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Research for Consideration of a Policy Proposal to Reform the Natural Rubber Industry's Structure and Stabilise Farmers' Dealing Conditions in Thailand

Edited by

Hajime Yamamoto

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PREFACE

1. Background and Objective of the Research

Thailand, Indonesia, and Malaysia together produce about 70 percent of the world's natural rubber (NR). Recently, the market for NR has been in a state of excess supply. This is because production in Cambodia, Myanmar, and Viet Nam has been increasing and, after 2011, demand for NR in China has been subdued. The price has suffered a continual decline since 2011, while NR stocks in Thailand have been increasing.

In order to stabilise the production environment of NR in Thailand and other Asian countries, it has become important to improve the production and distribution environment so that farmers can tolerate competitive and changing circumstances. We study the types of support for farmers that would be effective against price volatility of NR.

NR is used to make medical gloves, as well as tyres for vehicles and aircraft. The Thai government is also considering making use of NR in new applications, such as road paving and sports tracks. This study also looks into the possibility of increasing demand for NR through widening its various uses.

This research investigates various structural issues of the Thai NR industry, from the supply/ demand structure to the distribution structure, and also evaluates past and present policies in order to develop policy recommendations for structural reforms aimed at raising the competitiveness of NR and mitigating the impact of price fluctuations on farmers.

2. Research Methodology

In this research, intensive interviews with government agencies concerning NR policy, including the Ministry of Agriculture and Cooperatives, the Rubber Authority of Thailand, provincial ORRAF branches and central markets, were conducted between January and April 2016, in order to better understand the policy issues and validate policy recommendations. In addition, field surveys in the major NR producing sites were conducted in Hatyai in the South and in Nongkhai in the Northeast. Interviews with users of NR, mainly Japanese tyre makers, were conducted to evaluate the competitiveness of Thai NR and to understand market and technological factors affecting the structural changes of NR products.

3. Items in the Research

In Chapter 1, we provide a summary of survey results that are discussed in more detail in Chapters 2–5, followed by major policy recommendations.

In Chapter 2, we analyse NR production and the trade structure of NR in Thailand compared with other major producers and analyse why Thai NR production has been more adversely affected by the decline in the rubber price than other countries. The largest factor may be attributable to the past rapid expansion of NR plantations in the early 2000s and Thailand's increasing dependence on the Chinese market through exports of Standard Thai Rubber (STR), a medium-grade rubber. In this chapter, the research analyses the competitiveness of Thai NR compared with neighbouring countries such as Indonesia.

We analyse ways of improving competitiveness, by considering the possibility of mechanisation of the major products. We find that Ribbed Smoke Sheet (RSS) has little scope for mechanisation, while TSR is already extensively mechanised. Instead, production of crepe rubber, more of a premium grade than TSR, could be increased through mechanisation support to farms and at the cooperative level, especially in the Northeast.

In Chapter 3, the distribution structure of Thailand is analysed and compared with Malaysia and Indonesia. We find that the Thai distribution structure is rather complex, as there are several different distribution routes (collectors, cooperatives and local markets) and several chains of distribution (several chains of collectors from local collectors to city collectors). Despite the low share of central markets in the total number of transactions, the establishment of central markets has been instrumental in increasing the bargaining power of farmers due to their role in setting the market reference price.

In Chapter 4, recent NR government policies are studied, including the Master Plan, subsidies, the role and use of CESS, and the Rubber Authority of Thailand (RAOT), a newly established authority to plan and execute NR policy from 2015 onwards. The impacts of previous government subsidy policy are also discussed.

In Chapter 5, we introduce a discussion with Thai government officials on options trading, as a means of policy support to mitigate the risks to NR farmers of price fluctuations.

In Chapter 6, we discuss the unique environment of smallholders in the South, which makes it difficult for them to convert to other crops.

In Chapter 7, major policy proposals are discussed based on survey results in Chapters 2-6. These proposals are: in the short term, promoting purchased rubber in infrastructure usage; in the medium term, resolving the mismatch with Japanese tyre makers, introducing minimum price compensation, promoting differentiation through transparency/traceability; and in the long term, expanding rubber applications and developing the industry.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

