Dynamics of Mango Value Chain

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1. Introduction

The value chain concept has been described as a mindset shift from a traditional producer-focused supply-push approach to a consumer-focused demand-pull approach (Collins, 2009). These chains are critical to human society as providers of food and income to the majority of the world's population (Collins, 2009). An agricultural value chain referred to as the people and activities that transport a fundamental agricultural commodity like maize, vegetables, or fruits from inputs and production in the field to the customer, through stages such as processing, packaging, and distribution (Gagnon, 2012). Value chains encompass the flow of products, knowledge, finance, social capital, payments and information that are needed to organize producers and communities. However, these value chains are significantly differing in their dynamics in terms of product, technology, financial and information flows (Badar et al., 2019).

Fruits in both fresh and processed, have been identified as a global sector with high potential due to rising consumer demand. Performing value chain analysis on fruits are considered significant, as it carries promising economic returns. In this context, mango, both in fresh or processed form is a favourable sector that requires much consideration for its high market potential with rising demand from the local and export markets. In 2019, around 11,130 ha of mango extent was cultivated in Sri Lanka with a production of 80,000mt of fruits. Out of the total production of mango in average, only 0.85% were exported as fresh and dried forms (TAMAP Report, 2019). Existing literature on mango value chain are limited to identifying actors and mapping the chain. A little information on typology and dynamics of financial and information flows of mango value chains are available in the previous studies (Gagnon, 2012). Further, in the Sri Lankan context, studies on mango value chain are very limited. Considering that, the aim of this study is to define a typology of Sri Lankan mango value chain models, to explore the input-output relationships of mango value chains in Sri Lanka and to study the economic return and marketing margin through the mango value chain in Sri Lanka.

2. Materials and Methods

This study is a qualitative in nature and case study methodology was adopted when addressing its objectives. In achieving the first objective, this study has defined its' typology based on end market (Gereffi et al., 2003) and ownership structure. In the second objective, input-output relationships were mapped according to the value chain model proposed by Taylor (2005). When determining the consumer price indexes this study followed the formulars of Acharya and Agarwal (1987).

The sample of this study was drawn from Anuradhapura, Pollonnaruwa, Kurunegala, Hambanthota and Ratnapura districts of Sri Lanka, due to the higher extent and production. Participants (315) represented mango value chain actors from farmers to wholesalers to retailers. Participants were identified through snowball sampling technique because of unavailability of statistics about the actors of the value chain. Primary data were collected from the focus group discussions and in-depth qualitative interviews. An interview guide with open ended questions was prepared for the focus group discussions and interviews with key stakeholders in the chain. This allowed for an informal but guided conversation with

respondents. Secondary data and information were collected from the Department of Agriculture (DOA), Department of Census and Statistics, Department of Customs published reports and websites.

3. Results and Discussion

Typology of mango value chain in Sri Lanka based on end market and ownership structure

Targeted end market and ownership structure have selected as main characteristics to define the value chain typology. Accordingly, we identified three major mongo value chain models established in Sri Lanka. They are traditional, modern and export-oriented value chain models. Traditional value chain model caters to the local market and main product is fresh mangoes, modern value chain model targeted towards to the supermarkets/hotels and end products were both in fresh or in processed form and export-oriented value chain model provides fresh or processed mangoes for the export market.

Traditional value chain consists with lower level of actors; producers, collectors, whole sellers and retailers. Modern value chain consists with farmers, collectors, processors, whole sellers and retailers. Export value chain consists with several factors in different path ways including; farmers, collectors, processors, exporters, whole sellers and retailers. In our observations, we identified different types of end markets based on the typology. Accordingly, traditional value chains are catered to the local retailers, modern value chains are targeting the super markets, hotels and restaurants, and for the processing factories. Finally, the export value chains are supplying to the export market.

Table 1 provides the characteristics of each value chain model based on the following features. As per the table, key features of the export-oriented value chain were high in quality, most GAP certified, grading and packing, value creation, smooth information flow as well as premium in price. Traditional value chain model operates in volume basis, seasonal and handle higher quantities with a limited attention on grading, packing, value creation, fragile information flow, varied price and targeted across all income groups of the domestic market. Modern value chain model characteristics in a considerable level of quality, grading, value creation, price and targeted for the upper income class domestic consumers.

**Table 01. Features of Sri Lankan Mango Industry Value Chain**

Features	Traditional	Modern	Export
Quality	Mixed	Medium to Good	High
Grading	Basic	Good	Excellent
Product Flow	Major	Minor	Minor
Information Flow	Weak	Strong	Strong
Value Creation	Low	Medium	High
Price	Low	Medium	High
Consumer	Domestic (All income classes)	Domestic (Upper income class)	Foreign
Retailer	Traditional	Urban/Modern	Foreign

Input-Output relationships of mango value chain in Sri Lanka

In the second objective, we explored the input-output relationships of mango value chain. Accordingly following relationships (Figure 1) have built up. We identified input suppliers as the people who provide inputs (agro-chemicals, fertilizer, planting materials, plant protection

equipment, etc.) to the mango farmers. Producers were small holder farmers who grow mango and supply to wide range of middlemen including collectors, wholesalers, processors, retailers or consumers. Collectors are collecting harvest from mango producers at a farm gate price and supply to wholesalers or processors. Wholesalers perform post-harvest functions like; grading, sorting, washing, packing and supply to retailers or to consumers. Retailers purchased fruits from either producers or from wholesalers in small quantities. Finally, consumers are the end users who bought mangoes for consumption. Restaurants and fruit juice bars are also identified as the separate group of consumers in the study. The sample highlighted that the actors in the value chain are differed in business volume/ production and management practices.

