



TANG ZHIMIN

EDITED BY
SOMPORN ISVILANONDA

FRUIT THAT WILL LAST

THAI FRUIT EXPORT TO CHINA



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To

Lotus
& Angela

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Professor Dr. Tang Zhimin

Editorial Note

In the past decade, Thai fruit exports to China have experienced significant growth, resulting in a substantial increase in revenue. China's top five imported fruits from Thailand include durian, longan, mangosteen, young coconut, and pomelo. This growth in demand for Thai fruits in China is due to the country's large population, consistent economic growth, increased purchasing power, and appreciation for the taste of Thai fruits. However, concerns have arisen about the dominant role of Chinese traders in the Thai fruit supply chain to China and the potential impact of expanding and integrating their supply chain on the collection and distribution of Thai fruits. In addition, increasing export competition from neighboring ASEAN countries poses a potential threat to the export of Thai fruit. Moreover, in recent years the COVID-19 pandemic's effect on the direction of Thai fruit export supply chains in recent years is also a significant concern.

This book is a synthesis of the research project entitled "Demand-Driven Supply Chain: The Case of Thai Fruit Export to China in the Context of COVID-19 Pandemic." The study was conducted by Professor Dr. Tang Zhimin and colleagues at the Panyapiwat Institute of Management, supported by the National Research Council of Thailand (NRCT) and coordinated by The Knowledge Network Institute of Thailand (KNIT). The research proposes a policy implication on the demand-driven strategy for the market and supply chain development of Thai fruits for China, taking into account of the impacts of the COVID-19 pandemic.

The Coordination Office for Agricultural Policy Research and Policy Research Networking Enhancement, a joint collaboration between NRCT and KNIT, recognizes the importance of this research for policy makers, related government officers, fruit assemblers and exporters, fruit farmers, and other stakeholders. The Office, KNIT, and NRCT express their appreciation to Professor Dr. Tang Zhimin for compiling the research findings into this book and disseminating these findings to a broader audience.

Editor
Associate Professor Somporn Isvilanonda
July 2023

Table of Contents

	Page
Editorial Note	i
Acknowledgement	ii
Prologue	1
Chapter 1 : Methodology	5
1. The Settings of Research	7
1.1 Orchard of the World	7
1.2 The Permission List	8
1.3 Heavy Weight & Rising Star	9
2. The Sources of Information	12
2.1 Field Trips in Thailand	12
2.2 Online Interviews in China	12
2.3 Secondary Data	14
Chapter 2 : Supply Chain	17
1. Overview	19
2. Supply Chain in Thailand	20
2.1 R&D	20
2.2 Input for Production	23
2.3 Farming	25
2.4 Collection	27
2.5 Processing	28
2.6 Export	29
3. Role of Governments in Thailand	32
3.1 Direction	32
3.2 Regulation	35
3.3 Extension	38
3.4 Promotion	41
3.5 International Negotiation	44
4. Supply Chain in China	46
4.1 Cross Border Logistics	46
4.2 Import	50
4.3 Wholesale	52
4.4 Retail	55
4.5 Consumption	59

Table of Contents

	Page
5. Role of Governments in China	62
5.1 Direction	62
5.2 Regulation	63
5.3 Taxation	66
5.4 Facilitation	67
5.5 International Negotiation	68
Chapter 3 : Production	71
1. Overview	73
2. Heavy Weight	74
2.1 Durian	74
2.2 Mangosteen	78
2.3 Longan	81
3. Rising Star	85
3.1 Mango	85
3.2 Young coconut	89
3.3 Pomelo	82
Chapter 4 : Market	97
1. Overview	99
2. Heavy Weight	100
2.1 Durian	100
2.2 Mangosteen	107
2.3 Longan	111
3. Rising Star	115
3.1 Mango	115
3.2 Young coconut	120
3.3 Pomelo	124
Chapter 5 : Strategy	131
1. Overview	133
2. SWOT Matrix & Strategic Objectives	133
3. Critical Issues & Related Strategies	135
3.1 Supply Chain Integration	135
3.2 Digital Transformation	138
3.3 Competitive Marketing Mix	139
3.4 Resilient to External Shock	145
3.5 Conclusion: Strategic Objective & Related Strategies	146

Table of Contents

	Page
4. Action Plan to Achieve Strategic Objectives	146
Index	149

List of Tables

	Page
Table 1.1 Thai Fruits with Geographic Indication	7
Table 1.2 The Permission List of Thai Fruits in China	9
Table 1.3 Export Value of Thai Fruits to China	9
Table 1.4 Export Volume of Thai Fruits to China	10
Table 1.5 China's Share in the Volume of Thai Fruits Export	10
Table 1.6 Heavy Weights of Thai Fruits Export to China	11
Table 1.7 Rising Star of Thai Fruits Export to China	11
Table 1.8 Geographic Coverage of Field Trips in Thailand	12
Table 1.9 Stakeholders Represented & Fruits Covered in Field Trips	13
Table 1.10 Stakeholders in Online Interview in China	13
Table 1.11 Key Sources of Secondary Information	14
Table 1.12 HS Code of Thai Fruits of Customs of Thailand	15
Table 1.13 HS Code of Related Fruits & Code of Exporting Countries of General Administration of Customs of China (GACC)	15
Table 2.1 Components and Mechanism of the Supply Chain of Thai Fruit in China	19
Table 2.2 Anatomy of the Supply Chain of Thai Fruit in China	20
Table 2.3 Horticultural Research Institute & National Funding Agency for Fruit Research	21
Table 2.4 Export Procedure & Documentation in Thailand	31
Table 2.5 Fruit Development Strategy	33
Table 2.6 Direction for Fruits Board 2021-2023	34
Table 2.7 Fruit-Related Organizations in MOAC	34
Table 2.8 Thai Agricultural Standard (TAS)	36
Table 2.9 Good Agricultural Practices (GAP)	37
Table 2.10 Good Manufacturing Practice (GMP)	37
Table 2.11 Marketing Plan of DITP	43
Table 2.12 Market Access & Protocols For Thai Fruit Export to China	45
Table 2.13 Logistic Modes in Comparison	49
Table 2.14 Operators in Haitao	51
Table 2.15 Import Procedure & Documentation in China	52
Table 2.16 Major Fruit Wholesale Market in Mainland China	54
Table 2.17 Channel Structure of Fruit Retailing in Mainland China	57
Table 2.18 Leaders of Fruit Retailing in Mainland China	58
Table 2.19 Segments of Fruit Consumers in Mainland China	61
Table 2.20 New Consumer Behaviors in China for Fruit Consumption	61
Table 2.21 Selected Examples of Direction	63

List of Tables

	Page
Table 2.22 Requirement for Registered Orchard & Packing House	64
Table 2.23 Number of Registered Orchard and Packing Houses in Thailand	65
Table 2.24 Number of Designated Supervision Venues in Mainland China for Imported Fruits	65
Table 2.25 Selected Exhibitions in China Suitable for Thai Fruits	68
Table 3.1 Organization of Chapter 3	73
Table 3.2 Major Varieties of Thai Durian	75
Table 3.3 GI of Durian in Thailand	76
Table 3.4 Planting Area and Output of Durian in Thailand 2019-2021	76
Table 3.5 Durian Output Proportion in Geographic Regions and by Major Varieties	77
Table 3.6 Seasonal Variation of Durian Output in Thailand	77
Table 3.7 Technical Parameters for Durian Production in Thailand	78
Table 3.8 GI of Mangosteen in Thailand	79
Table 3.9 Planting Area and Output of Mangosteen in Thailand 2019-2021	79
Table 3.10 Mangosteen Output Proportion in Geographic Regions	80
Table 3.11 Seasonal Variation of Mangosteen Output in Thailand	80
Table 3.12 Technical Parameters for Mangosteen Production in Thailand	81
Table 3.13 Major Varieties of Thai Longan	82
Table 3.14 GI of Longan in Thailand	82
Table 3.15 Planting Area and Output of Longan in Thailand 2019-2021	83
Table 3.16 Longan Output Proportion in Geographic Regions and by Major Varieties	84
Table 3.17 Seasonal Variation of Longan Output in Thailand	84
Table 3.18 Technical Parameters for Longan Production in Thailand	85
Table 3.19 Major Varieties of Thai Mango	86
Table 3.20 GI of Mango in Thailand	87
Table 3.21 Planting Area and Output of Mango in Thailand 2019-2021	87
Table 3.22 Mango Output Proportion in Geographic Regions and by Major Varieties	88
Table 3.23 Seasonal Variation of Mango Output in Thailand	88
Table 3.24 Technical Parameters for Mango Production in Thailand	89
Table 3.25 Five Kinds of Aromatic Coconut in Thailand	89
Table 3.26 GI of Aromatic Coconut in Thailand	90
Table 3.27 Planting Area and Output of Young Coconut in Thailand 2019-2021	90
Table 3.28 Young Coconut Output Proportion in Geographic Regions	91

List of Tables

	Page
Table 3.29 Seasonal Variation of Aromatic Coconut Output in Thailand	91
Table 3.30 Technical Parameters for Young Coconut Production in Thailand	92
Table 3.31 Major Varieties of Thai Pomelo	93
Table 3.32 GI of Pomelo in Thailand	94
Table 3.33 Planting Area and Output of Pomelo in Thailand 2019-2021	94
Table 3.34 Pomelo Output Proportion in Geographic Regions and by Major Varieties	95
Table 3.35 Seasonal Variation of Pomelo Output in Thailand	95
Table 3.36 Technical Parameters for Pomelo Production in Thailand	95
Table 4.1 Organization of Chapter 4	99
Table 4.2 Export Value and Volume of Thai Durian in China 2018-2021	100
Table 4.3 Comparison of Export Value, Volume and Price of Thai Durian in China 2021-2022	101
Table 4.4 Countries with Permission of Durian Export to China	102
Table 4.5 Marketing Mix of During in Chinese Market	105
Table 4.6 Export Value and Volume of Thai Mangosteen in China 2018-2021	108
Table 4.7 Current and Potential Players in the Mangosteen Market in China	108
Table 4.8 Marketing Mix of Mangosteen in Chinese Market	109
Table 4.9 Export Value and Volume of Thai Longan in China 2018-2021	111
Table 4.10 Current and Potential Players in the Longan Market of China	112
Table 4.11 Marketing Mix of Longan in Chinese Market	113
Table 4.12 Export Value and Volume of Thai Mango in China 2018-2021	116
Table 4.13 Top 5 Export Markets of Thai Mango 2018-2021	116
Table 4.14 Major Players in the Mango Market of China	117
Table 4.15 Marketing Mix of Mango in Chinese Market	118
Table 4.16 Export Value and Volume of Thai Young Coconut in China 2018-2021	120
Table 4.17 Major Players in the Coconut Market of China	121
Table 4.18 Marketing Mix of Young Coconut in Chinese Market	122
Table 4.19 Export Value and Volume of Thai Pomelo in China 2018-2021	124
Table 4.20 Major Players in the Pomelo Market of China	125
Table 4.21 Thai Pomelo in China vs Shatian & Red Wentan	126
Table 4.22 Marketing Mix of Pomelo in Chinese Market	127
Table 5.1 Organization of Chapter 5	133
Table 5.2 SWOT Matrix & Strategic Objectives	135
Table 5.3 Supply Chain Components & Related Strategies	137
Table 5.4 Role of Thai Government & Related Strategies	138

List of Tables

	Page
Table 5.5 Digital Transformation (DT) & Related Strategies	139
Table 5.6 Competition Context of the Six Fruits	140
Table 5.7 Competition Strategies (CS)	140
Table 5.8 Marketing Mix: Product Strategies (MM1)	141
Table 5.9 Marketing Mix: Pricing Strategies (MM2)	142
Table 5.10 Players in the Channel Structure	143
Table 5.11 Promotion Messages in Promotion Strategies (MM4)	144
Table 5.12 External Shock (ES) and Related Strategies	145
Table 5.13 Linkage between the Seven Strategic Objectives and Related Sub-Strategies	146
Table 5.14 Involvement of Key Stakeholders for Strategic Objectives	147
Table 5.15 Roadmap & Milestone for Strategic Objectives	147
Table 5.16 Expected Export Value of Major Fruits of Thailand to China	148
Table 5.17 Resource Configuration to Achieve the Strategic Objectives	148

List of Figures

	Page
Figure 1.1 Fruit Production Data from Department of Agriculture Extension (DOAE)	16
Figure 2.1 Selected Examples of R&D	21
Figure 2.2 Selected Examples of Input for Production	24
Figure 2.3 Selected Examples of Farming	26
Figure 2.4 Selected Examples of Collection	27
Figure 2.5 Selected Examples of Processing	29
Figure 2.6 Selected Examples of Export	31
Figure 2.7 Agricultural and Cooperative Strategy (2017-2036)	32
Figure 2.8 Selected Examples of Direction	35
Figure 2.9 Selected Examples of Regulation	38
Figure 2.10 Selected Examples of Extension at National and Local Level	40
Figure 2.11 Selected Examples of Promotion	42
Figure 2.12 Selected Examples of International Negotiation	45
Figure 2.13 Border Checkpoints for Thai Fruit Export to China	48
Figure 2.14 Laos-China Railway	49
Figure 2.15 Cross Border Retailing e-Commerce Importer In China and Thailand	52
Figure 2.16 Major Fruit Wholesale Market in Mainland China	55
Figure 2.17 Channel of Fruit Retailing in Mainland China	57
Figure 2.18 New Retail in Fruit Retailing in Mainland China	58
Figure 2.19 Supply Chain Integration (SIC) by Leaders of Fruit Retailing	59
Figure 3.1 Appearance of Mangosteen	79
Figure 4.1 Representative Varieties of Durian in Malaysia	102
Figure 4.2 Representative Varieties of Durian in Vietnam	103
Figure 4.3 Representative Varieties of Durian in The Philippines	103
Figure 4.4 Promotion Contents for Durian in Chinese Market	106
Figure 4.5 Positive Keywords & Negative Comments for Durian in Chinese Market	106
Figure 4.6 Promotion Contents for Mangosteen in Chinese Market	110
Figure 4.7 Positive Keywords & Negative Comments for Mangosteen in Chinese Market	111
Figure 4.8 Promotion Contents for Longan in Chinese Market	114
Figure 4.9 Positive Keywords & Negative Comments for Longan in Chinese Market	115
Figure 4.10 Promotion Contents for Mango in Chinese Market	119

List of Figures

	Page
Figure 4.11 Positive Keywords & Negative Comments for Mango in Chinese Market	120
Figure 4.12 Promotion Contents for Young Coconut in Chinese Market	123
Figure 4.13 Positive Keywords & Negative Comments for Young Coconut in Chinese Market	124
Figure 4.14 Promotion Contents for Pomelo in Chinese Market	128
Figure 4.15 Positive Keywords & Negative Comments for Pomelo in Chinese Market	129

Prologue

"So that you might go and bear fruit—fruit that will last" — John 15:16

On August 22, 2022, “Zhou Liu Lian”, the largest Chinese brand of frozen, ripe-on-tree Thai durian, was launched by JOY WING MAU (鑫荣懋), one of the largest fruit importers in China. Thailand historically has focused on the fresh durian market, sending out the fruit picked at about 80% ripeness. Does this launch signal a trend to move out of its comfort zone in response to new consumer demands in China? How far would Thai fruits go on the road of “differentiation by brands”?

A few days later, on September 5, HONGJIU FRUIT (洪九果品) became the first Chinese fruit company listed on HKEX with a market capitalization of HK\$19 billion. HONGJIU, also the largest durian distributor in China, buys the fruit directly from Thai orchards, processes it in its local factories in Thailand and distributes it through its sorting centres in China. Such a model of “supply chain integration” (SCI) is also adopted by other Chinese players such as PAGODA (百果园). How can SCI assist Thai fruit exports to China?

On September 19, a fortnight later, two containers of fresh MonThong durian from Vietnam arrived at Ping Xiang (凭祥) Railway Station, China. Durian from Vietnam, with the Chinese official approval, arrived eventually. So did the first batch of Longan from Pailin, Cambodia, on October 27. How will Thailand fare in the scramble for the Chinese fruit market vis-a-vis the ASEAN newcomers?

Contrary to the pessimistic views on Chinese ZCP (Zero Covid Policy) in the early months of 2022, durian exports from Thailand to China from January to July 2022 outperformed the same period in 2021. What has really happened to the fruit logistics under Covid 19? What lessons may we learn?

News like the above flooded in during the last few months when this book was conceived. The winds of change herald new challenges and opportunities.

The top five imported fruits of China by value in 2022 are: durian, cherry, banana, mangosteen, and coconut, and the top three source countries are Thailand, Chile and Vietnam. China continues to be the largest market for Thai fruits.

China's per capita GDP surpassed \$12,700 in 2022. The market for Thai fruits is growing with expanding Chinese consumer income and deepening distribution channels into rural areas and third and fourth-tier cities. What are the new consumer behavior and its implication for marketing?

This book will address the questions raised above. It is about how Thai fruits can sustain their growth and reach the potential in China, how Thai stakeholders can embrace the opportunities and meet the challenges, how the soil can bear fruit—fruit that will last.

It starts with a recount of our journey of discovery to introduce the research settings and methodology, followed by an overview of the supply chain of Thai fruits to China. The production and market of six Thai fruits (durian, longan, mangosteen, mango, young coconut and pomelo) are scrutinized afterwards, building towards our proposed strategy of "Demand Driven Supply Chain":

Chapter 1: Methodologies

Chapter 2: Supply Chain

Chapter 3: Production

Chapter 4: Market

Chapter 5: Strategy

1

Methodology

"The joy of research is picking the fruits of discovery" — Steven Magee

1. The Settings of Research

1.1. Orchard of the World

1.2. The Permission List

1.3. Heavy Weight & Rising Star

2. The Sources of Information

2.1. Field Trips in Thailand

2.2. Online Interviews in China

2.3. Secondary Data

1. The Settings of Research

1.1 Orchard of the World

Thailand has abundant resources for tropical fruits. The government has assigned GI (Geographic Indication) to 26 fruits with 78 cultivars in 51 provinces (Table 1.1). These resources constitute a solid foundation for Thailand to be a luxuriant orchard of the world.

Table 1.1 Thai Fruits with Geographic Indication

Fruit (26)	Variety with GI (78)	Thai Name	Province (51)
Banana (5)	Kamphaeng Phet Banana	กล้วยไข่กำแพงเพชร	Kamphaeng Phet
	Phitsanulok Bang Krathum Dried Banana	กล้วยตากบางกระทุ่ม พืชคุณโลก	Phitsanulok
	Chumphon Lady finger Banana	กล้วยเล็บมือนางชุมพร	Chumphon
	Gluey Hin Bannang Sata	กล้วยหินเป็นนัสตา	Yala
	Hom Thong Pa Thum Banana	กล้วยหอมทองปทุม	Pathum Thani
Champedak (1)	Satun Champedak	จำปาตะสุต	Satun
Coconut (5)	Ratchaburi Aromatic Coconut	มะพร้าวน้ำหอมราชบุรี	Ratchaburi
	Banphaeo Aromatic Coconut	มะพร้าวน้ำหอมบ้านแพ้ว	Samut Sakhon
	Thap Sakae Coconut	มะพร้าวทับสะแก	Prachuap
	Bang Khla Aromatic Coconut	มะพร้าวน้ำหอมบางคล้า	Chachoengsao
	Koh Phangan Coconut	มะพร้าวเกาะพะนัง	Surat Thani
Durian (12)	Uttaradit Long Lab Lae Durian	ทุเรียนหลงลับแลอุตรดิตถ์	Uttaradit
	Uttaradit Lin Lab Lae Durian	ทุเรียนหลินลับแลอุตรดิตถ์	Uttaradit
	Nont Durian	ทุเรียนนนท์	Nonthaburi
	Durian Pa La-U	ทุเรียนป่าละอู	Nonthaburi
	Naiwong Ranong Durian	ทุเรียนในวังระนอง	Ranong
	Durian Prachin	ทุเรียนปราจีน	Prachinburi
	Sisaket Volcanic Area Durian	ทุเรียนภูเขาไฟศรีสะเกษ	Sisaket
	Phangnga Salika Durian	ทุเรียนสาละกาพังงา	Phangnga
	Cha Nee Koh Chang Durian	ทุเรียนชะนีเกาะช้าง	Trat
	Pakchong-Khaoyai Durian	ทุเรียนปากช่องเขาใหญ่	Nakhon Ratchsima
	Chan Durian	ทุเรียนจันทน์	Chanthaburi
	Sadet Nam Yala Durian	ทุเรียนสะเด็ดน้ำยะลา	Yala
Emblica (1)	Makham Pom Non Thai	มะขามป้อมในไทย	Nakhon Ratchsima
Giant Marian Plum. (1)	Mayongchid Nakhonnayok	มะยงชิดนครนายก	Nakhon Nayok
Jujube (1)	Nom Ban Phon Jujube	พุทราแม่บ้านโพธิ์	Kalasin
Longan (3)	Lamphun Biao Khiao Longan	ลำไยเบียวเขียวลำพูน	Lamphun
	Lamphun Golden Dried Longan	ลำไยทองแห้งเนื้อสีทองลำพูน	Lamphun
	Banphaeo Phuang Thong Longan	ลำไยฟองทองบ้านแพ้ว	Samut Sakhon
Longkong (1)	Longkong Tanyoungmat	ลองกองต้นหยงมัส	Narathiwat
Lychee (4)	Phayao Mae Chai Lychee	ลิ้นจี่แม่ใจพะเยา	Phayao
	Bang Khun Thian Lychee	ลิ้นจี่บางขุนเทียน	Bangkok
	Samutsongkham Kom Lychee	ลิ้นจี่คอมสุขุทสงคราม	Samut Songkham
	Nakhon Phanom Lychee	ลิ้นจี่นครพนม	Nakhon Phanom
Mango (3)	Nonthaburi Yai Klam Mango	มะม่วงยายกล้านนนทบุรี	Nonthaburi
	Nam Dok Mai Khung Bang Kachao	มะม่วงน้ำดอกไม้คุ้งบางกระเจ้า	Samut Prakarn
	Sakaeo Nam Dok Mai Mango	มะม่วงน้ำดอกไม้สระแก้ว	Sakaeo

Fruit (26)	Variety with GI (78)	Thai Name	Province (51)
Mango (3)	Nam Dol Mai See Thong Bang Khla Mango	มะม่วงน้ำดอกไม้สีทองบางคล้า	Chachoengsao
	Saraburi Man Nong Saeng Mango	มะม่วงมันหนองแซงสระบุรี	Saraburi
	Nam Dok Mai Samutprakarn Mango	มะม่วงน้ำดอกไม้สมุทรปราการ	Samut Prakan
Mangosteen (2)	Mung Kud Naiwong Ranong	มังคุดไฉฉะ รณอง	Ranong
	Khao Khiriwong Mangosteen	มังคุดเขาศีรีวัง	Nakhon Sithammarat
Maoberry (1)	Sakon Nakhon Mak Mao Berry	หมากเมาสกลนคร	Sakon Nakhon
Neck Orange (1)	Neck Orange Chana	ส้มจากจะนะ	Songkhla
Orange (1)	Nan Golden Orange	ส้มสีทองน่าน	Nan
Pineapple (11)	Phulae Pineapple	สับประดภูแลเชียงราย	Chiang Rai
	Nanglae Pineapple	สับประดนางแล	Chiang Rai
	Bankha Pineapple	สับประดบ้านคา	Ratchaburi
	Sriracha Pineapple	สับประดศรีราชา	Chonburi
	Trat Golden Pineapple	สับประดตราดสีทอง	Trat
	Rayong Golden Pineapple	สับประดทองระยอง	Rayong
	Uthen Pineapple	สับประดท่าอุเทน	Nakhon Phanom
	Phuket Pineapple	สับประดภูเก็ต	Phuket
	Pineapple Hauymon	สับประดหัวมุ่น	Uttaradit
	Sri Chiang Mai Pineapple	สับประดศรีเชียงใหม่	Nong Khai
	Bueng Kan Pineapple	สับประดบึงกาฬ	Bueng Kan
Pomelo (9)	Chainat Khaotangkwa Pomelo	ส้มโอบัวแดงกวาวชัยนาน	Chainat
	Nakhonchaisri Pomelo	ส้มโอบึงนครชัยศรี	Nakhon Pathom
	Samutsongkhram Khaoyai Pomelo	ส้มโอบัวใหญ่สมุทรสงคราม	Samut Songkhram
	Pakpanang Tubtim siam Pomelo	ส้มโอบัวหินสยามปากพนัง	Nakhon Sithammarat
	Yarang Puko Pomelo	ส้มโอบู่โกยะรัง	Pattani
	Pomelo Hom Khuanlang	ส้มโอบ้านควนลัง	Songkhla
	Pomelo Hom Khuanlang	ส้มโอบ้านขอมเมืองพิชิต	Phichit
	Thong Dee Ban Thaen Pomelo	ส้มโอบึงต๋านบ้านแท่น	Chaiyaphum
Rambutan (2)	Nasan Rongrien Rambutan	เงาะโรงเรียนนราสาร	Surat Thani
	Thong Pha Phum Rambutan	เงาะทองผาภูมิ	Kanchanaburi
Rose Apple (1)	Phet Rose Apple	ชมพูเพชร	Phetchaburi
Santol (2)	Ta Lung Santol	กระหือแตรลุง	Lop Buri
	Kathon-Hor-Bangkrang	กระหือแตรบางกร่าง	Nonthaburi
Sapodilla (1)	Banmai Sapodilla	ละมุดบ้านใหม่	Ayutthaya
Sugar Apple (1)	Pakchong Khaoyai Sugar Apple	น้อยหน่าปากช่องเขาใหญ่	Nakhon Ratchasima
Sweet Marian Plum (1)	Maprangwhan Nakhonnayok	มะปรางหวานนครนายก	Nakhon Nayok
Tamarind (2)	Phetchabun Sweet Tamarind	มะขามหวานเพชรบูรณ์	Phetchabun
	Pet Non Thai Manila Tamarind	มะขามเทศเพชรไชนันไทย	Nakhon Ratchasima
Tangerine (Mandarin orange) (2)	Bang Mod Tangerine	ส้มบางมด	Bangkok
	Mae Sin Tangerine	ส้มแม่สิน	Sukhothai
Velvet Tamarind (1)	Yarang Velvet tamarind	ลูกหยียะรัง	Pattani

Source : DIP 10/10/2020: 171 Thai GI updated February 25, 2023

1.2 The Permission List

However, not all fruits of Thailand may enter the Chinese market. The fruit import of the country is regulated with a system of permission lists. At the moment, 22 fruits from Thailand are permitted to be exported to China (Table 1.2).

Table 1.2 The Permission List of Thai Fruits in China

No.	Name	Chinese	Thai
1	Banana	香蕉	กล้วย
2	Carambola	杨桃	มะเฟือง
3	Coconut	椰子	มะพร้าว
4	Durian	榴莲	ทุเรียน
5	Guava	番石榴	ฝรั่ง
6	Jackfruit	菠萝蜜	ขนุน
7	Lychee	荔枝	ลิ้นจี่
8	Long kong	椰色果	ลองกอง
9	Longan	龙眼	ลำไย
10	Mango	芒果	มะม่วง
11	Mangosteen	山竹	มังคุด

No.	Name	Chinese	Thai
12	Orange	橙	ส้ม
13	Papaya	木瓜	มะละกอ
14	Passion fruit	西番莲(百香果)	เสาวรส
15	Pineapple	菠萝	สับปะรด
16	Pomelo	柚	ส้มโอ
17	Rambutan	红毛丹	เงาะ
18	Rose apple	莲雾	ชมพู่สด
19	Sapodilla	人心果	ละมุด
20	Sugar apple	番荔枝	น้อยหน่า
21	Tamarind	罗望子	มะขาม
22	Tangerine	柑橘	ส้มจีน

Source : GACC 2021 December 28

1.3 Heavy Weight & Rising Star

Among the 22 fruits in the permission list above, 14 are selected based on their significance in export value. Table 1.3 shows the export value to China from 2018 to 2021 according to the data from the Customs of Thailand. The growth rate of the export value and the share of the value of fruits in a total of 14 fruits are also reported. Fruits in the table are listed according to the share of value in 2021. For example, the export value of durian is 98 billion baht in 2021. It has the highest share (70.6%) among Thailand's 14 most essential fruits.

