

HoaLoc-Mango Market Value Chain Study In Mekong Delta, Vietnam

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Abstract

The objective of this study is to ensure the ongoing prosperity of the HoaLoc-mango value chain by an examination of the allocation of costs, revenues, and net profits among participants in the marketing channel. By identifying any vulnerabilities in the chain and proposing potential remedies, this research seeks to enhance its overall performance. The objective of this study was to use value chain analysis in order to evaluate the HoaLoc-mango value chain within the Mekong Delta region of Vietnam, and to determine its impact on the overall economic efficiency of the area. A total of 490 data points were gathered via surveys conducted among various stakeholders in the agricultural supply chain, including farmers, cooperatives, collectors, wholesalers, local merchants, export operations, processing firms, and grocery stores specializing in the sale of fresh produce. The value chain of the HoaLoc-mango exemplifies a paradigm of economic efficiency, yielding a substantial revenue of \$825.9 million and a net profit of \$66.4 million. Export channels, often referred to as marketing channels 1, 2, and 3, generate a substantial sum of \$92.6 million in revenue, accompanied by a net profit of \$8.1 million. The aggregate revenues generated by domestic channels 4 and 5 total \$733,351 million, accompanied by a net profit of \$58.3 million. The study revealed that producers are the most vulnerable actors in the mango supply chain, mostly owing to the substandard quality and limited scope of the chain. This study proposes three policy recommendations, including the redistribution of benefits, enhancement of technology, and elevation of standards. The findings of this research provide support to the notion that the value chain method might be a valuable tool in shaping public policy. Moreover, the present study contributes to the existing body of research about the examination of value chains in the context of tropical fruits and vegetables.

Keywords: Cost-benefit, value chain, HoaLoc-mango, export market.

1. INTRODUCTION

Value Chain Analysis (VCA) is often used by bilateral and multilateral development organizations in the realm of academic research and the formulation of policies. A comprehensive analysis of the value chain encompasses the examination of several components, including inputs, outputs, local and worldwide markets, public and private sectors, as well as the environment and natural resources. Assisting policymakers in effectively managing the supply chain and facilitating equitable distribution of agricultural research improvements may have significant and wide-ranging implications. VCA refers to a consortium of enterprises collaborating to produce and disseminate commodities, with a primary objective of aligning the supply chain with customer demands in terms of cost-effectiveness, quantity, and quality. Assume responsibility for the coordination of intra-

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organizational endeavors that include both horizontal and vertical dimensions, as well as those that cut across different departments. There are potentially many advantages associated with the process of bridging the divide between rural and urban areas. According to the study conducted by Rauch et al. (2001), there exists a significant financial interdependence between rural and urban families. According to Heike et al. (2016), entrepreneurs have the potential to facilitate the growth of rural economies by enhancing the trade connections between rural and urban regions. This presents novel prospects for small enterprises in both local and global markets.

In their policy analysis study, Bockel and Tallec (2005) used the usage of Value Chain Analysis (VCA), using funding provided by the Food and Agriculture Organization (FAO). The VCA included a wide range of subjects, including input-output relationships, production factors, institutions, the environment, and natural resources, all of which were presented to policymakers for their consideration. During our conversation, we extensively explored several aspects like the economic and social context, the importance of value chain outputs, the institutional framework, the input and output markets, as well as conducting a comprehensive economic and functional analysis. The implementation of VCA has the potential to provide assistance to those situated at the lower end of the socioeconomic spectrum, while also offering governments a means to enhance the efficiency of their food distribution systems. Agricultural supply networks include a range of favorable and unfavorable elements. The timely fulfillment of production and delivery deadlines is mostly contingent upon the effectiveness with which information on production schedules, quality assurances, and quantity requirements can be sent within a supply chain. According to Balyan et al. (2013), there is a conjecture that the increased participation of nations in the World Trade Organization might perhaps account for the observed escalation in the exportation of fresh mangoes. India's export volume saw a significant increase, surpassing the established international limit. To ensure the enduring viability of the export business, it is essential to establish and maintain legal measures. Meeting safety criteria in countries that import goods from India might be a challenge for Indian exporters. The development of standards for food security necessitates the use of rigorous scientific methods and adherence to established international norms.

In order to ensure that mangoes designated for the export market meet the required standards in terms of both quality and quantity, Roehlano and Jesus (2013) propose the establishment of vertical linkages. The potential value of the mango supply chain might be enhanced by the private sector's ability to implement vertical integration. The horizontal orientation of the market seems to have influence on the export sector. The marketing and refining industries exhibit strong performance due to their capacity to use economies of scale and their propensity for risk-taking. The analysis of costs and benefits is conducted along the whole value chain of Vietnamese mangoes. The expenditures under this category include the construction of a treatment or processing facility, the rejection of sales by market authorities, and significant quantities of transportation. The primary objective of this study is to analyze the existing cooperative dynamics between mango producers and mango purchasers along the mango value chain in southern Vietnam. The findings of this study will contribute to the development of strategies aimed at enhancing profitability for less powerful entities within the value chain, so ensuring their sustained presence.

