

# Developing an Effective Food Chain Management in a Developing Country: A Case Study on Manalagi Mango Fruit Supply Chain in Indonesia

Tedy Herlambang<sup>1</sup>  
Muresk Institute  
Curtin University of Technology  
1 Turner Avenue Brodie Hall Building  
Technology Park Bentley W.A. Australia 6102  
Phone: 618 9266 1308  
Fax : 618 9266 4422  
Email: [thelambang@gmail.com](mailto:thelambang@gmail.com)

Peter J. Batt  
Muresk Institute  
Curtin University of Technology  
1 Turner Avenue Brodie Hall Building  
Technology Park Bentley W.A. Australia 6102  
Phone: 618 9266 7596  
Fax : 618 9266 4422  
Email: [p.batt@curtin.edu.au](mailto:p.batt@curtin.edu.au)

Murray J. McGregor  
Muresk Institute  
Curtin University of Technology  
1 Turner Avenue Brodie Hall Building  
Technology Park Bentley W.A. Australia 6102  
Email: [m.mcgregor@curtin.edu.au](mailto:m.mcgregor@curtin.edu.au)  
Phone: 618 9690 1567  
Fax : 618 9266 4422  
Mobile: 0418 462 011

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<sup>1</sup> Corresponding author

## Executive Summary

### Developing an Effective Food Chain Management in a Developing Country: A Case Study on Manalagi Mango Fruit Supply Chain in Indonesia

Effectiveness in the supply chain relates to how well customer needs are satisfied. Sub-effectiveness could occur if each actor in a supply chain attempts to optimize its own results rather than to integrate its goals and activities with other actors to optimize the results of the entire chain. Presenting a case on Manalagi mango fruit supply chain in Indonesia, this study used price-margin analysis, gap analysis and relationship analysis to explore the effectiveness of the chain.

A high level of certain activity cost in the supply chain could indicate the inefficiency built into that activity. The perishable nature of fresh fruit made particular actors in the supply chain can damage all the efforts taken in another stage to deliver more value to customers. Thus, effectiveness is derived from the sum of the contributions of all participants along the chains.

To add more value in the supply chain in the form of quality, timeliness, food safety, and labour standards in production and marketing, participants need to apply management-intensive. This has technological, organisational and managerial implications that resound along the chain all the way to upstream and downstream.

Value creation potential of an individual firm can be enhanced, in some cases, through a more collaborative relationship with its suppliers and customers, provided that trust and commitment is developed. No one can guarantee the success of collaborative ventures, as adopting a more collaborative relation does not remove the volatile nature of prices and supply in the fresh produce industry which put frictions on relationships. This requires hard work, commitment and a fair degree of trust.

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### Abstract

Carrying out activity efficiently, closing gaps between existing actors' abilities and those required by the end customer, and a trusted relationship among actors is central to developing an effective fresh fruit supply chain management. A high level of certain activity cost in the chain could indicate the inefficiency built into that activity. The perishable nature of fresh fruit made particular actors in the chain can damage all the efforts taken in another stage to deliver more value to customers. To develop such effective supply chain requires hard work, commitment and a fair degree of trust.

Key-words: activity, ability, value, trust

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## Introduction

Recent measures of food consumption suggest remarkable improvements in the quality of Indonesian diets since the peak of the 1997/8 financial crisis. Food consumption per capita grew between 1996 and 2002 regardless of the crisis, both for the general population and for the poor. Interestingly, all of this growth was in high quality foods such as eggs, fish, beans and nuts, fats and oils, and fruit & vegetables. Per capita consumption of these high quality foods grew at an average annual rate of 2% between 1996 and 2002, with growth accelerating to 11% per year between 1999 and 2002. In contrast, consumption of starches declined between 1996 and 2002 (Molyneaux and Rosner 2004). An increasing number of richer consumers drive a demand for more added values: more variety, healthier and fresher produce. These developments have resulted in a change in effectiveness requirements for fresh produce supply chain.

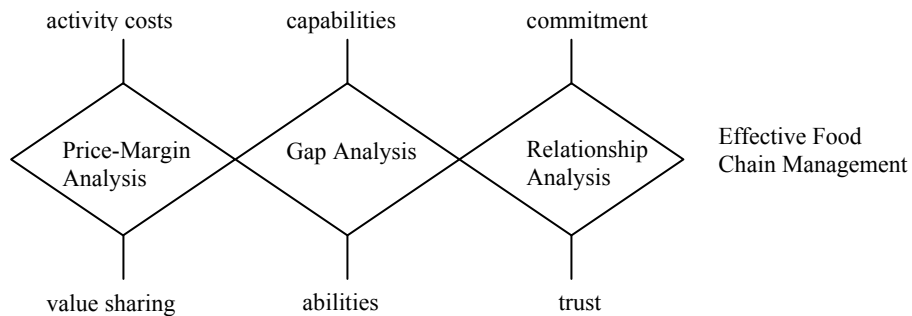
Effectiveness in the supply chain relates to how well customer needs are satisfied. Sub-effectiveness could occur if each actor in a supply chain attempts to optimize its own results rather than to integrate its goals and activities with other actors to optimize the results of the entire chain. Since the perishable nature of fresh fruit, there is a continuous change in the quality from the time the produce harvested to the time the produce reaches the consumer. As a consequent, particular actors in the supply chain can damage all the efforts taken in another stage to deliver more value to customers. Thus, effectiveness cannot be achieved by a single firm in chains, but is derived from the sum of the contributions of all participants along the chains. In the country where farm sizes are small and likely to remain that way for decades, consolidation at upstream supply chain is very unlikely. The chains are fragmented and involve a large number of small players. Together these two factors are hindrance to achieve dependable supply and consistent quality.

Risk and uncertainty have been the hallmark of horticultural business. A long gestation period, seasonal production, significant transportation and logistical costs, the low value/weight ratio, poor infrastructure, and the lack of any effective legal system to enforce fair trading, accentuates risk and uncertainty along the supply chain, especially in developing countries such as Indonesia.