Table 1.3 Export Value of Thai Fruits to China

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	share%
ทุเรียน	Durian	13,179	79.4	1	26,341	99.9	1	47,798	81.5	1	98,332	105.7	1	70.6
ลำไย	Longan	4,406	-16.1	2	9,696	120	3	12,661	31	2	18,024	42	2	12.9
มังคุด	Mangosteen	3,261	62.1	3	11,752	260.4	2	11,576	-1.5	3	15,966	37.9	3	11.5
มะพร้าวอ่อน	Coconut	1,313	58.9	4	1,891	44.1	4	2,554	35.1	4	5,131	100.9	4	3.7
ส้มโอ	Pomelo	319	2.1	6	244	-23.5	7	314	28.5	6	860	173.9	5	0.6
ขนุนสด	Jackfruit	308	22.4	7	353	14.4	6	338	-4.3	5	288	-14.6	6	0.2
กล้วยสด	Banana	520	52.8	5	486	-6.4	5	262	-46.2	7	216	-17.4	7	0.2
สับปะรด	Pineapple	233	104.0	8	226	-2.6	8	128	-43.6	9	207	61.9	8	0.1
มะม่วง	Mango	144	-1.7	9	172	19.1	9	205	19.2	8	91	-55.8	9	0.1
มะขาม	Tamarind	112	221.0	10	61	-45.7	10	42	-30.7	10	56	31.3	10	0.0
เงาะ	Rambutan	0.5	-72.6	13	44	7,906	11	14	-68.6	11	17	21.9	11	0.0
ลิ้นจี่	Lychees	19	-81.7	11	21	11.5	12	7	-67.5	12	13	96.5	12	0.0
ชมพู่สด	Rose apple	0.9	-73.3	12	1.3	43.0	13	0.4	-72.8	13	0.6	55.9	13	0.0
ลองกอง	Long kong	0.4	-69.2	14	0.2	-57	14	0.0	-100	14	0.6	-	14	0.0
	Total	23,816			51,269			75,899			139,203			100.0

Source: Customs of Thailand

Table 1.4 shows the export volume to China from 2018 to 2021 according to the data from the Customs of Thailand. The growth rate of the export volume and the rank of the growth rate of fruits in a total of 14 fruits are also reported. Fruits in the table are listed according to the alphabetical order of their English names. For example, the export volume of durian is 779,880 tons in 2021. It has a growth rate of 75% over the last year, ranks number five among Thailand's 14 most important fruits.

Table 1.5 shows the export volume of Thailand to the world and the share of China from 2018 to 2021, according to the data from Customs of Thailand. Fruits in the table are listed according to the alphabetical order of their English names. For example, the export volume of durian from Thailand to the world is 875,079 tons in 2021, 72% of which went to the Chinese market.

Table 1.4 Export Volume of Thai Fruits to China

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021		
		Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank
กล้วยสด	Banana	26,655	11.2	8	18,182	-31.8	12	11,119	-38.8	8	8,349	-24.9	13
มะพร้าวอ่อน	Coconut	54,063	47.2	6	96,700	78.9	5	122,689	26.9	1	226,621	84.7	4
ทุเรียน	Durian	199,986	47.4	5	375,333	87.7	4	444,411	18.4	3	779,880	75.5	5
ขนุนสด	Jackfruit	21,850	25.7	7	23,601	8.0	7	21,090	-10.6	5	18,252	-13.5	11
ลำไย	Longan	133,191	-16.3	10	281,320	111.2	3	343,304	22.0	2	476,025	38.7	7
ลองกอง	Longkong	27	-57.1	11	2	-92.2	14	0	-100	14	23	-	1
ลิ้นจี่	Lychees	1,176	-70.8	12	1,093	-7.1	8	457	-58.2	11	350	-23.3	12
มะม่วง	Mango	8,914	87.0	3	12,024	34.9	6	10,028	-16.6	6	4,941	-50.7	14
มังคุด	Mangosteen	80,816	54.8	4	290,735	259.8	2	217,938	-25.0	7	231,689	6.3	10
สับปะรด	Pineapple	14,790	112.1	2	13,696	-7.4	9	8,307	-39.3	9	10,430	25.6	9
ส้มโอ	Pomelo	9,795	3.8	9	7,075	-27.8	11	7,533	6.5	4	25,153	233.9	2
เงาะ	Rambutan	1	-98.5	14	1,390	99,769	1	248	-82.1	13	355	43.0	6
ชมพูสด	Rose apple	26.0	-85.5	13	16.9	-35.0	13	5.2	-69.5	12	11.0	113.6	3
มะขาม	Tamarind	5,492	178.4	1	4,065	-26.0	10	2,139	-47.4	10	2,794	30.6	8

Source: Customs of Thailand

Table 1.5 China's Share in the Volume of Thai Fruits Export

รายการผลไม้ 14	Fruits 14	2018		2019		2020		2021	
		World (ton)	%	World (ton)	%	World (ton)	%	World (ton)	%
กล้วยสด	Banana	28,557	93	18,607	98	11,587	96	8,530	98
มะพร้าวอ่อน	Coconut Y	84,439	64	131,355	74	152,831	80	260,871	87
ทุเรียน	Durian	486,435	41	655,395	57	620,893	72	875,079	72
ขนุนสด	Jackfruit	44,972	49	45,319	52	49,006	43	35,850	51
ลองกอง	Long kong	1,447	1.8	1,408	0.1	1,712	0.0	1,452	1.6
ลำไย	Longan	551,454	24	583,297	48	494,824	74	633,131	75
ลิ้นจี่	Lychees	2,207	53	1,338	82	1,184	39	877	40
มะม่วง	Mango	63,199	14	58,509	21	87,260	11	113,806	4
มังคุด	Mangosteen	177,406	46	409,028	71	291,951	75	256,266	90
สับปะรด	Pineapple	17,517	84	15,468	89	9,581	87	12,085	86
ส้มโอ	Pomelo	26,412	37	23,922	30	20,307	37	30,599	82
เงาะ	Rambutan	7,983	0.02	15,912	8.74	11,796	2.11	11,828	3.00
ชมพูสด	Rose apple	570	4.6	432	3.9	654	0.8	1,767	0.6
มะขาม	Tamarind	30,557	18	25,130	16	25,554	8	24,198	12

Source: Customs of Thailand

The top 3 fruits of export value to China are durian, longan, and mangosteen (Table 1.6). They are in the group called the Heavy Weight of Thai fruits export to China. As a group, it accounted for 95% of Thailand's 14 most important fruits in 2021.

Table 1.6 Heavy Weights of Thai Fruits Export to China

รายการผลไม้ 14 Fruits 14		2018			2019			2020			2021			
		Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	share%
ทุเรียน	Durian	13,179	79.4	1	26,341	99.9	1	47,798	81.5	1	98,332	105.7	1	70.6
ลำไย	Longan	4,406	-16.1	2	9,896	120	3	12,661	31	2	18,024	42	2	12.9
มังคุด	Mangosteen	3,261	62.1	3	11,752	260.4	2	11,576	-1.5	3	15,966	37.9	3	11.5
	Heavy Weight													95.0
	Total	23,816			51,289			75,899			139,203			100.0

Source: Table 1.3

The other group of interest may be called the Rising Star of Thai fruits export to China (Table 1.7). It includes young coconut, pomelo, and mango. Young coconut and pomelo have seen rapid growth in recent years. Export volume to China of young coconut increased from around 50,000 tons in 2018 to about 250,000 tons in 2021. Export volume to China of Pomelo more than doubled in 2021, increasing from about 10,000 tons in 2018 to around 25,000 tons in 2021. Although the export of mango did not do well in 2021, It is a potential rising star compared to other Thai fruits, judging from the quality of Nam Dokmai and its good performance in Japan & Korea.

Table 1.7 Rising Star of Thai Fruits Export to China

รายการผลไม้ 14 Fruits 14		2018			2019			2020			2021		
		Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank
มะพร้าวอ่อน	Coconut Y	54,063	47.2	6	96,700	78.9	5	122,689	26.9	1	228,621	84.7	4
มะม่วง	Mango	8,914	87.0	3	12,024	34.9	6	10,028	-16.6	6	4,941	-50.7	14
ส้มโอบ	Pomelo	9,795	3.8	9	7,075	-27.8	11	7,533	6.5	4	25,153	233.9	2

Source: Table 1.4

This book will focus on the fruits in the groups of Heavy Weight (durian, longan and mangosteen) and Rising Star (young coconut, pomelo and mango). Their production and market situation will be studied in chapter 3 and 4. The six fruits of Heavy Weight & Rising Star account for 99.4% of the value of Thai fruit export to China in 2021. China is also the dominant market of Thailand for Durian (72%), Mangosteen (90%), Longan (75%), Young Coconut (87%) and Pomelo (82%).

2. The Sources of Information

2.1 Field Trips in Thailand

Eighty-seven in-depth interviews and one focused group discussion were conducted from December 2020 to December 2021, covering 20 out of 76 provinces in Thailand. The geographic locations of the 20 provinces are presented in Table 1.8. The number of In-depth interviews covering various stakeholders and fruits is recoded in Table 1.9. The stakeholders in Thailand are classified into government officials, farmers, collectors, processors, exporters, logistic providers, and researchers. For example, 36 interviews were conducted with government officials and 29 interviews with farmers. Thirteen kinds of the most essential fruits in Thailand are covered including for example durian (50 interviews) and coconut (21 interviews).

Table 1.8 Geographic Coverage of Field Trips in Thailand

20 Provinces	Time	Activity
Bangkok	Dec 14 2020-Feb 15 2021	Field Trip
Chanthaburi	Mar 10-11 2021	Field Trip
Chiang Rai	Dec 17 2021	Focused Group
Chumphon	Aug 2-4 2021	Field Trip
Lamphun	Apr 29 2021	Field Trip
Mukdahan	Dec 17 2021	Focused Group
Nakhonphanom	Dec 17 2021	Focused Group
Nakornsitammarat	Jun 21-25 2021	Field Trip
Narathiwat	Mar 23-4 2021	Field Trip
Nongkhai	Dec 17 2021	Focused Group
Phetchabun	Mar 30-31 2021	Field Trip
Phitsanulok	Mar 29 2021	Field Trip
Prachuap	Mar 3-4 2021	Field Trip
Ratchaburi	Mar 2 2021	Field Trip
Rayong	Mar 12-13 2021	Field Trip
Samut Songkhram	Mar 1 2021	Field Trip
Surat Thani	Jun 21-25 2021	Field Trip
Trat	Mar 8-9 2021	Field Trip
Uttaradit	Apr 1 2021	Field Trip
Yala	Mar 25 2021	Field Trip



Source: CSAPIM

2.2 Online Interviews in China

Due to Covid-19 and the limitation on cross-border travel, the planned field trips in China are replaced by online interviews conducted with 23 stakeholders in China. Table 1.10 shows their geographic location in 12 provincial units and the step involved in the supply chain from R&D, farm, collection, and import to online or offline retail. Some big players, for example, A1 in Guangdong province, involve almost every step in the supply chain from farm to retail, compared with C1, which is a research institute in Yunnan province.

Table 1.9 Stakeholders Represented & Fruits Covered in Field Trips

Stakeholders		Interviews	Fruits		Interviews	Fruits		Interviews
government officials	G	36	Banana	9	Mango	15		
farmers	F	29	Coconut	21	Mangosteen	30		
collectors	C	23	Durian	50	Pineapple	19		
processors	P	21	Jackfruit	14	Pomelo	12		
exporters	E	15	Long Kong	19	Rambutan	15		
logistic providers	L	4	Longan	16	Rose Apple	11		
researchers	R	7			Tamarind	7		

Source: CSAPIM

Table 1.10 Stakeholders in Online Interview in China

Code	Location	Supply Chain Engagement						
		R&D	Farm	Collection	Import	Whole Sale	Retail Online	Retail Offline
A1	Guangdong							
A2	Beijing							
A3	Henan							
A4	Chongqing							
A5	Shanghai							
A6	Fujian							
A7	Hunan							
A8	Shanghai							
A9	Guangdong							
A10	Shanxi							
A11	Fujian							
B1	Zhejiang							
B2	Zhejiang							
B3	Beijing							
B4	Chongqing							
B5	Shanghai							
B6	Guizhou							
B7	Shanghai							
B8	Beijing							
B9	Guangdong							
B10	Hebei							
B11	Zhejiang							
C1	Yunnan							

Source: CSAPIM



2.3 Secondary Data

The insights from field trips in Thailand and online interviews in China are supplemented by the secondary data. The key sources of secondary information may be divided into four categories (Table 1.11):

- 1) Data from government, especially the fruit trade statistics from the Customs of Thailand (Table 1.12), General Administration of Customs of China (GACC) (Table 1.13), and the fruit production data from the Department of Agriculture Extension (DOAE) of Ministry of Agriculture and Cooperatives, Thailand (Figure 1.1);
- 2) Data from wholesale market, such as Talaad Thai and Jiang Nan 江南批发市场;
- 3) Data from fruit news providers in China, such as China Fruit Portal 中国水果门户, Produce Report 国际果蔬报道, Fresh Plaza: 全球果蔬网 and Asia Fruit 亚洲水果;
- 4) Data from e-Commerce platform in China for marketing information and customer feedback, such as Taobao/Tmall (淘宝/天猫), JD (京东), PinDuoDuo (拼多多), and Suning (苏宁).

Table 1.11 Key Sources of Secondary Information

Source	URL	Note
Thai Customs	https://www.customs.go.th	Thailand Fruit trade data
GACC	http://www.customs.gov.cn/customs	China Fruit trade data
DOAE	https://opendata.doe.go.th/site/index	Thailand production data
Talaad Thai	https://talaadthai.com	Thailand Fruit Price
Jiang Nan 江南批发市场	http://www.jnmarket.net	China Fruit Price
Produce Report 国际果蔬报道	https://guojiyueshu.com	China Fruit Import News
FreshPlaza: 全球果蔬网	https://www.freshplaza.cn	China Fruit Import News
China Fruit Portal 中国水果门户	https://www.chinafruitportal.com	China Fruit Import News
Asia Fruit 亚洲水果	https://asiafruitchina.net	China Fruit Import News
Taobao/Tmall	https://s.taobao.com https://detail.tmall.com	China E-commerce Platform
JD	https://item.jd.com	China E-commerce Platform
PinDuoDuo	https://www.pinduoduo.com	China E-commerce Platform
Suning	https://product.suning.com	China E-commerce Platform

Source: CASPIM

Table 1.12 HS Code of Thai Fruits of Customs of Thailand

รายการผลไม้ 14	Fruits 14	HS Code	Note
ทุเรียน	Durian	0810600001	Durian
		08106000501	Durians (Organic)
มังคุด	Mangosteen	08045030001	Mangosteens
		08045030501	Mangosteens (Organic)
เงาะ	Rambutan	08109030000	Rambutan
ลองกอง	Longkong	08109099002	Longkong
ลำไย	Longan	08109010000	Longans; Mata Kucing
ลิ้นจี่	Lychees	08109020000	Lychees
		08119000005	Frozen Lichees
มะม่วง	Mango	08045020001	Mangoes, fresh
กล้วยสด	Banana	08031010000	Fresh
		08039010001	Lady's finger banana, fresh
		08039020000	Cavendish banana
		08039030000	Chestnut banana
		08039090001	Sweet bananas
		08039090002	Other, fresh
ทุเรียนสด	Jackfruit	08109050000	Jackfruit
ชมพูสด	Rose apple	08109099003	Rose apples
ส้มโอ	Pomelo	08054000001	Pomelos
มะขาม	Tamarind	08109060000	Tamarinds
		08134020000	Tamarinds processed
มะพร้าวอ่อน	Coconut	08011910001	Young coconut
		08011910501	Young coconut (Organic)
สับปะรด	Pineapple	08043000001	Fresh pineapples
		08119000001	Frozen Pineapple

Source: <https://www.customs.go.th>

Table 1.13 HS Code of Related Fruits & Code of Exporting Countries of General Administration of Customs of China (GACC)

6 种水果	Fruits 6	HS Code	国家/地区	Country/Region	Code
榴莲	Durian	08106000	柬埔寨	Cambodia	107
			印度尼西亚	Indonesia	112
山竹	Mangosteen	08045030	老挝	Laos	119
			马来西亚	Malaysia	122
龙眼	Longan	08109030	缅甸	Myanmar	106
			菲律宾	Philippines	129
芒果	Mango	08045020	泰国	Thailand	136
			台湾	Taiwan	143
柚	Pomelo	08054000	越南	Vietnam	141
			巴基斯坦	Pakistan	127
椰子	Coconut	08011200	澳大利亚	Australia	601
			南非	South Africa	244
			埃及	Egypt	215
			以色列	Israel	115

Source: <http://www.customs.gov.cn/customs>

Figure 1.1 Fruit Production Data from Department of Agriculture Extension (DOAE)



Source: <https://opendata.doae.go.th/site/index>

2

Supply Chain

"I am the vine; you are the branches. If you remain in me and I in you, you will bear much fruit" — John 15:5

1. Overview
2. Supply Chain in Thailand
3. Role of Governments in Thailand

4. Supply Chain in China
5. Role of Governments in China

1. Overview

The supply chain of Thai fruits to China may be divided into 11 components, from "R&D" to "Consumption" (Table 2.1), which is regulated and supported by the governments of Thailand and China. The mechanism of the supply chain is explained in terms of "What" (the key functions of each component); "Who" (the key players in each component); and "How" (The process to fulfill the key functions).

As illustrated in Table 2.2, the section on "Supply Chain in Thailand" covers the components of "R&D", "Input for Production", "Farming", "Collection", "Processing", and "Export", complemented by the role of the Thai government in terms of "Direction", "Regulation", "Extension", "Promotion", and "International Negotiation"; The section of "Supply Chain in China" covers the components of "Cross Border Logistics", "Import", "Wholesale", "Retail", and "Consumption", complemented by the role of the Chinese government in terms of "Direction", "Regulation", "Taxation", "Facilitation" and "International Negotiation".

Table 2.1 Components and Mechanism of the Supply Chain of Thai Fruit in China

Components of Supply Chain										
R&D	Input For Production	Farming	Collection	Processing	Export	Cross Border Logistics	Import	Whole sale	Retail/ Delivery/ Support	Consumption
Government Regulation & Support of Thailand						Government Regulation & Support of China				
Mechanism of Supply Chain										
What			Who			How			Observation	

Source: CASPIM

Table 2.2 Anatomy of the Supply Chain of Thai Fruit in China

A	Supply Chain Thailand	I	R&D
		II	Input for Production
		III	Farming
		IV	Collection
		V	Processing
		VI	Export
B	Supply Chain in China	I	Cross Border Logistics
		II	Import
		III	Wholesale
		IV	Retail
		V	Consumption
C	Government of Thailand	I	Direction
		II	Regulation
		III	Extension
		IV	Promotion
		V	International Negotiation
D	Government of China	I	Direction
		II	Regulation
		III	Taxation
		IV	Facilitation
		V	International Negotiation

Source: CSAPIM

2. Supply Chain in Thailand

2.1 R&D

What

The key functions of R&D include:

- 1) Breeding program for disease-tolerant cultivars with good quality and high yield;
- 2) Research and development of better and suitable technology and good practices in pre and post-harvest management.

Who

The functions above are carried out by:

- 1) Specialized research institutes for fruits, i.e., Regional Horticultural Research Institute (HRI) and provincial and local Agricultural Research Centers under Department of Agriculture (DOA) of Ministry of Agriculture and Cooperatives (MOAC) (Table 2.3);
- 2) Learning Centers or local offices of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) in every district;

- 3) Research programs in universities and research institutes supported by major national funding agencies such as Agricultural Research & Development Agency (ARDA), National Research Council of Thailand (NRCT), National Science and Technology Development Agency (NSTDA), and Thailand Institute of Scientific and Technological Research (TISTR) (Table 2.3);
- 4) Private companies and farmers with their own R&D activities.

Table 2.3 Horticultural Research Institute & National Funding Agency for Fruit Research

Funding Agency for Fruit Research		Horticultural Research Institute (HRI) under Department of Agriculture (DOA)	
ARDA	Agricultural Research Development Agency	Region	Fruit crops
NRCT	National Research Council of Thailand	Northern region Chiang Rai Horticultural Research Center	Mango, longan, lychee, tangerine
		Chiang Mai Royal Horticultural Research Center	Longan, peach, plum, Chinese apricot, pear, macadamia, Arabica coffee
NSTDA	National Science and Technology Development Agency	Northeastern region Loei Horticultural Research Center	Macadamia, strawberry, peach, persimmon, pear, Arabica coffee
		Srisaket Horticultural Research Center	Papaya, cashew nut, mango, grape, tamarind
TISTR	Thailand Institute of Scientific and Technological Research	Upper central region Sukhothai Horticultural Research Center	Mango, marium plum, lime, pummelo, banana
		Eastern region Chanthaburi Horticultural Research Center	Durian, mangosteen, rambutan, longkong and Genus Salacca
		Southern region Chumphon Horticultural Research Center	Aromatic coconut, cacao, Robusta coffee, pineapple
		Trang Horticultural Research Center	Durian, Aromatic coconut, longkong, pummelo, neck orange, mangosteen

Source: Lop Phavaphutanon 2014: FRUIT PRODUCTION, MARKETING AND RESEARCH AND DEVELOPMENT SYSTEM IN THAILAND

Figure 2.1 Selected Examples of R&D



Source: CASPIM

How

The key functions of R&D are fulfilled through the following process:

- 1) R&D output generated in research programs with government funding;
- 2) R&D output transferred and promoted through Provincial Agricultural Research Centers and Learning Centers or local offices of DOAE;
- 3) Farmers and private companies adopt the R&D output, sometimes with their own adaptation and innovation.

Observation

On the positive side:

- 1) The government-funded research programs yield new fruit cultivars, for example, new durian cultivars of Chanthaburi 1-10 from Agricultural Research Center in Chanthaburi. (Figure 2.1);
- 2) There are also visible activities of District Learning Centers. For example, Learning Center in Prachuap for pineapple; and Learning Center in Narathiwat for long kong (Figure 2.1);
- 3) Young farmers are active in their own R&D activities; for example, farmer Yoongyut's innovation on pomelo planting technique (Figure 2.1).

The government-funded research programs yield new fruit cultivars, for example, new durian cultivars of Chanthaburi 1-10 from Agricultural Research Center in Chanthaburi. (Figure 2.1);

- 1) Being more responsive to market demand;
- 2) Being integrated with the innovations of farmers and private sectors;
- 3) Following up the adoption of new cultivars and technologies with continuous iteration.

2.2 Input for Production

What

The key functions of Input for Production include:

- 1) Provision of breeding materials and other agricultural supplies such as fertilizer, pesticide, and hormone;
- 2) Provision of equipment and machinery (including automation and digital equipment).

Who

The functions above are carried out by:

- 1) Commercial nurseries and sellers of other agricultural supplies;
- 2) Sellers of agricultural equipment and machinery and developers of IT applications;
- 3) Learning Centers or office of Department of Agricultural Extension (DOAE) under the Ministry of Agriculture and Cooperatives (MOAC) in every district;
- 4) Farmers and farmer organizations such as Community Enterprise, Cooperatives, and Land Collectives.

How

The key functions of Input for Production are fulfilled through the following process:

- 1) Farmers keep and develop seeds, sprouts, or grafting stocks themselves;
- 2) Farmers buy breeding materials, other agricultural supplies, equipments & machineries from commercial operators;
- 3) Farmer organizations such as Community Enterprise, Cooperatives, and Land Collectives buy breeding materials, fertilizer, pesticides, hormones in bulk at a lower price and reselling to their members;
- 4) Government provides breeding materials through Learning Centers or office of DOAE to promote new varieties;
- 5) Farmers adopt automation in field management or social media marketing applications with the assistance of IT developers and the advice of Learning Centers or office of DOAE.

Figure 2.2 Selected Examples of Input for Production

Breeding of MD2 Pineapple In Prachuap	Automation System In Farm Kehakaset	Breeding Long/Lin Laplae Durian In Uttaradit
		

Source: CASPIM

Observation

- 1) Most planting materials are provided by farmers themselves; for example, the breeding of Longlaplae and Linlaplae Durian in Uttaradit (Figure 2.2);
- 2) Community Enterprise or Learning centers play an important role in distribution of breeding materials, fertilizer, pesticide, and other chemicals;
- 3) There are visible government supports in promoting new varieties and subsidy for large agricultural machinery, for example, the breeding of MD2 Pineapple in Prachuap (Figure 2.2);
- 4) Some farms have adopted digital & automation processes in field management or social media marketing applications, “for example” automatic irrigation based on humidity sensors in Farm Kehakaset (Figure 2.2).

2.3 Farming

What

The key functions of Farming include:

- 1) Planting plan;
- 2) Water and soil management;
- 3) Pre-harvest field management;
- 4) Harvest and post-harvest handlings.

Who

The functions above are carried out by:

- 1) Small farms;
- 2) Small farms organized in Community Enterprise (วิสาหกิจชุมชน), Cooperatives (สหกรณ์) and land collectives (แปลงใหญ่).

How

The key functions of Farming are fulfilled through the following process:

- 1) Farmers plan and produce in response to price signals;
- 2) Farmers plan and produce in response to the order or farming contract of collectors, or importers/exporters;
- 3) Farmers plan and produce under the regulation and support of governments.

Observation

- 1) Farmer organizations such as community enterprise play important roles in organizing production (Figure 2.3);
- 2) New generation of Smart Farmers is leading in adopting new varieties and technology;
- 3) Some fruits with a large commercial operation, such as durian (Mon Thong), are very responsive to the price signal. Farmers tend to harvest earlier or cater for the festival periods in China;
- 4) Contract farming with a fixed price may not work if the contract price deviates from the ongoing market price. A better method is to contract for the quantity and determine the price later based on current market situations.

Figure 2.3 Selected Examples of Farming



Source: CASPIM

2.3 Collection

What

The key functions of Collection include:

- 1) Collecting fruits from individual farms;
- 2) Separation of fruits in different grades;
- 3) Simple packaging;
- 4) Delivery to processors or exporters.

Who

The functions above are carried out by:

- 1) Local collectors with permanent establishments such as cold storage;
- 2) Seasonal collectors coming during the harvest time;
- 3) Farmer organizations such as community enterprise;
- 4) Processors and exporters/importers themselves.

How

The key functions of Collection are fulfilled through the following process:

- 1) Farmers sell fruits to collectors;
- 2) Collectors separate fruits in different grades with simple packages in the packing house;
- 3) Collectors deliver the graded packages to processors or exporters.

Observation

- 1) Farmer organizations such as community enterprise play important roles in the collection (Figure 2.4);
- 2) If the market is not competitive, collectors affiliated to exporters/ importers may have more bargaining power as they may collude to set the price and purchasing quantity while farmers have no choice but to sell the perishable fruits in a short time;
- 3) Farmers nowadays are better informed about market and take quick reactions thanks to the mobile applications;
- 4) An auction market for fruit like those in Taiwan may be an alternative;
- 5) Some farmer organizations, such as community enterprises, may have difficulty to be certified as a packing house for export, as an extra investment is needed to apply for GMP.

Figure 2.4 Selected Examples of Collection



Source: CASPIM

2.5 Processing

What

The key functions of Processing include:

- 1) Simple processing (such as trimming or polishing coconut or freezing durian);
- 2) Deep processing (such as making coconut pudding, durian paste, or preserved tamarind).

Who

The functions above are carried out by:

- 1) Fruit processing factories;
- 2) Collectors or Exporters who have fruit processing capacities.

How

The key functions of Processing are fulfilled through the following process:

- 1) Fruit processing factories receive fruits from collectors;
- 2) Fruit processing factories (or, in some cases, collectors or exporters who have fruit processing capacities) transform fruits for easy consumption, longer preserving period or meeting the demand of consumers for better taste or nutrition function;
- 3) Fruits are processed under the regulation and support of governments;
- 4) Processed fruits are delivered to exporters.

Observation

- 1) Innovative processed products and packaging may be the key for Thai fruits to increase their value-added and capture more premium market;
- 2) There are many successful cases of young entrepreneurs. However, some traditional processing methods may need to be adjusted for the taste of Chinese consumers, for example, less sugar content (Figure 2.5).

Figure 2.5 Selected Examples of Processing



Source: CASPIM

2.6 Export

What

The key functions of Export include:

- 1) Buying in Thailand and selling in China;
- 2) Participate in forming prices in the market.

Who

The functions above are carried out by:

- 1) Thai export companies;
- 2) Chinese importers using Thai nominees;
- 3) Thai collectors or processors;
- 4) Thai farmers or farmer organizations.

How

The key functions of Export are fulfilled through the following process (Table 2.4):

- 1) Exporters are registered with Department of International Trade, Ministry of Commerce (MOC), Thailand;
- 2) Exporters negotiate with importers for a contract;
- 3) Exporters buy fruits from collectors or processors;
- 4) Exporters send sample products to Department of Agricultural Extension, Ministry of Agriculture and Cooperatives (MOAC), Thailand, to get Plant Disease-free Certificate;
- 5) Exporters assist importers in getting import authorization with Certificate of Disease, Pesticide Residue or Insect issued by Department of Agriculture, MOAC;
- 6) Exporters get Customs clearance from the Customs Department of Thailand;
- 7) Exporters deliver to importers through Cross Border Logistics.

Observation

- 1) Exporters are organized in Thai Fresh Fruit Traders and Exporters Association and Durian and Mangosteen Exporter Association (DMA) (Figure 2.6);
- 2) Higher competition among the Exporters drives up the buying price in Thailand and depresses the selling price in China. A higher price is good for Thai farmers, but it raises the issue of sustainability;
- 3) Exporters with Chinese backgrounds are driving out the Thai exporters due to their better connections in the Chinese market, and big capital (with large investors aiming the profit in its eventual IPO);
- 4) There may be legal and tax issues between the Thai nominees and their Chinese boss. It is also difficult to maintain the quality on a large scale;
- 5) About 80% of Thai fruit exporters are OEM for Chinese importers, 15% have their own brands;
- 6) There are attempts for direct dealing with Chinese importers by farmers and farmer organizations, however, without sustainable success.

