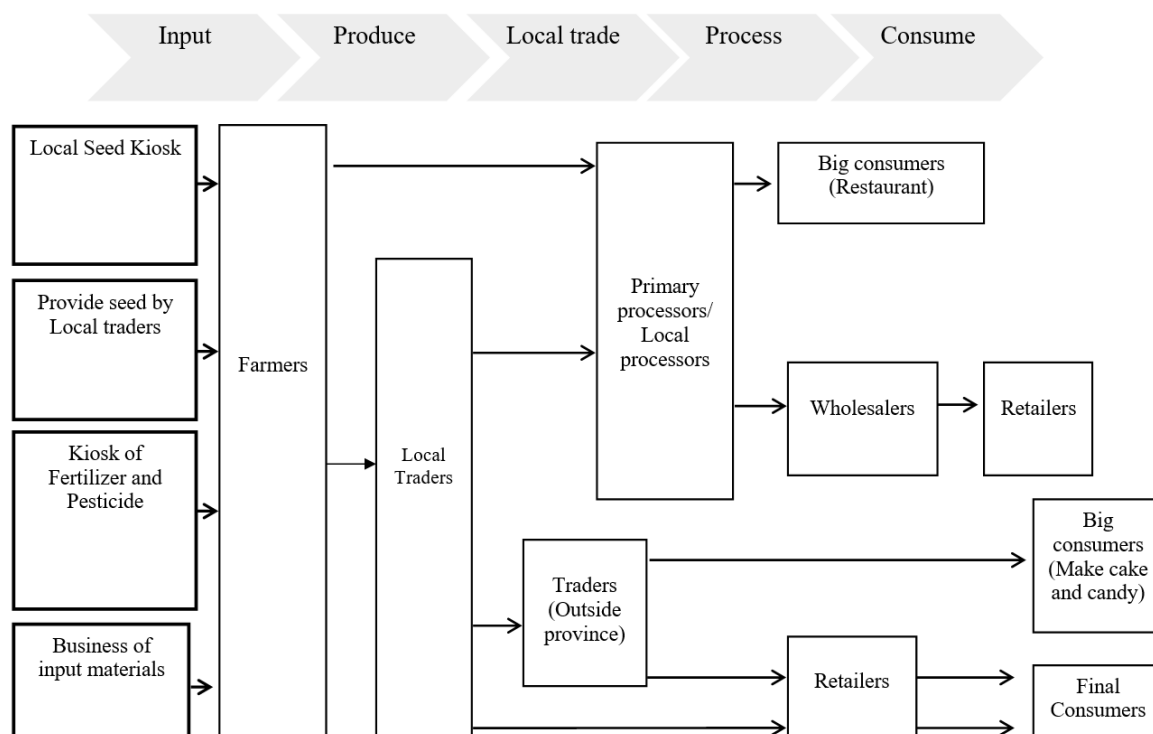


Fig. 1. Map of the avocado value chain in Bao Loc city

Source: Survey results of partners in the avocado value chain in Bao Loc, 2020

3.2 Chain market channel description

The survey results showed that avocados chain in Bao Loc city are consumed through four main market channels as follows:

Chanel 1: Farmers (Producers) – Local traders – Local processors – Wholesalers - Retailers – Consumers.

Local traders (traders in the province) bought avocados from farmers and then distribute avocados to the chain's avocado processing facilities). In addition, the primary processors also bought avocados from farmers and traders. For those driving outside the province, the total avocado input volume of primary processing establishments was 4%, then these establishments distribute to agents/wholesalers/wholesalers and retailers (3.6%) for redistribution to consumers.

Chanel 2: Farmers (Producers) – Local traders - Traders – Big processors - Big consumers.

Local traders sold avocados to traders outside the province (with 90.9% of the total avocado output of the whole chain). This Chanel was the leading distribution channel and the shortest distribution channel of the entire chain. Outside province traders redistributed it to big consumers/industrial consumers (65.3% of chain avocado output) to process into finished avocado products to supply to end consumers. In addition, traders outside the province provided avocados to primary processors and retailers.

Chanel 3: Farmers (Producers) – Local traders – Retailers – Consumers.

After collecting avocados from producers, collectors went through sorting and packing to redistribute to retailers and then redistributed them to technology consumers and final consumers. This output accounted for 6.5% of the entire chain's avocado production. In addition, retailers bought avocados from traders outside the province (24.2% of avocado output in the chain).

Chanel 4: Farmers (Producers) – Local traders - Traders (outside province) - Retailers – Big consumers.