2. METHODOLOGY

2.1. Sampling technique

The data gathering procedures used in this study were meticulously designed and implemented. The Mekong Delta was chosen as the research location due to its remarkable mango production system. Vietnam's significant production volume share of 63.5% and production area share of 50% underscore the country's substantial impact on the overall industry. The selection of the provinces of Vinh Long, Dong Thap, An Giang, and Tien Giang was based on their significant contributions to the development of the Mekong Delta region. According to the General Statistics Office's report in 2022, the provinces stated above contribute to 64% of the overall output volume and include 73% of the cultivated land in the Mekong Delta. A sample size of 490 observations was selected at random for the purpose of investigating and gaining a deeper comprehension of the competitive nature of the

HoLoc-mango. The study included a total of 389 farmers, 6 cooperatives, 30 collectors, 20 wholesalers, 7 exporters, 5 processors, 8 grocery stores, 8 fruit marketplaces, and 20 retailers.

2.2. Literature Review

The phrase "value chain" was introduced by Michael E. Porter to describe the successive steps that are included in the process of developing a product, starting with its conception and extending to its sale. According to Porter (1985, p. 34), the concept of "value systems" refers to the comprehensive coordination of a business's supply chain, including activities ranging from the acquisition of raw materials to the marketing and sale of the end product. The use of value chain concepts has been seen in several domains of academic study. A number of academic publications, such as Morris (2000), Kaplinsky & Morris (2001), Ponte & Gibbon (2005), and Schmitz (2005), have put forward alternative value chain frameworks that deviate from Porter's established methodology. The approach of value chain analysis was used by the researchers. According to Hergert and Morris (1989), cost targets play a crucial role due to the interconnectedness of many production phases. In 1999, Ramirez conducted an assessment of the managerial, economic, and organizational value of coproductions. The concept of "value chains" encompasses the several stages involved in a company's production and distribution processes. The determination of resource allocation was conducted via the use of Activity-Based Costing (ABC) methodology, which incorporates the consideration of both inputs and outcomes. The implementation of this method was a direct result of Mau's study of the process. Dekker (2003) asserts that the acquisition of domain knowledge is a prerequisite for the efficient use of coordination and value chain optimization methodologies.

Value delivery networks are formed when people or organizations engage in reciprocal collaborations with the same actors. The value chain diagram visually represents the process. The areas of focus include the marketing channels throughout the whole of the value chain, economic integration, international competitiveness, regulatory options, and product differentiation. The concept of Value Chain Analysis (VCA) is believed to have been influenced by Porter's seminal thesis in 1985, which garnered widespread acclaim and was recognized as a major advancement in the field throughout the 1990s (Porter, 1985). This approach facilitates the assessment of a company's competitive advantage within the framework of present-day global commerce. The value chain refers to a sequential set of activities undertaken with the objective of reducing the disparity between overall sales income and manufacturing costs. There exists a perpetual relationship and interdependence among activities, leading to consequential outcomes. Strategies have been created by academics and political leaders, drawing upon Porter's conceptual framework. The current year is 2011. The surname Trienekens is associated with the Netherlands. Globalization serves as a diagnostic tool for analyzing the interconnections among various components within a chain. The thorough comprehension of the value chain is facilitated by the examination of stakeholder benefits, the process of selecting and implementing value-adding strategies, the mapping and evaluation of institutional frameworks, as well as the assessment of governance-related institutional frameworks.

Rich et al. (2009) assert that the analysis of value chains may be conducted via the use of qualitative or quantitative methodologies. Several qualitative studies have been conducted to investigate the added value of each component of the supply chain, ranging from the acquisition of raw materials to the completion of the final product (FAO, 2003; Van Melle et al., 2007; Hanemann et al., 2008; Krain et al., 2008; Huang et al., 2009; Xayavong & Islam, 2009). These investigations have also shown the potential advantages and disadvantages of this approach. Van Melle et al. (2007) suggested the use of a value chain analysis. The use of gross margin analysis within the framework of value chain analysis has been documented in academic publications (Mitiambo, 2008; Tu, 2009). The conceptual framework of the Value Chain Analysis (VCA) was established via the use of Porter's methodology. Significant emphasis is focused on the examination of the impact of globalization on the interconnections within the chain. Kaplinsky and Morris (2001) propose that a value chain analysis may provide insights into several aspects, including stakeholders, governance, chain value, and stakeholder benefits.

Several research used variable component analysis (VCA). According to Michael and Deigan (1989), it is crucial to establish clear cost objectives since the expenses incurred during one step of production may have a significant impact on the costs of succeeding phases. Ramirez (1999) posited

that a significant focus on the notion of value co-production facilitated a comprehensive comprehension of market potential, management strategies, and cultural norms. In 2003, Kaplinsky and Morris made improvements to the value chain. In their study, Mau (2002) conducted an investigation of the origins and outputs of a specific system, using the methodological tool of value chain analysis. An additional aim of the study was to examine the Activity-Based Costing (ABC) approach to resource allocation. Dekker (2003) asserts that the need for fostering internal company cooperation and process improvement lies in the facilitation of fluid information interchange throughout the value chain. As of the present time, the calendar year is 2017. Based on the research conducted by Douglas et al. (year), it has been observed that the overall outcomes and offers experience improvement when there is collaboration across all entities involved in the value chain. The topic of discussion is the organization in the year 2020. The stakeholders of the Dominican Republic are identified, along with the analysis of cost and profit structures, as well as potential modifications to the distribution channels. Bilateral and international assistance organizations are using value chain analysis (Henriksen et al., 2010) as a strategic tool to inform and drive development initiatives. The use of value chain analysis has proven advantageous for both governmental organizations and academic institutions. Consequently, a growing number of humanitarian groups are adopting this approach. Lorenzo (2013) asserts that the use of Value Chain Analysis (VCA) aids in the allocation of resources for marketing channel expenditures and earnings. The Value Chain Analysis (VCA) technique assesses the economic efficiency of stakeholders, with a specific focus on social concerns, rather than being grounded in econometric principles. Rich et al. (2011) argue that the Value of Statistical Life (VCA) has limitations in its ability to effectively measure policy trade-offs and results.