Table 2.4 Export Procedure & Documentation in Thailand

	Step	Issued by	Evidence Required	Certificate
1	Exporter permission	Dept of International Trade, MOC	VAT registration	Exporter's ID card
2	Export authorization	Dept of Agricultural Extension, MOAC	Sample products	Plant disease-free certificates
3	Import authorization	Dept of Agriculture, MOAC	Sample products	Certificate of disease, pesticide residue or insect
4	Customs clearance	Customs Department.	Invoice Packing list	Thai Customs Form 101

Source: https://www.thaitpi.com/article_view.php?atid=182

Figure 2.6 Selected Examples of Export



ource: CASPIM

3. Role of Thai Government

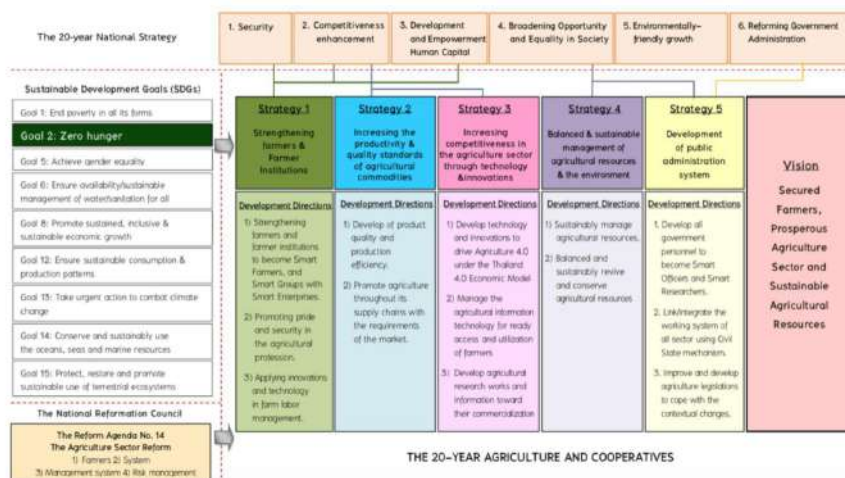
3.1 Direction

What

The key functions of Direction include:

- 1) Agricultural and cooperative strategy (2017-2036) with a vision for "Secured Farmers", "Prosperous Agricultural Sector" and "Sustainable Agricultural Resources" (Figure 2.7);
- 2) Forming and implementing "Fruit Board Strategies" (Table 2.5) with the directions focused on both quantity and quality of fruit production, with the measures for demand and supply in the process of "before harvest", "during harvest," and "after harvest" (Table 2.6).

Figure 2.7 Agricultural and Cooperative Strategy (2017-2036)



Source: MOAC, Thailand

Who

The functions above are carried out by:

- 1) Fruit Board, chaired by the Minister of Agriculture and Cooperatives, participated by Ministry of Agriculture and Cooperatives (MOAC), Ministry of Commerce (MOC) and working groups at the provincial level;

- 2) Related organizations of Ministry of Agriculture and Cooperatives (MOAC) (Table 2.7) in the clusters of operational, product development, resources management, and farmers and cooperatives development;
- 3) Related organizations of Ministry of Commerce (MOC), especially Department of International Trade Promotion (DITP); Department of Intellectual Property (DIP); Department of Internal Trade (DIT), and Department for Trade Negotiation (DTN).

Table 2.5 Fruit Development Strategy

<u>Fruit Development Strategy (2010 to 2014):</u> Increase production efficiency and quality. Expanding of off-season production, proper post-harvest management, & new cultivars Network of production and marketing, empowering of fruit grower groups Develop domestic market system, promote fruit consumption, control fruit importation, Logistics development, fruit distribution center Introduce Thai fruit to the world through different exhibitions
<u>Fruit Development Strategy (2022 to 2026):</u> Increase the capacity of fruit production management, & improve fruit products standards Improve the competitive capacity of production and marketing with technology and innovation Create strength and equality for farmers and fruit institutions in Thailand Manage resources sustainably and eco-friendly

Source: MOAC, Thailand

How

The key functions of Direction are fulfilled through the following process:

- 1) Production and marketing information are collected by the members of the Fruit Board at the national and provincial level;
- 2) Strategy and directions are formulated by the Fruit Board;
- 3) Strategy and directions are adjusted and implemented by the members of the Fruit Board at the national and provincial levels.

Observation

- 1) The government direction led by the Fruit Board (Figure 2.8) is overall effective and impressive, for example, in the management of quality and dealing with the cross border logistic crisis during the Covid-19 pandemic;
- 2) The government's direction is manifested in the government's role of Regulation (section 3.2), Extension (section 3.3), Promotion (section 3.4), and International Negotiation (Section 3.5).

Table 2.6 Direction for Fruits Board 2021-2023

Direction for Fruits Board 2021-2023	
Principle for 2021-2023	Have clear production data for linking the onsite and online market Each province manages fruits by itself completely
Measure for Quality	Knowledge and skill for fruits in and out season GAP & Standard for Fruits
Measure for Quantity	Balancing demand and supply MOAC data of supply & MOC data for demand (planting area condition, variety, output, grade, time to market) Provincial level หน่วยงาน adjust supply to demand, Peak time fair price: cost +30% profit
Process	Before Harvest: MOAC: Fruits out season, Quality, Small farms & big field. Forecast MOC: link buyers with sellers During Harvest: MOAC: Harvest target, Communication with consumers, Detect and punish product with less quality, Procession, Collect, separate levels of quality, set up tracing back system, online link to production MOC: distribution, buyer following law, export promotion, new market, online channel After Harvest: evaluation & plan

Source: MOAC, Thailand

Table 2.7 Fruit-Related Organizations in MOAC

Operational Cluster	Product Development Cluster	Agricultural Resources Management Cluster	Farmers & Cooperatives Production & Development Cluster
Office of the Permanent Secretary	Department of Agriculture	Royal Irrigation Department	Cooperatives Promotion Department
Office of Agricultural Economics		Land Development Department	Cooperative Auditing Department
National Bureau of Agricultural Commodity and Food Standards		Department of Royal Rainmaking and Agricultural Aviation	Department of Agricultural Extension
		Agricultural Land Reform Office	

Source: <https://www.moac.go.th/moaceng-organization>

Figure 2.8 Selected Examples of Direction



Source: CASPIM

3.2 Regulation

What

The key functions of Regulation include:

- 1) Set up standards and issue certificate to improve productivity, efficiency, and quality;
- 2) Set up standards and issue certificate to reduce unnecessary use of pesticides and other chemicals.

Who

The functions above are carried out by:

- 1) National Bureau of Agricultural Commodity Food Standards (ACFS), MOAC;
- 2) Department of Agriculture (DOA), MOAC;
- 3) Department of Agricultural Economics (DOAE), MOAC.

How

The key functions of Regulation are fulfilled through the following process:

- 1) ACFS sets up & publishes Thai Agricultural Standard (TAS) (Table 2.8);
- 2) DOA inspects & issues certifies of Good Agricultural Practices (GAP) (Table 2.9), Good Manufacturing Practice (GMP) (Table 2.10);
- 3) DOAE issues the harvest date of durian to prevent pre-mature harvest;
- 4) For fruit export, DOA conducts exporter registration, inspects & issues Phytosanitary Certificate (PC) against pests, contamination, or diseases and Health Certificate (HC) against chemical residuals and heavy metals such as sulfur dioxide.

Table 2.8 Thai Agricultural Standard (TAS)

Fruits	TAS Code
Aromatic Coconut	TAS 15-2007
BANANAS	TAS 6-2005
DURIAN	TAS 3-2013
LONGANS	TAS 1-2003
Longkong	TAS 11-2006
MANGO	TAS 5-2015
MANGOSTEEN	TAS 2-2013
PINEAPPLES	TAS 4-2003
Pomelo	TAS 13-2007
Rambutan	TAS 12-2006
Rose apple	TAS 17-2011
Sweet Tamarind	TAS 23-2014

Chapters in TAS (the case of MANGOSTEEN)	
1	SCOPE
2	QUALITY
3	SIZING
4	TOLERANCES
5	PACKAGING
6	MARKING AND LABELLING
7	CONTAMINANTS
8	PESTICIDE RESIDUES
9	HYGIENE
10	METHODS OF ANALYSIS
A1	ILLUSTRATIONS

Source: TAS2GO

Table 2.9 Good Agricultural Practices (GAP)

Good Agricultural Practices (GAP) REQUIREMENTS		
1	Water	Water used in planting area
		Water used for hydroponics
		Water used for post-harvest practices
2	Planting area	Contamination risk, soil degradation
3	Pesticides	Recommended pesticide and spraying methods
4	Pre-harvest quality management	Production control plan
		Production Inputs: Seeds, Fertilizers, Tools, Disposals
5	Harvest and post-harvest handlings	Appropriate harvesting period, grading, equipment
6	Holding, moving and storage	Prevention of contamination
7	Personal hygiene	Personal hygiene facilities & knowledge
8	Record keeping and traceability	Documentation, Traceability & Verification

Source: TAS 9001-2013

Table 2.10 Good Manufacturing Practice (GMP)

Good Manufacturing Practice (GMP) REQUIREMENTS		
1	Establishment	Location & Premises
		Tools and equipment
		Facilities
2	Control of Operation	Raw material & Containers
		Production process
		Water
		Management and supervision
		Product recall
		Documentation and record keeping
3	Maintenance and sanitation	Maintenance and sanitation program
		Maintenance & Cleaning
		Pest control & Waste management
4	Personal hygiene	Personal hygiene procedures.
5	Transportation	Prevent contamination and deterioration in transport
6	Labelling	Compliance with relevant laws and regulations
7	Training	Training on food hygiene

Source: TAS 9035-2010

Observation

- 1) Thailand is successful in meeting the requirement of importing countries with its system of standard and certification (Figure 2.9);
- 2) GAP & GMP gain popularity, especially for farmers aiming at the export market;
- 3) The strict policy for the harvest date of durian helped to ensure the export quality;
- 4) Strict measures and extra certificate of Covid test and disinfection helped to boost the export during the period of the pandemic;
- 5) More efforts may be necessary for response to the concern for reliance on chemicals for out-of-season harvesting and pest control.

Figure 2.9 Selected Examples of Regulation



Source: CASPIM

3.3 Extension

What

The key functions of Extension include:

- 1) Strengthen the capacity of farmers and farmer organizations such as community enterprises in producing according to the market needs;
- 2) Transfer appropriate agricultural technologies and provide agricultural services.

Who

The functions above are carried out by:

- 1) Department of Agricultural Extension (DOAE), MOAC;
- 2) Provincial and district offices and their learning centers of DOAE.

How

The key functions of Extension are fulfilled through the following process:

- 1) Provincial and district offices and their learning centers of DOAE carry out extension programs;
- 2) Farmers or farmer organizations such as land collectives, community enterprises, and cooperatives participate in the programs catering to various groups such as "young smart farmers", "offsprings of farmers", "agricultural labors", etc., in facilities such as "learning centers".

Observation

- 1) There is a clear strategy at the national level DOAE and various extension programs at the local level DOAE offices or learning centers (Figure 2.10);
- 2) There are visible efforts and results of the extension programs in terms of financial and technological support for maintaining quality standards, improving fruit variety, and reducing cost;
- 3) The farmers are encouraged to register their farms in a smartphone application, such as Farm Book and Farm Forecast to receive specific guidance.

Figure 2.10 Selected Examples of Extension at National and Local Level



Source: CASPIM

3.4 Promotion

What

The key functions of Promotion include:

- 1) Promoting awareness of Thai fruits in online and offline channels;
- 2) Business matching for Thai exporters and Chinese importers;
- 3) GI (Geographic Identification) for marketing advantage.

Who

The functions above are carried out by:

- 1) Department of International Trade Promotion (DITP), MOC;
- 2) Provincial offices for Commercial Affairs under the MOC;
- 3) Department of Intellectual Property (DIP), MOC;
- 4) Department of Internal Trade (DIT), MOC.

How

The key functions of Promotion are fulfilled through the following process:

- 1) The Fruit Board sets out the general strategy and coordinates the promotion activities;
- 2) DITP conducts activities to promote awareness of Thai fruits and business matching through Thai fruit exhibitions in China, flagship shops in online platforms such as Tmall, and activities in modern trade outlets;
- 3) Provincial offices for Commercial Affairs mobilize the farmers and farmer organizations to export;
- 4) DIP certifies fruits with GI. (Table 1.1). Farmers & traders in the geographic location may register for GI, valid for two years;
- 5) DIT sets up Farm Outlets for domestic trade.

Observation

- 1) DITP is very active in its promotion activities in China (Figure 2.11 and Table 2.11). It may extend its efforts in monitoring and predicting the need and behavior of Chinese consumers and communicate the information in the entire supply chain;
- 2) Provincial office for Commercial Affairs (Figure 2,11) has little involvement in international promotion due to budget constraints. The problem may be solved with more online meetings with wider local participation.

Figure 2.11 Selected Examples of Promotion





Source: CASPIM

Table 2.11 Marketing Plan of DITP

2020 Marketing Plan Online: OBM (Online Business Matching) 4 times Offline: Thai Fruit Golden Month 8 DITP Offices (Nanning, Qingdao, HK, Chengdu, Shanghai, Xiamen, Guangzhou, Kunming) 12 times in 11 cities: (Nanning, Qingdao, HK, Chengdu, Chongqing, Xian, Shanghai, Xiamen, Guangzhou, Shenzheng, Kunming) 816 mil baht Popular products: Coconut, Durian, Mangosteen, Pomelo, Rose apple, Jackfruit, Pineapple, Mango, Longan, Sugar apple, Rambutan, Banana Kluai khai, Durian flavored dessert, Fruit juice, Dried & Crispy Fruit, Crispy desert New potential: Dates
2021 Marketing Plan: Online: OBM, M&M (Mirror & Mirror): CIIE & Online negotiation Tmall Flagship store: Life stream, Net Idol, KOL Offline: Modern Trade: Chongqing, Xian, Harbin, Tianjin, Xiamen, Nanning, Baise, Shanghai, Beijing, Guangzhou Zhongshan Top Thai Brand Kunming 2021, China ASEAN Expo Thai Fruit Golden Month 13 cities Nanning, Changsha, Wuhan, Qingdao, Dalian, Chengdu, Chongqing, Beijing, Xiamen, Nanchang, Foshan, Zhanjiang, Kunming Hybrid: THAIFEXporter Virtual Trade Show (THAIFEX AUNGA 2021) 500 (30-40 fruit related) supplier, 200-300 importers

Source: DITP

3.5 International Negotiation

What

The key functions of International Negotiation include the following:

- 1) FTA (Free Trade Area) with China;
- 2) Fruit market access;
- 3) Sanitary and Phytosanitary (SPS) requirements.

Who

The functions above are carried out by:

- 1) Department of Trade Negotiation (DTN), MOC;
- 2) National Bureau of Agricultural Commodity Food Standards (ACFS), MOAC

How

The key functions of International Negotiation are fulfilled through the following process:

- 1) DTN negotiates on FTA Agreement which reduces the tariff of Thai fruits import in China;
- 2) ACFS negotiates with GACC (General Administration of Customs China) on market access and SPS (Sanitary and Phytosanitary Measures) requirements leading to related protocols

Observation

- 1) Thai fruits enjoy 0% tariff under the CAFTA (China ASEAN Free Trade Area);
- 2) ACFS (Figure 2.12) has secured market access for 22 Thai fruits (fresh/chilled/frozen) in China (Table 1.2). Other fruits are under negotiation through JTC-SPS (Joint Trade Committee-Sanitary and Phytosanitary Measures) (Table 2.12);
- 3) ACFS also reached agreements with GACC in protocols for exchanging GAP and GMP information on Thai selected fruits, and protocols on land transportation through third country, including specified routes and border checkpoints. (Table 2.12);

- 4) More border checkpoints for Thai fruits by land transportation were opened to deal with the problems of traffic jam during the Covid-19 pandemic;
- 5) There is a grievance of Thai exporters for the recent practice of CCIC, a Chinese company registered in Thailand to conduct pre-inspection for Thai fruits entering China.

Figure 2.12 Selected Examples of International Negotiation



Source: CASPIM

Table 2.12 Market Access & Protocols For Thai Fruit Export to China

Permitted List	22 Fruits: fresh/chilled/frozen (-18C) 31 Fruits: Dried as processed, Canned & Juice under food safety regulation
Market Access	Outside 22 fruits , need to apply market access, takes about 2 years JTC-SPS set up 2004, meet every 2 years
Protocol 1 & 2	Protocol 1 (2004): 5 fruits information on GAP, GMP Protocol 2 (2015): Rose apple added Now mango, durian, longan, lychee and mangosteen, Rose apple, Banana, Pineapple, Coconut, Jackfruit
Protocol on land transportation through third country	R9 (2009), R3A (2011) From 2020 onwards, any route 10 border checkpoints in China: Mohan 磨憨, Youyi Guan 友谊关, Dongxing 东兴, Pingxiang rail 凭祥铁路, Longbang 龙邦, Shuikou 水口, Hekou, 河口 Hekou rail 河口铁路, Tianbao 天保, Mohan rail 磨憨铁路 6 border checkpoints in Thailand: Chiang Khong 清孔, Mukdahan 穆达汉, Nakhon Phanom 那空帕农, Bueang Kan 汶干, Nong Khai 廊开, Banpuggard (Chanthaburi) 班帕卡

Source: ACFS

4. Supply Chain in China

4.1 Cross-Border Logistic

What

The key functions of Cross Border Logistics include:

- Cross border transportation and warehousing by land;
- Cross border transportation and warehousing by rail;
- Cross border transportation and warehousing by sea;
- Cross border transportation and warehousing by air.

Who

The functions above are carried out by:

- 1) Thai or Chinese operators by land;
- 2) Rail operators in Laos, Vietnam, and China;
- 3) International shipping companies;
- 4) Thai or Chinese airlines.

How

The key functions of Cross Border Logistics are fulfilled through the following process:

- 1) By land: leave from 6 border checkpoints in Thailand and enter 10 border checkpoints in China through Laos or Vietnam (Figure 2.13);
- 2) By rail: through the Vietnam-China railway and enter Pingxiang and Hekou in China, or through the Laos-China railway and enter Mohan in China;
- 3) By sea: leave from Lat Krabang seaport in Thailand and enter major ports in China, such as Shekou, Nansha, Zhanjiang, Qinzhou, Xiamen, Shanghai, Xingang, Qingdao, Dalian, and Fuzhou;
- 4) By air: leave from Bangkok to major cities in China such as Guangzhou, Shenzhen, Kunming, Chongqing, Beijing, Hangzhou, Shanghai, Nanning, Chengdu, and Changsha.

Observation

- 1) In comparison, by air can reach any Chinese city within one day, but maybe 7-8 times of the cost by sea. It takes the ships 4-7 days from Lat Krabang to major ports in China. Transportation in containers by truck takes about 2-3 days. Transportation in containers by rail costs 30%-50% less than by truck (Table 2.13);
- 2) Laos-China railway opened to traffic on December 3, 2021. It delivered the first batch of Thai fruits on April 1, 2022. Mohan checkpoint started operations on December 3, 2022. Thai fruits may utilize this railway to reach Kunming from Rayong in 4-5 days (Figure 2.14);
- 3) Due to the impacts of Covid 19, the volume proportion of land transport decreased from 48% in 2021 to an expected 40% in 2022, sea transport increased from 52% to 55%, while air transport jumped from less than 1% to 5%;
- 4) The shock of logistic breakdown came from congestion at the border checkpoints in early 2021. The situation improved gradually thanks to the cooperation between China and Thailand. On the Chinese side: higher passthrough efficiency with Drop and Pull Transport (甩挂) method, fruit green channel, and 7x24 customs clearance by appointment; On the Thai side: certification of Covid test and disinfection covering each step of the supply chain with a 2P2S (people, process, system & structure) mechanism;
- 5) On January 8, 2023, China announced the ending of the Zero Covid Policy (ZCP) and related draconian SPS procedure at the border checkpoints.

Figure 2.13 Border Checkpoints for Thai Fruit Export to China



Guangxi 3		Yunnan (1)	
2020	Land: 1 Youyiguan (Congzuo) Quốc tế Hữu Nghi Lạng Sơn 越山省友谊口岸	Rail/Land: 4 Pingxiang (Congzuo) Đồng Đăng Lạng Sơn 越山省同登	Land: 3 Dongxing (Fangchenggang) Móng Cái 广宁省芒街
Guangxi 2		Yunnan (4)	
2021	Land: 8 Longbang (Baize) Cửa khẩu Trà Lĩnh 高平省茶岭	Land: 10 Shuikou (Congzuo) Cửa khẩu Tà Lũng 高平省驮陵	Land/Rail: 6 7 Hekou (Honghe) Thành phố Lào Cai 老街省老街
Chiang Khong 1		Mukdahan 4	
Nakhon Phanom 3		Bueng Kan 2	
Nong Khai 6		Banpuagard 5	
R3A: Mohan		R9: Youyiguan	
R12: Youyiguan		New: Dongxing	
-		rail: Mohan	
-		-	

Source: <https://www.tap-magazine.net/blog-cn/mov64-1>

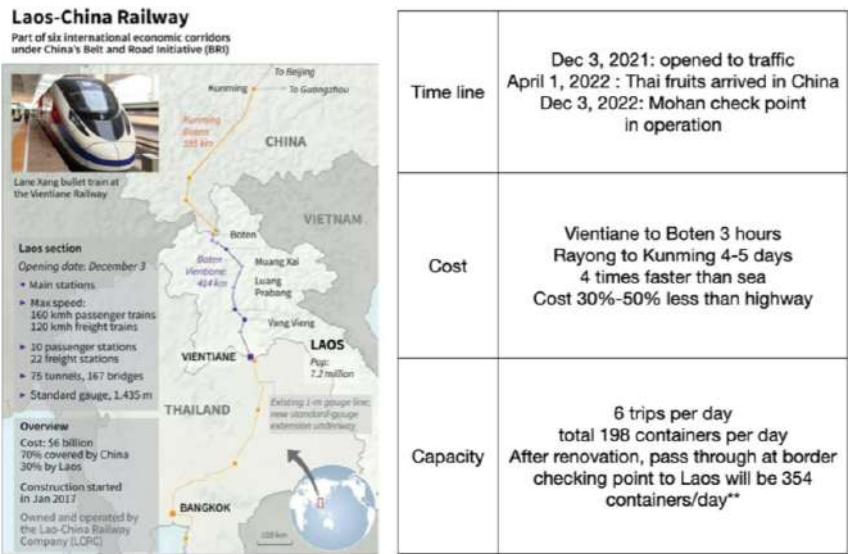
Graph Credit: TAP

Table 2.13 Logistic Modes in Comparison

Mode	Proportion*	Major Border Check Points In China	Travel Time	Cost**
Land	48% (2021) 40% (2022 plan)	Yuyiquan, Mohan Pingxiang, Dongxing Wanding	2-3 days	\$14/kg R3A \$22/kg R12
Rail		Pingxiang, Mohan, Hekou	3 hrs Vientiane-Boten 4-5 days Rayong-Kunming	30%-50% less than highway
Sea	52% (2021) 55% (2022 plan)	Shekou, Nansha, Hongkong, Zhanjiang, Qinzhou, Xiamen, Shanghai, Xingang, Qingdao, Dalian, Fuzhou	4-7 days From Lat Krabang to major ports	\$12/kg Lat Krabang to Shanghai
Air	<1% (2021) 5% (2022 plan)	Guangzhou, Shenzhen, Kunming, Zhengzhou Chongqing, Beijing, Hangzhou, Shanghai, Nanning Chengdu, Changsha	5 days from tree to table	\$65/kg (7-8 times of sea)

Source: CASPIM

Figure 2.14 Laos-China Railway



Source: <https://southeastasiabackpacker.com/laos-china-railway/>

Graph Credit: AFP

4.2 Import

What

The key functions of Import include:

- 1) Import in the form of general international trade;
- 2) Import in the form "Haitao" (shopping overseas) as an alternative to general international trade, especially in the form of "cross border retailing e-commerce import."

Who

The functions above are carried out by:

- 1) Licensed Chinese importers in general international trade;
- 2) Operators in "Haitao", especially cross border retailing e-commerce importers In China (Table 2.14).

How

The key functions of Import are fulfilled through the following process:

- 1) In the case of general trade: a) It is conducted by a licensed importer in the form of international trade involving multilevel channels, regulated by general rules of international trade (Table 2.15); b) An importer buys the product, which is distributed through wholesalers and retailers after the customs clearance, before being purchased by customers; c) The importer bears tariff, VAT, and Consumption Tax (if relevant);
- 2) In the case of cross border retailing e-commerce import: a) It is conducted on a B2C or C2C cross border retailing e-commerce platform; b) A customer orders the product on a platform. The importer prepares and delivers the product according to the order; in some cases stored in the bonded warehouse in the importing country; c) The tariff, VAT and Consumption Tax is charged at 70% of the normal level for a customer within his personal quota.

Observation

- 1) In the case of general trade: An importer takes a risk and charges a premium. There is profit margin for various levels of channels. Thai fruits may have a higher price for Chinese consumers. However, there is unlimited scope in both online or offline channels, and no personal quota for a customer;
- 2) In the case of cross border retailing e-commerce import: An importer prepares a product based on order, with less risk. There is no profit margin for extra levels of channels. Together with a lower cost of tariff, VAT, and Consumption Tax, Thai fruits may have a lower price for Chinese consumers (Figure 2.15). However, there are limited items in the approved list by the government. Some platforms are particularly cautious in selecting fruits and fruit importers. There is also a limitation of ¥5000 per transaction, and ¥26000 per person per year, as a personal quota if a customer would like to benefit from the lower taxes;
- 3) The Chinese importers of Thai fruits are, in many cases, the bosses of Thai exporters with Chinese background. Besides import and export, large Chinese importers also extended to other steps of the supply chain, such as farming, collection, and processing in Thailand and wholesale and retail in China (Session 4.4).

Table 2.14 Operators in Haitao

Category			Example
Haitao	Cross border retailing e-commerce importer In China	B2C	天猫国际 TMall 考拉海购 kaola
		C2C	全球购 taobao 抖音全球购 Tik Tok
	Cross border retailing e-commerce operators overseas		taihaitao.com lotuss.com
	Procurement service agents		Individuals
	Tourists shopping overseas		Individuals

Source: CASPIM

Figure 2.15 Cross Border Retailing e-Commerce Importer In China and Thailand



Source: CASPIM
 Graph Credit: 1) news.sina.cn; 2) douyin.com; 3) taihaitao.com; 4) cifnews.com

Table 2.15 Import Procedure & Documentation in China

	Step	Issued by	Major Evidence Required	Certificate
1	Fruit Import Permission	GACC	Business license Filing for international trade Other related documents	Fruit Import license
2	Fruit Quarantine Approval	GACC	Plant disease-free certificates, Certificate of disease, pesticide residue or insect issued by MOAC, Thailand	Quarantine License Valid for 6 months
3	Customs Clearance	GACC	Quarantine License Certificate of ROO Customes Declaration	Certificate of Inspection and Quarantine Customs clearance form

Source: https://www.thaitpi.com/article_view.php?atid=182

4.3 Wholesale

What

The key functions of Wholesale include:

- 1) Sale in bulk to a retailer;
- 2) Warehousing services;
- 3) Cold-chain transportation.

Who

The functions above are carried out by:

- 1) Registered Chinese wholesalers;
- 2) Warehousing services;
- 3) Cold-chain transporters.

How

The key functions of Wholesale are fulfilled through the following process:

- 1) Purchase fruits from importers;
- 2) Storage in the warehouse;
- 3) Distribution to retailers through online and offline platforms;
- 4) Cold-chain transportation.

Observation

- 1) The major national wholesale markets of fruit in Mainland China include: Guangzhou Jiangnan Fruit & Vegetable Market in Guangdong Province, Jiaxing Fruit Market in Zhejiang province and Shanghai Huizhan Fruit & Vegetable (Figure 2.16);
- 2) They are supported by around 40 regional markets, such as Xinfadi for Beijing; Shijiazhuang Qiaoxi for Northern China; Dalian Fruit for the Northeast, Xi'an Yuren Fruit for the Northwest; Zhengzhou Wanbang and Changsha Hongxing for the Central; Xiamen Zhongpu Fruit for the East; Shenzhen Higreen for the Southern, and Chongqing Double Blessing for the Southwest China (Table 2.16, Figure 2.16).

