

Supply Chain and Marketing of Processed Fruit: Processed Mangosteen in Rayong Province

Tunpawee Ratpongporn*

This research objectives were: 1. To study the supply chain of mangosteen and processed mangosteen products in the research area. 2. To study the marketing situation of processed mangosteen in Rayong area. 3. To study the marketing opportunity of processed mangosteen products. Used mixed methods in collecting data. The research population in qualitative research were government official, gardeners, wholesalers, producer of processed mangosteen in Rayong area. Quantitative research population were consumers who lived in Bangkok and Rayong province and sample size was 400 samples separate as 200 samples in Bangkok and 200 samples in Rayong. Used depth interview, observation, survey and questionnaire to collect data and used descriptive statistics to analyzing data.

The results of the study were as follow: 1. Mangosteen supply chain and processed mangosteen products in the research area and mangosteen market structure was not complicated. Market structure can be divided according to the level of distribution, garden market, local market and export markets. Supply chain management and logistics system for fresh mangosteen was engaged in logistics activities. Related parties in the supply chain were gardeners, collect gardeners, cooperatives and exporters. Logistics activities in supply chain included: raw material storage, production, packaging, mangosteen transport to sellers. Second grade mangosteen suppliers involved in the supply chain of processed mangosteen. 2. Marketing situation of processed mangosteen in Rayong province revealed that mangosteen was distributed in various brands in the area. Khun-laor brand was a popular brand name because it was widely sold as a major and first manufacturer of processed mangosteen .And marketing channels were sold by their own shop, by event in the area and sold through intermediaries in Rayong and Bangkok and did not exporting. 3. Marketing opportunity for processed mangosteen was moderate because the consumers response rate for product awareness, product trial and product buying rate were rather low but their opinion for product taste and value were rather good. If the producer have improved processed mangosteen attributes such as feature, taste, packaging the consumer have shown their intention to buy the product in moderate level.

JEL Codes: 503

1. Introduction

Agriculture is a major source of income and is important for food security of the country. Thailand is a major food producer in the world. Thailand can produce a variety of agricultural products according to the needs of domestic consumers and exported to foreign countries at a value of not less than 1.4 trillion baht per year (Office of Agricultural Economics, 2015, p.4) .Agricultural products are the major type of raw material for the industrial and service sectors. The eastern region of Thailand is very important because there are the area of industrial sector, agricultural and tourism industry also. In sector of agricultural consist of corp, garden tree and fruits. The economical fruits in the eastern region and Rayong province are Durion, Rambutan and mangosteen. Mangosteen which have called as “Queen of fruit” is a product for exporting and for domestic consume in Thailand which export value is

*Associate Professor Dr. Tunpawee Ratpongporn, Department of Marketing, Faculty Of Business Administration, Ramkhamhaeng University, Bangkok ,Thailand, E-Mail: Natha2517@Gmail.Com

more than 3,000 million baht per year (Chitipat,2013) and the trend is higher and the mangosteen cultivated area is rising and there are the amount of mangosteen output which can not export and some year there are over supply of mangosteen .Processed mangosteen products have developed such as mangosteen juice, scrambled mangosteen ,mangosteen soap and etc. The market value for processed mangosteen show the growth rate but still have some problems in production and marketing issues and lack of information about consumer attitude toward the products and marketing opportunity for processed mangosteen which this research focus only for scrambled mangosteen.

2. Literature Review

2.1 Production Situation of Mangosteen in the Eastern Region of Thailand

Information from the Agricultural Information Center, Office of Agricultural Economics show that the production of mangosteen in the eastern areas of Rayong, Chantaburi and Trat province had nearly half of the country about cultivated area and the mangosteen output. The average yield per rai was higher than the national average. Table 1 show the perennial area ,yield area ,yield and yield per rai of mangosteen in Rayong province between 2014 – 2016

Province/year	Rayong 2014	Rayong 2015	Rayong 2016
Perennial area (Rai)	28,564	28,445	-
Ratio of perennial area/nation(%)	6.25	6.32	-
Yield area (Rai)	23,656	26,231	26,258
Ratio of yield area/ nation (%)	5.73	6.32	6.26
Yield (Ton.)	16,710	14,264	13,191
Ratio of yield/nation(%)	5.77	7.13	7.00
Yield per Rai (Kg.)	706	544	502

2.2 The General Problems of Mangosteen Production

Production problems such as gardener' lack of knowledge for exporting, costs rising, shortage of labor.