Agricultural Institutions	farm cooperatives and associations
BAAC	Bank for Agriculture and Agricultural Cooperatives
CESS	Rubber export tax
IRSG	International Rubber Study Group
MOAC	Ministry of Agriculture and Cooperatives
NCPO	National Council for Peace and Order
NR	Natural rubber
ORRAF	Office of the Rubber Replanting Aid Fund
Rai	Unit of area, equals to 1,600 square meters or 0.16 hectare
RAOT	Rubber Authority Of Thailand
REO	Rubber Estate Organisation
RRIT	Rubber Research Institute of Thailand
RSPO	Roundtable on Sustainable Palm Oil
RSS	Ribbed Smoke Sheet
STR	Standard Thai Rubber (block rubber with Thai standard)
TSR	Technically Specified Rubber (block rubber with international standard)
THB	Thai Baht: THB100 = USD2.86 as of 28 April 2016
USS	Unsmoked Sheet

Chapter 1

Summary

1.1 Thai NR supply and demand

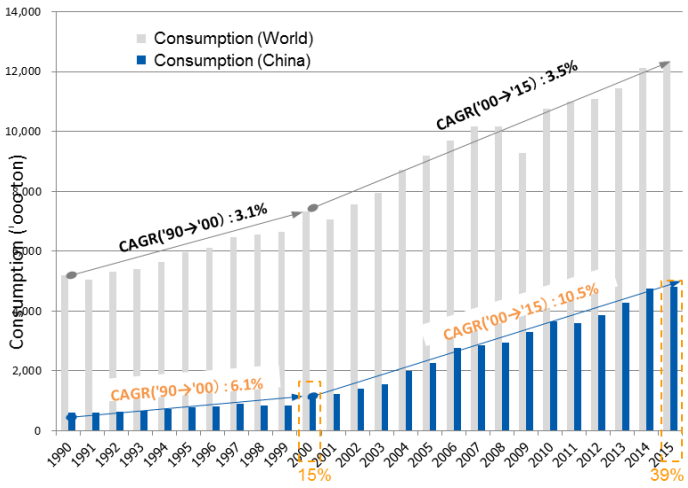
1.1.1 Trend of NR supply and demand / price

The Chinese market, which drives world rubber demand, has stagnated, resulting in inventory levels increasing and prices declining.

- NR demand has been led by rapid increases in demand in China since 2000. China's share of total consumption increased from 15 percent in 2000 to 39 percent in 2015.
- Along with rapid growth in demand in China, inventory levels have decreased since 2000, and the price continued to increase until 2011 (the price in 2011 was around 7.2 times the price in 2000).

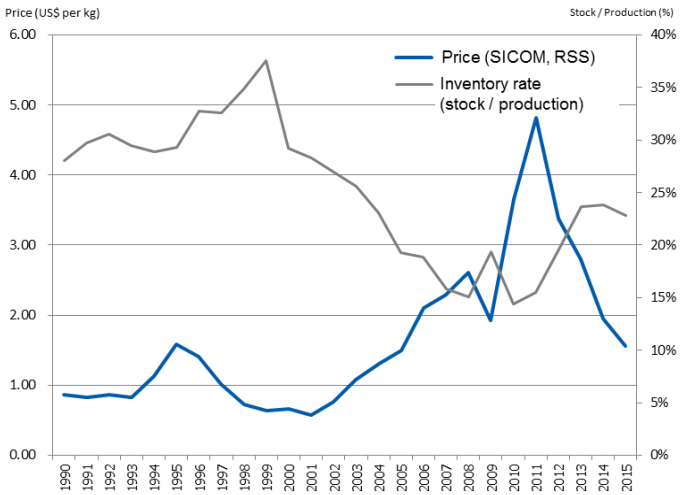
However, due to the slowdown in China's economic growth, inventory levels have increased and prices have declined since the beginning of 2012.

Figure 1-1: Trends in NR Consumption



Source: IRSG statistics.

Figure 1-2: Trends in NR price and inventory level



Source: IRSG statistics.

1.1.2 Trends in NR production

Thailand cannot control production increases and the country has seen continual increases in production even though prices have fallen since 2012.