Table 2.16 Major Fruit Wholesale Market in Mainland China

Provincial Unit	Chinese Name	Short Name In English
Beijing	北京新发地市场	Beijing Xinfadi
Tianjin	天津红旗农贸批发市场	Tianjin Hongqi
Hebei	石家庄桥西水果批发市场	Shijiazhuang Qiaoxi Fruit
Shanxi	太原河西水果批发市场	Taiyuan Hexi Fruit
Liaoning	沈阳八家子水果批发市场	Shenyang Bajiazi Fruit
Liaoning	大连水果批发市场	Dalian Fruit
Jilin	长春地利水果批发市场	Changchun Dili Fruit
Heilongjiang	哈尔滨哈达水果批发市场	Harbin Hada Fruit
Shanghai	上海西郊国际农场品交易中心	Shanghai Xijiao
Shanghai	上海展展果蔬	Shanghai Huizhan Fruit & Vegetable
Jiangsu	南京众彩物流农副产品中心	Nanjing Zhongcai
Zhejiang	嘉兴水果市场	Jiaxing Fruit
Zhejiang	浙江金华农产品批发市场	Zhejiang Jinhua
Zhejiang	杭州果品集团	Hangzhou Fruit
Anhui	合肥周谷堆水果批发市场	Hefei Zhougudui Fruit
Fujian	福州海峡农副产品中心	Fuzhou Haixia
Fujian	厦门中埔水果批发市场	Xiamen Zhongpu Fruit
Jiangxi	南昌深圳农产品批发市场	Nanchang Shenzhen
Shandong	济南堤口水果市场	Jinan Dikou Fruit
Shandong	青岛东方鼎盛水果市场	Qingdao Dongfang Dingxin Fruit
Henan	郑州万邦国际农产品物流城	Zhengzhou Wanbang
Hubei	武汉光露水果批发市场	Wuhan Guangxia Fruit
Hunan	长沙红星农副产品大市场	Changsha Hongxing
Hubei	武汉光露水果批发市场	Wuhan Guangxia Fruit
Hunan	长沙红星农副产品大市场	Changsha Hongxing
Guangdong	广州江南果菜批发市场	Guangzhou Jiangnan Fruit & Vegetable
Guangdong	深圳海吉星	Shenzhen Higreen
Guangdong	东莞下桥水果批发市场	Dongguan Xiaqiao Fruit
Guangxi	南宁海吉星水果市场	Nanning Higreen Fruit
Hainan	海口南北水果批发市场	Haikou Nanbei Fruit
Chongqing	重庆江津双福水果市场	Chongqing Double Blessing Fruit
Sichuan	成都濠阳水果批发市场	Chengdu Mengyang Fruit
Yunnan	昆明金马正昌水果批发市场	Kunmin Jinma Zhengchang Fruit
Guizhou	贵阳花溪石板水果批发市场	Guiyang Huaxi Shibai Fruit
Inner Mongolia	呼和浩特美通水果批发市场	Hohhot Meitong Fruit
Ningxia	银川新世纪水果批发市场	Yinchuan Xinsiji Fruit
Qinghai	青海高原水果批发市场	Qinghai Gaoyuan Fruit
Shanxi	西安雨润水果批发市场	Xi'an Yuren Fruit
Gansu	兰州张苏滩蔬菜瓜果批发市场	Lanzhou Zhangsutian Fruit & Vegetable
Xinjiang	乌鲁木齐北园春水果批发市场	Ürümqi Belyanchun Fruit

Source: Fruit Information Centre

Figure 2.16 Major Fruit Wholesale Market in Mainland China

Guangzhou Jiangnan	Jiaxing Fruit
Guangzhou Jiangnan Fruit & Vegetable 广州江南果菜批发市场 https://www.jnmarket.net 广东省广州市增槎路926号	Jiaxing Fruit 嘉兴水果市场 http://www.jxsgsc.com 浙江省嘉兴市南湖区兴运路61号
Beijing Xinfadi	Shanghai Huizhan
Beijing Xinfadi 北京新发地市场 http://www.xinfadi.com.cn 北京市丰台区新发地	Shanghai Huizhan Fruit & Vegetable 上海辉展果蔬 http://www.huizhanmarket.com 浦新公路永南路1688号

Source: CASPIM

4.4 Retail

What

The key functions of Retail include:

- 1) Sale and deliver fruits to ultimate customers;
- 2) In a suitable amount and package, and right scenario.

Who

The functions above are carried out by (Table 2.17 & Figure 2.17):

- 1) Operators of Modern Trade (including super-market, super-market for fresh food, and modern convenience store);
- 2) Sellers in B2C and C2C e-Commerce platforms;
- 3) Operators in Agricultural Market;
- 4) Operators of Fruit Shops (including traditional fruit stalls and modern franchised fruit shops).

How

The key functions of Retail are fulfilled through the following process:

- 1) Interaction with customers on-site in Modern Trade and Fruit Shops;
- 2) Interaction with customers online on e-Commerce platforms;
- 3) Interaction with customers in New Retail: “New Retail” with the seamless merger of offline, online, logistics, and data (Figure 2.18).

Observation

- 1) The “pain points” of the retailers of Thai fruits include: a) unstable quality; b) pest and hazardous substance; c) deficiency in retail-friendly packaging (e.g. size and convenience) and d) the need for new varieties. In response, Chinese retailers have a) announced their own fruit standard classification (Figure 2.19), quality guarantee as a part of after-sale service, and initiated a system of traceability; b) developed new varieties for Chinese market; and c) promoted mixed fresh-cut fruits for convenience;
- 2) “Live streaming” is very popular supported by MCNs (Multi-Channel Network), which sign up and incubate Internet celebrities, create and distribute the content, operate the fan club, and interface with social media platforms;
- 3) One aspect to enhance the customer experience of “New Retail” is speed delivery (such as reach the home of the customer within 30 minutes in a range of 3 km) with a system of DMW (distributed mini warehouse). New retailers also build stores in the community;
- 4) The retail fruit industry in China is very competitive: the top 5 fruit retailers accounting for 3.6% of the market. They are led by PAGODA and HONGJIU. Both of them have significant presence in Thailand (Table 2.18 and Figure 2.18);
- 5) One strategy to enhance fruit export in Thailand is to construct a “Demand Driven Supply Chain” (DDSC), with better mechanisms of demand detection, communication, adaptations and collaboration at every step of the supply chain. The idea of DDSC could be realized through supply chain integration (SCI) driven by emerging leaders of importers or retailers (from both Thailand and China), which have expanded to almost every step of the supply chain, from farming to retailing and customer service;

- 6) HONGJIU and PAGODA are good cases to the point. Their roles could be described in a 5i model: 1) Information (Quick feedback from the retail end); 2) Initiation (Trigger reactions in networks of SMEs, research units, & farms); 3) Interconnection (Coordinate along the supply chain); 4) Inspection (Establish and implement the higher standard with trace back system); and 5) Investment (Bring in financial, technological, and human resources leveraging the economy of scale). These roles will be more significant in the context of digital transformation. They should also be complemented by active government regulations to protect the interests of Thai farmers and SMEs and make sure the Thai and Chinese stakeholders abide by laws and get their fair share of benefits.

Table 2.17 Channel Structure of Fruit Retailing in Mainland China

Channel	Value (¥ billion) 2021	Share	Value (¥ billion) 2016	Share
Modern Trade	454.1	42%	239.7	34%
e-Commerce	156.7	14%	27.7	4%
Agricultural Market	307.2	28%	345.4	49%
Fruit Shop	165.4	15%	89.4	13%
Total	1083.4	100%	702.2	100%

Source: CASPIM based on data from 中商情报网 ASKCI.com

Figure 2.17 Channel of Fruit Retailing in Mainland China



Source: CASPIM
 Graph Credit: 1) sohu.com; 2) m.tibet.cn; 3) kknews.cc; 4) m.huoyuan51.com

Figure 2.18 New Retail in Fruit Retailing in Mainland China



Source: CASPIM

Graph Credit: 1) inf.news; 2) sohu.com; 3) yonghui.com; 4) finance.sina.cn

Table 2.18 Leaders of Fruit Retailing in Mainland China

	HONGJIU FRUIT (洪九)	PAGODA (百果园)
Set Up	2002	2001
HQ	Chongqing	Shenzhen
IPO	HKEX IPO Sep 5 2022 HK\$19 bil	HKEX IPO Jan 16 2023 HK\$10 bil
Revenue (2021)	¥10 bil	¥10 bil
Business Model	Largest distributor of SE Asia fruits Front to Front supply chain	Top fruit retailer in China Franchise networks & membership

Source: CASPIM

Figure 2.19 Supply Chain Integration (SIC) by Leaders of Fruit Retailing

Backgrounds of HONGJIU	Backgrounds of PAGODA
The largest durian distributor in China. It bought the fruit directly from Thai orchards, processed with its local factories and distributed through its sorting centers to wholesalers and retailers in China. It acquired at least ¥2 billion from 17 external investors such as Alibaba since 2016. The gross profit margin from durian is 20.7% in 2021, compared with 15% for fruit industry on average.	The largest fruit retailer in China. It has more than 5,300 shops serving 80 million plus members in 130 cities in China. It has its own fruit standard classification for Thai fruits. In a new model of cooperation with its production bases in Thailand, the firm also helps local farmers optimize fruit varieties and enhance agricultural production skills.
Production Base of HONGJIU	Product Standard of PAGODA
	

Source: CASPIM

Graph Credit: 1) hjfruit.com; 2) pagoda.com.cn

4.5 Consumption

What

The key functions of Consumption include:

- 1) Prepare and utilize fruits as part of the diet;
- 2) Dispose of the inedible part of the fruit or the waste;
- 3) In some cases, provide feedback on the operations of the upper stream of the supply chain.

Who

The functions above are carried out by:

- 1) The customers of Thai fruits who are estimated to comprise half of the middle class in China: A typical family of 3 persons with annual disposable income between ¥100,000 to ¥500,000;
- 2) They include about 200 million people (15% of the population) or 70 million families;
- 3) They can be divided into three segments "New Entry", "Frequent User", and "Connoisseur" (Table 2.19).

How

The key functions of Consumption are fulfilled through the following process:

- 1) The customers make purchase decisions based on need and in response to the marketing a mix of retailers. Share their experience and opinions in various social media groups such as WeChat (微信) or ZhiHu (知乎);
- 2) For the segment of "New Entry": Start a trial of Thai fruits following words of mouth recommendation, or after experiencing Thai fruits in oversea travel;
- 3) For the segment of "Frequent User": Demand for convenience and shopping for value by comparing competing sources;
- 4) For the segment of "Connoisseur": Happy to pay a premium for quality and safety, and Search for specialty, exoticness, and authenticity. They are the patrons of higher-end shopping mall and specialized online store.

Observation

There are notable changes in consumer behavior due to "Higher income", "Convenience of Online & Offline Shopping", "Health Concern" and "Social Demography" (Table 2.20):

- 1) Higher income enables Chinese consumers to buy fruits in larger quantity: The average fruit consumption is more than 50kg per person per year and more than half of the consumers will take fruit every day. With higher purchasing power, they have a broader perspective and more choices. The consumption scenario extended from meals to non-meal, such as an afternoon tea and snack, with a taste for exotic and authentic products. Imported or domestic produce with recognized brands or GI (Geographical Indication) will be preferred;
- 2) With the convenience of online & offline shopping, Chinese consumers may demand easier access. An online exchange will enhance the role of tech-savvy young people, where they produce and search for information and become shrewd buyers, conduct "group buying" in communities, and seeking acceptance in social networks, when fruit consumption enhances the public persona (人设);

- 3) Rising health concern leads Chinese consumers to be particular about nutrition and function of fruits, welcoming fruits to be organic and safe, low in sugar as a part of light meal. The attentions are paid to nutrition elements and their intensity, such as dietary fiber, Vitamins, antioxidants, micronutrients;
- 4) In terms of changing social demography, a small portion of fruits may be preferred by a smaller nuclear family. Aging society may also demand fruits catering to the taste, digestion system and nutrition requirements for senior citizens.

Table 2.19 Segments of Fruit Consumers in Mainland China

Segment	Family Income ¥/Year	Estimated Size mil	Typical Behaviour	Marketing Implications
New Entry	55,000-160,000	108	Start trial of Thai fruits following words of mouth recommendation, or after experiencing Thai fruits in oversea travel	Wider & deep reach of channels Create awareness and exposure especially in offline point of sales. Nurture their consumption habits
Frequent User	160,001-345000	71	Purchase at least 2 times per month during the fruit season Demand for convenience Shop for value: comparison competing brands.	Manage competition in value Packaging and delivery speed Content management & user involvement to provide sufficient information
Connoisseur	>345,001	20	Happy to pay a premium for quality & safety Look for speciality, exoticness and authenticity Higher-end shopping mall and specialized online store	Manage quality, Marketing message New variety, GI Certificate and brands in developed markets.

Source: CASPIM

Table 2.20 New Consumer Behaviors in China for Fruit Consumption

Driver		New Consumer Behaviour	Marketing Implication
Higher Income	1	Broader perspective and more choices	Manage competition
	2	Buy larger quantity	Capture bigger market
	3	Buy higher quality	Manage quality, Marketing message
	4	Demand for convenience	Packaging and delivery speed
	5	Demand for service	Onsite/online service, after sale service
	6	Exotic & authentic	New variety, GI
	7	Self realization & emotion	Brand story & social value
Online & Offline Shopping	8	Easy access	Wider & deep reach of channels
	9	Substitute of oversea trip	Capture bigger market
	10	Bigger role of tech savvy young people	Technology & message for young people
	11	Embrace celebrity	Social media promotion
	12	Produce and search for information	Content management & user involvement
	13	Shrewd buyer	Value
	14	Group buying in community	Utilizing the new channels
	15	Longing for Acceptance in social network	Opinion leader in the target circle
Health Concern	16	Nutrition & function	Product development & promotion message
	17	Organic & safety	Certificate & traceability
	18	Low sugar	Low sugar contents in processed fruits
Social Demography	19	Light meal	Freshly squeezed juice & frozen fruit flesh
	20	Nuclear family	Small portion of fruits for small family
	21	Aging society	Health functions for aged people

Source: CASPIM

5. Role of Chinese Government

5.1 Direction

What

The key functions of Direction include:

- 1) Direction in terms of the national development plan;
- 2) Direction in terms of the development of international trade;
- 3) Directions in terms of the development of e-Commerce.

Who

The functions above are carried out by:

- 1) NPC (The National People's Congress);
- 2) SC (The State Council);
- 3) MOC (Ministry of Commerce).

How

The key functions of Direction are fulfilled through the following process:

- 1) The plans and directives would be formed and announced by NPC, SC, and MOC (Table 2.21).

Observation

- 1) The plans and directives would impact the economic prospects of the country and priority of regional and industrial development;
- 2) The plans and directives may reveal new opportunities or obstacles for trade.

Table 2.21 Selected Examples of Direction

Issued by	Document Name	Major Points
NPC	国民经济和社会发展第十四个五年规划和2035年远景目标纲要 Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035	Harmonizing the rules of internal and international trade in terms of regulation system, qualification, quality standard, permission & certification, inspection & quarantine
		Reduce tariff & transaction cost to increase the imports of high quality products Expand trade with neighboring countries & cross border trade
SC	关于加快发展外贸新业态新模式的意见 Opinions on Developing New Business & New Business Model in Foreign Trade	Promotion Cross-border ecommerce
MOC	十四五“电子商务”发展规划 14th FYP for Development of eCommerce	By 2025, e-Commerce ¥45 tri On line retail ¥17 tri Cross-Border e-Commerce ¥2.5 tri

Source: CASPIM

5.2 Regulation

What

The key functions of Regulation include:

- 1) Market access of Thai fruits;
- 2) SPS requirement of Thai fruits;
- 3) Approval list of registered orchards and packing houses of Thai fruits;
- 4) Approval list of “designated supervision venues in mainland China for imported fruits.”

Who

The functions above are carried out by:

- 1) SAMR (State Administration for Market Regulation), which took over the functions of SAIC (State Administration for Industry and Commerce);
- 2) GACC (General Administration of Customs of China), which took over the functions of quality supervision, inspection, and quarantine from AQSIQ (General Administration of Quality Supervision, Inspection, and Quarantine).

How

The key functions of Regulation are fulfilled through the following process:

- 1) GACC announces "the permission list for fruits import" (Table 1.2) to control the market access to Thai fruits;
- 2) GACC evaluates the requirements for a "registered orchard and packing house" (Table 2.22), and grants permission (Table 2.23);
- 3) GACC announces the list of "designated supervision venues in mainland China for imported fruits" (Table 2.24).

Observation

- 1) Thailand is in a favorable position in terms of the number of fruits with market access to China. It may feel the pressure of competition when more of its ASEAN neighbors like Vietnam and Cambodia have gained more access in recent years;
- 2) There are discussions on relaxing the requirement of "registered orchard and packing house", such as the minimum area of an orchard.

Table 2.22 Requirement for Registered Orchard & Packing House

Requirement for Orchard
Area >100 mu *
No source of contamination nearby
Responsible person for pest monitoring & prevention
Quality Management System: Documentation on organization structure, training, pest monitoring & control, management of chemicals, GAP
No major plant diseases in past 2 years

Requirement for Packing House
Use permitted chemicals
No source of contamination nearby
Clear source of fruits
Seperation of fruits from different sources
With required Information and sign in the packaging
No major technical issue for quarantine facilities
No pest or poisonous & harmful matters above the standard

*1 rai=2.4 mu=1600 square meter

Source: <https://customs.mactd.com/23202.html>

Table 2.23 Number of Registered Orchard and Packing Houses in Thailand

Registered Orchard (13 fruits)		Registered Packing House
Longan	38,427	1,733
Durian	48,367	
Mangosteen	30,443	
Mango	7,124	
Coconut	3,213	
Lychee	970	
Jackfruit	1,527	
Tamarind	961	
Pine apple	3,028	
Pomelo	2,292	
Rambutan	6,536	
Banana	3,065	
Rose apple	46	

Source: GACC January 30, 2022

Table 2.24 Number of Designated Supervision Venues in Mainland China for Imported Fruits

Provincial Unit	Number	City
Beijing	2	Beijing (2)
Tianjin	5	Tianjin (5)
Hebei	2	Shijiazhuang (2)
Liaoning	5	Dalian (4), Shenyang (1)
Shanghai	6	Shanghai (6)
Jiangsu	6	Nanjing (6)
Zhejiang	6	Hangzhou (4), Ningbo (2)
Anhui	3	Hefei (3)
Fujian	14	Fuzhou (5), Xiamen (9)
Shandong	4	Qingdao (3), Jinan (1)
Henan	1	Zhengzhou (1)
Hubei	1	Wuhan (1)
Hunan	2	Changsha (2)
Guangdong	31	Guangzhou (8), Shenzhen (11), Gongbei (4), Shantou (3), Huangpu (3), Jiangmen (1), Zhanjiang (1)
Guangxi	11	Nanning (11)
Hainan	1	Haikou (1)
Chongqing	2	Chongqing (2)
Sichuan	1	Chengdu (1)
Yunnan	9	Kunming (9)
Shaanxi	1	Xi'an (1)
Gansu	1	Lanzhou (1)
Xinjiang	6	Urumqi (6)

Source: <https://www.opsmoac.go.th/beijing-news-files-431291791824>

5.3 Taxation

What

The key functions of Taxation include:

- 1) Customs Duty (Tariff);
- 2) VAT (value-added tax).

Who

The functions above are carried out by:

- 1) GACC (General Administration of Customs of China).

How

The key functions of Taxation are fulfilled through the following process:

- 1) The customs duty is 0% for all fruits from Thailand under the CAFTA (China ASEAN Free Trade Area);
- 2) The VAT for imported fruit has been reduced from 13% in 2017 to 9% in 2019;
- 3) $VAT = (CIF + \text{Tariff}) \times \text{VAT rate}$, where CIF means the price quoted, including Cost, Insurance, and Freight.

Observation

- 1) Some Thai exporters consider the VAT of China as an NTB (Non-Tariff Barrier) as Thailand exempts VAT on the import of agricultural products;
- 2) Some Thai exporters complained about different VAT in different provinces in China. This might be explained by different transportation costs in CIF, or different values of cost in CIF as claimed by the shipper, which is the base for calculating VAT;
- 3) Another reason for different VAT is the case of "cross border retailing e-commerce import", where VAT is charged at 70% of the normal level for a customer within his personal quota.

5.4 Facilitation

What

The key functions of Facilitation include:

- 1) Promote fruit import;
- 2) Facilitate fruit import.

Who

The functions above are carried out by:

- 1) Trade Development Bureau, MOC;
- 2) CCPIT (China Council for the Promotion of International Trade);
- 3) China International Import Expo Bureau;
- 4) CCCFNA (China Chamber of Commerce For Import and Export of Foodstuffs, Native Produce And Animal By-Products).

How

The key functions of Facilitation are fulfilled through the following process:

- 1) Trade facilitation by MOC and CCPIT;
- 2) Promotion activities in cooperation with DITP of Thailand;
- 3) National and local trade exhibitions (Table 2.25).

Observation

- 1) There is significant efforts and achievement of the Chinese government to improve the country's business environments;
- 2) There is good exposure of Thai fruits in the exhibitions and joint promotion activities conducted or facilitated by various government organizations.

Table 2.25 Selected Exhibitions in China Suitable for Thai Fruits

Location	Name in Chinese	Name in English
Guangzhou	中国进出口商品交易会	Canton Fair
Shanghai	中国国际进口博览会	China International Import Expo
Shanghai	上海国际果蔬展览会	FruVeg Expo Shanghai
Beijing	北京国际果蔬展览会	CHINA FVF
Shenzhen	世界食品（深圳）博览会	ANUFOOD China
Haikou	中国(海南)国际热带农产品冬季交易会	CHWTF Tropical Agricultural Products

Source: CASPIM

5.5 International Negotiation

What

The key functions of International Negotiation include the following:

- 1) FTA (Free Trade Area) with Thailand;
- 2) Fruit market access;
- 3) Sanitary and Phytosanitary (SPS) requirements.

Who

The functions above are carried out by:

- 1) MOC (Ministry of Commerce);
- 2) SAMR (State Administration for Market Regulation);
- 3) GACC (General Administration of Customs of China).

How

The key functions of International Negotiation are fulfilled through the following process

- 1) MOC negotiates on FTA Agreement with DTN (Department of Trade Negotiation) under MOC of Thailand;
- 2) SAMR signs and executes FTA;
- 3) GACC negotiates with ACFS (National Bureau of Agricultural Commodity Food Standards (ACFS) under MOAC of Thailand on market access and SPS requirement leading to related protocols.

Observation

- 1) Thai fruits enjoy 0% tariff under the CAFTA (China ASEAN Free Trade Area);
- 2) GACC has approved market access for 22 Thai fruits (fresh/chilled/frozen) in China (Table 1.2). Other fruits are under negotiation through JTC-SPS (Joint Trade Committee-Sanitary and Phytosanitary Measures);
- 3) GACC also reached agreements with ACFS in protocols for exchanging GAP and GMP information on Thai selected fruits, and protocols on land transportation through third country, including specified routes and border checkpoints. (Table 2.12);
- 4) More border checkpoints for Thai fruits by land transportation were opened to deal with the problems of traffic jam during the Covid-19 pandemic; due to effective communication between Thailand and China.

3

Production

"No one can reap the fruit before planting the trees " — Luiz Inacio Lula da Silva

- 1. Overview
- 2. Heavy Weight
 - 2.1 Durian
 - 2.2 Longan
 - 2.3 Mangosteen

- 3. Rising Star
 - 3.1 Mango
 - 3.2 Young coconut
 - 3.3 Pomelo

1. Overview

Before reaping the six fruits focused on in this book, their planting is studied in this chapter with the following four parts (Table 3.1):

- 1) Variety : major varieties or cultivars¹; the list of GI (geographical indication);
- 2) Trend : output trend in three years, including planting area, output, output per rai, and fame gate price;
- 3) Structure : output structure in geographic regions; by major varieties and seasonal variations;
- 4) Parameter : technical parameters such as growth period (life of a tree, years before carrying fruit, flowering period before harvest, harvest time), planting intensity, and unit cost.

Table 3.1 Organization of Chapter 3

Fruits Covered	1	Heavy Weight	1	Durian
			2	Mangosteen
			3	Longan
	2	Rising Star	1	Mango
			2	Young Coconut
			3	Pomelo
Production Data of Each Fruit				
Variety	Major varieties or cultivars		Major varieties or cultivars, GI list	
Trend	Output trend in three years		Planting area, Output, Output per rai, Farm gate price	
Structure	Output structure		In regions, By varieties, and Seasonal variations	
Parameter	Technical parameters		Growth period, Planting intensity, and Unit cost	

Source: CASPIM

¹ Varieties often occur in nature, and most varieties are true to type: the seedlings with the same unique characteristic as the parent. Cultivars are “cultivated varieties” by humans. They are not necessarily true to type. To propagate true-to-type clones, many cultivars must be propagated vegetatively through cuttings, grafting, or even tissue culture.

2. Heavy Weight

2.1 Durian

Variety

There are more than 600 varieties of durians in Thailand, according to Horticultural Research Center of Chanthaburi. Thai Youth Encyclopedia identifies 174 varieties in 6 groups². Other sources, such as yearofthedurian.com present 234 varieties³. MonThong, Chanee, KradumThong, GanYao, and Puang Manee are very well received in the Chinese market, together with other more exotic varieties such as Long Lap Lae, Lin Lap Lae, Chanthaburi 1, and Nuanthongchan (Table 3.2).

The Department of Intellectual Property (DIP) of the Ministry of Commerce (MOC) in Thailand also granted GI (geographical indication) to 11 groups of durian in the country (Table 3.3).

² The foundation of Thai Youth Encyclopedia 2006: Thai Youth Encyclopedia (สารานุกรมกรมสำหรับเยาวชนไทย) No. 28.

³ www.yearofthedurian.com

Table 3.2 Major Varieties of Thai Durian

	Variety	Characteristics
1	หมอนทอง MonThong 金枕头	The most planted and exported variety. Big size,; Thick dark yellow flesh, sweet and creamy, strong aroma, thin skin; Weight 3-5 kg.
2	ชะนี Chanee 青尼	Traditionally popular variety and better resistant to diseases; Medium size, golden yellow, thick flesh, fine texture, soft, sweet and creamy, strong aroma; Weight 2-4kg.
3	กระดุมทอง KradumThong 甲仑	An early season variety in Thailand; Small size; Light yellow flesh, fine texture, soft, sweet but not creamy, big seed; Weight around 1 kg.
4	ก้านยาว GanYao 干尧	One of the famous and expensive durian varieties in Nonthaburi Province; Medium size, with a long stalk; Light yellow flesh, fine texture, soft, sweet and creamy, big seed; Weight 2-4kg.
5	พวงมณี Puang Manee 托曼尼	Native to the province of Chanthaburi, valued for its toffee-like flavor; Small size; Vibrant golden flesh, smooth, dry but creamy, strong sweetness, big seed; Weight 0.8-1.5 kg.
6	หลงลับแล Long Lap Lae 珑榴莲	One of the famous and expensive durian varieties in Laplae District Uttaradit Province; Small to medium size; Thick dark yellow flesh, fine texture. sweet and creamy, soft aroma; Round shape, thin skin, stunted seeds; Weight 0.5-3.5 kg.
7	หลินลับแล Lin Lap Lae 琳榴莲	One of the famous and expensive durian varieties in Laplae District Uttaradit Province; Small size, Light yellow flesh, sweet and creamy with a hint of savoury, fine texture, soft aroma; Cylindrical shape, thin skin, stunted seeds; Weight 1.0-1.8 kg.
8	จันทบุรี 1 Chanthaburi 1 山大五里1	Hybrid of Chanee and MonThong; Medium size; Yellow flesh, sweet and creamy, fine-grained, soft aroma, mostly stunted seeds; Weight 2.6-3.6 kg.
9	นวลทองจันทร์ Nuanthongchan 诺通赞	Hybrid of Puang Manee and MonThong; Medium size, Thick gold yellow flesh, sweet and creamy, very weak aroma; Thin skin, small seed; Weight 2.5-3.0 kg.

Source: Compiled by CASPIM

Table 3.3 GI of Durian in Thailand

Name	Name in Thai	Province
Uttaradit Long Lab Lae Durian	ทุเรียนหลงลับแลอุตรดิตถ์	Uttaradit
Uttaradit Lin Lab Lae Durian	ทุเรียนหลินลับแลอุตรดิตถ์	Uttaradit
Nont Durian	ทุเรียนนนท์	Nonthaburi
Durian Pa La-U	ทุเรียนป่าละอู	Nonthaburi
Naiwong Ranong Durian	ทุเรียนในวังระนอง	Ranong
Durian Prachin	ทุเรียนปราจีน	Prachinburi
Sisaket Volcanic Area Durian	ทุเรียนภูเขาไฟศรีสะเกษ	Sisaket
Phangnga Salika Durian	ทุเรียนสลิกาพังงา	Phangnga
Cha Nee Koh Chang Durian	ทุเรียนชะนีเกาะช้าง	Trat
Pakchong-Khaoyai Durian	ทุเรียนปากช่องเขาใหญ่	Nakhon Ratchasima
Chan Durian	ทุเรียนจันทน์	Chanthaburi

Source:: DIP 2021

Trend

The production of durian in Thailand is highly responsive to price signals, with about 3-year time lag. The large export to China and higher price bided by Chinese importers stimulated the increase in planting area since 2018. In 2021, the planting area reached 1.2 million rai and an output of 1.3 million tons. The new trees will increase the supply in the near future, which brings about the concern of the sustainability of the high price.