Hawkins and Popkin (2015) as well as De Brauw et al. The Value Creation Assessment (VCA) is a comprehensive evaluation tool that assesses several aspects of joint endeavors, including their potential, output, efficacy, and durability. The objectives of this initiative are enhancing the resilience of the system's weak points via the establishment of robust communication channels, as well as fostering integration among the wholesale, retail, and delivery sectors. The operation of markets might exhibit some deficiencies. Based on the findings of the Asian Development Bank (ADB, 2019), it has been observed that producers in Pakistan and Vietnam are remunerated with less than 30 percent of the selling price for their agricultural products. There is potential for development in all parts of the fresh mango export business, including postharvest processing, farm management, and distribution routes. Growers have the potential to achieve cost savings via engaging in collaborative efforts with shippers and processors. Tanzania is actively engaged in endeavors to enhance the quantity of reliable contractual distributors and merchants for mangoes in strategically targeted areas. The use of data obtained from an analysis of the value chain has the potential to enhance the understanding of competitive and efficient market indicators.

Based on distinct study findings, it has been observed that the mango industry in Myanmar is composed of six distinct value chains. Among them, five value chains mostly cater to the local market, while one value chain is specifically dedicated to foreign exports. The yearly rate of mango exports is around 2%. The cost of mangoes is rather high. Based on the findings of Naing (2015), it can be seen that a significant majority, namely 175 out of 250, of the city's exporting enterprises are concentrated exclusively inside the metropolitan region. The remaining 80 individuals are engaged in wholesale activities. A research on the Philippine mango value chain was undertaken by Karina and her colleagues in 2017. The Philippines is responsible for exporting around 4% of the global mango supply. The absence of mango fruit would render several commercial and industrial uses unfeasible. A significant proportion of mango export enterprises, namely 73%, operate on fields that are less than 3 hectares in size. The nations that demonstrate significant importation of Philippine mangoes are the United States, Hong Kong, South Korea, Japan, China, and Canada. Approximately 70% of the cellulose found in the region of Chittoor in India is obtained from the tothapuri/alphonso variety. Mango farmers and processors engage in a collective effort to establish a coordinated approach for harvesting and distributing the fruit. In 2018, the Food and Agriculture Organization (FAO) reported that the majority of commercially accessible Vizianagaram mangoes were eaten by the populations of Delhi, Raipur, and Kolkata, accounting for over 90% of global consumption. Based on the research conducted by William (2014), the distribution of the Hoa Loc mango value chain reveals that around 77% of its product is allocated inside the domestic market of Vietnam,

while the remaining 63% is mostly shipped to China. San et al. (2020) reported that a total of 150 Vietnamese enterprises are responsible for processing about 10% of the global mango crop.

In a study conducted in 2016, Romo and Bokelmann found that mangoes are the only product sold by small-scale growers in Dong Thap. The promotion of collaborative efforts among farmers and agricultural professionals. They provide the industry with crucial assistance, profound insight, and extensive expertise. The mango value chain encompasses the many stakeholders and entities engaged in the cultivation, distribution, procurement, transportation, processing, export, and consumption of the fruit. There is a scarcity of exporters and producers who use refrigeration techniques. Exporters use a range of techniques upon obtaining raw mangoes, such as dehydration, refrigeration, preservation, and integration into ice cream. Truong et al. (2015) reported that Chumangos constitute 74.5 percent of China's overall mango exports. The primary recipient of mango exports from Vietnam was the Chinese market. The Vietnamese mango market is mostly controlled by a single consumer market. The significance of excellent information is often underestimated, however it plays a crucial role in market penetration, competitive advantage, and targeting the appropriate customer base. Vietnam's significant focus on the cultivation and consumption of mangoes yields considerable advantages for both the value chain and subsistence growers. In his study, Alam (2018) investigates the sequential journey of mangoes from the farm to the shop, with the aim of evaluating the benefits and drawbacks associated with the traditional supply chain for mangoes. The mango business is characterized by the collective participation of producers, distributors, and retailers, who collectively bear the financial outcomes, both positive and negative, of their involvement in the sector. According to the study findings, mango farmers demonstrated excellent growth despite encountering challenges such as postharvest loss and middlemen. Retailers may get several advantages from value chains. The population residing in Pakistan derives pleasure from consuming mangoes.

The research conducted by Badar et al. (2015) revealed that Pakistani consumers placed equal importance on both the extrinsic factors, including safety and marketing, and the internal factors, such as curiosity and experience, while evaluating mangoes. According to Krain et al. (2008), the production of mangoes has been recognized as a very profitable enterprise in the Embu area. As stated by Badar et al. (2019), the mango export value networks use a combination of modern and traditional value chains in order to effectively cater to diverse customer demographics. The preservation of the main market for mango goods and the promotion of economic development are heavily influenced by the presence of traditional value chains. However, customers have been drawn to contemporary value chains as a result of the remarkable expansion of innovative retail formats. The efficiency and general quality of current value chains are enhanced by collaboration with producers, notably by using reverse integration tactics. The need for enhanced collaboration among farmers necessitates the development of their relationships. The transfer of the mango industry from an outdated to a contemporary value chain has the capacity to significantly contribute to the economic and social development of the nation.