Effectiveness put importance on how well goals of adding more values to customer are accomplished. Hence, it is important to find gap between existing actors' abilities and those required by the end customer. As the gaps along the chains have very important bearing on costs, quality, price, and hence profit, it is important to close that gap to achieve effective chain management. This perspective points to the need to carry out activities efficiently as basis in developing an effective supply chain. While fruit prices to large extent were determined by supply and demand, from firms' perspective, a certain level of price is needed to cover activity costs and to give financial reward to compensate the firm's efforts.

However, effective food chain management depends not only on closing the gap and changing activities, but also on the nature of relationship among participants along the chains. A trusted

relationship is central to harmonizing vertically interdependent activities and actors for value creation.



**Figure 1. Analytical Framework**

Firms are establishing relationships with their suppliers because it enables them to become more efficient and more effective (Kalwani and Narayandas 1995; Sheth and Sharma 1997). By developing relationships with their suppliers, customers can anticipate improved access to markets and more reliable market information (Low 1996); a more reliable supply of production inputs (Håkansson 1982); improved product quality and performance (Landeros and Monczka 1989); and a higher level of technical interaction in the form of informational exchange, potential product adaptations and technical assistance (Cunningham and Homse 1982). In the other, through becoming closer to customers and better understanding and satisfying customer needs, suppliers can achieve greater customer loyalty and higher repeat sales. Collectively, buyers become less sensitive to price competition and suppliers may benefit from higher prices. The greatest benefit of a long-term relationship is the reduction in uncertainty (Arndt 1979; Dwyer, Schur, and Oh 1987; Håkansson 1982; Noordewier, John, and Nevin 1990; Oliver 1990).

However, in the fresh fruit supply chain, adopting a more relational exchange does not reduce the uncertainty of prices or supply (quantity and quality). In horticultural markets, the sum of the value created tends to be fixed and thin, and thus the issues of dividing the value fairly among channel participants often cause major conflict. A number of barriers that frequently create conflict in fresh fruit value chains in the developing countries are the inherent high risk and uncertainty of business, limited access to information, the lack of an acceptable governance system, an inequitable sharing of power and inequitable sharing of the risk. This characteristic has historically impeded the process of trust building (O'Keffe 1996). Thus, achieving effective alignment among all participants in the value chain is one important factor in developing an effective supply chain. Presenting a case on Manalagi mango fruit supply chain in Indonesia, this study will use gap analysis, price margin analysis and relationship analysis to explore the effectiveness of the chains (Figure 1).

## Manalagi Mango Supply Chain

In the Manalagi mango supply chain, from farm to table, the chain is fragmented and involves a large number of small players. Market supply depends largely on the quantities of produce

harvested, which cannot be readily adjusted from stocks. The harvest season can extend for at least six months from June to December. The peak harvest season is in September-October. In normal production year prices exhibit a typical seasonal pattern in which, as the new harvest starts to come to the market, prices decline from June, reaching a trough in the period from September to October, when the market is flooded.

Mango reaches the market from the farm in one principal way: by means of direct sales to collector agent/broker using *tebasan* system. *Tebasan* is harvesting practices in which standing fruit almost ready for harvest is sold to a *penebas* at once. A *penebas* is a harvesting contractor (a collector agent or a broker) who organises harvesting workers and travels from village to village to get contracts and carry them out during the harvesting season. In order to obtain large volumes, the mangoes of various farmers are mixed together by collector and broker. While this practice facilitates the entry of multiple producers into the chain, the fruit loses its identity in the first stage in the supply chain.

As collector agents and brokers usually buy mangoes using the *tebasan* system, all post harvest activities become intermediaries' responsibility. In general, intermediaries do simple post harvest activities such as grading, and packing. This is because of their scale is too small to reach economically operation scale to invest in the fixed assets; they have limited access to advanced technology for modern machine, and have limited market information, especially information on buyers.

Collector agents and brokers faced uncertainty both at the upstream and at the downstream supply chain. The use of *tebasan* system at the upstream practically would not guarantee a continuous supply and consistent as collector agents have to assemble and aggregate the fruit collected from the many small farmers. While at the downstream, fruit prices were largely determined by supply and demand at wholesale market.

Once the fruits collected have reached an amount of one truck (20 tones), brokers contact truck operators to deliver mangoes to wholesale markets in Jakarta. Brokers, in particular, are able to transact directly with urban wholesalers in Jakarta. They transport collected and packed fruit directly to the urban areas. While for collector agents, it is impossible for them to skip the brokers to establish direct relations with wholesaler.

Brokers rely on their contacts with wholesaler for information on the prices in the wholesale market in Jakarta. Generally, collector agents and brokers have very little information on the quantity of mangoes supplied and to whom the fruit was sold by wholesalers. Brokers do not know what price they will receive for the produce they have consigned to the market until 7-10 days later. While this results in considerable uncertainty in marketing mangoes, the lack of any tangible standards results in prices that are difficult to compare. Potentially, this leaves the collector agents and brokers exposed to the possibility of paying higher prices for the fruit they harvest and collect than what the market is willing to pay.

Wholesalers operate on a commission basis to link buyers to sellers. Wholesalers are seldom big enough to consider investing in cold storage, thus many problems arise during the peak season. When the peak season comes, unsold produce quickly decays. Where produce is unsold, the wholesalers either pass the cost of disposal onto the brokers or ask them to dispose of the

product. On the other hand, capital can be a constraint for most wholesalers as they must rent their stalls from the state government annually and pay additional monthly costs for cleaning in the Jakarta wholesale market.

## Objectives

1. Analysing the costs-price-margin in each dyad in the supply chain.
2. Exploring the gap along the supply chain.
3. Exploring trust and commitment as two important elements in business to business relationships.
4. Discussing the implications of results of point 1, 2 and 3 on developing an effective fresh fruit chain management in Indonesia.