Table 3.4 Planting Area and Output of Durian in Thailand 2019-2021⁴

Fruits	Total Planting Area (1000 rai)			Output (1000 ton)			Output/rai (kg/rai)			Farm Gate Price (Baht/kg)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Durian	967	1,147	1,192	743	1,109	1,289	1,551.37	1,569.88	1,525.14	89.90	100.26	111.49

1 rai = 1,600 square meters = 2.4 Chinese mu (亩)

Source:: DOAE 2021

⁴ Data from the database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Structure

The East (e.g. Chanthaburi) and South (e.g. Chumphon) regions accounted for 49% and 43% of output in 2021 (Table 3.5), MonThong continues to dominate the market (nearly 90% of the output) because of its commercial viability, followed by Chanee (about 5%). Puang Manee and GanYao also gained popularity (Table 3.5).

Table 3.5 Durian Output Proportion in Geographic Regions and by Major Varieties⁵

Region	Proportion of Output (%)	
	2021	2020
South	42.80	43.18
East	49.02	48.81
North	4.62	4.77
West	1.56	2.35
North East	1.97	0.89
Central	0.03	0.01
All	100.00	100.00

Major Variety	Proportion of Output (%)	
	2021	2020
MonThong	87.81	86.61
Chanee	4.76	5.47
KradumThong	1.33	1.55
GanYao	0.86	0.56
Puang Manee	0.24	0.14
Others	5.01	5.66
All	100.00	100.00

Source:: DOAE 2021

Although Thailand is able to deliver durian all year round, the major harvest season starts in March (with varieties like Puang Manee and Chanee). MonThong in the East will enter by mid April. The South will carry on until October (Table 3.6).

Table 3.6 Seasonal Variation of Durian Output in Thailand⁶

Fruit	Proportion of Harvest % (2020)											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Durian	0.46	0.73	4.66	14.86	19.14	14.02	14.07	17.22	10.48	3.51	0.44	0.41

Source:: DOAE 2021

⁵ Data from the database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

⁶ Data from the database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Parameter

The technical parameters for durian production in Thailand (Table 3.7) are based on findings of the field trip observations by the researcher team. It is interesting to note a tree may carry fruit in 3 to 5 years with the cleft grafting method of breeding. The farmers are thus quick to expand production when the farm gate price (Table 3.4) is much higher than the average cost of 30 ฿/kg.

Table 3.7 Technical Parameters for Durian Production in Thailand

Technical Parameters		Case Source
Life of a Tree	40-50 years	CTDL
Years Before Carrying Fruits	3-5 years, with cleft grafting method of breeding	BKAP
Harvest After Flowering	120 - 135 (Mon Thong), 102-103 (Chanthaburi 1-3)	CTAR
Harvest Time	East: Mar-June; South: July-Oct	CTDL
Planting Intensity	20 trees per rai, 80 fruits/tree/year	BKAP, BKTE
Cost of Production	20-30 ฿/kg	BKJT, RACA

Source:: CASPIM field trip

2.2 Mangosteen

Variety

Without a pollination process, mangosteen has only one variety in the world. The fruit may appear glossy or striped due to different field management practices or ages of a tree (Figure 3.1). A good fruit may have a big size (up to 100g in size 6A), smooth and glossy skin in purple or black color, with white and fluffy flesh, and a sweet and sour flavor.

The Department of Intellectual Property (DIP) of Ministry of Commerce (MOC) in Thailand also granted GI (geographical indication) to 2 groups of mangosteen in the Ranong and Nakhon Sithammarat provinces (Table 3.8).

Trend

The output in 2021 is less than half of that in 2019 due to lower output per rai under poor weather conditions and a reduction of planting area. Lower output, however, supported the farm gate price of around 40 ฿/kg, merely higher than the production cost but much lower than that of durian (Table 3.9).

Figure 3.1 Appearance of Mangosteen



Source: Compiled by CASPIM

Table 3.8 GI of Mangosteen in Thailand

	Name	Name in Thai	Province
1	Naiwong Ranong Mangosteen	มังคุดในวงระยอง	Ranong
2	Khao Khiriwong Mangosteen	มังคุดเขาคีรีวง	Nakhon Sithammarat

Source:: DIP 2021

Table 3.9 Planting Area and Output of Mangosteen in Thailand 2019-2021⁷

Fruits	Total Planting Area (1000 rai)			Output (1000 ton)			Output/rai (kg/rai)			Farm Gate Price (Baht/kg)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Mangosteen	498	506	473	549	334	246	1,682.98	1,090.03	759.28	36.77	40.56	38.24

1 rai = 1,600 square meters = 2.4 Chinese mu (亩)

Source:: DOAE 2021

⁷ Data from the database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Structure

The major production bases are in the South (e.g. Chumphon) and East (e.g. Chanthaburi) (Table 3.10). Although Thailand is able to deliver mangosteen all year round, the major harvest season starts in March and ends in October, with the peak time from May to August (Table 3.11).

Table 3.10 Mangosteen Output Proportion in Geographic Regions⁸

Region	Proportion of Output (%)	
	2021	2020
South	71.20	41.81%
East	27.88	57.68%
North	0.29	0.02%
West	0.46	0.46%
North East	0.15	0.03%
Central	0.02	0.00%
All	100.00	100.00

Source:: DOAE 2021

Table 3.11 Seasonal Variation of Mangosteen Output in Thailand⁹

Fruit	Proportion of Harvest % (2020)											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Mangosteen	0.67	0.69	1.48	13.43	26.17	15.31	13.25	19.50	7.94	1.15	0.15	0.26

Source:: DOAE 2021

⁸ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

⁹ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Parameter

The technical parameters for mangosteen production in Thailand (Table 3.12) are based on findings of the field trip observations by the researcher team. The production is not very responsive to price change in the short run, as it takes 6-8 years for a tree to bear fruit. The supply depends largely on the weather condition. In the long run, higher farm gate price of alternative fruits such as durian leads farmers to reduce the planting area of mangosteen. Careful post-harvest handling increases the cost, as its outer skin will be hardened if bruised.

Table 3.12 Technical Parameters for Mangosteen Production in Thailand

Technical Parameters		Source
Life of a Tree	May be 100 years, mostly 30-40 years old	CTFD, NASF
Years Before Carrying Fruits	From seed: 8-12, 15 years properly, cleft grafting 6 years	BKJT, CTFD
Harvest After Flowering	100 -120 days	CTFD, RYFC
Harvest Time	Mainly April to Sep	CTFD
Planting/Production Intensity	120kg/tree	CTFD
Cost of Production	20B/kg	CTFD

Source:: CASPIM field trip case studies

2.3 Longan

Variety

There are 66 varieties of longan in Thailand, according to the Plant Germ-plasm Database of Department Of Agriculture (DOA)¹⁰ Daw or E-Daw are the dominant varieties. Other well sought after varieties include Biew Khiew, Chompoo etc. (Table 3.13).

The Department of Intellectual Property (DIP) of Ministry of Commerce (MOC) in Thailand also granted GI (geographical indication) to 3 groups of longan in the provinces of Lamphun and Samut Sakhon (Table 3.14).

¹⁰ Plant Varieties Protection Office, Department Of Agriculture 2002: [Plant Germ-plasm Database : Longan](https://www.doa.go.th/pvp/wp-content/uploads/2019/12/Longan.pdf).
[https:// www.doa.go.th/pvp/wp-content/uploads/2019/12/Longan.pdf](https://www.doa.go.th/pvp/wp-content/uploads/2019/12/Longan.pdf)

Table 3.13 Major Varieties of Thai Longan

	Variety	Characteristics
1	พันธุ์ดอ หรืออีดอ Daw or E-Daw	Most popular in Thailand harvesting in late June to early July; Big seed. The flesh, sweet and with good flavor, is rather tough and not crispy; Grown in the northern provinces.
2	พันธุ์เบี้ยวเขียว Biew Khiew	Well sought after, harvesting in late August to September; Round, large, brownish green, large proportion of flesh which is crispy, pleasant scented and sweet; Thick skin which is advantageous to longer shelf life; Grown in the northern provinces.
3	พันธุ์แห้ว หรืออินแห้ว Haew	Harvesting mid to late August; Medium to large in size, average proportion of flesh which is firm and of good eating quality. Thick skin which is advantageous to longer shelf life; Suitable for canning; Grown in the northern provinces.
4	พันธุ์สีชมพู Chompoo	Well sought after; Harvesting in middle July to early August; Medium size, oval in shape and with greenish light brown skin. Large proportion of flesh which is slightly pink, very sweet and has a pleasant aroma; Grown in the northern provinces.
5	พันธุ์พวงทอง Phuang Thong	Smooth light brown skin with brown spot. Thick flesh, crisp, creamy white color, just right degree of sweetness; Harvesting mid Feb suitable for the market Chinese New Year.
6	พันธุ์เพชรสาร ทวาย Phetsakon	Lowland cultivar; Grown in the central region in Samut Sakhon and Ratchaburi; Big seed, Firm flesh, not very sweet; First harvest May to June, Second harvest December to January

Source: Compiled by CASPIM

Table 3.14 GI of Longan in Thailand

Name	Name in Thai	Province
Lamphun Biaokhiao Longan	ลำไยเบี้ยวเขียวลำพูน	Lamphun
Lamphun Golden Dried Longan	ลำไยอบแห้งเนื้อสีทองลำพูน	Lamphun
Banphaeo Phuang Thong Longan	ลำไยพวงทอง บ้านแพ้ว	Samut Sakhon

Source: Compiled by CASPIM

Trend

2021 was a year of harvest for Longan when the output reached nearly 1.2 million tons. The price, however, hit the lowest due to a large supply in Thailand and a clog in export to China due to Covid 19 (Table 3.15).

Table 3.15 Planting Area and Output of Longan in Thailand 2019-2021¹¹

Fruits	Total Planting Area (1000 rai)			Output (1000 ton)			Output/rai (kg/rai)			Farm Gate Price (Baht/kg)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Longan	1,309	1,678	1,659	729	797	1,178	1,273.10	1,274.11	1,499.17	26.23	20.2	17.67

1 rai = 1,600 square meters = 2.4 Chinese mu (亩)

Source: DOAE 2021

Structure

North (such as Chiangmai & Lamphun) and East region (such as Chanthaburi) accounted for 68% and 29% of output in 2021. The dominating variety E-Daw accounted for 98% of output in 2021. To cater for the season of Chinese market, varieties like Phuang Thong and Phetsakon gained its shares in the planting area recently (Table 3.16). Longans in the North are generally whiter, with thin skin, fleshy and sweet. Longans in the East are bigger, fleshy and with thick skin.

Harvest starts in July until March of the next year (Table 3.17). The peak harvest time in the north is July and August. But the fruit is available all year round because of out-of-season varieties and application of potassium chlorate to induce off-season flowering. The control of harvest time may cause oversupply in a particular season.

¹¹ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Table 3.16 Longan Output Proportion in Geographic Regions and by Major Varieties¹²

Region	Proportion of Output (%)		Major Variety	Proportion of Output (%)	
	2021	2020		2021	2020
South	0.01	0.08	E-Daw	98.02	97.04
East	28.76	26.79	Ka Lok	0.04	0.03
North	67.55	68.46	Chompoo	0.07	0.22
West	1.99	1.67	Phetsakon	0.04	0.12
North East	1.63	2.98	Phuang Thong	0.09	0.00
Central	0.06	0.01	Biew Khiew	0.04	0.02
All	100.00	100.00	Haew	0.00	0.08
			Others	1.70	2.49
			All	100.00	100.00

Source:: DOAE 2021

Table 3.17 Seasonal Variation of Longan Output in Thailand¹³

Fruit	Proportion Harvested % (2020)											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Longan	10.00	6.09	3.90	1.56	1.51	1.83	10.51	24.39	6.31	9.34	11.68	12.88

Source:: DOAE 2021

Parameter

The technical parameters for longan production in Thailand (Table 3.18) are based on findings of the field trip observations by the researcher team. The production is highly responsive to price signals with about a 3-year time lag (as new trees may carry fruit after 3 years using the air laying method of breeding). The low farm gate price in 2021 is close to the average cost, which dims the future of longan.

SO₂ fumigation may extend the shelf life of longan from 3 days to more than 60 days. But the concern of SO₂ residual (above the standard 30 ppm) reduces the competitiveness of Thai longan vis-a-vis the fresh ones in China. One alternative is to use the new cold storage system, which may keep the fruits fresh for more than 20 days.

¹² Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

¹³ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Table 3.18 Technical Parameters for Longan Production in Thailand

Technical Parameters		Source
Life of a tree	20-30 years	OAE
Years Before Carrying Fruits	2-3 years with air laying method of breeding	OAE
Harvest After Flowering	3-4 months	OAE
Harvest Time	July-Aug, Dec-Jan	OAE
Planting/Production Intensity	64-400 trees/rai, 100kg/tree/year	Longan Garden
Cost of Production	16-20B/kg	TRAA

Source:: CASPIM field trip case studies

3. Rising Star

3.1 Mango

Variety

There are around 200 varieties of mango in Thailand¹⁴, led by Nam Dokmai, followed by Kiew Savoey, Choc Anan and Kaew (Table 3.19). They may be divided into three groups based on their major usage: 1) mainly consumed raw (e.g. Kiew Savoey, Faa Lan and Raed); 2) mainly consumed ripe (e.g. Nam Dokmai); 3) suitable for the processing industry: such as to be preserved (e.g. Kaew), or to make mango juice (e.g. Mahachanok).

The Department of Intellectual Property (DIP) of Ministry of Commerce (MOC) in Thailand also granted GI (geographical indication) to 6 groups of mango from major production bases in Chachoengsao, Samut Prakarn, Saraburi, Sakaeo and Nonthaburi provinces (Table 3.20).

Trend

Mango had a big harvest in 2021 with an output of 900,000 tons, thanks to a bigger planting area and higher output/rai. The higher supply also depressed the price to a year low at 16 B/kg (Table 3.21).

¹⁴ See a list of 174 varieties at <https://sites.google.com/site/mamwngggg/rae-chux-phanthu-mamwng-thiy-174-say-phanth>; A survey of 46 varieties in Chachoengsao province, an important production site of mango in Thailand in: <https://www.surinseed.com/article/180/รวบรวมชนิดมะม่วงหาวหงษ์-1๓-46-ชนิด>

Table 3.19 Major Varieties of Thai Mango

	Variety	Characteristics
1	น้ำดอกไม้สีทอง Nam Dokmai Si Thong	Most popular variety for export; Flesh is yellow with a shade of orange, little fiber; Sour when raw, sweet when ripe, with special aroma; Stunted seed; Good endurance during transportation and resistance to diseases; Average weight 350g.
2	เขียวเสวย Kiew Savoey	Popular for consumption when it is raw; Flesh is yellow with a shade of orange; Sweet and creamy when raw, sweet when ripe, with light fragrance; Big size, average weight 400g.
3	โชคอนันต์ Choc Anan	Miracle mango with two crops in a year; Flesh is yellow, no fibre; Sour and firm when raw, sweet and with fine texture when ripe, with slightly pungent odor; Big size, thin seed, weight 300-400g.
4	แก้ว Kaew	Long time consumed in Thailand, popular for three flavors combined: sweet, sour and creamy; Sweet and firm, crispy and creamy with little gum even when it is raw; Weight 200-300g.
5	เขียวมรกต Kiew Morakot	A variety grows fast and easy to bear fruits; Thick flesh, crispy and creamy when raw, sweet and aromatic when ripe; Stunted seed; Big size, average weight 500g.
6	ฟ้าลั่น Faa Lan	Distinguished for its cracking sound when the skin is peeled off; Creamy and not much sour when raw; Creamy and with a right degree of sweetness, fine texture and little fiber when ripe; Average weight 285g.
7	มหาชนก Mahachanok (rainbow)	Distinguished for its elongated and curved shape; Sour when raw, sweet and sour when ripe with its special aroma; Seed is long and thin; Suitable for consumption fresh or processed into mango juice; Weight 250-370g.
8	จินหวง (นวลคำ) Jinhuang	Flesh is dark yellow, firm with fine texture, creamy, crispy, aromatic and slightly sweet when ripe; No fiber or pungent odor; Very big size, thin and stunted seed, weight 0.8-1.8 kg.
9	อาร์ทูอีทู R2E2	Distinguished for its round shape and orange color; Flesh is lemon yellow, firm and with little fibre; Middle degree of sweetness when ripe; No pungent odor; Big size, weight 0.6-1 kg.
10	แรด Raed	It is called 'Rhinoceros' due to the little pointed horn that protrudes out of the fruit; Very sour when raw, sweet and sour when ripe; Lots of fibre and short seed; Usually consumed as a sour snack along with dips; Average weight 300g

Source: Compiled by CASPIM

Table 3.20 GI of Mango in Thailand

Name	Name in Thai	Province
Nonthaburi Yai Klam Mango	มะม่วงยายกล่ำนนทบุรี	Nonthaburi
Nam Dok Mai Khung Bang Kachao	มะม่วงน้ำดอกไม้คุ้งบางกะเจ้า	Samut Prakarn
Sakaeo Nam Dok Mai Mango	มะม่วงน้ำดอกไม้สระแก้ว	Sakaeo
Nam Dol Mai See Thong Bang Khla Mango	มะม่วงน้ำดอกไม้สีทองบางคล้า	Chachoengsao
Saraburi Man Nong Saeng Mango	มะม่วงมันหนองแซงสระบุรี	Saraburi
Nam Dok Mai Samutprakarn Mango	มะม่วงน้ำดอกไม้สมุทรปราการ	Samut Prakan

Source:: DIP 2021

Table 3.21 Planting Area and Output of Mango in Thailand 2019-2021¹⁵

Fruits	Total Planting Area (1000 rai)			Output (1000 ton)			Output/rai (kg/rai)			Farm Gate Price (Baht/kg)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Mango	825	894	914	517	552	903	1,564.12	1,400.85	2,078.30	22.72	27.08	15.64

1 rai = 1,600 square meters = 2.4 Chinese mu (亩)

Source:: DOAE 2021

Structure

North (e.g. Phitsanulok, Chiang Mai), Northeast (e.g. Loei, Nakhon Ratchasima) and West (e.g. Prachuap Khiri Khan, Ratchaburi) accounted for 87% of the output of Mango in the country in 2021. Other important provinces include Chachoengsao in the East and Nonthaburi in the Central. The most important variety is Nam Dokmai, but its share dropped from 34% in 2020 to 26% in 2021, together with other traditional varieties, replaced by new varieties such as Jinhuang and R2E2 (Table 3.22). The major harvest season starts in February and ends in June, with the peak time from March to May (Table 3.23).

¹⁵ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Table 3.22 Mango Output Proportion in Geographic Regions and by Major Varieties¹⁶

Region	Proportion of Output (%)		Major Variety	Proportion of Output (%)	
	2020	2021		2020	2021
South	0.37	0.25	Nam Dokmai	34.19	26.00
East	11.48	7.67	Kiew Savoey	12.69	8.68
North	42.86	35.04	Choc Anan	13.07	7.51
West	20.61	11.83	Kaew	5.69	4.73
North East	19.34	41.85	Kiew Morakot	6.06	2.91
Central	5.33	3.37	Faa Lan	5.64	1.91
All	100.00	100.00	Mahachanok	1.79	1.44
			Jinhuang	0.02	0.85
			R2E2	0.12	0.49
			Raed	0.43	0.45

Source:: DOAE 2021

Table 3.23 Seasonal Variation of Mango Output in Thailand¹⁷

Fruits	Total Planting Area (1000 rai)			Output (1000 ton)			Output/rai (kg/rai)			Farm Gate Price (Baht/kg)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Pomelo	58	62	72	122	118	173	2811.65	2807.63	3197.37	32.56	28.12	35.39

Source:: DOAE 2021

Parameter

The technical parameters for mango production in Thailand (Table 3.24) are based on findings of the field trip observations by the researcher team. The production is highly responsive to price signals with about a 1-3 year time lag (as new trees may carry fruit after 1 year using a grafting method of breeding).

¹⁶ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

¹⁷ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Table 3.24 Technical Parameters for Mango Production in Thailand

Technical Parameters		Source
Life of a tree	Normally 25 years (there are trees of 100 years age)	PSAA
Years Before Carrying Fruits	By grafting 1 year, 3 years normal production	PSAA
Harvest After Flowering	3-4 months	PSAA
Harvest Time	Mar-May	PSAA
Planting/Production Intensity	25 trees/rai (modern) or 30-40 trees possible, 200 fruits/tree	PSAA
Cost of Production	11-12 B/kg	PSCA, PSFD

Source:: CASPIM field trip case studies

3.2 Young coconut

Variety

Young Coconut is consumed for flesh and juice. It is divided into sweet juice coconut and aromatic coconut. There are five kinds of aromatic coconuts in Thailand, distinguished by their color, size, juice volume and flesh weight (Table 3.24).

Table 3.25 Five Kinds of Aromatic Coconut in Thailand

	Aromatic Coconut	Juice Volum	Flesh Weight
1	Green fruit, Round bottom	460 ml	120g
2	Yellow fruit, Round bottom	390 ml	100g
3	Brown fruit, Round bottom	390 ml	100g
4	Green fruit, Pleated bottom, Medium size	330 ml	90g
5	Green fruit, Pleated bottom, Small size	120 ml	50g

Source:: DOA 2019: Technology Management for Production of Aromatic Coconut

The Department of Intellectual Property (DIP) of Ministry of Commerce (MOC) in Thailand also granted GI (geographical indication) to 3 groups of aromatic coconuts from major production bases in Ratchaburi, Samut Sakhon and Chachoengsao provinces (Table 3.25).

Table 3.26 GI of Aromatic Coconut in Thailand

Name	Name in Thai	Province
Ratchaburi Aromatic Coconut	มะพร้าวน้ำหอมราชบุรี	Ratchaburi
Banphaeo Aromatic Coconut	มะพร้าวน้ำหอมบ้านแพ้ว	Samut Sakhon
Bang Khla Aromatic Coconut	มะพร้าวน้ำหอมบางคล้า	Chachoengsao

Source:: DIP 2021

Trend

The planting area and output of young coconuts have grown quickly in recent years: the output increased from 325,000 tons in 2019 to 529,000 tons in 2021, stimulated by high demand in China, which also supports a price of 12.22 Bath/kg in 2021, increased from 10.88 Bath/kg in 2020 (Table 3.26).

Table 3.27 Planting Area and Output of Young Coconut in Thailand 2019-2021¹⁸

Fruits	Total Planting Area (1000 rai)			Output (1000 ton)			Output/rai (kg/rai)			Farm Gate Price (Baht/kg)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Coconut Y	175	219	235	325	433	529	3,334.27	3,431.89	3,890.06	13.61	10.88	12.22

1 rai = 1,600 square meters = 2.4 Chinese mu (亩)

Source:: DOAE 2021

Structure

The most important production base is the West (Ratchaburi, Samut Sakhon, Samut Songkhram), followed by the South (Nakhon Si Thammarat), and the East (Chachoengsao) (Table 3.27). Young coconut or aromatic coconut can be harvested all year round, although the demand is lower during the winter time in China (Table 3.28).

¹⁸ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Table 3.28 Young Coconut Output Proportion in Geographic Regions¹⁹

Region	Proportion of Output (%) 2021	
	ton	%
South	76,896	14.5
East	54,389	10.3
North	867	0.2
West	385,631	72.9
North East	3,190	0.6
Central	7,951	1.5
ALL	528,924	100.0

Source:: DOAE 2021

Table 3.29 Seasonal Variation of Aromatic Coconut Output in Thailand²⁰

Proportion Harvested % (2020)												
Provinces	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Ratchaburi	4.66	8.03	8.09	4.56	3.13	4.44	6.87	9.11	11.03	13.57	16.15	10.38
Samut Sakhon	12.55	5.36	4.42	5.1	6.85	7.22	8.2	10.8	12.39	12.75	12.26	9.05
Chachoengsao	9.06	5.42	5.05	4.73	5.51	8.4	9.44	11.81	11.56	10.32	9.59	9.11
Samut Songkram	6.33	5.67	5	6.67	6.67	10	11.33	12.67	12	8.33	8	7.33
Chon Buri	8.54	8.54	8.54	8.54	8.54	8.54	8.54	8.54	8.49	8.48	7.35	7.35

Source:: DOAE 2021

Parameter

The technical parameters for young coconut production in Thailand (Table 3.29) are based on findings of the field trip observations by the researcher team. The production is also highly responsive to price signals with about a 3-year time lag.

Aromatic coconut belongs to the Dwarf Palm family (or มะพร้าวพันธุ์หมูสี). There are varying degrees of aroma of young coconut in Thailand, although many of them claim to be aromatic coconut. There may be "Xenia Effect": when aromatic coconut cross-pollination with other varieties and lose its aroma.

¹⁹ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

²⁰ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Table 3.30 Technical Parameters for Young Coconut Production in Thailand

Technical Parameters		Source
Life of a tree	35-40	DOA
Years Before Carrying Fruits	3 years, but 6 years up better quality	DOA
Harvest After Flowering	6 months	DOA
Harvest Time	Harvest every 20 days, Winter low sales in China	DOA
Planting/Production Intensity	37-43 trees/rai, 5500 fruits/rai/year, >120 fruits/tree/year	DOA
Cost of Production	5 B/kg	BKFK

Source:: CASPIM field trip case studies

3.3 Pomelo

Variety

There are around 20 cultivars of pomelo currently planted in the world²¹. Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) publishes the data of 9 cultivars which are popular in the commercial plantation in Thailand²² (Table 3.30).

The Department of Intellectual Property (DIP) of Ministry of Commerce (MOC) in Thailand also granted GI (geographical indication) to 9 groups of pomelo from major production bases in the country (Table 3.31).

Trend

The rapid growth of export to China was supported by the expansion of output which reached 173,000 tons in 2021, nearly 50% growth. The higher output was achieved through higher panting area and output per rai. The farm gate price was above 35 B/kg, the highest in three years (Table 3.32).

²¹ <http://citruspages.free.fr/pomelos.php>

²² Database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC). See also W. Makkumrai et al. 2021 COMPARISON OF POMELO (CITRUS MAXIMA) GROWN IN CHINA AND THAILAND. *Frontier of Agricultural Science and Engineering* 8(2): 335–352.

Table 3.31 Major Varieties of Thai Pomelo

	Variety	Characteristics
1	ทับทิมสยาม Tabtinsiam	Flesh from dark pink to red, similar as pomegranate; Soft, sweet, juicy, and with flavorful aroma; It has a few seeds or is seedless; °Brix 9.7%–12.7%; Weight 1.8 – 2.0kg.
2	ทองดี Thong Dee	The predominant commercial cultivar in Thailand; Flesh soft pink, soft, very juicy, watery, not bitter, and fragrant; Seedy, thin skin; °Brix 10.5%– 11.9%; Weight 0.9 – 1.1kg.
3	ขาน้ำผึ้ง Khao Naphung	Flesh honey-colored, firm, sweet and a bit sour, crisp, juicy but not watery; Seeds are large but few in number; Quite thick skin; °Brix 11.4%–12.6%; Average weight 1.8 kg.
4	ขาวใหญ่ Khao Yai	Flesh white with a shade of yellow, sweet, crisp a bit sour, and juicy but not watery; Seeds are quite large and numerous; °Brix 10.5%–12.4%; Big size, weight 1.2–2.3 kg and may reach 3.0–4.0 kg.
5	ขาวพวง Khao Phuong	Commonly used as offering in festivals; Flesh white with a shade of yellow, sweet and sour, juicy but not watery; The skin is moderately thick and with few seeds; °Brix 9.8%; Average weight 1.3 kg.
6	ขาวแตงกวา Khao Tangkwa	Flesh white, sweet and mildly sour, not bitter, crisp, soft, dry and not watery; Thin skin with large flesh, °Brix 10.8%–11.4%; Weight 0.9–1.6 kg.
7	ท่าข่อย Tha Khoi	Pith thick and fluffy with a unique aroma; Flesh light pink, soft, juicy, sour and mildly sweet; Thin skin with a few seeds and sometimes seedless; °Brix 8.69%–9.39%; Weight 0.7–0.8 kg.

Source: Compiled by CASPIM

Table 3.32 GI of Pomelo in Thailand

Name	Name in Thai	Province
Chainat Khaotangkwa Pomelo	ส้มโอขาวแตงกวาชัยนาท	Chainat
Nakhonchaisri Pomelo	ส้มโอนครชัยศรี	Nakhon Pathom
Samutsongkhram Khaoyai Pomelo	ส้มโอขาวใหญ่สมุทรสงคราม	Samut Songkhram
Pakpanang Tubtim siam Pomelo	ส้มโอทับทิมสยามปากพนัง	Nakhon Sithammarat
Yarang Puko Pomelo	ส้มโอปูโกะรัง	Pattani
Pomelo Hom Khuanlang	ส้มโอหอมควนลัง	Songkhla
Thakhoi Mueang Phichit	ส้มโอท่าซ้อยเมืองพิชิต	Phichit
Thong Dee Ban Thaen Pomelo	ส้มโอทองดี บ้านแท่น	Chaiyaphum
Prachin Pomelo	ส้มโอปราจีน	Prachinburi

Source:: DIP 2021

Table 3.33 Planting Area and Output of Pomelo in Thailand 2019-2021²³

Fruits	Total Planting Area (1000 rai)			Output (1000 ton)			Output/rai (kg/rai)			Farm Gate Price (Baht/kg)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Pomelo	58	62	72	122	118	173	2811.65	2807.63	3197.37	32.56	28.12	35.39

1 rai = 1,600 square meters = 2.4 Chinese mu (亩)

Source:: DOAE 2021

Structure

The most important regions for pomelo production are the West (e.g. Ratchaburi) and the North (e.g. Pichit). The most popular variety in Thailand is Thong Dee, followed by Khao Naphung (Table 3.33). The output of the bestselling Thai pomelos in China, Tubtim siam increased from 95 tons in 2020 to 11,838 tons in 2021. 93% of the output comes from the southern province of Nakhon Si Thammarat, where Pakpanang has the recognition of GI.