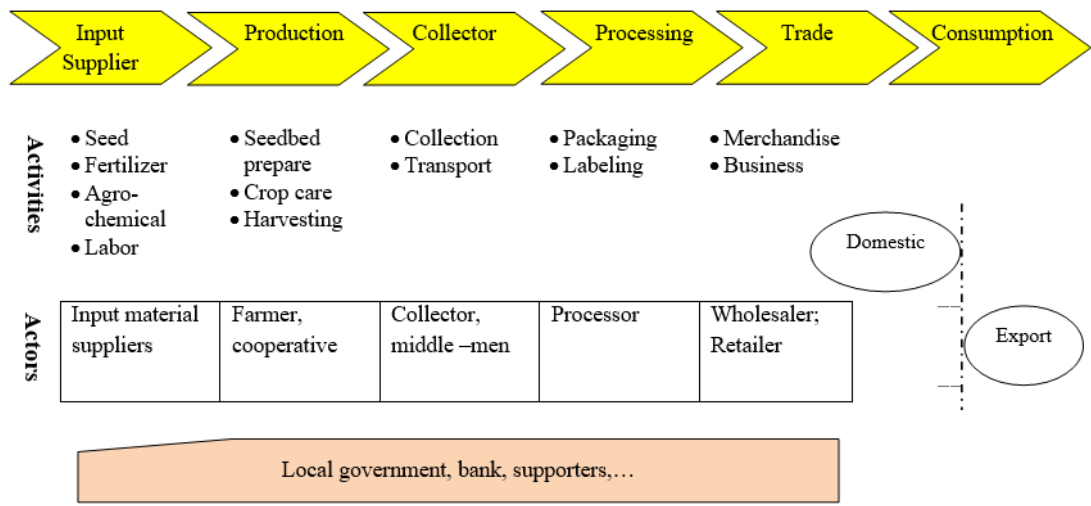
2.3. Empirical model

The analysis of the value chain is a very effective approach for comprehensively understanding the interconnected roles carried out by different organizations. This article addresses several inquiries, including the parties concerned, the economic elements influencing the situation, the progression of events, and the mechanisms behind the process of development. The correlation between enhanced operational efficiency within the supply chain and heightened competitiveness, as well as the generation of novel value, has been established. This, in turn, results in elevated pay and improved working conditions for employees. The aforementioned information may be of use to economists and policymakers. The value chain notion proposed by Andreas (2018) is used in this context. The system comprises a multitude of customers, supporters, and participants who engage in the different stages of production. All individuals, ranging from input providers to ultimate product purchasers, are actively engaged in the process. Fertilizers, agrochemicals, labor, soil preparation, crop management, harvesting, collection and transportation, processing, retailing, and local and worldwide trade are integral constituents of the agricultural sector. The value creation process involves several essential components, including raw material suppliers, agricultural producers, cooperative groups, intermediaries, processors, wholesalers, retailers, exporters, and both local and

foreign customers. In addition to local and national governmental bodies, freight forwarders include a diverse range of entities, including non-governmental organizations (NGOs), financial institutions, agricultural extension agencies, academic institutions, and other freight forwarding entities.

Benefit-cost calculation

- Input cost = root fertilizer + leaf fertilizer + paclobutrazol + herbicide + insecticide + fungicide
- Marketing cost = energy + wrapping bag + machine depreciation + transport depreciation + hired labor + family labor + land rent
- Total cost = Input cost + Marketing cost
- Revenue = selling price of a ton of mango
- Added value = Revenue – Input cost
- Net profit = Revenue – Total cost
- The marketing costs of traders and processors include the cost of packing, hired labor, transport, testing, and others.
- The mango ton will be used to compute all indicators.
- The value chain diagram rate of dispersed goods is calculated as follows:
 - The total input products of the first actors will be 100%, and the entire output products of the final actors must equal 100%.
 - Each actor must input and output equally.



Note:

- Stages of production:
- Main stakeholders in chain:
- Final users:
- Supporters in value chain:

Figure 1. Conceptual framework of value chain (Andreas, 2018)