Further, it is observed how input information, products, technical knowledge and finance move through the mango value chain and directions of the flows (figure 1). Government organizations like DoA, Institute of Post-harvest Technology, Foreign funded projects like Agriculture Modernization Project and Asian Development Bank as identified as the supporting organizations. Both government and private sector initiatives assist mainly through advisory services, technology transfer, infrastructure, financial services and trainings for the value chain actors. Moreover, postharvest losses vary among different actor combinations, such as; % post-harvest losses from producers to collectors (10%), collectors to wholesalers (7%), wholesalers to retailers (6%) and retailers to consumers (3%) in the chain.
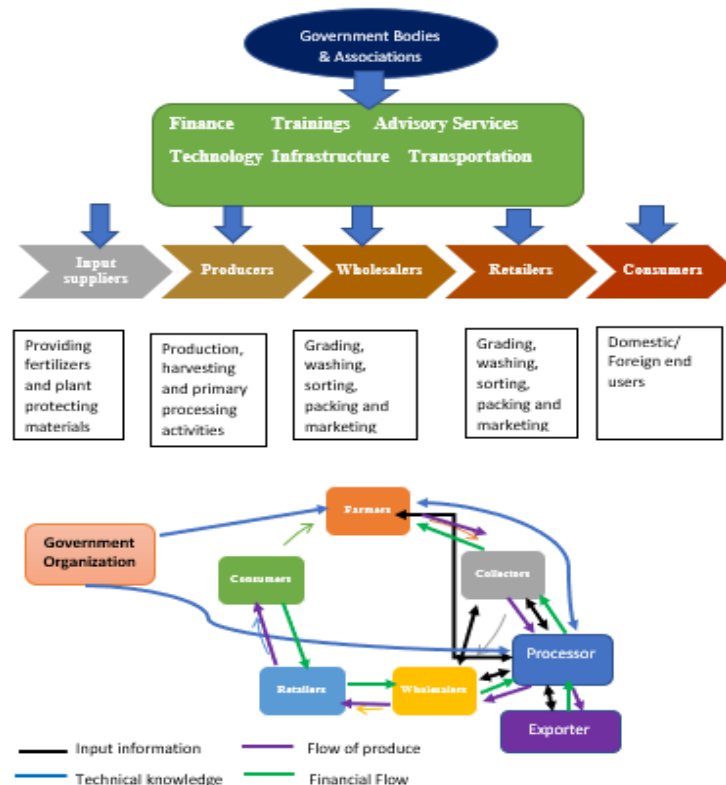
Figure 1. Comprehensive map of mango value chain in Sri Lanka (Source: Developed by the author)

Economic return and Marketing Margin through the mango value chain in Sri Lanka

In finding the economic return and marketing margin over the Sri Lankan mango value chain, we studied three major mango varieties that are frequently trading in the Sri Lankan market namely; TJC, Karthakolomban and vilad. This price information was collected during the major mango season in 2021, which is May-July. TJC is the commercially cultivating mango variety in Sri Lanka. Karthakolomban and Vilard are cultivated in small holder farms and home gardens in Sri Lanka.

Table 02. Return and market margins earned by different market functionaries in Mango value chains

Return/Margin	TJC (Rs/Kg)	Karthakolomban (Rs/Kg)	Vilard (Rs/Kg)
Wholesaler purchase price	350	100	50
Retailer purchase price	500	150	100
Consumer purchase price	760	250	200
Retailer share in consumer price	34.2%	60%	50%
Wholesaler share in consumer price	19.7%	20%	25%

4. Conclusions

It can be concluded that, typology of Sri Lankan mango value chain can be categorized as traditional, modern and export categories much similar to other developing countries in the region. These chains significantly differ in their dynamics in terms of product, volume flow, postharvest chain management practices (cleaning, grading, packing, etc), level of quality, value creation, financial and information flows. Further, these chains are differed in terms of value chain profile consist in structure, actors and end markets. Input suppliers, producers, wholesalers, retailers and consumers are identified as the major actors in the value chain but they differ in business volume, production and management practices. Findings of the return and market margins revealed that, wholesalers and retailers yield a considerable share in consumer price throughout the mango value chain.

In overall, the findings of this study suggest that, there's a need to build and coordinate relationships and foster information exchange among the value chain actors. Further to change the dynamics of mango industry through gradual transformation of traditional to modern. Moreover, the huge market margin taken by the retailers and wholesalers can be subtracted, if the farmers are empowered for the value creation and direct marketing strategies.

5. References

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