Pomelo can be harvested all year round, although the peak months are from July to September (Table 3.34).

²³ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

Table 3.34 Pomelo Output Proportion in Geographic Regions and by Major Varieties²⁴

Region	Proportion of Output (%)	
	2020	2021
South	1.78	10.24
East	12.93	5.13
North	34.86	38.08
West	45.02	41.85
North East	2.38	2.70
Central	3.03	2.00
All %	100.00	100.00

Major Variety	Proportion of Output (%)	
	2020	2021
Khao Naphung	19.82	18.75
Khao Phuong	0.41	0.04
Khao Hom	0.05	0.02
Khao Tangkwa	4.66	16.32
Khao Paen	0.01	0.02
Khao Yai	18.27	12.88
Thong Dee	47.74	30.63
Tubtim siam	0.08	6.86
Tha Khoi	2.47	7.36
Others	6.49	7.12
All (%)	100.00	100.00

Source:: DOAE 2021

Table 3.35 Seasonal Variation of Pomelo Output in Thailand²⁵

Fruit	Proportion Harvested % (2020)											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Pomelo	6.06	5.33	4.25	5.67	6.77	7.69	13.87	15.11	14.56	9.67	5.32	5.69

Source:: DOAE 2021

Parameter

Table 3.36 Technical Parameters for Pomelo Production in Thailand

Technical Parameters		Source
Life of a tree	20-30 years	chiataigroup.com
Years Before Carrying Fruits	2 years	chiataigroup.com
Harvest After Flowering	6.5-8 months	technologychaoban
Harvest Time	All Year Round, Peak July to September	DOAE
Planting/Production Intensity	19-32 trees per rai, 200 fruits/tree	www.tridge.com
Cost of Production	7B/kg	Tippawan 2019*

*Tippawan 2019: Journal of SSMS http://ssms.jp/img/files/2019/04/sms13_7220.pdf

²⁴ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

²⁵ Data from database of Department of Agricultural Extension (DOAE) of Ministry of Agriculture and Cooperatives (MOAC) <https://opendata.doae.go.th>

4

Market

"It's a tough market today. The low-hanging fruit has already been picked." — Gary Eldred

1. Overview

2. Heavy Weight

2.1 Durian

2.2 Longan

2.3 Mangosteen

3. Rising Star

3.1 Mango

3.2 Young coconut

3.3 Pomelo

1. Overview

The fruit market in China is highly competitive. Even the durian in Thailand faces increasing competition from ASEAN neighbors like Vietnam, Malaysia and the Philippines. This Chapter focuses on the market intelligence of the six fruits in concern, each covered with the following four parts (Table 4.1):

- 1) Thai Fruit in China: export values and volumes from Thailand, and their trends;
- 2) Among Competitors: current and potential competitors, their capacity and advantages;
- 3) Marketing mix: observations of the 4P mix (product, price, promotion, channel) in Chinese market;
- 4) Consumer insights in terms of positive keywords and negative feedback.

Table 4.1 Organization of Chapter 4

Fruits Covered	1	Heavy Weight	1	Durian
			2	Mangosteen
			3	Longan
	2	Rising Star	1	Mango
			2	Young Coconut
			3	Pomelo

Marketing Data of Each Fruit	
Thai Fruit in China	value volume, and trend
Among Competitors	current and potential competitors
Marketing Mix	case observations of 4P mix
Consumer Insight	positive key words & negative feedback

Source: CASPIM

2. Heavy Weight

2.1 Durian

Thai Durian in China

From the export value and volume of Thai durian in China (Table 4.2), we may observe the following:

- 1) Despite of Covid 19 and its negative impacts on international trade, durian export from Thailand to China reached 779,800 tons and \$98,322 million in 2021;
- 2) The success in 2021 is attributed to rising demand in China through channel deepening, and strict control of quality, such as “eradication of premature harvest” by the Thai government;
- 3) The growth rate, about 80% to 100% per year for value in the 4-year period, is impressive. The relatively lower growth rate for volume shows the price premium every year;
- 4) Contrary to the pessimistic views on Chinese ZCP (Zero Covid Policy) in the early months of 2022, durian export in Thailand quickly recovered from April to June, when the problem of traffic jam was solved by the joint efforts of the Thai and Chinese governments, and the Thai exporters. With a surge in November and December, the accumulated durian export from Thailand to China in the year 2022 outperformed that of 2021 (Table 4.3);
- 5) The growth in the past shows the market acceptance and potential to absorb the extra capacity. The major challenges remain in terms of possible future disruption of logistics, quality control of Thailand, and competition from other ASEAN countries.

Table 4.2 Export Value and Volume of Thai Durian in China 2018-2021

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Mill B	Δ%	V Rank	Mill B	Δ%	V Rank	Mill B	Δ%	V Rank	Mill B	Δ%	V Rank	share%
ทุเรียน	Durian	13,179	79.4	1	26,341	99.9	1	47,798	81.5	1	98,332	105.7	1	70.6

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021		
		Ton	Δ%	Rank	Ton	Δ%	Rank	Ton	Δ%	Rank	Ton	Δ%	Rank
ทุเรียน	Durian	199,986	47.4	5	375,333	87.7	4	444,411	18.4	3	779,880	75.5	5

Source: Custom of Thailand quoted in Tables 1.3 and 1.4.

Table 4.3 Comparison of Export Value, Volume and Price of Thai Durian in China 2021-2022

Month	2022 (Ton)		2021 (Ton)		฿/kg 2022	฿/kg 2021
	Current	Accumulated	Current	Accumulated		
Jan	8,479	8,479	7,201	7,201	180	144
Feb	1,389	9,867	20,619	27,820	158	139
Mar	11,642	21,509	11,643	39,464	149	140
Apr	127,428	148,937	140,189	179,653	142	133
May	256,549	405,486	211,350	391,003	127	120
June	161,783	567,270	82,650	473,653	124	128
July	102,989	670,259	111,669	585,321	134	119
Aug	19,121	689,380	124,685	710,006	130	117
Sep	4,684	694,064	30,962	740,968	147	132
Oct	5,420	699,484	9,555	750,523	156	158
Nov	36,394	735,879	12,798	763,321	154	165
Dec	53,790	789,668	16,552	779,872	148	167

Source: Compiled by CASPIM from Data of Customs of Thailand

Among Competitors

China, the largest market of durian in the world, imported 822,000 tons of fruit in 2021¹, mostly from **Thailand**, the largest producer on earth, which churned out more than 1 million tons a year in the past. Thai farmers benefit from the large and growing market: durian export to China took off in 2003 when FTA was established between the two countries, and Thailand is the only country on the permission list for fresh durian until 2021 (Table 4.4).

Malaysia gained export permission for frozen durian puree and meat in 2011 and whole frozen durian in 2019. Its major varieties are Musang King and Black Thorn (Figure 4.1). The two varieties are positioned for the higher-end market of "Connoisseurs". In 2022 the price of Musang King is ฿600/kg-฿700/kg, more than three times of MonThong of Thailand. The limitation for the country is the export capacity: Malaysia is the biggest country for durian consumption in the world. The domestic market devours most of its output. Out of its total output of about 0.4 million tons, only 20,000 tons are earmarked for China.

¹ Data of Customs of China

Table 4.4 Countries with Permission of Durian Export to China

	Thailand	Malaysia	Vietnam	Phillipines
Permission by China	Both Fresh & Frozen	Frozen Only (Meat & Whole Fruit)	Fresh	Fresh
Market share in China	>99%	<1%	-	-
Production capacity	> 1 mil ton	0.4 mil ton	0.6 mil ton	0.1 mil ton
Major Varieties In China	MonThong, Chane, Kra Durn, GanYao, Puangmanee	Musang King, Black Thorn, Sultan	MonThong Ri6	Puyat, Kob Duyaya, D101
Major Season	Mar-Oct	Jun-Jan	Apr-July, Oct-Mar	Feb-April, Aug-Oct

Source: Compiled by CASPIM

Figure 4.1 Representative Varieties of Durian in Malaysia

D197 Musang King 猫山王	D200 Black Thorn 黑刺	D24 Sultan 苏丹	D198 Golden Phoenix 金凤凰
Musang King (Mao Shan Wang)  Dusky green husk Oval/pear shaped Small seeds Thick turmeric yellow flesh Bittersweet, creamy taste Star-shaped pattern at bottom	Black Thorn  Bright yellow & creamy flesh Sweet, custardy taste Darker thorn tips A small 'belly-button' indent on bottom of shell	D24 (Sultan)  Homogeneous green husk Round/odd shaped Wholesome seeds Pale yellow flesh Thin, sharp thorns Round brown patch at bottom	Golden Phoenix (Jin Feng)  Small round shaped Thin husk Tightly packed thorns Small dusky seed Thin pale yellowish white flesh Creamy texture

Source: SG FoodAgency

Graph Credit: SGFoodAgency

Vietnam gained the export permission and officially entered the Chinese market in September 2022. It used to sell durian to China through unofficial border trade or in the name of Thai produce. Its major varieties are MonThong and Ri6 (Figure 4.2). Its advantages over Thailand are shorter transportation routes to China (around 36 hours vs three/four days) and lower production costs. At the first stage, only 51 orchards in Vietnam (compared with more than 55,000 in Thailand), received export permission. That translates to 18,000 out of around 600,000 tons of total capacity. However, in early 2023, the number of orchards' export permission jumped to 163. The plantation area also increased to 80,000 hectares, far above the figure of 65,000-75,000 hectares in the government plan for 2030.

Figure 4.2 Representative Varieties of Durian in Vietnam



Source: <https://zhuanlan.zhihu.com>

Graph Credit: zhuanlan.zhihu.com

The Philippines acquired the official permission for export of fresh durian to China in 2023. It is the top 10 durian exporter in the world from 2014 to 2021. In 2020, its output was around 100,000 tons, about 80% from the Davao region in the south. The popular varieties include descendants of seeds from Thailand such as Puyat, the Kobs, Duyaya, Nanam, Alcon Fancy, and GD-69, and those from Malaysia such as D101, D24, and Red Prawn (Figure 4.3).

Figure 4.3 Representative Varieties of Durian in The Philippines

Puyat 普倅	the Philippine's main commercial durian variety. A seedling of Chaneé, one of the fattiest, fleshiest, with the strong sweet flavor
Kob Yellow 科布耶路	Mild one that's not too sweet, and not too strong odor
Kob White 科布怀特	Massive 5 kilo, white or pearly-grey fleshed, with an elongated shape. Extremely fatty, dense and very bitter. One of the best tasting
Duyaya 杜亚倅	Bright yellow, with one of the highest flesh-to-seed ratio
Nanam 普纳	Sweet, mild with a slightly nutty flavor.

Source: <https://zhuanlan.zhihu.com>

The other potential competitors are Cambodia, Laos and China itself. The capacity of **Cambodia** is about 37,000 tons, with the most famous location in Kampot. The **Laos** Attracted investors from Vietnam and China recently for durian plantation. One Chinese company announced its plan to build a durian orchard of nearly 17,000 rai in Attapeu. Hainan (海南) province in **China** flaunted its success in the commercialization of durian production in 2022. It may deliver 45,000 to 75,000 tons by 2024-2025.

The Chinese market for durian is not saturated yet, as some speculated the market may reach its peak at 1.3 to 1.5 million tons. However, the growth of demand may not catch the growth of supply as more durian orchards (from Thailand as well as its neighbors) enter the market. Product innovation and better quality control may be the solutions for Thailand to meet the challenge in the scramble for the durian market in China.

Marketing Mix

The observations on durian in Chinese market include product varieties such as MonThong, Puang Manee, Musang King, in the form of fresh fruit, frozen fruit or frozen meat, their package size, price, countries of origin such as Thailand and Malaysia, retailers and major e-commerce platforms such as TMall, JD, PingDuoDuo and Suning (Table 4.5).

In terms of products, besides the dominating MonThong, Chinese consumers also seek other varieties, especially Chanee, GanYao, and Puang Manee from Thailand. Frozen durian meat (for controllable quality and convenience) and the related concept of "ripe on the tree" gained popularity, pioneered by Musang King from Malaysia in the high-end segment. Small size is popular for nuclear families in China.

In terms of price, the frozen Musang King was around ¥160-¥170/kg compared with ¥80- ¥115/kg for MonThong and Puang Manee during the time surveyed. MonThong from Vietnam claimed to be of Thai origin is a strong competitor in the lower-end segment, where the price may reach ¥35-¥40/kg in some platforms or outlets.

Table 4.4 Marketing Mix of During in Chinese Market

Product	Origin/Supplier	Price
猫山王速冻榴莲一级果 2-2.5斤 Frozen Musang King Grade A 1-1.25 kg	Malaysia 果然馆 Guo Ran Guan Suning	¥174/kg
托曼尼 4-5斤 Puang Manee 2-2.5 kg	Thailand 1号鲜客(FRESHMAN) Suning	¥115.6/kg
金枕头榴莲 4.5-5.5斤 MonThong 2.25-2.75 kg	Thailand 创晟果蔬 Chuang Sheng Guo Shu JD	¥83.2/kg
猫山王榴莲 冻带壳榴莲 2.2斤-2.6斤 Frozen Musang King 1.1-1.3 kg	Malaysia 马猫 Ma Mao JD	¥167.7/kg
冷冻金枕头榴莲肉 Frozen MonThong Meat	Thailand 榴芒一刻 Liu Mang Yi Ke TMall	¥393.2/kg
泰国金枕榴莲4-5斤 MonThong 2-2.5 kg	Thailand 绿丰山 Lv Feng Shan TMall	¥115.2/kg
A级泰国金枕头榴莲肉 有核2斤直播 Frozen MonThong Meat with Stone 1 kg Lifestream	Thailand 鲜陌百 Xian Mo Bai PingDuoDuo	¥39.9/kg
泰国金枕头榴莲 5-6斤 MonThong 2.5-3 kg	Thailand 渭源百香园 PingDuoDuo	¥34.2/kg

Source: Compiled by CASPIM

Figure 4.4 Promotion Contents for Durian in Chinese Market

Durian and Mangosteen	Method for Opening a Durian
	
Method for Detecting Ripeness	Serving Ideas
	

Source: Compiled by CASPIM
Graph Credit: 1) item.taobao.com; 2) Weidian.com; 3) cnhnb.com; 4) maishoudang.com

Figure 4.5 Positive Keywords & Negative Comments for Durian in Chinese Market

Positive Key Words	Negative Feedback
香糯 Tender	Little meat
润滑 Smooth	Unripe (Si Bao 死包: would not ripe)
甜而不膩 Agreeable sweetness	Rotten
肉多 Fleshy	Big Stone
核小 Small stone	
果味香浓 Strong flavor	
果肉饱满 Plump flesh	
树上熟 Ripe on tree	
急冻锁鲜 Rapid freeze for freshness	
冰淇淋口感 Like icecream	

Source: Compiled by CASPIM

Consumer Insight

The consumer insights for durian in Chinese market are reflected in the promotion contents of the sellers (Figure 4.4), positive keywords in the promotion message and negative comments from customers (Figure 4.5).

From the analysis of the promotion message and feedback from customers, the positive keywords for category durian include "Tender", "Smooth" "Like ice cream", "Fleshy", "Small Stone", "Plump flesh", "Agreeable sweetness", "Strong flavor", "Rapid freeze for freshness" and "Ripe on the tree".

The most frequent complaints from Chinese consumers for durian are: "Unripe" or "Si Bao (死包)", a situation when the fruit will not ripe under any situations, "Rotten", or "Little meat", "Big Stone".

Methods for "Detecting ripeness", "Accelerating the ripening", "Opening the fruit", "Serving Ideas" are popular topics in the promotion content for consumers.

2.2 Mangosteen

Thai Mangosteen in China

From the export value and volume of Thai mangosteen in China, we may observe the following:

- 1) Mangosteen export to China reached 231,689 tons and ฿15,966 million in 2021. The volume was lower than 290,735 tons in 2019, but the value was higher than ฿11,752 million baht in 2019. The market accepted the higher price, and the exporters are profitable (Table 4.6);
- 2) Covid-19 and China's ZCP did have a negative impact on Thai mangosteen export to China in 2022: Its export volume and value dropped to 181,198 tons and ฿12,499 million in 2022. The average price, however, remained at 69 ฿/kg, the same as that of 2021.

Table 4.6 Export Value and Volume of Thai Mangosteen in China 2018-2021

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Mil B	Δ%	V Rank	Mil B	Δ%	V Rank	Mil B	Δ%	V Rank	Mil B	Δ%	V Rank	share%
มังคุด	Mangosteen	3,261	62.1	3	11,752	260.4	2	11,576	-1.5	3	15,966	37.9	3	11.5

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021		
		Ton	Δ%	Rank	Ton	Δ%	Rank	Ton	Δ%	Rank	Ton	Δ%	Rank
มังคุด	Mangosteen	80,816	54.8	4	290,735	259.8	2	217,938	-25.0	7	231,689	6.3	10

Source: Customs of Thailand quoted in Tables 1.3 and 1.4.

Among Competitors

There are five countries with export permission of mangosteen to China so far: Thailand, Malaysia, Indonesia, Vietnam, and Myanmar, while the Philippines is under negotiation for market entry (Table 4.7). The mangosteen market in China is dominated by Thailand (around 90%), followed by Indonesia (around 10%). There are insignificant imports from Malaysia (around 1%) and Vietnam (<1%). Indonesia complements Thailand well in the harvest season. Vietnam has a large capacity for production, but its export to China has been suppressed by strict inspection and quarantine processes so far.

Mangosteen is planted in Fujian, Guangdong and Yunnan provinces in China, but there is no large-scale commercial production.

Table 4.7 Current and Potential Players in the Mangosteen Market in China

Thailand	Malaysia	Vietnam	Indonesia	Myanmar	Philippines	China
Permitted	Permitted	Permitted	Permitted	Permitted	Under Negotiation	
90% market Output 0.5 mil tons Thin skin, Fresh Best Season: Apr to Sep	1% Market Output 0.1 tons June-Aug Dec-Jan	<1% Market Output: 1.2 mil tons May-Aug	10% market Output: 0.3 mil tons Mainly domestic Price 1/2 of Thailand Oct-Mar	Not Active In production or export	Output: 5000 tons Aug-Oct	Fujian, Guangdong Yunnan No large scale commercial production May-Sep

Mangosteen Import China	2021		2020		2019	
	ton	%	ton	%	ton	%
Thailand	228,103	91.7	255,062	86.6	341,084	93.6
Indonesia	20,521	8.2	35,729	12.1	19,490	5.3
Malaysia	221	0.1	3,833	1.3	4,011	1.1
Vietnam	-	-	42	0.01	-	-
Total	248,845	100.0	294,665	100.0	364,584	100.0

Source: Compiled by CASPIM, with import data from GACC (General Administration of Customs of China)

Marketing Mix

The observations on mangosteen in Chinese market include product grade, package size, price, countries of origin such as Thailand and Indonesia, retailers and major e-commerce platforms such as TMall, Tao Bao, JD, PingDuoDuo and Suning (Table 4.5).

Mangosteens from Thailand were sold at prices from around ¥50/kg to ¥95/kg, which is similar to those from Indonesia during the time surveyed

Table 4.8 Marketing Mix of Mangosteen in Chinese Market

Product	Origin/Supplier	Price
3斤油麻竹 Mangosteen 1.5 kg	Not specified 梁孟涵 LIANG MENG HAN Suning	¥52/kg
新鲜山竹5斤(5A大果) Mangosteen 5A 2.5 kg	Thailand 1号鲜客 FRESHMAN Suning	¥56/kg
10斤新鲜5A6A大果 Mangosteen 5A/6A 5 kg	Thailand 歌慕 GeMu TMall	¥52/kg
3斤5A大果 Mangosteen 5A 1.5 kg	Indonesia 乐鲜果园 Lexian Guoyuan Tao Bao	¥99/kg
5A级超大果 净重1.5kg Mangosteen 5A 1.5 kg	Indonesia 京觅 Jing Mi JD	¥92.7/kg
5A级超大果 净重2.5kg Mangosteen 5A 2.5 kg	Thailand 三萌果蔬 Sanmeng JD	¥83.2/kg
进口山竹 1kg Mangosteen 1 kg	Thailand 定岁 Dingsui PingDuoDuo	¥95.88/kg
3A果 净重1.5kg Mangosteen 3A 1.5 kg	Thailand 果芝优选 Guozhi Youxuan PingDuoDuo	¥46.6/kg

Source: Compiled by CASPIM

Consumer Insight

The consumer insights for mangosteen in Chinese market are reflected in the promotion contents of the sellers (Figure 4.6), positive keywords in the promotion message and negative comments from customers (Figure 4.7).

From analysis of the promotion message and feedback by customers, the positive key words for category mangosteens include “Queen of fruits” (for matching durian), “Long periods for nutrition accumulation”, “Hand picked”, “Pure white fresh & beautiful purple skin”, “Soft & melted in the mouth” and “Refreshing”. The most frequent complaints are: “Hard as rock, can not open”, “Thick skin & little flesh”, “Not fresh and rotten”.

Methods for “Knowing the number of sections inside by counting the petals on top of the fruit”, “Opening the fruit”; “Size of each grade”, and “Illustration that the fruit is still edible despite certain blemish on the skin” are popular topics for consumers.

Figure 4.6 Promotion Contents for Mangosteen in Chinese Market

Grade of Mangosteen	Methods of Counting the Sections
	
Methods of Opening the Fruit	Methods of Judging Quality
	

Source: Compiled by CASPIM

Graph Credit: 1) sohu.com; 2) efoodline.com; 3) zhuanlan.zhihu.com; 4) laitimes.com

Figure 4.7 Positive Keywords & Negative Comments for Mangosteen in Chinese Market

Positive Key Words	Negative Feedback
果中皇后 Queen (matching Durian)	Not fresh
直供 Direct import	
优选大果 Selected big fruit	
长期沉淀 Long period for nutrition accumulatormn	Hard as rock Can not open
手摘 Hand picked	
霞衣白肉 White fresh purple skin	
饱满圆润 Plump round shape	Rotten
皮薄多肉核小 Thin skin, fleshy, small pit	
细嫩 Soft, melted in mouth	
酸甜 Sweet & sour	Thick skin & little flesh
滑润 Smooth	
多汁 Juicy	
爽口 Refreshing	
营养 Mineral, fiber, vitamine	

Source: Compiled by CASPIM

2.3 Longan

Thai longan in China

From the export value and volume of Thai longan in China, we may observe the following:

- 1) Thai Longan export to China reached 476,025 tons and ฿18,024 million in 2021, the highest in history (Table 4.9);
- 2) Covid-19 and China's ZCP did have a negative impact on Thai longan export to China in 2022: Its export volume and value dropped to 340,089 tons and ฿12,662 million in 2022. The average price is 37.2 ฿/kg in 2022, slightly lower than 37.8 ฿/kg in 2021.

Table 4.9 Export Value and Volume of Thai Longan in China 2018-2021

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	share%
ลำไย	Longan	4,406	-16.1	2	9,696	120	3	12,661	31	2	18,024	42	2	12.9
รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	
ลำไย	Longan	133,191	-16.3	10	281,320	111.2	3	343,304	22.0	2	476,025	38.7	7	

Source: Customs of Thailand quoted in Tables 1.3 and 1.4.

Among Competitors

There are six countries with export permission of longan to China so far: Thailand, Malaysia, Indonesia, Vietnam, Myanmar and recently Cambodia (October 2022), while Laos is under negotiation for market entry (Table 4.10).

China is a large producer of longan with a capacity of 2 million tons, twice as large as that of Thailand. China imported around 0.5 million tons of longan every year, mostly from Thailand in 2020 and 2021.

Table 4.10 Current and Potential Players in the Longan Market of China

Thailand	Malaysia	Vietnam	Indonesia	Myanmar	Cambodia	Laos	China
Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Under Negotiation	
Output 1mil tons 470,000 tons to China around 99% market July-Aug, Dec-Jan	Not significant In production and export	Output 600,000 tons 1000 tons to China around 1% Market (Used to be 30% 2019) All year	Not significant In production and export	Not significant In production and export	Output 110,000 tons Before 8000 tons to China via Thailand Oct-May	Not significant In production and export	Production 2 mil tons Import 0.5 mil tons June-Aug
Longan Import China	2021		2020		2019		
	ton	%	ton	%	ton	%	
Thailand	467,967	99.8	342,213	98.7	279,446	68.7	
Vietnam	979	0.2	4,592	1.3	127,169	31.3	
Total	468,946	100.0	346,805	100.0	406,615	100.0	

Source: Compiled by CASPIM, with import data from GACC (General Administration of Customs of China)

Marketing Mix

The observations on longan in Chinese market include product grade, package size, price, countries of origin such as Thailand and China, retailers and major e-commerce platforms such as TMall, JD, PingDuoDuo and Suning (Table 4.11).

Longans from Thailand were sold at prices from around ¥30/kg to ¥50/kg, compared with ¥50/kg to ¥60/kg, the high-quality ones from China (e.g. 储良 Hainan Chuliang or 石硖 Guangdong Shixia) during the time surveyed. The price can go down to ¥9.9/kg in the livestream sales on the discount platform such as PingDuoDuo.

Table 4.11 Marketing Mix of Longan in Chinese Market

Product	Origin/Supplier	Price
整箱 A级大果净重2斤 Longan 1 kg Grade A	Thailand 汶优香 WENYOUXIANG Suning	¥30/kg
泰国进口龙眼净重2斤 Longan 1 kg	Thailand 陈小四水果 Chen Xiaosi Fruit Suning	¥34.8/kg
石硖桂圆当季5斤 Guangdong Shixia Longan 2.5 kg	China 川芯鲜 Chuan Xin Xian TMall	¥63.6/kg
龙眼一级3斤 Longan Grade A 1.5 kg	Thailand 天猫超市 TMall SuperMarket TMall	¥33.27/kg
5斤 精选礼盒装 Longan 2.5 kg Gift box	Thailand 九宠 Jiu Chong JD	¥47.92/kg
精品大桂圆礼盒 2斤 Longan 1 kg Gift box	Thailand 亿果争鲜 Yi Guo Zheng Xian JD	¥42.8/kg
海南储良龙眼 Hainan Chuliang Longan 1.5 kg	China 绿果缤纷 Lv Guo Bin Fen PingDuoDuo	¥46.8/kg
整箱批发龙眼 4斤 Longan 2 kg wholesale (No.1 sales on PingDuoDuo with live streaming)	Thailand 鲜果大果 Xian Guo Da Guo PingDuoDuo	¥9.9/kg

Source: Compiled by CASPIM

Consumer Insight

The consumer insights for longan in Chinese market are reflected in the promotion contents of the sellers (Figure 4.8), positive keywords in the promotion message and negative comments from customers (Figure 4.9).

From analysis of the promotion message and feedback from customers, the positive key words for category longan include “Traditionally nutritional”, “Sweet and juicy”, “Crisp & tender”, “Fleshy and thin skin”, “Moist”, “Chewy”, and “Crystal clear”, and The most frequent complaints are: “Dry”, “A particular smell”, “Not fresh, rotten”, Germinating”, “Small size”, and “Not sweet”. Messages about “High-quality orchard” and “Claimed advantages of longan from Thailand compared with local ones” are popular topics.