3. RESULT AND DISCUSSION

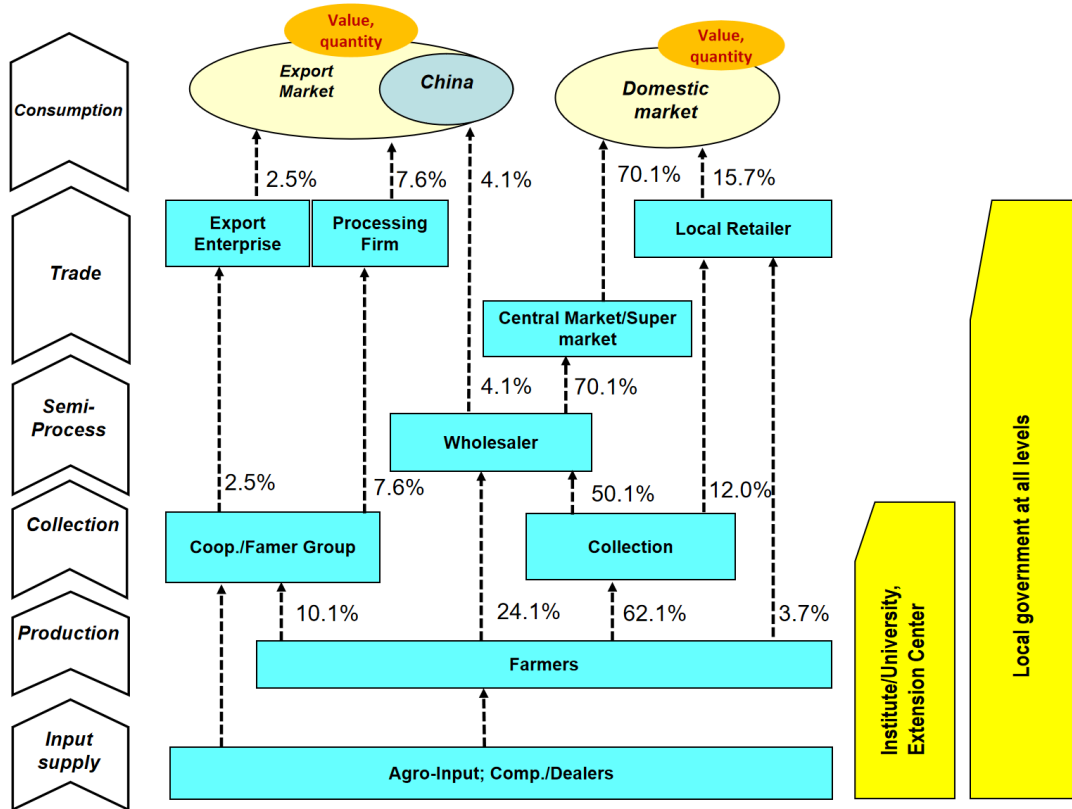


Figure 2. Diagram of HoaLoc-mango marketing channels

The findings of the research on the value chain of HoaLoc-mango reveal that the domestic sales channel constitutes a significant proportion of the total mango volume, amounting to 85.8%. The export channel accounts for a mere 14.2% of the total market. The present study demonstrates the existence of five primary channels within the value chain of HoaLoc-mango, with three channels designated for export purposes and two channels designated for local use. Each of these avenues serves various features, quality criteria, and business operations.

Table 1 displays the distribution of total expenditures and revenue across the various participants in the export market channel. According to the findings of the study, it has been shown that farmers who choose for export channels inside the HoaLoc-mango value chain tend to generate higher net profits compared to those who operate other export channels. Nevertheless, it is worth noting that farmers have the lowest mean annual average net profit among all occupations. The farmers in Channel 1 get a remuneration that is 2.4 times more net profit compared to the Cooperative, and twice as high compared to the exporting enterprise. The result of this calculation yields a net profit of 767.1 USD/ton. The growers operating inside the second distribution channel had a net profit of 356.7 USD/ton, surpassing the net profit of the processing firm approximately 4.4 times and exceeding the net profit of the cooperative about 2.2 times. The net profit generated by Channel 3 farmers amounts to 572.1 USD/ton, representing a net profit that is 4.1 times more than that of wholesalers. The annual average net profit performance of farmers using export channels 1, 2, and 3 is comparatively lower than that of other stakeholders. The significant disparity in productivity between farmers and those engaged in other forms of entrepreneurship is a prominent determinant. The primary contributors to HoaLoc-mango production are peasant farmers, who often own less than 1 hectare of farming area. The mango farmers in channel 1 collectively yield an average annual production volume of 0.6 tons are produced, with cooperatives contributing 30.5 tons and exporting companies contributing 28.3 tons. In addition, 2.2 tons are produced by farmers, with 65.2 tons originating from cooperatives and 265.7 tons from processing firms in channel 2. Furthermore, farmers in Channel 3 deliver 2.5 tons, and wholesalers with a total of 40.6 tons being distributed. The findings of this study demonstrate that economies of scale play a pivotal role in generating

advantages within the realm of business and industry. Hence, firms operating inside export channels 1, 2, and 3 are seen to be the most susceptible entities within the market.

Table 2 presents a comprehensive analysis of the advantages and disadvantages associated with the domestic distribution channels used by HoaLoc-mango. Farmers consistently generate the highest net profit compared to others in local channels 4 and 5, excluding retailers. The farmer receives a net profit of 572.1 USD/ton from Channel 4. The quantity exhibits a 3.1 times increase in comparison to the amount retailed in supermarkets/fruit shops. Furthermore, it shows a 5.6 times increase when compared to the net profit distributed by wholesalers, and a 3.9 time increase when compared to the net profit by collectors. The remuneration provided to farmers in channel 5 amounts to 271.10 USD/ton, representing a compensation net profit that is 1.8 times higher than that received by collectors. The farm's annual average net profit routinely ranks as the least favorable among all types of businesses. Consequently, the impact of economies of scale significantly influences the level of success achieved by enterprises. The HoaLoc-mango farmers in channel 4 exhibit a yearly average production of 3.1 tons, which is much lower than the annual yields of collectors (41.3 tons), distributors (215.1 tons), and retailers (283.5 tons) involved in the mango trade. Channel 5 also saw a number of similar occurrences.

The significance of the domestic market channel within the HoaLoc-mango value chain is evident from the data shown in Tables 1 and 2. During the specified reporting period, the domestic channel generated a profit of 58.4 million USD and made a contribution of 733.5 million USD to the total revenue. The figure described above is almost eight times bigger than the total income generated via exports, and seven times larger than the total profit obtained through exports. The HoaLoc-mango value chain has generated a total sales figure of 825.9 million USD, resulting in a net profit of 66.4 million USD.