Collectors purchased avocados from farmers and sold avocados to traders outside the province after sorting them. They further classified the avocados for sale to industrial consumers or retailers for distribution to end consumers. In addition to buying avocados from traders outside the province (24.2% of chain output), retailers bought avocados from traders/barn owners in the province (6.5% of chain output) to redistribute to consumers. The results of this analysis were like the results of the study of the guava value chain by Hena Imtiyaz and Peeyush Soni (2016). The research results showed that the value chain of agricultural products starts from the producer (who is farmers), and went through the different partners such as collectors, transporters, industrial processors, exporters, and consumers. The technologies and infrastructure in the chain were best met, but transparency, commitment, and trust among chain partners did not show sustainability.

3.3 Activities of partners in the chain

3.3.1 Producers (Farmer)

Characteristics of producers: the survey results of 90 avocado growing households showed that 75.6% of household heads are male and 24.4% female. They had an average age of 54.5 years (minimum 34 years old, maximum age 75 years) and had an average of 20.5 years of experience in avocado farming (at least one year, maximum 40 years). The education level of avocado farmers was relatively low, with an average of class 7. 33.3% attended primary school, 45.6% attended lower secondary school, and 21.1% attended high school (Table 1). Their average population was 4.2 people. Of which 2.6 people were the main laborers in the family.

Table 1. Information of household

Content		Number	Rate (%)
Age	Average	54,5	
	Maximum	75	
	Minimum	34	
Production Experience	Average	22	
Gender	Male	68	75.6
	Female	22	24.4
Education	Unlettered	0	0.0
	Primary school	30	33.3
	Secondary school	41	45.6
	High school	19	21.1

Source: survey date of 90 household in Bao Loc city, 2020

The survey results of 90 avocado-growing households showed that most avocado farmers buy seedlings from growers inside and outside the province (97.6%). There was 2.4% of farmers use seeds from their own or non-originating varieties. The variety that farmers grow with the highest yield was Sharwill avocado (33.3%). The average yield was 96.7 kg/tree, accounting for 54.6% of total production. However, this variety was challenging to buy because there is no supplier. This variety has been chiefly re-created and no longer has the same quality as the original variety. The local variety used by farmers was Hass avocado (accounting for 66.7%). This type of avocado had

a low yield but better quality than other avocado varieties, accounting for about 45.4% of the total avocado variety, with an average yield of 79.4 kg/tree (Table 2).

Table 2. Yield of the avocado

Kind of	Household	Average yield
Bơ Sharwill	33.3%	96.7 kg/tree
Bơ Hass	66.7%	79.4 kg/tree

Source: Survey data of 90 household in Bao Loc city, 2020

Finance needs: The average capital requirement of avocado farmers was USD 6,145.75/ha, of which only 46.6% of farming households had enough finance for production, 53.4% of farming households (Table 3). The rest did not have enough capital. They bought seeds and inputs on post-payment forms from traders/barn owners and local agricultural supply stores. Number with 19.28% of farm households borrowed money from the Bank for Social Policies and the Bank for Agriculture and Rural Development in avocado production. The cost of loans accounted for 68.7% of the total cost of avocado cultivation.

Table 3. Input cost of avocado production household

Content	Rate (%)	Cost (USD/hectare)
Organic fertilizer	20.02	1,230.00
Chemical fertilizer	22.47	1,380.78
Pesticide	7.51	460.52
Seed	12.00	740.00
Labor	17.26	1,060.65
Others	20.74	1,273.80
Total	100%	6,145.75

Source: Survey results of 90 farmers in Bao Loc city, 2020

The average yield of avocado farmers in Bao Loc city was 85.2 kg/tree. The average selling price was 0.86 USD/kg avocado. Many farmers sold avocados to traders/barn owners in the province (99.8%). In addition, farmers sold avocados to preliminary processing establishments in the province (0.2%).

3.3.2. Local traders (inside province)

In the process of purchasing avocados, traders used motorbikes to select avocados, set prices, set a date for plucking, and order avocados for farmers. The average cost was 1.74 - 2.17 USD/trip for small trucks (capacity from 0.8 - 1.5 tons) to buy avocado from farmers. Only 15.38% of traders/shop owners used home trucks to buy, the remaining 84.62% rented cars with an average cost of 15.21 USD/trip, the lowest was 4.34 USD/trip in the commune. The highest was 26.08 USD/trip to buy in neighboring districts) (Table 4).