Processing problems such as lack of knowledge, equipment and technology for processing mangosteen and lack of packaging development.

Marketing problems such as gardener received low price of their production and had low bargaining power with the merchants and the collectors and the distribution system of mangosteen was ineffective.

2.3 Mangosteen Processed Products

Types of mangosteen processed products were frozen mangosteen, mangosteen vinegar, mangosteen cider, mangosteen juice, scrambled mangosteen, other mangosteen products such as mangosteen soap, mangosteen lotion.

2.4 Concepts, Principles and Theories

2.4.1 Supply Chain Management

Definition of supply chain: The coordination of related business units in the flow of goods from raw materials to the final consumer with the circulation of information from the final consumer to the first supplier and consists of both direct and indirect steps which meet the needs of the customer and include all logistics activities. Successful supply chain management needs effective management information system, cooperation and coordination between members in marketing system and handle the effectively flow of funds and capital as well as systematically operating.

2.4.2 Marketing Mix Strategies

Product Strategies

Product levels are as follow:

Product Features mean as a function of an item which is capable of gratifying a particular consumer need and is hence seen as a benefit of owning the item. In business, a product feature is one of the distinguishing characteristics of a product or service that helps boost its appeal to potential buyers, and might be used to formulate a product marketing strategy that highlights the usefulness of the product to targeted potential consumers. (business dictionary, 2018)

Product attributes mean as characteristics of a raw material or finished good which make it distinct from other products. Attributes include size, color, functionality, components and features that affect the product's appeal or acceptance in the market. (Business dictionary, 2018)

Product benefits mean actual factor (cost effectiveness, design, performance, etc.) or perceived factor (image, popularity, reputation, etc.) that satisfies what a customer needs or wants. (Business dictionary, 2018)

Product values mean an assessment of the worth of a good or service. The product value assessed by a business when setting a price for a particular product can depend on its production costs, its overall market value and the value of the product as perceived by a targeted group of consumer. (business dictionary, 2018)

Product Mix

A product mix or product assortment is the set of all products and items a particular seller offers for sale. A product mix consists of various product lines. A company'

product mix has a certain width, length, depth and consistency.(Kotler and Keller,2006,p.353.)

Product Differentiation concepts are as follow:

Form-Many products can be differentiated in form –the size, shape, or physical structure of a product.

Features-Most products can be offered with varying features that supplement their basic function. A company can identify and select appropriate new features by surveying recent buyers and then calculating customer value versus company cost for each potential feature. (Kotler and Keller,2012,p.351.)

Customization-Marketers can differentiated products by customizing them. They have increased their ability to individualize market offerings, messages, and media. Mass customization is the ability of a company to meet each customer' requirements- to prepare on a mass basis individually designed products, services, programs, and communications. .(Kotler and Keller,2012,p.351.)

Brand Equity

Brand equity definition is a phrase used in the marketing industry which describes the value of having a well-known brand name, based on the idea that owner of a well-known brand name can generate more money from products with the brand name than from products with less well known name (Wikipedia) .Another defined brand equity as the incremental contribution per year obtained by the brand in comparison to the underlying product or services with no brand –building efforts.(Srinivasan, Park and Chang,2005).

Customer Based Brand Equity: CBBE model has basic premise that the power of a brand lies in what customers have learned, felt, seen, and heard about the brand as the result of their experiences over time or in other words , the power of a brand lies in what resides in the minds of customers.(Keller,2003,p.59)

Packaging

Packaging includes all the activities of designing and producing the container for a product .The package is the buyer 's first encounter with the product. A good package draws the consumer in and encourage product choice. And various factors contribute to the growing use of packaging as a marketing tool such as self –service ,consumer affluence, company and brand image and innovation opportunity . (Kotler and Keller,2012,p.368.)

Price

Price is the one element of the marketing mix that produces revenue; the other elements produce costs. Price are perhaps the easiest element of the marketing program to adjust; product features, channels and even communications take more time. Price also communicates to the market the company's intended value

proposition of its product or brand. A well –design and marketed product can command a premium price but new economic realities cause many consumer to price sensitivity so many companies have had to carefully review their pricing strategy as a result. (Kotler and Keller, 2012, p.405.)