Figure 4.8 Promotion Contents for Longan in Chinese Market

High Quality Orchard	Thai Longan vs. Chinese Longan								
 光照充足 平均温度25-30℃ 有利于果实光合作用，开花结果期早 土壤肥沃 海水冲刷土壤，蓄水性好，矿物质丰富，为龙眼提供充足养分 降水充沛 平均降水量约1000毫米，滋养龙眼成熟结果	<table><tr><th>Thai Longan</th><th>Chinese Longan</th></tr><tr><td>Golden lustre Fleshy Juicy</td><td>Pale Soft flesh Bit dry</td></tr><tr><td>Not easy to suffer from internal heat</td><td>Easy to suffer from "internal heat"</td></tr><tr><td>Rich in Vitamin</td><td>Relatively less Vitamins</td></tr></table>	Thai Longan	Chinese Longan	Golden lustre Fleshy Juicy	Pale Soft flesh Bit dry	Not easy to suffer from internal heat	Easy to suffer from "internal heat"	Rich in Vitamin	Relatively less Vitamins
Thai Longan	Chinese Longan								
Golden lustre Fleshy Juicy	Pale Soft flesh Bit dry								
Not easy to suffer from internal heat	Easy to suffer from "internal heat"								
Rich in Vitamin	Relatively less Vitamins								

Source: Compiled by CASPIM

Graph Credit: 1) product.suning.com; 2) taobao.com

Figure 4.9 Positive Keywords & Negative Comments for Longan in Chinese Market

Positive Key Words	Negative Feedback
传统营养 Traditionally nutritional	Not fresh/Rotten
甜蜜 Sweet	
多汁 Juicy	Germinating
脆嫩 Crisp & tender	
薄皮 Thin skin	Dry
多肉 Fleshy	
饱满紧实 Plump & firm	Small size
有嚼感 Chewy	
晶莹剔透 Crystal clear	Not sweet
水润 Moist	
优质源头 High quality orchard	A particular smell

Source: Compiled by CASPIM

3. Rising Star

3.1 Mango

Thai Mango in China

From the export value and volume of Thai mango in China, we may observe the following:

- 1) Mango export from Thailand to the world increased both in volume and value from 2018 (63,198 tons, \$2,017 million) to 2021 (113,806 tons, \$2,936 million). However, the export to China in 2021 dropped to its lowest level in the past years (4,941 tons) compared with the peak of 2019 (12,024 tons), which might be explained by the fierce competition in the Chinese market (Table 4.12);

- 2) China is not the most important market for Thai mango so far, ranging from No. 3 to No. 5 in the top 5 list (Table 4.13). In 2021, the largest market was Malaysia (64% in volume), followed by Vietnam and Korea (around 10% each). China is No.5 alongside with Singapore (about 5%), the lowest position in recent years. It is worth noting the case of Korea: it accounted for 32% in value but only 10% in volume, reflecting a high price premium. The success in Korean market shows the potential of Thai mango in China in the premium market as a rising star;
- 3) Covid-19 and China's ZCP did have a negative impact on Thai mango export to China in 2022: According to the data of GACC, its export volume and value dropped to 1,989 tons and ¥25 million in 2022 from 5,651 tons and ¥58 million in 2021. The average price, however, increased from 10.3 ¥/kg in 2021 to 12.7 ¥/kg in 2022.

Table 4.12 Export Value and Volume of Thai Mango in China 2018-2021

การส่งออก 14	Fruits 14	2018			2019			2020			2021			
		Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	share%
ผลไม้	Mango	144	-1.7	9	172	19.1	9	205	19.2	8	91	-55.8	9	0.1
การนำเข้า 14	Fruits 14	2018			2019			2020			2021			
		Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	
ผลไม้	Mango	8,914	87.0	3	12,024	34.9	6	10,028	-16.6	6	4,941	-50.7	14	

Source: Customs of Thailand quoted in Table 1.3 and 1.4.

Table 4.13 Top 5 Export Markets of Thai Mango 2018-2021

Top 5 Markets 2018			Top 5 Markets 2019			Top 5 Markets 2020			Top 5 Markets 2021		
Country	Volume %	Value %	Country	Volume %	Value %	Country	Volume %	Value %	Country	Volume %	Value %
VIETNAM	39.1	6.8	MALAYSIA	23.4	5.7	MALAYSIA	48.8	19.4	MALAYSIA	64.0	45.3
MALAYSIA	18.9	5.2	CHINA	21.2	12.5	CHINA	12.6	12.8	VIETNAM	10.1	5.8
KOREA	15.0	42.6	VIETNAM	17.4	2.6	VIETNAM	10.9	4.0	KOREA	9.9	32.0
CHINA	14.1	8.0	KOREA	16.7	40.6	KOREA	8.9	23.1	SINGAPORE	5.1	2.8
JAPAN	3.0	9.0	LAO	9.5	2.5	LAO	7.8	3.0	CHINA	4.3	3.1

Source: Customs of Thailand

Among Competitors

The key competitor of Thailand is actually China itself, the world second largest producer of mango, with the capacity of more than 3 million tons, 3 times that of Thailand. According to the data of GACC, China imported 14,148 tons of mango from abroad in 2021. The four largest suppliers are Thailand (39.9%), Cambodia (23.6%), Vietnam (19.0%) and Taiwan (14.5%) (Table 4.14).

Table 4.14 Major Players in the Mango Market of China

Thailand	China	Cambodia	Vietnam	Taiwan
Permitted	-	Permitted	Permitted	Permitted
Output: 0.9 mil ton Mar-May, Dec-Jan	Output: 3.3 mil ton May-Oct	Output: 1.75 mil ton Mar-July	Output: 0.9 mil ton Mar-Apr, May-Sep	Output: 0.15 mil tons May-Sep
Nam Dokmai 水仙 Mahachanok 彩虹 Okrong 白花	Guifei 贵妃 Jinhuang 金煌 Tainong No.1 台农1号	Keo Romiet 高乐美	Khiaoyai 大青 Keo Romiet 高乐美	Inwin 爱文 Jinhuang 金煌

Mango Import China	2021		2020		2019	
	ton	%	ton	%	ton	%
Thailand	5,651	39.9	11,711	14.0	8,562	61.8
Philippines	52	0.4	98	0.1	158	1.1
Cambodia	3,343	23.6	25	0.0	10	0.1
Vietnam	2,694	19.0	67,181	80.5	141	1.0
Myanmar	77	0.5	-	-	2	0.0
Taiwan	2,050	14.5	3,991	4.8	4,798	34.6
Pakistan	37	0.3	4	0.0	20	0.1
Australia	242	1.7	453	0.5	163	1.2
Total	14,148	100.0	83,461	100.0	13,854	100.0

Source: Compiled by CASPIM, with import data from GACC (General Administration of Customs of China)

Marketing Mix

The observations on mango in Chinese market include product grade, package size, price, countries of origin such as Thailand, Vietnam and China, retailers and major e-commerce platforms such as TMall, Tao Bao, JD, and PingDuoDuo (Table 4.15).

The premium mango of Thailand (Nam Dokmai Si Thong) can be sold at ¥100/kg, while the ordinary quality ones around ¥20/kg, compared with the local ones between ¥4/kg to ¥20/kg. Mango from Vietnam can be bought at about ¥2/kg,

In 2021 the market welcomed a small "Pi Pa Mango" which is actually Mayongchid, a fruit not yet permitted for import. It is well received for its sweet and sour flavor and can fetch a price of around ¥150/kg.

Table 4.15 Marketing Mix of Mango in Chinese Market

Product	Origin/Supplier	Price
水仙芒果3斤特大果 Mango 1.5 kg Extra big Nam Dokmai Si Thong	乐鲜果园 Lexian Guoyuan Tao Bao	¥99.3/kg
彩虹芒10斤当季小核 Mango 5 kg Mahachanok (rainbow)	Thailand 睿初 Rui Chu JD	¥20/kg
迷你稀有泰国枇杷芒8斤 Mayongchid 4 kg	Thailand 卓之鲜 Zhuo Zhi Xian JD	¥162/kg
迷你稀有泰国枇杷芒2斤 Mayongchid 1 kg	China 正光奇才 ZG JD	¥188/kg
海南贵妃芒果新鲜9斤水 Hainan Guifi Mango 4.5 kg	China 果品康 Guo Pin Kang Tao Bao	¥15.5/kg
四川攀枝花凯特芒果10斤 Sichuan Kate Mango 5 kg	China 果妙园 Guo Miao Yuan Tao Bao	¥4/kg
海南小台农9斤 Xiao Tai Nong Mango 4.5 kg	China 果品康 Guo Pin Kang TMall	¥21.7/kg
越南大青芒 10斤 Khiaoyai Vietnam 5 kg	Vietnam 亿熙 Yi Xi PingDuoDuo	¥2.14/kg

Source: Compiled by CASPIM

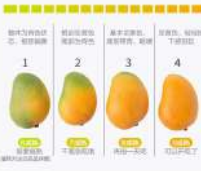
Consumer Insight

The consumer insights for mango in Chinese market are reflected in the promotion contents of the sellers (Figure 4.10), positive keywords in the promotion message and negative comments from customers (Figure 4.11).

From analysis of the promotion message and feedback by customers, the positive key words for category mongo include “Not fibrous”, “Aromatic”, “Juicy”, “Thin skin”, “Thin stone”, and “Right Brix Acid Ratio”, “Aftertaste” and “Golden color”, and the most frequent complaints are: “Sour”, “Big stone” and “Less weight than claimed” .

Messages about “Method of ripening and serving”, “Nutrient value”, “Illustration of thin stone”, and “Education about acceptable spots and stains on the skin” are popular topics. There is also an innovative packaging illustrating the right color for ripeness.

Figure 4.10 Promotion Contents for Mango in Chinese Market

Nutrient Value	Method of Ripening & Serving
	
Illustration of Ripeness	Thin Stone
	

Source: Compiled by CASPIM
 Graph Credit: 1) & 2) huaguoshan.com; 3) zhuanlan.zhihu.com; 4) huaguoshan.com

Figure 4.11 Positive Keywords & Negative Comments for Mango in Chinese Market

Positive Key Words	Negative Feedback
无纤维 Not fibrous	Not as advertised
多汁 Juicy	
芒香四溢 Aromatic	Less weight than claimed
皮薄 Thin skin	
核薄 Thin stone	Stains on the skin
果肉厚实 Fleshy	
入口即化 Melt in mouth	Sour
酸甜比 Brix Acid Ratio	
回味 Aftertaste	Big stone
味浓 Rich flavour	
果肉金黄 Golden color	
营养功效 Nutrient value	

Source: Compiled by CASPIM

3.2 Young Coconut

Thai Young Coconut in China

From the export value and volume of young Thai coconut in China, we may observe:

- 1) Young coconut is a true rising star among other Thai fruits in China. Export to China reached 226,621 tons and \$5,131 million in 2021. The growth in volume is 85% on top of 79% growth in 2019 and 27% in 2020. The higher growth rates in value than in volume in 2020 and 2021 indicate a higher price in these two years (Table 4.16);
- 2) Covid-19 and China's ZCP did not hinder Thai export of young coconut to China in 2022. The export volume and value reached 376,548 tons and \$8,369 million in 2022, the highest level in history.

Table 4.16 Export Value and Volume of Thai Young Coconut in China 2018-2021

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	share%
มะพร้าวอ่อน	Coconut Y	1,313	58.9	4	1,891	44.1	4	2,554	35.1	4	5,131	100.9	4	3.7

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021		
		Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank
มะพร้าวอ่อน	Coconut Y	54,063	47.2	6	96,700	78.9	5	122,689	26.9	1	226,621	84.7	4

Source: Customs of Thailand quoted in Table 1.3 and 1.4.

Among Competitors

China produces about 25,000 tons of coconut, mostly in Hainan province. It imported 871,753 tons in 2021, mostly from Indonesia (43.8%), Thailand (38.3%) and Vietnam (15.1%). Thailand dominates the retail market for young coconut. Its two other competitors serve mainly industrial users to produce coconut oil or milk (Table 4.17).

Table 4.17 Major Players in the Coconut Market of China

Thailand	Indonesia	Vietnam	Malaysia	Philippines	China
Output 1.7 mil ton (all coconut) Mainly for fresh coconut retail	World Largest producer Output 18 mil tons Export to China Mainly for industrial use	Output 1.7 mil ton Export to China Mainly for industrial use	Output 0.6 mil ton	World 2nd Largest producer Output 15 mil tons	Output about 25,000 ton Mostly in Hainan Total import 0.87 mil ton
Coconut Import China	2021		2020		
	ton	%	ton	%	
Thailand	333,703	38.3	245,662	38.7	
Indonesia	381,457	43.8	269,080	42.4	
Vietnam	131,491	15.1	96,674	15.2	
Philippines	24,982	2.9	22,008	3.5	
Malaysia	121	0.0	877	0.1	
Taiwan	-	-	-	-	
Total	871,753	100.0	634,301	100.0	

Source: Compiled by CASPIM, with import data from GACC (General Administration of Customs of China)

Marketing Mix

The observations on young coconut in Chinese market include: product types such as polished or trimmed, normal or aromatic, whole fruit or coconut water, package type and size (such as easy open), price, countries of origin such as Thailand and China, retailers and major e-commerce platforms such as TMall, JD, PingDuoDuo and Suning (Table 4.18).

The coconuts of Thailand are sold at ¥10 to ¥15 per unit, at a price similar to the local ones during the time surveyed. The promotion price in the online discount platform PingDuoDuo can go down to ¥4.32 per unit. The "Easy Open Coconut" with a plastic opening on top is sold at a slightly higher price. A 220 ml of coconut juice with rapid frozen technology is available at a price similar to a piece of fresh coconut.

Table 4.18 Marketing Mix of Young Coconut in Chinese Market

Product	Origin/Supplier	Price
泰国奶香椰皇 6个装 Polished Young Coconut 6 units	Thailand 冠町 Guan Ding Suning	¥11.65/unit
海南文昌椰青4个装 Trimmed Young Coconut 4 units	China 籽协鲜子 Zi Xie Xian Zi JD	¥15.5/unit
泰国香水椰9个装 Trimmed Aromatic Coconut 9 units	Thailand 果香果颜 Guo Xiang Guo Yan JD	¥11.1/unit
泰国香水椰9个装 Trimmed Aromatic Coconut 9 units	Thailand 奥英 Ao Ying PingDuoDuo	¥4.32/unit
泰国易开椰青6个装 Easy Open Trimmed Young Coconut 6 units per box	Thailand 百果园 Pagoda TMall	¥18.17/unit
盒马泰国椰青9粒装 Trimmed Young Coconut 9 units per box	Thailand 盒马 Hema TMall	¥14.33/unit
海南牛奶椰皇2个装 Polished Young Coconut 2 units per box	China 甘福园 Gan Fu Yuan TMall	¥9.4/unit
泰椰椰肉椰子汁 Coconut Water with Meat Frozen 7-day presale 220 ml/unit. 9 units	Thailand 泰椰 Thaiblue 喜儿的小卖部 Xier XiaoMaiBu	¥14.3/unit

Source: Compiled by CASPIM

Consumer Insight

The consumer insights for young coconut in Chinese market are reflected in the promotion contents of the sellers (Figure 4.12), positive keywords in the promotion message and negative comments from customers (Figure 4.13).

From analysis of the promotion message and feedback by customers, the positive key words for category young coconut include “Refreshing and Thirst-quenching”, “Sweet smell like milk”, “Abundant water”, “Thin shell”, “Meat tender & smooth”, “Meat springy”, and “Low sugar Low calorie”, and the most frequent complaints are: “Spoiled & sour”, “Unripe” and “With crack and little water”.

Message about “Open a coconut with the attached coconut opener” “Nutrient value”, “Serving ideas”, and “Education about Acceptable colors of coconut water” are popular topics.

Figure 4.12 Promotion Contents for Young Coconut in Chinese Market

Use a Coconut Opener	Serving Ideas
开椰子小教程  1. 将开椰子器对准椰子顶部 2. 撬出开椰子器顶部的椰子壳 3. 沿椰子壳顶部边缘将椰子壳撬开 4. 剥皮后看到椰子壳内的椰子肉 5. 用力将椰子壳撬开，露出椰子肉 6. 剥开椰子壳，千万记得！椰子肉要趁热吃，凉了就不好吃了	自制椰子汁  椰子鸡汤  Acceptable Colors of Coconut Water 这些颜色都是正常的  偏淡 偏深 偏黄

Source: Compiled by CASPIM
Graph Credit: 1) zhuanlan.zhihu.com; 2) item.taobao.com; 3) read01.com

Figure 4.13 Positive Keywords & Negative Comments for Young Coconut in Chinese Market

Positive Key Words	Negative Feedback
清爽 Refreshing	Spoiled & sour
自然甘甜 Natural sweetness	
生津解渴 Thirst-quenching	With crack and little water
营养丰富 Nutrient	
多汁 Abundant Water	Unripe
壳薄 Thin Shell	
送开椰器吸管 With Coconut opener	
椰肉嫩滑 Meat tender & smooth	Not fresh
椰肉Q弹 Meat springy	
低糖低热 Low sugar Low calorie	
牛奶香 Sweet smell like milk	

Source: Compiled by CASPIM

3.3 Pomelo

Thai Pomelo in China

From the export value and volume of Thai pomelo in China, we may observe:

- 1) Thai export of pomelo to China reached 25,153 tons and ฿860 million in 2021, with an impressive growth rate of 234% over the past year, mostly driven by the best selling Tubtim siam (Table 4.19);
- 2) Covid-19 and China's ZCP did not hinder Thai export of pomelo to China in 2022. The export volume and value reached 26,571 tons and ฿1,050 million in 2022, the highest level in history.

Table 4.19 Export Value and Volume of Thai Pomelo in China 2018-2021

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	Mil B	△%	V Rank	share%
ส้มโอบ	Pomelo	319	2.1	6	244	-23.5	7	314	28.5	6	860	173.9	5	0.6
รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	Ton	△%	Rank	
ส้มโอบ	Pomelo	9,795	3.8	9	7,075	-27.8	11	7,533	6.5	4	25,153	233.9	2	

Source: Customs of Thailand quoted in Table 1.3 and 1.4.

Among Competitors

Grapefruits and Pomelo are different species in the permission list of fruit import in China. However, they share the same HS code 0805400001 and appear in the same group as 柚类 in Chinese statistics. The imports from South Africa, Israel & Egypt are grapefruit (*Citrus × paradisi*), which is a hybrid of crossing sweet orange (*Citrus Sinensis*) with pomelo (*Citrus maxima* or *Citrus grandis*).

The biggest competitor of Thai Pomelo in China is China itself which is the world largest producer of the fruit, followed by Taiwan and Vietnam” the latter entering China through the border trade and via Thailand (Table 4.20).

Thai pomelos in China include: Tubtim siam, Thong Dee, Khao Tangkwa etc. Tubtim siam has a clear advantage over Shatian of China as it is dry and seedy, or Red Wentan of Taiwan as it is slightly bitter (Table 4.21).

Table 4.20 Major Players in the Pomelo Market of China

China	Thailand	Taiwan	Vietnam
-	Permitted	Permitted	Unpermitted
Output 5 mil tons Harvest Dec-Feb “Shatian” (沙田柚)	Output 0.96 mil tons Harvest August-Sep Thong Dee Khao Tangkwa Tabtinsiam	Output 75,000 tons Harvest Sep-Oct Red Wentan (红文旦)	Enter China via Thailand Output 0.95 mil tons Harvest June-Dec - Khao Tangkwa

Grapefruits & Pomelo Import China	2021		2020	
	ton	%	ton	%
Thailand	23,295	18.8	7,515	9.5
Taiwan	5,320	4.3	4,405	5.6
South Africa	85,107	68.6	54,512	68.7
Israel	3,776	3.0	6,301	7.9
Egypt	5,643	4.5	4,797	6.0
Total	124,116	100.0	79,341	100.0

Source: Compiled by CASPIM, with import data from GACC (General Administration of Customs of China)

Table 4.21 Thai Pomelo in China vs Shatian & Red Wentan

Thai Pomelo in China		Shatian 沙田柚	Red Wentan 红文旦
Product	Selling Point		
Thong Dee	Sweet with a hint of sourness. 10.5-11.9°Brix, No bitterness Translucent, Juicy, Fragrant Minute fiber residue	Sweet & crisp 10.7-11.3°Brix Dry and Seedy	Thick pulp Soft & Juicy Grapefruit like fragrance Slightly bitter 8-10°Brix
Khao Tangkwa Khao Naphung Khao Yai	Soft but not slush Lightly sweet 11~14°Brix, Low acidity, No bitterness Longer storage period 2-3 months		
Tubtim siam	Thin peel, Thick pulp, Soft & Juicy, Translucent, Minute fiber residue Few seeds Sweet 14~15°Brix & fragrant		

Source: Compiled by CASPIM

Marketing Mix

The observations on pomelo in Chinese market include product variety, package size, price, countries of origin such as Thailand and China, retailers and major e-commerce platforms such as TMall, Tao Bao, JD, PingDuoDuo and Suning (Table 4.22).

Tubtim Siam is sold at a premium price of more than ¥100/kg, compared with other Thai pomelos (around ¥15/kg to ¥30/kg), Taiwan Red Wentan (around ¥30/kg), and local ones (around ¥7/kg to ¥20/kg), during the time surveyed.

Table 4.22 Marketing Mix of Pomelo in Chinese Market

Product	Origin/Supplier	Price
泰国红宝石KPY柚子3斤 Tubtim siam Pomelo 1.5 kg	Thailand 都市鲜生 Dou Shi Xian Sheng Tao Bao	¥102.9/kg
20斤梅州沙田柚子 Shatian Pomelo 10 kg	China 柚满园 You Man Yuan TMall	¥7.69/kg
青柚4个装(总重大于7斤) 白肉蜜柚青皮 Khao Tangkwa Pomelo 3.5 kg	Thailand 1号鲜客 FRESHMAN Suning	¥28.2kg
海南红心三红柚3-4斤 Hainan Red Meat Pomelo 2 kg	China 逸奥铭 Yi Ao Ming JD	¥17.75/kg
台湾红文旦柚4斤左右 Taiwan Red Wentan 2 kg	Taiwan 马保果 Ma Bao Guo JD	¥29/kg
福建红心柚子5-6 斤 Fujian Red Meat Pomelo 3 kg	China 果亦哆 Guo Yi Duo JD	¥16.2/kg
泰国红宝石柚子 礼盒装 3斤 Tubtim siam Pomelo 1.5 kg	Thailand 溢果坊 Yi Guo Fang PingDuoDuo	¥103.7/kg
泰国品种翡翠青柚3斤 Khao Tangkwa Pomelo 1.5 kg	China 苏晓鲜原产地 Su Xiao Xian PingDuoDuo	¥15.8/kg

Source: Compiled by CASPIM

Consumer Insight

The consumer insights for pomelo in Chinese market are reflected in the promotion contents of the sellers (Figure 4.14), positive keywords in the promotion message and negative comments from customers (Figure 4.15).

From analysis of the promotion message and feedback by customers, the positive key words for category pomelo includes “Sweet with a tint of acidity”, “No bitterness”, “Translucent meat”, “Juicy”, “Aromatic”, “Thin skin”, “Few seeds”, “Easy shelling” and “No forced ripening”, and the most frequent complaints are: “Not red or sweet as advertised”, “Bitter”, “Large pith” and “Not worth the money”.

Messages about “Method of shelling a pomelo”, and “Nutrient value”, are popular topics.

Figure 4.14 Promotion Contents for Pomelo in Chinese Market

Nutrient of Pomelo	Method of Shelling Pomelo
	
Ruby Pomelo Gift Box	
	

Source: Compiled by CASPIM
Graph Credit: 1) edh.tw; 2) douyin.com; 3) tmall.com

Figure 4.15 Positive Keywords & Negative Comments for Pomelo in Chinese Market

Positive Key Words	Negative Feedback
不催熟 No forced ripening	Not worth the money
甜酸 Sweet with a tint of acidity	
多汁 Juicy	Not red or sweet as advertised
红色果肉 Red meat	
果香浓郁 Aromatic	
果肉晶莹 Translucent meat	Bit bitter
肉质细腻 Smooth meat	
皮薄 Thin skin	Large pith
不苦 No bitterness	
少核 Few seeds	
易去皮 Easy shelling	

Source: Compiled by CASPIM

5

Strategy

"The fruits are on the top of the tree. Stretch your hands and keep stretching them." — Israelmore Ayivor

1. Overview
2. SWOT Matrix & Strategic Objectives
3. Critical Issues & Related Strategies
 - 3.1 Supply Chain Integration
 - 3.2 Digital Transformation
 - 3.3 Competitive Marketing Mix
 - 3.4 Resilient to External Shock
 - 3.5 Conclusion: Strategic Objective & Related Strategies
4. Action Plan to Achieve Strategic Objectives

1. Overview

Thailand needs to keep stretching its hands in the fruit market in China with strategies. Discussion in the previous chapters on the supply chain, production and marketing leads to strategic objectives (Ob) based on SWOT analysis, followed by four critical issues and their related strategies on 1) Demand Driven Supply Chain Integration (SCI); 2) Digital Transformation (DT); 3) Competitive Marketing Mix (CS and MM); 4) Resilient to External Shock (ES). In conclusion, these issues are linked to the strategic objectives together with an action plan (Table 5.1).

Table 5.1 Organization of Chapter 5

1	SWOT Matrix & Strategic Objectives (Ob)		
2	Critical Issues & Related Strategies	1	Supply Chain Integration (SCI)
		2	Digital Transformation (DT)
		3	Competitive Marketing Mix (CS and MM)
		4	Resilient to External Shock (ES)
		5	Conclusion: Strategic Objective & Related Strategies
3	Action Plan to Achieve Strategic Objectives		

Source: CASPIM

2. SWOT Matrix & Strategic Objectives

Seven Strategic Objectives (Ob1-Ob7) are proposed based on the SWOT matrix which includes Strength (S1-S4); Weakness (W1-W4); Opportunity (O1-O4); and Threat (T1-T4) for Thai fruits in Chinese market. The strategies are formed by examining the pairs of Strength and Opportunity (SO strategies); Weakness and Opportunity (WO Strategies); Strength and Threat (ST Strategies); and Weakness and Threat (WT Strategies) (Table 5.2).

Strength (S)

- S1: Abundant resources of fruit and R&D capabilities for new varieties
- S2: Established reputation, scale & channels
- S3: Government direction, regulation, extension, promotion & negotiation
- S4: Entrepreneurial farmers and other stakeholders

Weakness (W)

- W1: Stable and high-quality supply
- W2: Understanding of Chinese market
- W3: Innovation in processing and packaging
- W4: Efficient system for fruit collection and distribution

Opportunity (O)

- O1: Changing needs and behavior of Chinese customers
- O2: Emerging integration of supply chain in Thailand & China
- O3: New logistic capability by air and train via Laos
- O4: Digital technology in production and marketing

Threat (T)

- T1: Shocks of Covid 19 impacting market demand, cost, logistics, and labor supply
- T2: Lack of sustainability due to oversupply and price fluctuation
- T3: Competition from neighboring ASEAN suppliers
- T4: Malign practice in production & collection undermining the quality & reputation

Strategic Objectives (Ob)

- Ob1: R&D and Innovation
- Ob2: Embrace Supply Chain Integration
- Ob3: Manage External Shock
- Ob4: Maintain Sustainability
- Ob5: Enhance Competitive Advantage
- Ob6: Protect Stakeholders
- Ob7: Leverage Digital Transformation

Table 5.2 SWOT Matrix & Strategic Objectives

SWOT Matrix Of Thai Fruits	Strength S1: Abundant resources of fruit and R&D capabilities for new varieties S2: Established reputation, scale & channels S3: Government direction, regulation, extension, promotion & negotiation S4: Entrepreneurial farmers and other stakeholders	Weakness W1: Stable and high quality supply W2: Understanding of Chinese market W3: Innovation in processing and packaging W4: Efficient system for fruit collection and distribution
Opportunity O1: Changing need and behavior of Chinese customers O2: Emerging integration of supply chain in Thailand & China O3: New logistic capability by air and train via Laos O4: Digital technology in production and marketing	SO Strategies: $(S1+S3+S4)+O1=Ob1$: R&D and Innovation $(S3+S4)+(O2+O4)=Ob2$ Embrace Supply Chain Integration $(S3+S4)+O3=Ob3$ Manage External Shock	WO Strategies: $(O2+O4)-(W1+W2+W3+W4)=Ob7$ Leverage Digital Transformation
Threat T1: Shocks of Covid 19 impacting market demand, cost, logistic, and labor supply T2: Lack of sustainability due to oversupply and price fluctuation T3: Competition from neighboring ASEAN suppliers T4: Malign practice in production & collection undermining the quality & reputation	ST Strategies: $(S3+S4)-T1=Ob3$ Manage External Shock $(S3+S4)-T2=Ob4$ Maintain Sustainability $(S1+S2+S3+S4)-T3=Ob5$ Enhance Competitive Advantage $S3-T4=Ob6$ Protect Stakeholders	WT Strategies: $T1+(W1+W2+W3+W4)=Ob3$ Manage External Shock $T2+(W1+W2+W3+W4)=Ob4$ Maintain Sustainability $T3+(W1+W2+W3+W4)=Ob5$ Enhance Competitive Advantage

Source: CASPIM

3. Critical Issues & Related Strategies

The seven strategies above are elaborated in the following four issues and their related sub-strategies: 1) Demand Driven Supply Chain Integration (SCI); 2) Digital Transformation (DT); 3) Competitive Marketing Mix (CS and MM); 4) Resilient to External Shock (ES).

3.1 Demand Driven Supply Chain Integration (SCI)

Demand Driven Supply Chain

Demand Driven Supply Chain (DDSC) is defined as a supply chain in response to demand signals. It has built-in mechanisms for demand detection, anticipation, communication and adaption, as well as collaboration among different components of the supply chain. It has features of "Alignment" (shared vision), "Agility" (responsive to change), and "Adaptability" (Adjustment of organizational structure). The management of DDSC aims to close gaps in the supply chain, Improve the information flow to enhance the value with the best customer experiences.

Supply Chain Integration (SCI)

As discussed in section 4.4 in Chapter 2, The ideal of a demand driven supply chain (DDSC) of fruit export to China could be realized through Supply Chain Integration (SCI) driven by emerging leaders of importers or retailers (from both Thailand and China) which have expanded to cover almost every component of the supply chain, from farming to retailing and customer service.

Their roles in supply chain integration (SCI) can be summarized in a 5i framework:

- Information: Quick feedback on consumer demand from the retail end;
- Initiation: Reactions triggered in response or in advance to the changing demand with the network of SMEs, research units, and farms;
- Interconnection: Coordination among different units along the supply chain;
- Inspection: Establishment and implementation of higher quality standards with traceback system;
- Investment: Financial, technological and human resources brought in by the leaders of SCI, leveraged by their economy of scale.