Table 4. Information of local trader

Content	Minimum	Maximum	Average
Experience (year)	3	30	16,5
Family labor (person)	1	2	1,5
Capital by money (USD)	1,739.13	15,956.52	8,847.82
Transport cost (USD)	4.34	26.08	15.21
Buy-Yield (ton/local trader/year)	120	3240	1680

Source: Survey data of 30 local traders in Bao Loc city, 2020)

3.3.3 Retailers (inside province)

A survey of 15 retailers showed that avocado retailers had an average of 11 years of experience (highest 20 years, lowest 2 years). The average participating labor was four people, including two family workers and two outsourced workers. For outsourced workers, mainly female workers (mainly in selecting young avocados and crushed avocados), the average salary was 130.43 USD/person/month.

Table 5. Information of retailers (inside province)

Content	Minimum	Maximum	Average
Experience (Year)	2	20	11
Labor (Person)	3	5	4
Buy-Yield (ton/retailer/year)	1.32	159.00	80.16
Rate of loss (%)	30	15	22.5

Source: Survey data of 15 retailers, 2020

3.3.4 Processors (Processing establishments/enterprises - inside and outside province)

Processors had 24 years of experience in exporting and processing confectionery and butter products. The average number of employees in processing establishments/enterprises was 4.5 people, of which 2 are family workers and 2.5 were outsourced. The average rental price was 152.17 USD/person/month.

Table 6. Buy – Sale activities of processors

Content	Minimum	Maximum	Average
Experience (year)	15	33	24
Labor (person)	4	5	4.5
Yield (ton/enterprise/year)	1.32	30.00	15.66

Source: Survey data of 15 processors, 2020

Buying activities

Processing establishments/enterprises mainly bought avocados from traders/barn owners inside and outside the province. The type of avocado purchased was avocado, with an average size of 16.5 cm. The average purchase price was 1.04 USD/kg. The average purchase volume was 20.1 tons/base/year. The form of payment was cash, and there was a payment contract.

Sale activities

Processing establishments/enterprises sold confectionery from butter to supermarkets, wholesalers/retailers inside and outside the province. The average selling price of avocado products was 3.19 USD/kg. The highest was 3.91 USD/kg. Sales volume in July and January was the highest of the year due to high demand for summer tourism and Tet shopping for confectionery and payment mainly in cash.

Table 7. Retail price of avocado's production of processors

Content	Minimum	Maximum	Average
Avocado's production (USD/kg)	2.47	3.91	3.19

Source: Survey data of 15 processors, 2020

3.3.5 Agents, wholesalers/retailers

Agents, wholesalers/retailers had an average of 15 years of experience in trading avocado products. In addition, they sold other fruit products. The peak time of the year was in January. Usually, the number of employees in each agent was five employees, of which house workers were about 1-2 people. Outsourced labor was mainly for loading, transporting goods, with an average salary of 173.91 USD/person/month (Table 8).

Table 8. Labors in wholesalers/retailers

Content	Minimum	Maximum	Average
Experience (year)	7	11	9
Number of labor (person)	1	5	3

Source: Survey data of 30 retailers and 15 wholesalers, 2020

Purchasing activities

Agents bought avocado products from preliminaries inside and outside the province. The average purchase volume was 1 ton/agent/year. Preliminary processing establishments deliver goods to their places and pay by cash or bank transfer (for patrons).

Sale activities

The average selling price of avocado products by agents/wholesalers was 2.39 USD/kg. For retailers, it was about 2.69 - 2.74 USD/kg of product. Through agents/wholesalers to sell to retailers inside and outside the province, pay in cash and deliver to the place of purchase, shipping costs outside the province (by cars) from 0.22 to 0.43 USD/10 kg of product and in the province, this cost was only about 0.22 USD/20 kg of product.

3.4 Logistics analysis of avocado value chain in Bao Loc city

3.4.1 Production logistics

The results showed that 49.4% of farmers used motorbikes to buy avocado seeds from seed suppliers in the province. The remaining plant seed suppliers will gather enough orders from farmers to deliver avocado seeds by truck. For input materials, 50.6% of farmers used motorbikes to buy fertilizers, plant protection drugs, and tools and aids in the production process, 49.4% agents/stores transported inputs to farmers' houses by truck. The average cost of a motorbike trip to buy input materials was about 0.43 USD/trip. Most farmers rent machinery in the tillage stage (till the land) with an average cost of 65.20 - 108.75 USD/ha; the remaining steps, such as planting, tending, and harvesting, are mainly performed by hand.