Based on the available data, it can be inferred that farmers are the players in the value chain who are most susceptible to vulnerability. The paper provides illustrated examples of suitable approaches for effectively participating in permissible marketing channels, with the aim of maximizing the financial advantages for agricultural stakeholders.

Case 1: Concerns over the substandard quality of exported mangoes have been expressed by farmers in Case 1. As a result, the conventional retail system, which constitutes the marketing channel 5, provides just 5.3 tons of the overall amount of unclassified common mangoes. The mean annual average net profit for farmers affiliated with channel 5 is 1,436.8 USD.

Case 2: mango growers are provided with opportunities to reach both the export market (referred to as marketing channel 2) and the retail system inside the megalopolis (referred to as marketing channel 4). Nevertheless, it is important to consider that a significant number of farms have not yet attained the requisite quality benchmarks for the transportation of perishable fruit. Approximately 2.2 tons were sent via channel 2, while approximately 3.1 tons were communicated via channel 4. The aggregate annual average net profit generated by the farmers amounts to 2,558 USD, with channel 2 contributing 784.6 USD and channel 4 contributing 1,773.4 USD.

Case 3: In the context of exporting mangoes, farmers engage in the practice of categorizing their mangoes into distinct types prior to starting the sales process. The growers demonstrate remarkable cultivation practices, resulting in mangoes of high quality. The supply data for mangoes of grades 1, 2, and 3 is assigned to marketing channels 1, 2, and 3, respectively. The allocation of mangoes differs throughout the three channels, with channel 1 getting 0.6 tons and generating a net profit of 460.3 USD. channel 2, besides, receives 2.2 tons and yields a net profit of 784.6 USD. Lastly, Channel 3 receives 2.5 tons and generates a net profit of 143.1 USD. In the third scenario, the cultivator's annual average net profit amounts to 2,675.1 USD.

Table 1. The cost-benefit analysis of actors in the export channels

Indicators	Farmer	Cooperative	Collector	Wholesaler	Export Enterprise	Processing Firm	Total
The marketing channel 1							
Selling price (USD/ton)	3,735.3	4,255.8			10,335.9		
Input cost (USD/ton)	1,354.2	3,735.3			4,255.8		
Marketing cost (USD/ton)	1,614.0	202.6			5,686.9		
Net profit (USD/ton)	767.1	317.9			393.2		
Avg. volume/year (ton)	0.6	30.5			28.3		
Net profit/year (USD)	460.3	9,696.0			11,127.6		
The marketing channel 2							
Selling price (USD/ton)	1,752.3	2,089.5				2,840.6	
Input cost (USD/ton)	636.7	1,752.3				2,089.5	
Marketing cost (USD/ton)	758.9	172.5				669.3	
Net profit (USD/ton)	356.7	164.7				81.8	
Avg. volume/year (ton)	2.2	65.2				265.7	
Net profit/year (USD)	784.6	1,0738.4				21,734.3	
The marketing channel 3							
Selling price (USD/ton)	2,754.0			3157.0			
Input cost (USD/ton)	995.4			2754.0			
Marketing cost (USD/ton)	1,186.5			262.4			
Net profit (USD/ton)	572.1			140.6			
Avg. volume/year (ton)	2.5			40.6			
Avg.net profit/year (USD)	1,430.2			5708.4			

The integrated economic efficiency of export channels							
Volume (ton)	9,984.2	7,101.4		8,226.4	1,757.8	8,015.5	
Selling price (USD/ton)	2,390.6	2,625.7		1,106.3	10,335.9	2,840.6	
Net profit (USD/ton)	491.1	202.6		49.3	393.2	81.8	
Total revenue (Thous. USD)	23,868.6	18,646.3		9,100.8	18,168.2	22,768.7	92,552.6
Total net profit (Thous.USD)	4,903.3	1,438.9		405.3	691.2	655.7	8,094.4
% Total revenue	25.8	20.1		9.8	19.6	24.6	100.0
% Total net profit	60.6	17.8		5.0	8.5	8.1	100.0

Source: Field survey data in 2022

Table 2. The cost-benefit analysis of actors in domestic channels

Indicators	Farmer	Collector	Wholesaler	Central Market /Supermarket	Local Retailer	Total
The marketing channel 4						
Selling price (USD/ton)	2,754.0	3,002.6	3,288.7		4,241.3	
Input cost (USD/ton)	995.4	2,754.0	3,002.6		3,288.7	
Marketing cost (USD/ton)	1,186.5	100.5	184.8		769.1	
Net profit (USD/ton)	572.1	148.1	101.3		183.5	
Avg. volume/year (ton)	3.1	41.3	215.1		283.5	
Net profit/year (USD)	1,773.4	6,116.5	21,789.6		52,022.3	
The marketing channel 5						
Selling price (USD/ton)	2,236.8	2,474.1			2,981.7	
Input cost (USD/ton)	896.8	2,236.8			2,474.1	
Marketing cost (USD/ton)	1,068.9	89.2			94.3	
Net profit (USD/ton)	271.1	148.1			413.3	