## Procedures

The first phase focuses on price margin analysis. This analysis is intended to provide a comprehensive picture of the flow and the volume of the fruit, activities performed by each agent and the costs needed to carry out those activities, the price and margin at each dyad.

Market intermediaries surveyed provided detailed evidence regarding their most recently completed mango transaction, defined as a transaction in which a given quantity of fruit was purchased and sold. Information was also collected on all the activity costs incurred from purchase to sale as well as the buying and selling prices. These costs were variable in that they were specific to the transaction (physical activity costs).

These data enabled the calculation of the gross marketing margin: the difference between buying and selling price, the total marketing costs, and the net margin: the residual after activity costs are deducted from the gross margin. Clearly the net margin includes returns that may be attributed to factors of marketing whose costs are not explicitly included in the set of marketing costs, such as managerial inputs, as well as transaction costs such as partner search and information gathering.

The second phase focuses on gap analysis. Gap analysis seeks to explore whether each player perform well enough in regard to its partner needs upstream and downstream concomitantly so that the overall supply chain is efficient. An efficient supply chain needs to take into consideration the technical ability and experience of the people involved, the functional quality of the produce, and credentials and experience of the business operators.

Technical quality describes the customer's specifications on physical descriptions of the product (Gronroos 1990). This could be its size; shape; colour; freedom from pests and diseases; purity (in terms of its freedom from chemical contaminants, pathogenic organisms and genetically modified plants); maturity or freshness; and the manner in which the product is packed (Batt 2002). Functional quality describes the way a supplier goes about delivering the product to the customer.

Industrial purchasing theory suggests that customers will seek to purchase goods from those suppliers who are best able to deliver the desired quantity, within predetermined quality

specifications, on time, at an agreed price (Monczka, Trent, and Handfield 1998). Since most market intermediaries purchase produce in the expectation that they will be able to sell them on, the timely and efficient receipt of produce is critical to the success of most downstream processing and retail operations. To assess this, some hypothesis testing is employed to identify any significant differences between each agent upon variables proposed.

The third phase focuses on the role of trust and commitment in the functioning of exchanges in the supply chain. Trust is an important lubricant of relationships. Research shows that trust is a basic requirement of good buyer-seller relationships (Anderson and Narus 1990; Geyskens, Steenkamp, and Kumar 1998; Morgan and Hunt 1994; Rousseau et al. 1998). It binds parties and has an important future orientation (Ganesan 1994). It is efficient and enables a party to place a fair degree of reliance on their counterpart (Bradach and Eccles 1989).

For buyer-seller relationships, a high degree of trust and a long-term orientation are necessary pre-conditions for success (Ganesan 1994). A high degree of trust between partners in a buyer-seller relationship is conducive to coordinating behaviour, whereas lower levels of trust may lead to competitive behaviour (Anderson and Narus 1990; Gulati 1995). Trust encourages effective communication, information sharing and joint pay-offs (Dwyer, Schur, and Oh 1987; Ring and Van de Ven 1992).

To induce people or organizations to contribute their resources of time, energy, knowledge, and intelligence to an organization's value creation processes, an organization must offer something valuable in return. In effect, to come into existence and to remain in existence, organizations must help individuals or other organizations to achieve a level of goal attainment that they could not otherwise achieve and to bring some form of benefit, whether psychological, social, cultural, professional, or economic to the people who participate in its activities (Sanchez and Heene 2004). An organization must therefore create benefits for its providers of resources that exceed the benefits they could achieve through their own efforts.

Commitment is a key issue in the business-to-business literature (Gundlach, Achrol, and Mentzer 1995; Wilson 1995). It represents the buyer's perception that the relationship with a particular supplier is so important that it is worth investing special effort to maintain it indefinitely (Anderson and Weitz 1992; Morgan and Hunt 1994). When trading partners are committed to each other they are more willing to cooperate, comply with each other's requests (Morgan and Hunt 1994), be flexible, share information, and engage in joint problem solving. Committed partners are willing to invest in valuable assets specific to an exchange, demonstrating that they can be relied upon to perform essential functions in the future. The net result is improved performance in the exchange process and increased profitability for both parties (Anderson and Weitz 1992).

As like most studies in this field of research, this phase relied heavily on perceptual measures. Most items for trust and commitment especially in the context of developing countries cannot be measured directly by existing measures. In dealing with this problem, a large number of items were then prepared to assure their reliability and face validity. However the straightforward use of these items would result in a lengthy questionnaire, which puts a heavy load on respondents and threatens to reduce the quality of the data. Thus, decision made to use new items or adapting



existing items to the Manalagi mango fruit supply chain. Multi-item scales were used, because they have a higher reliability than single-item scales (see for example (Kerlinger 1985).

It is important to have robust items for two constructs proposed. However, in the industrial marketing context, there are relatively few key actors (Håkansson and Snehota 1995) and in fresh fruit supply chain in particular, the relationships of market intermediaries are likely to prove problematic as the lower the chain, the smaller the number of the participant. These characteristics give rise to the problem of being unable to collect enough data so that factor analysis can be run. While it would be rather straightforward to test for significant differences among groups on the basis of a single variable, relationship constructs are more appropriate to be measured using multi-items scale (Batt 2003).

In the absent of any reliable potential respondent data from which a sample of potential respondents can be selected, by necessity the survey must rely upon the drawing of a non probability sample. The sample was generated using a snowballing technique, in which initial contacts provide suggestion for potential respondents with whom the initial respondents do business (Sudman 1976). Face-to-face personal interviews provided the only means of contacting potential respondents. Detailed interviews were conducted with 53 collector agents, 12 brokers, and 10 wholesalers in Indonesia. Data were collected from June 2004 to March 2005.