Marketing Channel and Value Networks

Marketing channels are set of interdependent organization participating in the process of making product or service available for use or consumption. Value Networks is a system of partnerships and alliances that a firm creates to source, augment, and deliver its offerings. A value network includes a firm' suppliers and its suppliers' suppliers, and its immediate customers and their end customers. A company needs to orchestrate these parties in order to deliver superior value to target market. Marketers have traditionally focused on the side of value network that looks toward the customer ,adopting customer relationship management (CRM) software and practice.(Kotler and Keller,2012,p.439-440)

Marketing Communication and promotion

Marketing communications are the means by which firms attempt to inform, persuade, and remind consumers-directly or indirectly about the product and brands the sell. Marketing communications represent the voice of the company and its brands. By strengthening customer loyalty, marketing communications can contribute to customer equity. Marketing communication mix consists of eight modes as follow, advertising, sales promotion, events and experiences, public relation and publicity, direct marketing, interactive marketing, word-of-mouth marketing, and personal selling. (Kotler and Keller, 2012, p.497-500.)

2.4.3 Consumer Buying Behavior

A consumer 'buying behaviors influenced by cultural, social, and personal factors of these, cultural factors exert the broadest and deepest influence.

The buying decision process: the five-stage model is that the consumer typically passes through five stages: problem recognition, information search, evaluation of alternatives, purchase behavior, and post purchase behavior. (Kotler and keller, 2012, p.173-190.)

3. The Methodology

This research had used mixed methods both qualitative and quantitative research.

3.1 Population and Sampling

The research population in qualitative research were government official, gardeners, wholesalers, producer of processed mangosteen in Rayong area. Had collected qualitative data from 1 government official, 5 gardeners, 2 wholesaler/exporter representative (called ' Long'),1 collector and 1 processed mangosteen producer. Quantitative research population were consumers who lived

in Bangkok and Rayong province and sample size was 400 samples separate as 200 samples in Bangkok and 200 samples on Rayong.

3.2 Tools and Methods to Collect Data

Had used depth interview, observation, survey in qualitative research and used questionnaire to collect data and sample of scrambled mangosteen for sampling population to testing it and packaging pictures for considering. Had used purposive sampling in qualitative research and used judgemental and snowball sampling to select sampling in quantitative research.

3.3 Analytical Method

Used descriptive statistics to analyzing data such as percentage, frequency ,mean and standard deviation. Used content analysis for qualitative data.

4. The Findings

4.1 Mangosteen Supply Chain and Logistics Activities

The components of mangosteen supply chain and logistics activities were as follow:

1. Procurement or sourcing
2. Logistics managemen
 - a. Transportation
 - b. Material management
 - c. Warehousing and product storage
3. Organizational Management
 - a. Contracting
 - b. Vertical integration
 - c. Cold chain management

Shown the supply chain structure of fruits in Eastern area by figure1 below.