Such a strategy of "Supply Chain Integration" (SCI), however, should be complemented by active promotion and regulations of Thai government to protect the interests of each party in the supply chain, especially Thai farmers and SMEs, and make sure the Thai and Chinese stakeholders abide by laws and regulations to get their fair shares of benefits.

Supply Chain Components & Related Strategies

The sub-strategy of 11 components of the supply chain from "R&D" to "Consumption" is laid out in Table 5.3, regulated and supported by the governments of Thailand from "Direction" to "Negotiation" (Table 5.4). This sub-strategy of SCI (SC1-SC11 and GT1- GT5) are linked with the seven strategic objectives (Ob) in section 3.5.

Table 5.3 Supply Chain Components & Related Strategies

Component	Strategy
R&D SC1	Develop disease-tolerant cultivars with good quality and high yield in response to the market demand; promote good practices of field management, processing technology, and packaging; follow up the adoption process; with digital technology; strive for sustainability and competitiveness.
Input for Production SC2	Introduce high-quality planting materials (e.g. seed, sprout or grafting stock) of new cultivars in response to the market demand; distribute fertilizer, pesticide, and hormone with minimal environmental and health hazards; introduce and adapt to the local condition the digital equipment for automation and mobile application for technical knowledge and market information; strive for sustainability and competitiveness.
Farming SC3	Adopt new cultivars in response to the market demand; participate in R&D and innovation; apply technologies, especially digital technologies and best practices in capacity planning, water & soil management, pre-harvest field management, harvest and post-harvest practices; with minimal environmental and health hazards; follow TAS and GAP; achieve economy of scale through "Cooperatives" and "Land Collectives"; manage external shock with the market forecast and government guidance, strive for sustainability and competitiveness.
Collection SC4	Collect in response to the market demand; promote GMP to be a Registered Packing House for exporting to China; adopt "GMP plus" or "Covid Free Certificate" (CFC) to comply with the Zero Covid Policy (ZCP) in China; maintain the quality standard by government or importers; promote the traceback system; share market information with digital technology; strive for sustainability and competitiveness.
Processing SC5	Transform fruits for easy consumption, longer preserving period, better taste or nutrition function in response to the market demand; digest the oversupply of raw fruits due to season or external shock; participate in R&D and innovation; apply technologies, especially digital technologies (e.g. for quality control and process automation) and best practices; promote GMP; maintain the quality and safety standard by government or importers; strive for sustainability and competitiveness.
Export SC6	Develop professional exporters, and embrace supply chain integration with closer upstream-downstream links; in response to the market demand; brand building; maintain the quality standard by government or importers; promote the traceback system; share market information with digital technology; manage external shock with diversification; law & regulation to protect both Thai and Chinese stakeholders; strive for sustainability and competitiveness.
Cross Border Logistics SC7	Mitigate the traffic congestion due to the ZCP by using all modes of transportation (land, rail, sea and air), through all possible routes and designated ports; utilize the Laos-China railway fully with proper infrastructure and Customs facility; extend cold storage capability; apply digital technology to monitor and share the cargo information; reach the inland area of China; raise the speed of delivery for freshness and reduce waste; strive for sustainability and competitiveness.
Import SC8	Product selection and development in response to the market demand; expand cross border trade, embrace supply chain integration with closer upstream downstream links; promote the traceback system; share market information with digital technology; build up more trust & cooperation with the Thai government and local partners; comply with ZCP; strive for sustainability and competitiveness.
Wholesale SC9	Efficient distribution and storage service to retailers; embrace supply chain integration with closer upstream-downstream links; promote the traceback system; share market information with digital technology; raise the speed of delivery for freshness and reduce waste; strive for sustainability and competitiveness.
Retail SC10	Deliver satisfactory consumer experience through online and offline contact points and CRM programs; enhance the awareness and reputation of Thai fruits; embrace supply chain integration with closer upstream links; brand building; set up and maintain standard for quality & food safety; promote the traceback system; share market information, predict sales volume and manage inventory and shelf display with digital technology; strive for sustainability and competitiveness.
Consumption SC11	Discover, communicate, and fulfill customer needs. Participate in R&D and innovation with new product ideas; develop marketing content from the feedback with digital technology like social media; the consumer's right protection with quality and food safety, information from trace back system; strive for sustainability and competitiveness.

Source: CASPIM

Table 5.4 Role of Thai Government & Related Strategies

Component	Strategy
Direction GT1	Set up and implement national fruit strategy, coordinate MOAC (for production) and MOC (for marketing) by the Fruit Board; promote R&D and Innovation; embrace supply chain integration; manage external shock such as Covid 19, maintain sustainability in demand and supply, enhance competitive advantage, protect stakeholders; and leverage digital technology.
Regulation GT2	Set up standards (e.g. TAS) & issue certificate (e.g. GAP and GMP) to improve productivity, efficiency and quality; ensure Thai fruits meet the SPS requirements of international standards and importing countries with minimal environment and health hazard; manage external shock such as Covid 19; embrace supply chain integration; enact and enforce rules to protect all stakeholders with digital technology; strive for sustainability and competitiveness.
Extension GT3	Promote R&D and Innovation; extend the strength of farmers and enterprises with planning for optimal size, higher efficiency and quality; in response to the market demand; system to manage external shock (e.g. storage, deep processing, insurance, diversification); embrace supply chain integration; provide technology advice through farmer organizations such as local "learning centres" and "community enterprises", with digital technology such as mobile apps; strive for sustainability and competitiveness.
Promotion GT4	Build up and enhance awareness and reputation of Thai fruits, expand fruits and areas with GI (Geographic Identification); promote sales online and offline in cooperation with local governments, importers & retailers; through business matching, Thai fruit exhibitions, flagship shop in Tmall, in-store activities; embracing supply chain integration, manage external shock with extra marketing efforts; apply digital technology such as social media; strive for sustainability and competitiveness.
Negotiation GT5	Negotiates with GACC (General Administration Customs of China) on market access and SPS requirement; expand the permission list of Thai fruits; update and implement the Protocol on land transportation through third country; urgent action to mitigate traffic congestion due to the ZCP by fully utilizing the Laos-China railway and speeding up the Customs procedure; Coordinate with Laos and Vietnam for cross-border land transportation; strive for sustainability and competitiveness.

Source: CASPIM

3.2 Digital Transformation (DT)

The roles of SCI in the 5i framework discussed above are enhanced with digital transformation (DT) (Table 5.5). This sub-strategy of DT (DT1-DT3) is linked with the seven strategic objectives (Ob) in section 3.5.

Table 5.5 Digital Transformation (DT) & Related Strategies

Component	Strategy
Big Data & AI DT1	Gene selection & modification for better cultivars Risk management, such as weather prediction and pest/disease control Demand prediction & inventory optimization CRM & individualized recommendation Smart government for policy-making and execution
IoT & Automation DT2	Management of temperature, moisture, and chemicals in the field Locate and adjust conditions of containers in transportation Shelf management in retail stores Drone & robots in field management, processing & transportation
Mobile Communication & Social Media DT3	Shop any time and any place Consumers with product knowledge & traceback ability Producers' access to technology and real-time market information

Source: CASPIM

3.3 Competitive Marketing Mix (CS and MM)

Based on the marketing intelligence data of previous chapters, the competition strategies (CS) are discussed (section 3.3.1), together with the guide to marketing mix in terms of Product (MM1), Pricing (MM2), Channel (MM3) and Promotion methods and messages (MM4) for the six fruits in focus (Durian Longan, Mangosteen, Mango, Young Coconut and Pomelo) (section 3.3.2). These sub-strategies of CS (CS1-CS2) and MM (MM1-MM4) are linked with the seven strategic objectives (Ob) in section 3.5.

3.3.1 The Competition Context and Related Strategies (CS)

Two sub-strategies of competition are laid out for “Differentiation from the Chinese Competitors” (CS1) and “Differentiation from the CLMV Competitors” (CS2) (Table 5.7), based on a review of the competition context of the six fruits (Table 5.6).

Table 5.6 Competition Context of the Six Fruits

Fruit	Competition Context
Durian	Thailand has a dominating position (99% market share). The major competitors are Malaysia and Vietnam. Musang King of Malaysia is a strong in terms of quality, customer perception and marketing capability, but is limited by its production scale. Durian of Vietnam has the advantage of large capacity and lower price. Other potential competitors include Cambodia, Laos and the Philippines.
Mangosteen	The market in China is dominated by Thailand (around 90%), followed by Indonesia (around 10%). There are insignificant imports from Malaysia (around 1%) and Vietnam (<1%). Indonesia complements Thailand well in the harvest season. Vietnam has a large capacity for production, but its export to China is suppressed by strict inspection and quarantine processes.
Longan	China produces about 2 mil tons of longan a year and imports about 0.5 mil tons, of which Thailand has a share of 99% in the last two years. Vietnam is the current, and Cambodia is the potential competitor. Chuliang and Shixia of China are strong competitors for Thailand in terms of taste and quality and without the problem of SO2 fumigation as in Thailand.
Mango	The key competitors of Thailand are China, Cambodia (newly permitted in 2021), Vietnam and Taiwan. China produced about 3.3 million tons, and imported about 14000 tons in 2021, of which Thailand accounted for around 40%, followed by Cambodia and Vietnam, each around 20%, and Taiwan, around 15%. Guifei and Jinhuang of China is quite competitive as Irwin of Taiwan, compared with lower priced ones such as Khiaoyai and Keo Romiet of Vietnam and Cambodia. Nam Dok Mai of Thailand is sold as a premium fruit.
Young Coconut	China produced around 25,000 tons but imported 870,000 tons of young coconut in 2021. Indonesia and Thailand are two biggest exporters to China (with a market share of around 40% each), followed by Vietnam (15%). However, the fruit from Indonesia and Vietnam is mainly for industrial users, leaving Thailand as the dominating player in the retail market, with the volume growing by 3 times in 2021
Pomelo	China is the world's largest producer of pomelo, with an output of more than 5 mil tons. It imported around 30,000 tons in 2021, of which 80% are from Thailand and 20% from Taiwan. Tubtim siam in the premium segment has an obvious advantage over Shatian of China as it is dry and seedy, or Red Wentan of Taiwan as it is slightly bitter.

Source: CASPIM

Table 5.7 Competition Strategies (CS)

Component	Strategy
Differentiation from the Chinese Competitors CS1	Emphasis on the world reputation of Thai fruits Emphasis on the earth and water quality in Thailand Emphasis on international certificates acquired Emphasis on superior nutrition property based on lab test
Differentiation from the CLMV Competitors CS2	Emphasis on established record in the world market Emphasis on unique taste & appearance Emphasis on embodied Thai culture Emphasis on superior technology in field, storage & logistic

Source: CASPIM

3.3.2 Marketing Mix and Related Strategies (MM)

Marketing Mix: Product Strategies (MM1)

The “Product” strategies of the six fruits in the “Marketing Mix” are laid out in Table 5.8 below:

Table 5.8 Marketing Mix: Product Strategies (MM1)

Fruit	Product Strategy
Durian	Besides the dominating MonThong, Chinese consumers also seek other varieties, especially Chane, GanYao, and Puang Manee. Frozen durian meat is a good option, with the advantages of controllable quality, convenience for consumption, and year-round supply. Small size is popular for nuclear families.
Mangosteen	There is only one variety of mangosteen in the world. A good fruit may have a big size (up to 100g in size 6A), smooth and glossy skin in purple or black color, white and fluffy flesh, and a sweet and sour flavor. The Chinese market may support a higher price as long as the quality meets the expectation. One challenge is post-harvest handling to reduce the bruise.
Longan	The dominating variety Daw is supplemented by Phuang Thong and Phetsakon to cater for the festival season of Chinese market. The fruit is available all year round due to the application of potassium chlorate to induce off-season flowering. Thai longans are appreciated for their golden lustre, more flesh, juice and vitamins, and less likely to catch internal heat after consumption. However, the issue of SO2 fumigation should be addressed as some consumers are put off by the practice.
Mango	Nam Dokmai and Mahachanok need to find their positions in the face of high-end Irwin from Taiwan, the lower end Khiaoyai from Vietnam, Keo Romiet from Cambodia, and wide middle-range local varieties such as Guifei and Jinhuang. A unique combination of Nam Dokmai and glutinous rice may be a breakthrough point as most Chinese tourists are impressed by the Thai desserts. Thai operators may also leverage the quality standard for entering the Japanese and Korean markets, such as controlling the chemical residuals and keeping freshness in long-distance transportation.
Young Coconut	Young Coconut should be expanded as a value product with quality and competitive price by 1) Maintaining the unique selling points of aroma by better field management (preventing cross-pollination with other varieties), guided by TAS; 2) Solving the problem of low prices during winter in China to increase production scale and lower the cost, with technique to shift the harvest time or deep processing such as coconut juice and dessert; 3) promoting the use of cost effective “ready to open” packaging.
Pomelo	Thai pomelos in China include Thong Dee, Khao and Tubtim siam. Tubtim siam has a clear advantage which drove the rapid growth of pomelo export. It is advised to manage the capacity and maintain the quality and supply chain stability of Tubtim siam: consider expanding its GI area on the one hand and publish a special quality standard to protect its uniqueness.

Source: CASPIM

Marketing Mix: Pricing Strategies (MM2)

The “Pricing” strategies of the six fruits in the “Marketing Mix” are laid out in Table 5.9 below:

Table 5.9 Marketing Mix: Pricing Strategies (MM2)

Fruit	Pricing Strategy
Durian	The price of the frozen Musang King was around ¥160-¥170/kg compared with ¥80-¥115/kg for MonThong and Puang Manee during the time surveyed. In the medium run, higher supply of in Thailand and entry of the Vietnam with considerable quantity may depress the selling price in China.
Mangosteen	Mangosteens from Thailand were sold at prices from around ¥50/kg to ¥95/kg, which is similar to those from Indonesia, during the time surveyed. There are still latitudes for price hike in future, especially when weather condition reduces the output, due to the uniqueness of Thai Mangosteens in its harvest season, which is not overlapped with that of Indonesia.
Longan	Longan from Thailand was sold at prices from around ¥30/kg to ¥50/kg, compared with ¥50/kg to ¥60/kg, the high-quality ones from China (e.g. 储良 Hainan Chuliang or 石硖 Guangdong Shixia) during the time surveyed. The selling price is difficult to go up further due to strong competition.
Mango	Nam Dokmai Si Thong can be sold at ¥100/kg, while the ordinary quality ones around ¥20/kg, compared with the local ones between ¥4/kg to ¥20/kg during the time surveyed. It is advised to maintain the premium position of Nam Dokmai and raise its image and value perception through marketing campaigns at the same time.
Young Coconut	The young coconuts of Thailand are sold at ¥10 to ¥15 per unit, at a price similar to the local ones, during the time surveyed. The price may go down for market competitiveness and in response to a higher supply in Thailand.
Pomelo	Tubtim siam is sold at a premium price of more than ¥100/kg, compared with other Thai pomelos (around ¥15/kg to ¥30/kg), Taiwan Red Wentan (around ¥30/kg), and local ones (around ¥7/kg to ¥20/kg), during the time surveyed. It is advised to maintain the premium price of Tubtim siam with an emphasis on its rareness and leverage its reputation to drive sales of other varieties of pomelo in Thailand.

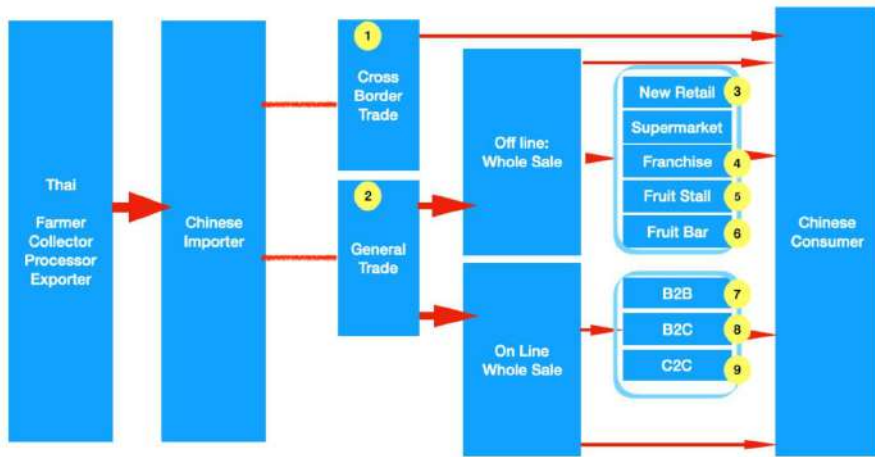
Source: CASPIM

Marketing Mix: Channel Strategies (MM3)

The channel structure is presented in Figure 5.1 and Table 5.10, based on the learnings from the channel-related components of “Export”, “Import”, “Wholesale”, and “Retail” discussed in Chapter 2. The “Channel” strategies of Thai fruits in China include:

- Professional exporters and importers should be the major intermediary;
- “Cross Border e-commerce” and “General Trade” are two major forms of international trade;
- Use “On line channel” for ubiquitous customer engagement;
- Use “Off line channel” for a sensual experience and convenience;
- Start “Channel Deepening” process to enter cities of the third tier and below, as well as rural areas.

Figure 5.1 Channel Structure for Thai Fruits in China



Source: CASPIM

Table 5.10 Players in the Channel Structure

	Player	Definition
1	Cross Border Trade	Conducted by a cross-border trade operator in the name of personal use Regulated by special rules for lower tariff & VAT
2	General Trade	Conducted by a registered importer in the form of formal international trade Involving multilevel channels, regulated by normal rules of tariff & VAT
3	New Retail	Retailers integrating online ordering & payment, offline display & experience and logistic service
4	Franchise	National or regional fruit chain stores such as Pagoda
5	Fruit Stall	Small size roadside fruit retailers
6	Fruit Bar	F&B establishments selling fruit juice, fruit snack, and other processed fruits
7	B2B	An e-commerce firm selling to business units, e.g. restaurants, fruit processing factories
8	B2C	An e-commerce firm selling to individual consumers
9	C2C	An individual selling on an e-commerce platform such as Taobao to individual consumers

Source: CASPIM

Marketing Mix: Promotion Strategies (MM4)

“Promotion Measures” in promotion strategies include:

- Lifestreaming by KOL in social media;
- Group buying, limited time offer in discount e-commerce platform;
- User experience sharing;
- Flagship shop, SEO for e-commerce platform;
- In-store special display and promotion activities;
- Thai fruit festival and exhibition for imported food.

The keywords and related “knowledge tips” for potential customers in “Promotion Messages” in promotion strategies for the six fruits are laid out in Table 5.11.

Table 5.11 Promotion Messages in Promotion Strategies (MM4)

Fruit	Promotion Message
Durian	“Tender & Smooth,” “Like ice-cream,” “Fleshy & Small stone,” “Plump flesh,” “Agreeable sweetness,” “Strong flavor,” “Rapid freeze for freshness,” and “Ripe on the tree” Knowledge Tips: “detecting ripeness,” “accelerating the ripening,” “opening the fruit”, and “serving ideas.”
Mangosteen	“Queen of Fruits”, “Long periods for nutrition accumulation”, “Handpicked”, “Pure white fresh & beautiful purple skin”, “Soft & melted in the mouth”, and “Refreshing” Knowledge Tips: “number of sections inside”, “Opening the fruit”, “Size of each grade”, “Illustration that the fruit is still edible despite certain blemishes on the skin.”
Longan	“Traditionally nutritional”, “Sweet and juicy”, “Crisp & tender”, “Fleshy and thin skin”, “Moist” “Chewy”, and “Crystal clear” Knowledge Tips: “High-quality orchard” and “Clamed advantages of longan from Thailand compared with local ones.”
Mango	“Not fibrous”, “Aromatic”, “Juicy”, “Thin skin”, “Thin stone”, “Right Brix Acid Ratio”, “Aftertaste” and “Golden color” Knowledge Tips: “Method of ripening & serving”, “Nutrient value”, “Illustration of thin stone”, “Education about acceptable spots and stains on the skin” and “right color for ripeness.”
Young Coconut	“Refreshing and Thirst Quenching”, “Sweet smell like milk”, “Abundant water”, “Thin shell”, “Meat tender & smooth”, “Meat springy”, and “Low sugar, Low calorie” Knowledge Tips: “Open a coconut with the attached coconut opener”, “Nutrient value”, “Serving ideas”, and “Acceptable colors of coconut water.”
Pomelo	“Sweet with a tint of acidity”, “No bitterness”, “Translucent meat”, “Juicy”, “Aromatic”, “Thin skin”, “Few seeds”, “Easy shelling” and “No forced ripening” Knowledge Tips: “Method of shelling a pomelo” and “Nutrient value”

Source: CASPIM

3.4 Resilient to External Shock and Related Strategies (ES)

Covid 19 pandemic from 2019 to 2022 is a good case of external shocks for Thai fruit export. The lessons from Covid 19 include the impacts of the shock and strategies to mitigate the negative impacts:

The negative supply-side shock includes: 1) Shut down of planting & processing operation; 2) Disruption of logistics: fewer containers, higher freight, slow border pass-through; 3) Decreasing the number of foreign labors.

The negative demand-side shock includes: 1) Regression to basic and functional consumption in domestic and overseas markets; 2) Inconvenience for Chinese importers visiting Thailand; 3) Rejection of contaminated fruit by Chinese Customs.

Table 5.12 External Shock (ES) and Related Strategies

Component	Strategy
Dealing with Logistic Breakdown ES1	New transportation route and border checking points Improve related infrastructure such as new bridges and warehouses Improve Customs procedures such as opening Green Channel
Dealing with Rejection of Contaminated Fruit ES2	Limit the damage in terms of affected packing houses or transportation firm Communication with foreign counterparts for a clear definition and measurement procedure of contamination and disinfection requirement Implement GMP+ and related certificate in line with the requirement of foreign counterparts
Alternative market ES3	Diversify the export markets and channels Expand the domestic market
Digital Technology ES4	Take the opportunity to adopt more digital technology to reduce labor costs and contamination

Source: CASPIM

3.5 Conclusion: Strategic Objective & Related Strategies

The sub-strategies above related to the critical issues of Demand Driven Supply Chain Integration (SCI) (Section 3.1), Digital Transformation (DT) (Section 3.2), Competitive Marketing Mix (CS and MM) (Section 3.3); and Resilient to External Shock (ES) (Section 3.4) are linked to the seven strategic objective (Ob1-Ob7) based on the SWOT analysis in Section 2 In Table 5.13 below.

Table 5.13 Linkage between the Seven Strategic Objectives and Related Sub-Strategies

Strategic Objective		Related Strategy
Ob1	R&D and Innovation	SC1, SC3, SC5, SC11, GT1, GT3
Ob2	Embrace Supply Chain Integration	SC1- SC11, GT1- GT5
Ob3	Manage External Shock	ES1-ES4, SC3, SC4, SC6, GT1-GT5
Ob4	Maintain Sustainability	SC1- S11, GT1-GT5, MM1-MM4
Ob5	Enhance Competitive Advantage	SC1-S11, GT1-GT5, CS1-CS2, MM1-MM4
Ob6	Protect Stakeholders	SC2-SC7, SC10-SC11, GT1-GT2
Ob7	Leverage Digital Technology	DT1-DT3, SC1-SC11, GT1-GT4

Source: CASPIM

4. Action Plan to Achieve Strategic Objectives

The Action Plan to achieve the strategic objectives is laid out, including:

- 1) Involvement of key stakeholders from "R&D", "Input for Production", "Farming", "Collection", "Processing", and "Export", "Cross Border Logistics", "Import", "Wholesale", "Retail" and "Government" for each of the seven "Strategic Objectives" (Table 5.14).
- 2) Roadmap & Milestone for each of the seven Strategic Objectives: the expected achievement in the time frame of 4 to 5 years compared with the base year of 2021 (Table 5.15), and the expected export value of the six fruits in focus from Thailand to China (Table 5.16).
- 3) Resource configuration necessary to achieve the seven "Strategic Objectives" (Table 5.17), including "Natural Resources", "Human Resources", "Technology Resources", "Natural Resources", "Financial Resources" and "Public Resources".

Table 5.14 Involvement of Key Stakeholders for Strategic Objectives

Strategic Objectives		R&D	Input For Production	Farming	Collection	Processing	Export	Cross Border Logistic	Import	Wholesale	Retail	Government
Ob1	R&D and Innovation	●		●		●						●
Ob2	Embrace supply chain integration	●	●	●	●	●	●	●	●	●	●	●
Ob3	Manage External Shock			●	●	●	●	●				●
Ob4	Maintain Sustainability	●	●	●	●	●	●	●	●	●	●	●
Ob5	Enhance Competitive Advantage	●	●	●	●	●	●	●	●	●	●	●
Ob6	Protect Stakeholders		●	●	●	●	●		●		●	●
Ob7	Leverage Digital Technology	●	●	●	●	●	●	●	●	●	●	●

Source: CASPIM

Table 5.15 Roadmap & Milestone for Strategic Objectives

Strategic Objectives		1 year	2-3 Years	4-5 years
Ob1	R&D and Innovation	Survey & prioritize for the breakthrough points	R&D with the short and mid run achievements	Commercialize the short run Achievements
Ob2	Embrace supply chain integration	Plan and select potential leader	Policy adjustment Implement integration	Gains from integration Further development
Ob3	Manage External Shock	Urgent action in response to ZCP	Set up system for managing external shock	System for managing external shock in position
Ob4	Maintain Sustainability	Sustainability plan on both demand and supply side	Marketing mix & planning for optimal size for sustainability	Significant improvement on sustainability
Ob5	Enhance Competitive Advantage	Identify current and potential competitors in Chinese market	Marketing mix & extension in targeted areas	Retain or enlarge market share in targeted areas
Ob6	Protect Stakeholders	Identify vulnerability and plan for policy adjustment	Policy adjustment to address the vulnerabilities	Stakeholders are better protected
Ob7	Leverage Digital Technology	Plan and prepare for the infrastructure & expertise	Encourage the adoption	Adoption rate 50% of people or operations

Source: CASPIM

Table 5.16 Expected Export Value of Major Fruits of Thailand to China

Fruit	2021 (mil B)	2024 (mil B)	2026 (mil B)
Durian	98,332	127,438	215,371
Longan	18,024	23,359	33,637
Mangosteen	15,966	20,692	29,796
Coconut Y	5,131	7,804	15,296
Pomelo	860	1,115	1,605
Mango	91	118	199
Total	138,404	180,526	295,905

Source: CASPIM

Table 5.17 Resource Configuration to Achieve the Strategic Objectives

Natural	New land and adjustment of land usage Improve earth and water quality, Improve irrigation system
Human	R&D personnel for new cultivars development & field management Skilled Farmer for adopting new technology Marketing experts, Technician for digital technology
Technology	Breeding of new cultivars Technology for field management, post harvest storage & logistics, deep processing Digital Tecnology
Financial	Investment for natural resource, human resource and technology development Budget for government programs
Public	Government support for R&D, new technology adoption and training Government planing & promotion for land adjustment & new variety adoption Government support for community enterprise Government involvement and support for international negotiation & oversea marketing

Source: CASPIM

Index

	Page
Demand Driven Supply Chain	135
Durian	135
Chinese Market	100-101
Competitors	101-104
Consumer Insight	107
Marketing Mix	104-106
Production	74-78
Longan	
Chinese Market	111
Competitors	112
Consumer Insight	114-115
Marketing Mix	112-113
Production	81-85
Mango	
Chinese Market	115-116
Competitors	117
Consumer Insight	119-120
Marketing Mix	117-118
Production	85-89
Mangosteen	
Chinese Market	107-108
Competitors	108
Consumer Insight	110-111
Marketing Mix	109
Production	78-81
Methodology	
Field Trips in Thailand	12-13
Online Interview in China	13
Secondary Data	14-16
Pomelo	
Chinese Market	124

Index

	Page
Competitors	125-126
Consumer Insight	128-129
Marketing Mix	126-127
Production	92-95
Strategy	
Action Plan	146-148
Competition	139-140
Digital Transformation	138-139
Marketing	141-144
Resilient to External Shock	145
Strategic Objective & Related Strategies	146
Supply Chain	136-138
SWOT Matrix	133-135
Supply Chain	
Collection	26-27
Components Overview	19-20
Consumption	59-61
Cross-Border Logistic	46-49
Export	29-31
Farming	25-26
Government of China	
Direction	62-63
Facilitation	67-68
International Negotiation	68-69
Regulation	63-65
Taxation	66
Government of Thailand	
Direction	32-35
Extension	38-40
International Negotiation	44-45
Promotion	41-43
Regulation	35-38
Import	50-52
Input for Production	23-24

Index

	Page
Processing	28-29
R&D	20-22
Retail	55-59
Wholesale	52-55
Supply Chain Integration	136
Supply Chain Strategies	136-138
Thai Fruits	
Export to China	
Permission List	8-9
Value & Volume	9-11
Geographic Indication	7-8
Young coconut	
Chinese Market	120
Competitors	121
Consumer Insight	123-124
Marketing Mix	121-122
Production	89-92



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