Avg. volume/year (ton)	5.3	24.8			11.2	
Net profit/year (USD)	1,436.8	3,672.9			4,629.0	
The integrated economic efficiency of domestic channel						
Volume (ton)	60,326.8	57,725.33	49,288.011	49,288.01	11,038.83	
Selling price (USD/ton)	2,659.4	2925.4	3,288.7	4,241.3	2981.7	
Profit (USD/ton)	517.0	148.1	101.3	183.5	413.3	
Total revenue (Thous. USD)	160,430.8	168,867.0	162,093.5	209,045.2	32,914.5	733,351.0
Total net profit (Thous.USD)	31,189.0	8,549.1	4,992.9	9,044.4	4,562.3	58,337.7
% Revenue	21.9	23.0	22.1	28.5	4.5	100.0
% Net profit	53.5	14.7	8.6	15.5	7.8	100.0

Source: Field survey data in 2022

Overall, the enhancement of mango fruit quality has the capacity to augment the annual net profit of producers. The annual average net profit of the farmer in Case 3 exhibits a notable increase of 1,238.3 USD compared to case 1, and a 117.1 USD increment relative to case 2, so exemplifying a remarkable illustration of this phenomenon. It is evident that the farmer, who plays a pivotal role in the HoaLoc-mango value chain, receives the lowest remuneration among all the stakeholders. The pivotal significance of farmers as primary suppliers of raw materials at the start of the value chain is well recognized. Upon comparative analysis with the other five marketing channels, it becomes evident that this particular channel generates the most revenue in its whole. The lower annual net profit seen in the mango value chain may be attributed to a lesser scale of production rather than an unequal allocation of sales across the five marketing channels.

Recommendations for enhancing the development of HoaLoc-mango industry

Enhancing the connectivity of both vertical and horizontal relationships throughout the HoaLoc-mango value chain is essential in order to comply with market quality standards and regulatory obligations. Additionally, this will facilitate the exchange of market information, enable large-scale and secure manufacturing, and foster collaboration among stakeholders. Furthermore, the implementation of this strategy will contribute to the improvement of market information dissemination. The relevance of this issue has increased as its vulnerability in the supply chain has been brought to light. The subsequent policy proposals derived from the aforementioned subjects are outlined below.

The procedure of ensuring the maintenance of optimal quality

The concept of production organization defined by horizontal connectivity pertains to the implementation of a horizontal production system across the whole of the manufacturing process. Farmers that possess an inclination for cultivating extensive mango plantations in adherence to ethical farming principles may choose to participate in a farmer's cooperative or establish a commercial agreement with other farmers. The aforementioned collaborative endeavors have the potential to serve as the fundamental basis for the implementation of appropriate agricultural methodologies, resulting in the attainment of safety certifications and compliance with traceability regulations. The establishment of robust connections between producers and other stakeholders and networks is contingent upon the use of cooperatives. In order to effectively address the need for educational reform, it is essential to use farming practices that are ecologically sustainable, apply efficient harvesting techniques, utilize postharvest management strategies, possess extensive market knowledge, and leverage the expertise of agricultural business experts. Consequently, individuals may exert more control over their financial prospects and the enterprises they establish as a direct consequence of their endeavors.

Collaboration via vertical integration is necessary for trade agreements to effectively facilitate the advancement of commercial activities within the agricultural sector, including farmers, cooperatives, and processing enterprises, therefore aligning with their primary objective. This technique facilitates the process of allocating expenditures by providing distinct benefits and limits. The potential outcomes of farms being in closer proximity to processing firms include enhanced agricultural output and increased negotiating leverage for farmers. In order to achieve this aim, it will be imperative to enhance the availability of mangoes that adhere to more stringent criteria regarding size and quality. Theoretically, this has the potential to facilitate stakeholders' comprehension and recognition of quality standards, obligations related to compliance, and limitations imposed by supply and demand dynamics.

Assistance provided to a firm, either in the form of monetary resources or services, with the aim of facilitating the achievement of success. The Vietnamese government is actively engaged in efforts to establish and ratify free trade agreements (FTAs) within its domestic jurisdiction as well as on the international stage. Vietnam is now engaged in active

deliberations with three more nations, so augmenting the aggregate count of Free Trade Agreements (FTAs) signed by the country to 13. Vietnam's agricultural exporters have the potential to participate in global value chains and attract foreign investment if they effectively capitalize on the current opportunities. The worldwide mango trade is significantly influenced by many key agreements, including the ASEAN Economic Community, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, the Europe-Vietnam Free Trade Agreement, and the United Kingdom-Vietnam Free Trade Agreement. The literature reveals that there are instances in which certain countries, although being parties to free trade agreements (FTAs), fail to impose import duties on fresh mangoes and mango-related products originating from Vietnam. This non-compliance with the provisions of these agreements has been substantiated by the study conducted by Brian et al. (2021) and Thang (2018). In order to enhance public awareness and understanding of Free Trade Agreements (FTAs) and related topics such as tariffs, standards, quality assurance, competition, and trade law, it is recommended that the Department of Industry and Trade organize conferences, seminars, and dialogues to address these matters. The dissemination of information on Free Trade Agreements (FTAs) and related topics requires a systematic approach to planning and execution. Exporters might derive many advantages from this prevailing pattern, which include augmented export quantities, expanded clientele, and reduced expenses linked to market analysis. In order to effectively fulfill the requirements of importers and adhere to international standards, it is essential for merchants to possess a comprehensive understanding of every component within the value chain. The implementation of a quality management system might potentially enhance mango production in order to meet the requirements for exporting high-quality mangoes. As a result, the market will have the ability to establish higher prices for mangoes. There is a potential for financial benefits to be accrued by all participants in the supply chain, with a special emphasis on farmers, as a result of this phenomenon.