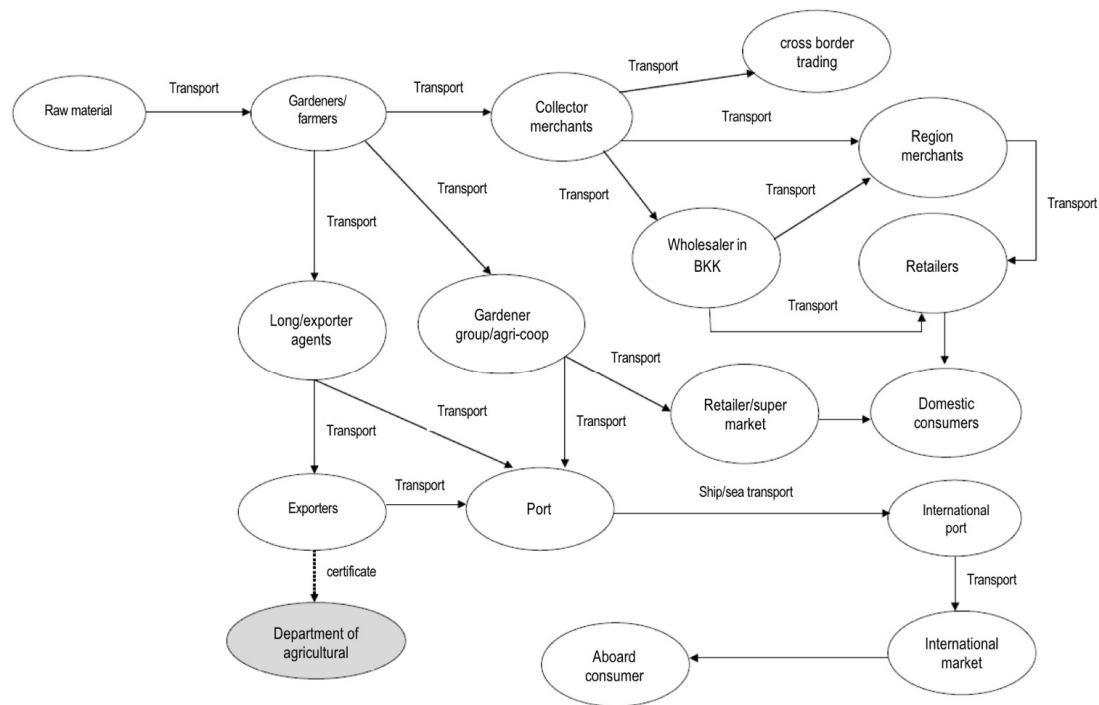


Figure1 Supply Chain structure of Fruit in Eastern region (Rayong province)

Source: Field survey and Report of Agricultural Information Center , 2015.

And shown the operating processes of mangosteen supply chain by figure 2 below.

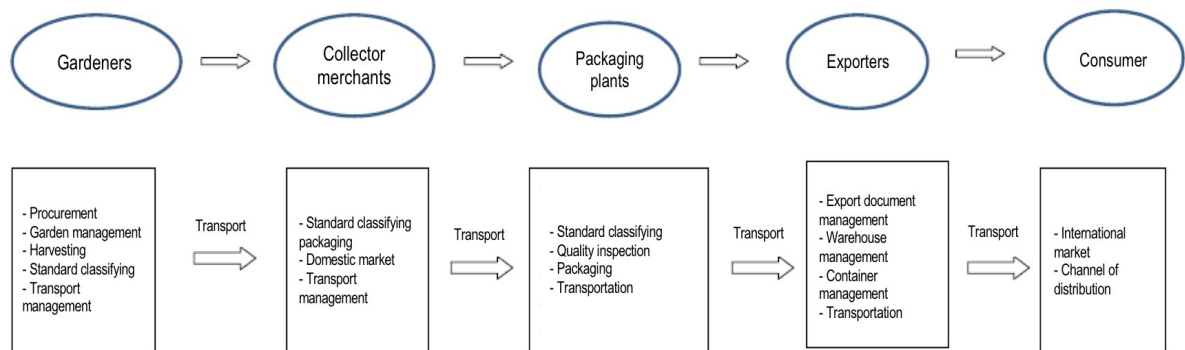
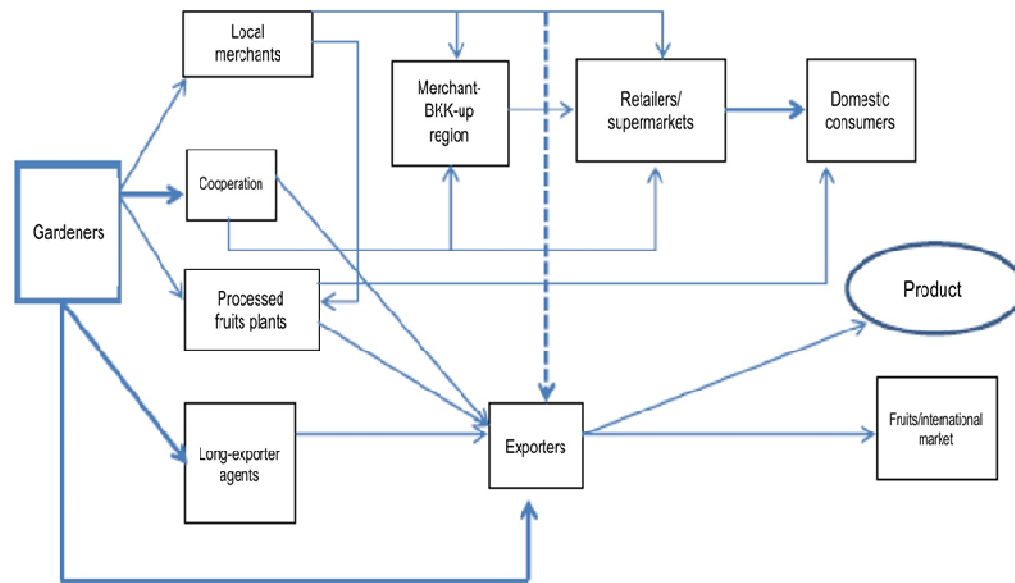