Most of the traders/barn owners in the province come to farmers' houses to buy. Only 0.2% of farmers sold to primary processing establishments by motorbike, with an average cost of 1.30 USD/trip. The factors leading to the lack of linkage of the chain were that the current avocado trading market was still free, there were no order/sales contracts, and transparency in purchasing prices had not been clearly demonstrated. The producer's point of view, including the primary actor, the farmer, and the actors involved in the production process, showed that improving the status of the weak variables was beneficial for producers, improve quality and safety, share risks among chain partners, provide competitive prices to consumers, and improve overall chain efficiency and sustainability existing values (Kognt, 1988; Esty, 2004; Park et al., 2004; Mol, 2006; Zhao et al., 2007).

According to research by Vo Thi Thanh Loc and Nguyen Phu Son (2011), when there were no association contract, from production to consumption, with many partners involved, this chain was not sustainable when the benefits between the parties are not sustainable. The partners in the value chain were very different. This study showed that, from production to circulation in the chain, there were almost no production association contracts. Collectors play an important role, connecting the middlemen from farmers to processing facilities or final consumers. This was an unsustainable link when the weak were farmers, and traders were the ones who dominate the prices in purchasing.

3.4.2 Logistics of circulation

For traders inside and outside the province: Traders/barn owners in the province used motorbikes and trucks in the process of purchasing and selling to traders outside the province. Both parties will agree with shipping costs in advance.

By motorcycle: The cost of viewing and depositing was on average 1.74 to 2.17 USD/trip for traders in the province. For traders outside the province to buy avocados from traders in neighboring provinces, this cost was an average of 5.22 to 6.52 USD/trip. For traders far away, about 300-500 km, the cost was approximately 43.47 USD/trip to buy avocado.

By trucks: Depending on the agreement, the buyer or seller covered the shipping costs; usually, the buyer would pay this cost. Transportation cost during buying avocados from farmers averaged 11.30 USD/trip, the smallest was 4.34 USD/trip in the immediate area, and the highest was \$26.08/buying trip in remote areas. Transportation costs for avocados range from 13.04 to 21.74 USD/ton for neighboring provinces, averaging 43.47 USD/ton for remote regions such as Mekong Delta, Binh Duong, Dak Lak with capacity from 10 to 20 tons/day.

For primary processors: Primary processors bought avocados directly from farmers, traders/barn owners inside and outside the province. They mainly bought from traders/barn owners in the province and had them delivered to their places with initial transportation costs. In addition, establishments used floor machines (average price of 913.01 USD/machine), roasting machines (average price of 826.08 USD/machine), presses (average price of 30.43 USD/machine) during the preliminary processing of fresh avocado into cake and candy.

For agents/wholesalers and retailers: Most agents did not have to bear shipping costs because the seller delivers the goods to their place of business. Only agents/wholesalers must provide to the buyer's place; Shipping costs outside the province (carrying) from 0.21 to 0.43 USD/10 kg of product and within the province, this cost was only about 0.21 USD/20 kg of product. For agents/retailers, because they mainly sold at the premises in small quantities, there was almost no shipping cost.

This study showed that the avocado value chain was passed through many channels, and there were many actors involved in the chain with different degrees. However, the existing avocado value chain did not link actors participating in the chain, leading to unsustainability in the chain. The actors were very vulnerable in participating. Partner in the chain needed strategic development to satisfy consumers in terms of transparency, relationship, commitment, linkage, trust in quality, safety, price, service (Kongt, 1988, Esty, 2004; Park et al., 2004; Mol, 2006, Zhao et al., 2007; Marugavel, 2010; Ariyawardana et al., 2012 and Hena and Peeyush, 2014).

4. CONCLUSION

Research results on actors participating in the avocado value chain in Bao Loc city, Lam Dong province, Vietnam, described four chain market channels and trading activities of each actor participating in the chain. The most popular channels through the mayor were Farmers - Traders/barn owners in the province - Preliminary establishments - Agents/wholesalers - Retailers - End consumers. In which, the cost to grow 1 hectare of avocado was 6,145.75 USD. Traders had to invest in purchasing capital on average 8,847.82 USD/crop. The chain's circulation logistics showed that avocados are mainly collected at farmers' homes through traders and then transported to processing facilities for distribution. The results of this study also showed that the trader was an intermediary in the avocado value chain, to reach the processing facility/consumer, avocados must go through an intermediary who was a local trader.

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