## Results

### Price Margin Analysis

In absolute terms, gross marketing margins appear to be seven times higher in the collector agent or broker than in the wholesaler level (Table 1). However, the margin received by wholesalers is risk free and wholesalers have the largest scale of operation in the supply chain. For wholesalers, it seems that wholesalers have not expended any physical activity costs. Activity costs for wholesalers were mainly related to finding potential buyers (transaction cost).

**Table 1:** Gross margin, activity costs and net margin in the Manalagi mango supply chain (Rp/kg)

	Farmer	Collector agent/Broker	Wholesaler
Buying	-	600-700	
Selling	600-700	3,000	2,500
Gross Margin		2,300-2,400	10% X 3,000 = 300
Activity Cost		1,500	
Net Margin		800-900	

Source: Primary data

Net margin, calculated as the residual after deducting activity costs from the gross margin, are roughly similar in absolute terms between collector agent and broker around Rp 800-900 per kg respectively. However, the latter groups are able to cover wider territory and have larger turn over. At the same time, net margin might vary between collector agents and brokers. This profit to a large extent depends on their buying price from farmers. Collector agents and brokers make

their profits mainly through harvesting, grading and sorting, packing, and transporting mango from rural areas to marketing areas.

Table 2 shows gross margin, activity costs and net margin in the Manalagi Mango supply chain in percentage. Three price scenarios used: minimum price, average price and maximum price. Viewing these three elements relative to the selling price, it can be seen that if market intermediaries received average prices, for the sample as a whole, the buying price represents 20-23 percent, activity costs represent 50 percent, and net margin represent 27-30 percent of the selling price. For the time fruit prices have reached the maximum point, market intermediaries could have 70 percent net margin. Practically, in the case of market intermediaries received minimum price, intermediaries were only able to cover their activity costs.

Notwithstanding the considerable variation net margin wholesalers could have during the season. For the wholesalers, the net margin they could get depends on the magnitude of their transaction cost. During the peak season, it was also difficult for wholesaler to find potential buyers.

Table 2: Gross margin, activity costs and net margin in the Manalagi Mango supply chain in Percentage

Price	Collector agent/broker			Wholesaler (Jakarta)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Buying	600-700 (40-47)	600-700 (20-23)	600-700 (9-10)	-	-	-
Selling	1,500	3,000	7,000	1,500	3,000	7,000
Gross Margin	800-900 (53-60)	2,300-2,400 (77-80)	6,300-6,400 (90-91)	10% X 1,500 = 150	10% X 3,000 = 300	10% X 7000 = 700
Activity Cost	1,500 (100)	1,500 (50)	1,500 (21)	-	-	-
Net Margin	(700-600) (40-47)	800-900 (27-30)	4,800-4,900 (69-70)	150	300	700

Source: Primary data, ( ): loss or percentage

The high proportion of the selling price that is attributed to the activity costs indicates that market intermediaries add relatively large value, in terms of grade, pack, storage and transport of the mango. The share of the selling price attributed to buying price is as high as 40 percent and 10 percent, respectively, in peak season and off peak season. The results suggest that procurement cost is important. Price risks were the biggest risk in the supply chain, considering that the price received by collector agents and brokers depend on the dynamic of supply and demand in wholesale market, and their impact on the net margin market intermediaries could be received.

Table 3 shows a breakdown of activity costs. Handling costs comprise the costs of harvesting, grading, loading the fruit into the wooden boxes, loading it to a transport vehicle for wholesale market. Some collector agents do grading and packing directly at the spot while other transport un-graded fruit to their property for further grading and packing. Harvesting costs comprise of labour cost on harvesting the fruit. Packaging costs include the costs of empty wooden boxes (once use only), paper and nail used for the boxes.

Table 3: Breakdown of activity costs

Type	CA/BR	WS	Total
Handling: harvesting, grading, loading	100 (7)	-	100 (7)
Transport	800 (53)	-	800 (53)
Packaging costs: box, paper, nail	200 (13)	-	200 (13)
Labourer at wholesale market	100 (7)	-	100 (7)
Rental lot	100 (7)	-	100 (7)
Loss	200-300 (13)	-	200-300 (13)
Commission	10% of sales	-	10% of sales
Total	1,500 + 10%	-	1,500 + 10%

Where ca: collector agent; br: broker; ws: wholesaler; ( ) percentage

Transport costs include only the costs of transporting the fruit from the brokers' property to wholesale market in Jakarta. This cost is the cost paid to transporters for renting truck which is usually divided among collectors and brokers in proportion to the mango each agent sends to wholesale market.

Brokers stored the fruit before sending them to wholesalers. However, difficulties arise in estimating storage costs as trader do not use a specialized warehouse to store the fruit, rather they use a space around their house for storing the fruit. Commission costs include the commissions paid to wholesaler for the sale of fruits.

Among the various costs, transport costs appear to be the most important; for the surveyed market intermediaries they ranged between 50 percent and 55 percent of total activity costs. The second most important costs are those of packaging and losses which was around 13 percent. While handling, stall lot rental in wholesale market and labourer account around seven percent.

This is a significant finding in that these costs are directly linked to the inefficiency built into trading practices. First, the high transportation cost. This could be attributed to relative lack of transportation infrastructure. As noted earlier, the main value added in the Manalagi mango supply chain is from spatial transfer of produce. Thus, it was expected that transport costs also represent the bulk of activity costs. However, higher transportation costs could act as a disincentive for trade. The high transportation costs explain the very low net margin traders received when fruit price at the minimum level. At the same time the lack of transportation infrastructure and cold storage contributed to high losses. Second, handling, loading and offloading are labour-intensive, the costs of which significantly contributed the activity costs. The lack of a system for grading and standardising requires the visual inspection of the mango, one by one, resulting in the need to recheck every fruit at the producing areas and at the wholesale market. This involves not only labour costs but also time costs, resulting in the slowing of transactions.