The allocation of financial resources towards the development and implementation of technical innovations

The concept of "horizontal linking" is used within the realm of production organization to denote the practice of amalgamating and harmonizing many departments or organizations that operate at the same hierarchical level within the organizational structure. The ability of individuals to interact with one other enhances not only the exchange of communication but also facilitates the trade of goods, services, and information. The proposition entails the provision of attractive financial incentives by the government to farmer organizations and cooperatives, with the aim of fostering the use of state-of-the-art technology. Examples of applications include various techniques such as trickle irrigation systems, integrated solutions for water and fertilizer management, and the use of unmanned aerial vehicles for pesticide spraying. The objective of this paper is to provide a standardized framework for the use of these technologies.

In order to fully capitalize on the economic benefits of relocating their operations to mango-growing regions, mango processing enterprises must collaborate to form a vertical integration. The acquisition of specialized financial resources to facilitate investments in advanced manufacturing technology is crucial throughout the migration process. The proper allocation of these investments plays a pivotal role in ensuring the effective outcome of the process. The advancement and widespread availability of instruments and technical innovations have significantly contributed to the enhancement of produce output. Several features that are included in this context include state-of-the-art cold storage facilities, vapor thermal treatment plants, standardized packaging manufacturing lines, and classification software. The mango industry stands to gain advantages from the implementation of macroeconomic policies, such as the use of loan packages. This approach has shown significant efficacy in enhancing productivity, facilitating the creation of superior products, and fostering the integration of state-of-the-art

advancements. The increasing influence of Vietnam has led to heightened competition within the global mango industry. The proliferation of employment opportunities facilitated by advancements in technology is advantageous for both the manufacturing and service sectors. The objective of the strategy is to attract potential investors to make financial investments in the firm, hence facilitating an expansion in production capacity and subsequent growth in revenue. The use of new mango cultivars and a substantial increase in mango production holds promise for enhancing mango accessibility and fostering market dynamism in the mango industry.

The mechanism via which benefits are allocated

Farmers are sometimes seen as the most vulnerable component within the supply chain, despite their crucial contribution in supplying essential resources to other entities. The transfer of benefits to producers is associated with two significant outcomes, namely enhanced supply chain efficiency and improved product quality. The inclusion of a greater number of farmers in collective entities such as cooperatives and farmer organizations is vital. These groups possess the capacity to effectively argue for farmers' interests during contract negotiations, hence facilitating equitable distribution of benefits.

- The decrease in commodity prices has facilitated cost savings for consumers.
- Improving the Practice of Contract Negotiation
- The present study aims to optimize the production processes of mango products and improve the quality of these products via the use of improved training techniques.
- It is essential for processing firms to assist their customers in obtaining quality certification.
- The potential solution to the prevalent problem of rising labor costs in the agriculture industry might include the use of advanced machinery and equipment inside food-processing businesses.
- The allocation of resources towards digital marketing and e-commerce has the capacity to mitigate the economic strain associated with shipping costs and intermediaries.

4. CONCLUSION

The farmer represents the most vulnerable component of the HoaLoc-mango production chain. Farmers involved in the HoaLoc-mango value chain have the lowest annual average net profit due to suboptimal yields and inadequate product quality. Furthermore, there exists a dearth of technical diversity and innovation in the processing of commodities intended for the global market. Various strategies, including as benefit transfer, technical development, and quality improvement, are now being used to strengthen the value chain of HoaLoc-mango.

The primary contributions of the study include elucidating the practicality of the analytical instrument and highlighting the significance of value chain analysis in the context of policy formulation, as follows:

- The study's cost-benefit analysis used many economic factors, such as land rent, family labor expenses, and depreciation costs, in order to determine the value of the measuring gadget. Opportunity cost was among these variables. In contrast to previous research endeavors that have mostly concentrated on financial efficiency, the present study provides a comprehensive examination of the value chain within the agricultural sector. This website provides a comprehensive analysis of the HoaLoc-mango industry, including a matrix that outlines the price breakdown. The methodology for calculating the conversion coefficients between these categories is also explained in the article. This provides an opportunity for additional investigation into the use of value chain analysis in

the context of tropical fruit and vegetable farming. This study aims to assess the value of the agri-food chain by focusing on the examination and evaluation of the production-trading account and the consolidated account.

– The study used rigorous quantification techniques to assess the many stakeholders involved and conducted a thorough cost-benefit analysis of the whole value chain. This approach was utilized to identify the actors who are most susceptible to vulnerability and to uncover the underlying factors contributing to this vulnerability. Ultimately, the study findings provide strategies for enhancing policy quality, advancing technology, and redistributing advantages to more effectively allocate incentives for chain members that are disadvantaged. The management of the supply chain in a sustainable manner is shown by the emphasis placed on agricultural product research. Agricultural supply chains are intricate economic networks that facilitate the distribution of risks and benefits among their constituent members. The objective of this study is to ascertain the possibilities and challenges encountered by small enterprises within these particular contexts. This serves as an illustration of the benefits that economies of scale provide to both businesses and manufacturers. This study shows the empirical results of assessment studies via the use of a value chain analysis. The study uncovers new issues and their corresponding policy implications, highlights gaps in knowledge, and presents the primary objectives for future applied research and evaluation.

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