Figure 3 shown the distribution channel of mangosteen in the research area



Source: Field survey

Market structure can be divided according to the level of distribution, garden markets, local markets and export markets. Supply chain management and logistics system for fresh mangosteen was engaged in logistics activities. Related parties in the supply chain were gardeners, collect gardeners, cooperatives and exporters. Logistics activities in supply chain included: raw material storage, production, packaging, mangosteen transport to sellers. Second grade mangosteen suppliers involved in the supply chain of processed mangosteen.

4.2 Marketing Situation of Processed Mangosteen in Rayong Province

Marketing situation of processed mangosteen in Rayong province revealed that mangosteen was distributed in various brands in the area. Khun-laor brand was a popular brand name because it was widely sold as a major and first manufacturer of processed mangosteen. And marketing channels were sold by their own shop, by event in the area and sold through intermediaries in Rayong and Bangkok and did not exporting.

4.3 Marketing Opportunity of Processed Mangosteen (Scrambled Mangosteen)

Considered marketing opportunity of processed mangosteen by consumer behavior toward scrambled mangosteen and their attitude.

Table 2 Shown Consume rate of processed mangosteen of sampling population

Type of processed mangosteen/amount and percentage	Amount	percentage
1.Have consumed concentrated mangosteen juice	52	13.0
2.Have consumed mangosteen juice in glass package	60	15.0
3. Have consumed mangosteen juice in tetra-pack package	62	15.6
4. Have consumed mangosteen juice in can	22	5.5
5.Have consumed scrambled mangosteen	76	19.0
6.Have ever seen processed mangosteen but did not consume it before	123	30.8
7. Did not ever seen processed mangosteen and did not consume it before	145	36.3

The research output shown that the consume rate of mangosteen was rather low and only 19% of sampling population have consumed scrambled mangosteen so if the company have improved their marketing mix strategies for processed mangosteen the consumed rate can be higher because the research result had shown the positive consumer attitude toward the processed mangosteen .

Their opinion about the delicious taste of scrambled mangosteen were high level and the attitude toward the product price, packaging and identity of taste were moderate. And their intention to buy and consume the product were moderate. Their attitude toward processed mangosteen were shown by table 3

Table 3: The Sampling Population Attitude toward Scrambled Mangosteen

Topic of opinion	Mean	S.D.	Level of agreement
1.Taste of scrambled mangosteen was delicious	3.61	0.89	High
2 Taste of scrambled mangosteen was unique and difference from another scrambled fruits.	3.09	1.02	Moderate
3.Price of scrambled mangosteen was suitable with it quantity and package	3.35	0.92	Moderate
4.The intention to buy and consume scrambled mangosteen .	3.09	1.06	Moderate
5.Package of scrambled mangosteen was suitable and convenience to use	3.25	1.00	Moderate
6. Total consumer satisfaction toward scramble mangosteen	3.42	0.97	Moderate

5. Summary and Conclusions

5.1 Mangosteen and processed mangosteen supply chain in the research area were not complicated. Market structure can be divided according to the level of distribution, garden market, local market and export markets. Supply chain management and logistics system for fresh mangosteen was engaged in logistics activities. Related parties in the supply chain were gardeners, collect gardeners, cooperatives and exporters. Logistics activities in supply chain included: raw material storage, production, packaging, mangosteen transport to sellers. Second grade mangosteen suppliers involved in the supply chain of processed mangosteen.

5.2 Marketing situation and opportunity of processed mangosteen in Rayong province.

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