Third is the cost of commissions paid for wholesalers' services. These costs ranged from 8 to 10 percent of the selling price. These costs reflect the importance of wholesaler in the supply chain showed by its relatively high share of the selling price and by its pervasive use in all the market intermediaries surveyed. Given that wholesalers play a significant role in the wholesale market in urban cities, this finding can be interpreted as an indication that the presence of wholesalers in the

Manalagi mango supply chain context represents the costs of market coordination and reduces the search costs that would be incurred by market intermediaries if they would sell the mangoes by themselves.

## Gap analysis

In the supply chain, brokers played a role of outlets from producing areas. They link small farmers, collector agents and wholesalers. It is important to explore the abilities of brokers as a focal firm in the chains. To gain better insights into the gap, each of these items was also explored from partners' perspective.

**Table 4: Attributes brokers believe collector agent require and the extent to which brokers meet these attributes**

Items	Br perceived <sup>1</sup>		Br ability <sup>2</sup>		Sig.
	Mean	SD	Mean	SD	
close personal friendship	5.92	.289	5.75	.452	.339
provide market information	5.92	.289	5.75	.452	.339
<b>have a good reputation</b>	<b>5.83</b>	<b>.389</b>	<b>5.17</b>	<b>.389</b>	<b>.001</b>
willing to share risk	5.83	.389	5.75	.452	.674
provide technical advice	5.83	.389	5.83	.389	1.000
give financial support	5.75	.452	5.92	.289	.339
<b>financially secure</b>	<b>5.67</b>	<b>.492</b>	<b>4.83</b>	<b>.577</b>	<b>.010</b>
geographically close	5.58	.515	5.75	.452	.438

<sup>1</sup>where 1 is “not at all important” and 6 is “very important”

<sup>2</sup>where 1 is “not at all well” and 6 is “very well”

br: broker

Table 4 explored items broker perceived a collector agent sought. Looking at the Table, it becomes clearly apparent that in responding to eight fixed response statements, three most important variables a broker reported were a close personal friendship, provide market information, and good reputation. Brokers also perceived that all those items were very important for collector.

Table 4 indicated that from brokers' perspectives, most brokers have no problems in fulfilling collector agent's needs. Brokers claimed that they had a close personal friendship, provide market information, willing to share risk, provide technical advice and give financial support. However, brokers reported that they had not good reputation and were not financially secure.

Table 5 explored the same eight items from a collector agent's perspective. Looking at Table 5, it becomes clearly apparent that in responding to the same eight fixed response statements, collector agents claimed that all those items were very important for them. Three most important variables a collector agent seeks from their preferred broker were the willingness to share risk, close personal friendship and financial support. Price variation is unavoidable in the supply chain as prices to a large extent are determined by the changes in supply and demand. It is not surprising that collector agents demand for risk sharing. Financial support is needed for fruit

procurement and to pay transportation costs. It is understandable then that collector agents demand for financial support. It can also be noted that collector agents perceived that their preferred brokers were not able to fulfil almost all of the items. Interestingly, the majority of collectors saw that brokers had a good reputation and were financially secure. It is important to note that the gap collector agent reported on broker ability to fulfil their needs includes willingness to share risk, a close personal friendship, giving financial support, providing market information, and providing technical advice.

**Table 5: Attributes collector agents seek from their preferred broker and the extent to which brokers meet these attributes**

<i>Items</i>	<i>Ca want<sup>1</sup></i>		<i>Ca get<sup>2</sup></i>		<i>Sig.</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
<i>willing to share risk</i>	<b>5.98</b>	<b>.137</b>	<b>5.89</b>	<b>.320</b>	<b>.024</b>
<i>close personal friendship</i>	<b>5.96</b>	<b>.192</b>	<b>5.85</b>	<b>.361</b>	<b>.033</b>
<i>give financial support</i>	<b>5.89</b>	<b>.320</b>	<b>5.28</b>	<b>.568</b>	<b>.000</b>
<i>geographically close</i>	5.89	.320	5.83	.379	.444
<i>have a good reputation</i>	5.81	.441	5.91	.295	.168
<i>financially secure</i>	5.79	.409	5.87	.342	.209
<i>provide market information</i>	<b>5.06</b>	<b>.534</b>	<b>5.92</b>	<b>.267</b>	<b>.000</b>
<i>provide technical advice</i>	<b>5.06</b>	<b>.602</b>	<b>5.57</b>	<b>.537</b>	<b>.000</b>

<sup>1</sup>where 1 is “not at all important” and 6 is “very important”

<sup>2</sup>where 1 is “not at all well” and 6 is “very well”

ca: collector agent

**Table 6: Attributes brokers believe wholesaler require and extent to which brokers meet these attributes**

<i>Items</i>		<i>Br Perceived<sup>1</sup></i>		<i>Br Ability<sup>2</sup></i>		<i>Sig.</i>
		<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
<i>have mangoes that are well graded</i>	<i>F</i>	5.92	.289	5.75	.452	.339
<i>have mangoes in the desired size(s)</i>	<i>F</i>	<b>5.83</b>	<b>.389</b>	<b>4.17</b>	<b>.389</b>	<b>.046</b>
<i>to be able to assure quality</i>	<i>S</i>	<b>5.67</b>	<b>.492</b>	<b>5.42</b>	<b>.515</b>	<b>.000</b>
<i>to be able to deliver fruit of desired quality</i>	<i>F</i>	5.67	.492	5.08	.289	.082
<i>are willing to meet customer’s immediate needs</i>	<i>F</i>	<b>5.67</b>	<b>.492</b>	<b>4.50</b>	<b>.522</b>	<b>.002</b>
<i>have good looking fruit</i>	<i>T</i>	<b>5.58</b>	<b>.515</b>	<b>4.42</b>	<b>.515</b>	<b>.000</b>
<i>to be able to deliver mangoes when required</i>	<i>F</i>	5.50	.522	3.67	.492	.275
<i>to have a reputation for delivering good quality mangoes</i>	<i>S</i>	5.50	.522	5.08	.515	.096
<i>have mangoes available in the quantities required</i>	<i>F</i>	5.42	.515	4.33	.492	.000
<i>to be able to extend credit</i>	<i>S</i>	5.17	.389	4.92	.289	.082
<i>have mangoes of the desired variety</i>	<i>F</i>	5.08	.515	4.50	.522	.012
<i>have mangoes that are free of pests and disease</i>	<i>T</i>	4.42	.515	3.58	.515	1.000
<i>have mangoes that are free of physical injury</i>	<i>T</i>	<b>4.33</b>	<b>.492</b>	<b>3.42</b>	<b>.515</b>	<b>.001</b>
<i>have mangoes that are free of chemical residues</i>	<i>T</i>	<b>3.92</b>	<b>.289</b>	<b>4.00</b>	<b>.000</b>	<b>.001</b>
<i>have mangoes of several different varieties</i>	<i>F</i>	3.92	.515	3.92	.289	1.000
<i>have mangoes that are well packed</i>	<i>S</i>	<b>3.83</b>	<b>.389</b>	<b>4.08</b>	<b>.289</b>	<b>.002</b>
<i>to provide mangoes that are competitively priced</i>	<i>S</i>					

<sup>1</sup>where 1 is “not at all important” and 6 is “very important”

<sup>2</sup>where 1 is “not at all well” and 6 is “very well”

br: broker

Table 6 explored quality dimensions brokers believed wholesaler sought. Looking at Table 6, it becomes clearly apparent that in responding to 11 fixed response statements four most important variables brokers reported were mangoes that are well graded, mangoes in the desired size, brokers who are able to assure quality. It was apparent that according to brokers, for wholesaler functional quality dimensions are as important as service quality dimensions.

Asking the same items to wholesalers, slight differences were found. Wholesalers reported that the following items: the willingness to meet customer's immediate needs, reputation for delivering good quality mangoes, the ability to deliver mangoes when required, the ability to extend credit and have mangoes that are well graded were very important. Although all of the items are included in functional and service quality dimension, wholesalers put emphasis on the ability to deliver fruit immediately.

**Table 7: Attributes wholesalers seek from broker and extent to which brokers meet these attributes**

<i>Items</i>		<b>Ws want<sup>1</sup></b>		<b>Ws get<sup>2</sup></b>		<b>Sig.</b>
		Mean	SD	Mean	SD	
<i>are willing to meet customer's immediate needs</i>	<i>F</i>	<b>6.00</b>	<b>.000</b>	<b>4.00</b>	<b>.667</b>	<b>.000</b>
<i>to have a reputation for delivering good quality mangoes</i>	<i>F</i>	<b>5.80</b>	<b>.422</b>	<b>4.60</b>	<b>.843</b>	<b>.005</b>
<i>to be able to deliver mangoes when required</i>	<i>F</i>	<b>5.70</b>	<b>.483</b>	<b>4.10</b>	<b>.738</b>	<b>.000</b>
<i>to be able to extend credit</i>	<i>S</i>	5.70	.483	5.60	.516	.678
<i>have mangoes that are well graded</i>	<i>F</i>	5.60	.516	5.30	.675	.279
<i>to be able to assure quality</i>	<i>S</i>	5.50	.527	4.90	.738	.051
<i>to be able to deliver fruit of desired quality</i>	<i>F</i>	5.50	.527	5.00	.471	.052
<i>have mangoes in the desired size(s)</i>	<i>F</i>	<b>5.20</b>	<b>.422</b>	<b>4.20</b>	<b>.789</b>	<b>.004</b>
<i>have mangoes that are free of pests and disease</i>	<i>T</i>	<b>5.20</b>	<b>.422</b>	<b>3.80</b>	<b>.632</b>	<b>.001</b>
<i>have good looking fruit</i>	<i>T</i>	<b>5.20</b>	<b>.422</b>	<b>4.00</b>	<b>.667</b>	<b>.003</b>
<i>have mangoes that are free of physical injury</i>	<i>T</i>	<b>5.10</b>	<b>.316</b>	<b>4.30</b>	<b>.483</b>	<b>.003</b>
<i>have mangoes available in the quantities required</i>	<i>F</i>	5.10	.568	4.80	.422	.193
<i>have mangoes of the desired variety</i>	<i>F</i>	4.70	.483	4.90	.316	.343
<i>have mangoes of several different varieties</i>	<i>F</i>	3.50	.527	3.50	.527	1.000
<i>have mangoes that are well packed</i>	<i>S</i>	<b>3.50</b>	<b>.527</b>	<b>4.30</b>	<b>.483</b>	<b>.003</b>
<i>have mangoes that are free of chemical residues</i>	<i>T</i>	3.40	.516	3.80	.422	.168
<i>to provide mangoes that are competitively priced</i>	<i>S</i>	5.90	.316			

<sup>1</sup>where 1 is "not at all important" and 6 is "very important"

<sup>2</sup>where 1 is "not at all well" and 6 is "very well"

ws: wholesaler

## Relationship Analysis

In explaining the nature of broker's relationships as a buyer and a supplier, brokers generally reported that their relationships with upstream collector agents were much less trusting (Table 8). Brokers indicated that they did not trust their preferred collector agent and had not confidence in them. On most occasions, brokers perceived that collector agents put their own interests before that of the relationship and could seldom be relied upon. In the Manalagi mango supply chain, the collector agents are generally associated with specific brokers. It is brokers who finance the collector agents. After receiving money from the brokers, the collector agents are obligated to deliver the fruit to brokers within 1-2 days. This must be of some concern for conflict is

inevitable in the relationship between collector agents and brokers. With such low levels of trust, the opportunistic practices that the collector agents often exchanged in made the exchange both more difficult and more uncertain.

**Table 8: Brokers relationship with collector agent and brokers relationship with wholesaler**

	CA<BR		BR>WS		Sig.
	mean	SD	mean	SD	
<b>Trust</b>					
I trust this trader	3.83	.577	4.00	.739	.551
I have confidence in this trader	3.58	.515	3.67	.492	.586
<b>This trader always considers my best interests</b>	<b>3.17</b>	<b>.577</b>	<b>4.00</b>	<b>.603</b>	<b>.005</b>
This trader is only interested in their own welfare	3.50	.674	3.25	.754	.082
This trader cheated frequently that make me loss	3.67	.778	3.08	.669	.089
Overall, this trader is basically honest and can be trusted	3.75	.452	3.83	.389	.586
<b>Commitment</b>					
<b>This trader make efforts to help me</b>	<b>3.08</b>	<b>.515</b>	<b>2.17</b>	<b>.835</b>	<b>.002</b>
This trader provides financial assistance during difficult times	2.33	.492	2.08	.793	.429
This trader share proprietary market price information with me	2.42	.515	2.67	1.303	.571
<b>This trader and I often discuss better ways to pack fruit</b>	<b>3.33</b>	<b>.651</b>	<b>1.83</b>	<b>.577</b>	<b>.000</b>
<b>This trader often suggests ways to grade fruit</b>	<b>3.50</b>	<b>.522</b>	<b>1.83</b>	<b>.577</b>	<b>.000</b>
<b>This trader and I often discuss more efficient ways to transport the fruit</b>	<b>2.58</b>	<b>.515</b>	<b>1.92</b>	<b>.669</b>	<b>.025</b>
<b>This trader often discusses market development and how we can transact together</b>	<b>4.00</b>	<b>.603</b>	<b>2.08</b>	<b>.793</b>	<b>.000</b>

Where 1 is “I disagree a lot” and 6 is “I agree a lot”

CA < BR demonstrates the brokers’ relationship with their preferred collector agent

BR > WS demonstrates the brokers’ relationship with their preferred wholesaler

Similarly, acting as a supplier, the level of trust brokers have with their downstream buyers is also low. While most brokers demonstrated quite low levels of trust in their relationship with upstream suppliers, most collector agents indicated low levels of trust in their exchange with their preferred wholesaler. The wholesalers were perceived to be more likely to cheat and were generally uninterested in the broker’s welfare.

From the standpoint of the collector agents, collector agents generally reported that their relationships with downstream broker agents were quite positive (Table 9). On most occasions, collector agents perceived that broker put their own interests as well as collector agents. Hence collector agents claimed that overall brokers were basically honest and could be trusted.

Not unexpectedly, given that the collector agents were effectively representing the brokers, brokers were perceived to have made a considerable investment in the relationship, offering financial assistance and sharing proprietary price information. However, brokers seemed less able to assist in suggesting more appropriate ways to pack and grade the fruit.

**Table 9: Collector agents relationship with broker and brokers relationship with collector agent**

	CA>BR		CA<BR		Sig.
	Mean	SD	mean	SD	
<b>Trust</b>					
<b>I trust this trader</b>	4.94	.745	3.83	.577	.000
<b>I have confidence in this trader</b>	4.79	.689	3.58	.515	.000
<b>This trader always considers my best interests</b>	4.70	.749	3.17	.577	.000
<b>This trader is only interested in their own welfare</b>	2.17	.802	3.50	.674	.000
<b>This trader cheated frequently that make me loss</b>	2.13	.735	3.67	.778	.000
<b>Overall, this trader is basically honest and can be trusted</b>	4.85	.770	3.75	.452	.000
<b>Commitment</b>					
<b>This trader make efforts to help me</b>	4.64	.787	3.08	.515	.000
<b>This trader provides financial assistance during difficult times</b>	4.45	.667	2.33	.492	.000
<b>This trader share proprietary market price information with me</b>	4.51	.750	2.42	.515	.000
<b>This trader and I often discuss better ways to pack fruit</b>	2.64	.558	3.33	.651	.000
<b>This trader often suggests ways to grade fruit</b>	2.70	.540	3.50	.522	.000
<b>This trader and I often discuss more efficient ways to transport the fruit</b>	2.66	.553	2.58	.515	.661
<b>This trader often discusses market development and how we can transact together</b>	4.45	.695	4.00	.603	.035

Where 1 is “I disagree a lot” and 6 is “I agree a lot”

CA > BR demonstrates the collector agents’ relationship with their preferred broker

CA < BR demonstrates the brokers’ relationship with their preferred collector agent

**Table 10: Brokers relationship with wholesaler and wholesalers relationship with broker**

Items	BR>WS		BR<WS		Sig.
	Mean	SD	mean	SD	
<b>Trust</b>					
<b>I trust this trader</b>	4.00	.739	3.80	.422	.457
<b>I have confidence in this trader</b>	3.67	.492	4.10	.316	.022
<b>This trader always considers my best interests</b>	4.00	.603	3.90	.316	.642
<b>This trader is only interested in their own welfare</b>	3.25	.754	3.00	.000	.275
<b>This trader cheated frequently that make me loss</b>	3.08	.669	2.90	.316	.437
<b>Overall, this trader is basically honest and can be trusted</b>	3.83	.389	4.10	.316	.097
<b>Commitment</b>					
<b>This trader make efforts to help me</b>	2.17	.835	3.10	.316	.003
<b>This trader provides financial assistance during difficult times</b>	2.08	.793	2.50	.527	.172
<b>This trader share proprietary market price information with me</b>	2.67	1.303	2.50	.527	.691
<b>This trader and I often discuss better ways to pack fruit</b>	1.83	.577	2.50	.527	.011
<b>This trader often suggests ways to grade fruit</b>	1.83	.577	2.70	.483	.001
<b>This trader and I often discuss more efficient ways to transport the fruit</b>	1.92	.669	2.90	.316	.000
<b>This trader often discusses market development and how we can transact together</b>	2.08	.793	3.20	.422	.001

Where 1 is “I disagree a lot” and 6 is “I agree a lot”

BR > WS demonstrates the brokers’ relationship with their preferred wholesaler

BR < WS demonstrates the wholesalers’ relationship with their preferred broker



There were medium levels of trust between wholesalers and brokers (Table 10). Wholesalers tended to transact with a number of brokers in order to assure themselves of a continuous supply of good quality fruit. There was surprisingly little communication between wholesalers and brokers with regard to improving the quality of the fruit or the manner in which it has presented. Irrespective, brokers, it seemed were keener to explore whatever ways they could to deliver superior quality fruit to customers, presumably in the expectation that they would receive a higher price.

## Discussion and Implications

At the upstream supply chain, a large number of small farmers might impair operational efficiency. Similarly, operational efficiency would be impaired if the transportation infrastructure is poor. In the Manalagi mango supply chain, price margin analysis proved that the share of transportation costs were very significant in the total activity costs. It has been also found that fruits sometimes reach the wholesale market in inferior condition due to the time lag between harvesting time and the time the fruit reach wholesale market due to transportation problems. Despite difficult initial conditions at the upstream supply chain, improvements on transportation infrastructure are of great importance to reduce produce losses and to increase value in the chains.

From the marketing perspective, a mango fruit is considered mature when it has reached the stage at which, after harvest and ripening, its eating quality will be desirable to the consumer. Mangoes are harvested at the so-called mature-green stage so that it can be packed and delivered to market before it ripens and becomes too soft. This is the stage of physiological maturity at which ripening will occur, while still allowing time for handling and marketing.

A mango may be mature, but not ripe. It is only ripe when it is ready to eat. A mature mango will ripen properly, whereas an immature one will not. The stage of maturity at picking will affect the speed of ripening, and the final quality of the edible fruit. When fruit are removed from the tree several days before the onset of ripening, they are initially hard and green. To achieve good flavour and appearance, mangoes must be fully mature before harvesting. The fruit progressively soften, change colour and develop aroma at a rate determined by the storage conditions and the maturity of the fruit at harvest. Nevertheless, harvesting periods were also induced by prices prevailed in market.

As far as price is concerned, another serious problem is the month to month fluctuation. One important characteristic of mango crop is that they have significant fluctuated fruit production from year to year. The proportion between the male and hermaphrodite flower, temperature during formation and position in the inflorescence, the season and tree health determine the potential fruit. Early season sales usually bring more than average prices hence the temptation is strong to harvest fruits often before they mature. This has been a major reason for the incidence of poor quality fruits on the market.

In the Manalagi mango supply chain, there is no doubt that wholesalers are the chain leaders. It is the wholesaler who controls the information and coordinates the distribution of fresh fruit from the producing areas to the city. From the standpoint of the wholesaler, the commission arrangement has a number of advantages. It provides guaranteed supplies because brokers must

visit the wholesaler to collect their money and invariably, traders will send produce to the same wholesaler. For the wholesalers, this is a way of gaining credit with no explicit interest charge from suppliers and they were able to retain a 10% commission fee irrespective of the price at which the fruit was ultimately sold. However, for brokers and collector agents such an arrangement was problematic since they face high price uncertainty.

Gap analyses have revealed some quality dimensions which could be explored to add more value in the supply chain in the form of quality, timeliness, food safety, and labour standards in production and marketing. However, it needs to apply highly management-intensive for there is a threshold of product, capital, and transaction attributes which smallholders must have. A set of product, capital, and transaction attributes has technological, organizational and managerial implications that resound along the chain all the way to upstream and downstream participants.

It has long been a tenet of exchange that firms engage in exchange for benefits and value, not products. The exchange process is quite complex by the fact that each party to the exchange may place different important weights on activities undergone and resources forfeited. Consequently, it is more likely that there would be some significant differences in the importance of the offer quality dimensions between actors in the chains.

The focus of supply chain management is on vertical coordination (Hobbs 1996) and is explicitly on finding the most effective and efficient way of adding value (Fearne, Hughes, and Duffy 2000). In order for any process to be completed efficiently there is a need for more effective communication between and within all participants involved. Sharing information can increase a firm's ability to learn from its partners, to induce innovation via joint development opportunities and to inculcate skills and capabilities from its partners (Spekman, Spear, and Kamauff 2002). However, sharing information as a prerequisite for fair relationships poses a real threat to independence, particularly when those involved lack mutual trust and have a tendency to behave opportunistically.

Meanwhile, supply chain management does not remove the volatile nature of prices and supply in the fresh produce industry which put frictions on relationships. All inter-company relationships simultaneously exhibit conflict and co-operation, with guile and self-seeking (Turnbull, Ford, and Cunningham 1996). Even the most productive relationships can exhibit power, dependence, and conflict (Ford et al. 2001). Thus, the managerial aspects of value chain related to finding interaction patterns particularly the firm's efforts to influence their counterparts and to a large extent related to firms' efforts to manage conflicts since disagreements is natural aspect of business relationships.

Some of the barriers towards achieving greater coordination are lack of mutual trust by chain participants, lack of an acceptable governance system with fair sharing of risk and rewards in a value chain. For commercial relationships to succeed compensation must not only be offered in exchange for goods and services rendered but must also be perceived as being fair by each of the transacting parties (Forker and Stannack 2000). Thus there is a need to incorporate fairness into mainstream trading between participants in supply chain. While fairness and justice is partly about price, which for commodities is influenced partly by the balance of supply and demand, price is not the only ingredient of fair trading practices. Other trading practices also reflect imbalances in fairness and market power between actors.

The relationship marketing literature indicates that the value creation potential of an individual firm can be enhanced, in some cases, through a more collaborative relationship with its suppliers and customers (Spekman, Kamauff, and Myhr 1998), provided that trust and commitment is developed (Morgan and Hunt 1994). However, the development of partnerships requires hard work, commitment and a fair degree of trust in the long term intentions of partners. No one can guarantee the success of collaborative ventures, particularly if they are not robust enough to stand up to the rigors of the market place - improved returns can only come from improved value to the final consumer which is quite difficult to deliver with fresh produce.

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