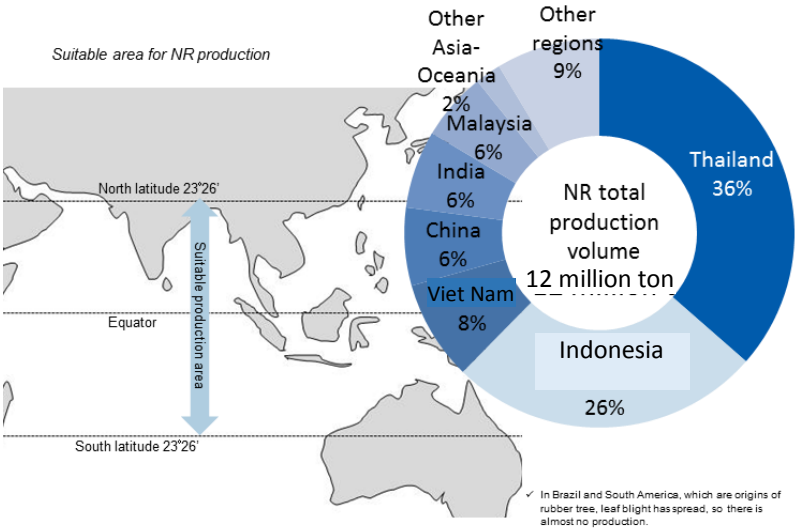
- NR producing countries are concentrated in Southeast Asia. Among these countries, Thailand accounts for 36 percent of total production volume, and Indonesia accounts for 26 percent, and the two countries lead world production.

- Thailand has continued to increase production at an annual rate of 4.4 percent from 2000 to 2015, and has also maintained this production increase despite the decline in prices since 2012.

- Indonesia has a high ratio of new estates and the climate is suitable for palm production, so it is easy to change production to palm oil depending on the price situation.

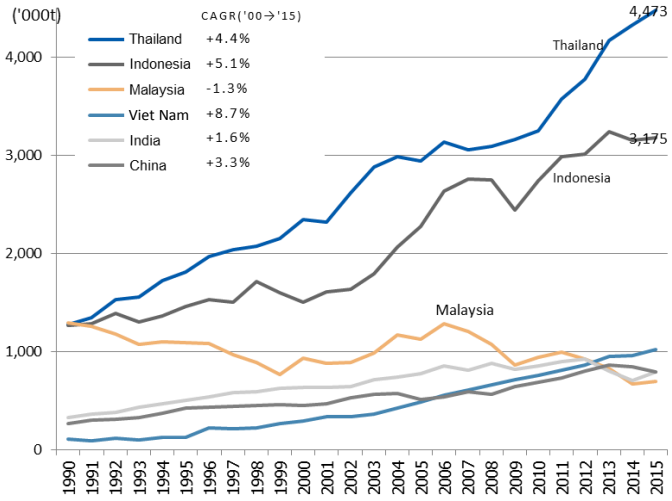
    - Oil extraction within 24 hours after harvest is required for palm oil, so it is difficult for smallholders to change production. It is particularly disadvantageous for farmers producing RSS.

Figure 1-3: Distribution of major producing countries



Source: IRSG statistics.

Figure 1-4: Trends in production volumes in major producing countries



Source: IRSG statistics.

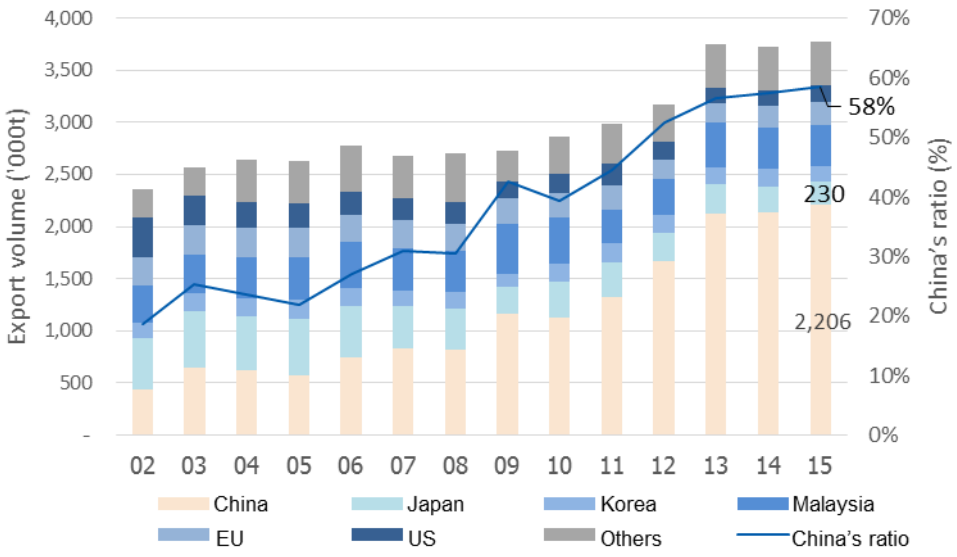
1.1.3 Thailand's supply has increased to meet Chinese demand

Mutual interdependence on NR between China and Thailand has been growing rapidly since 2000, when the import dependence of China and the export dependence of

Thailand were both close to 60 percent.

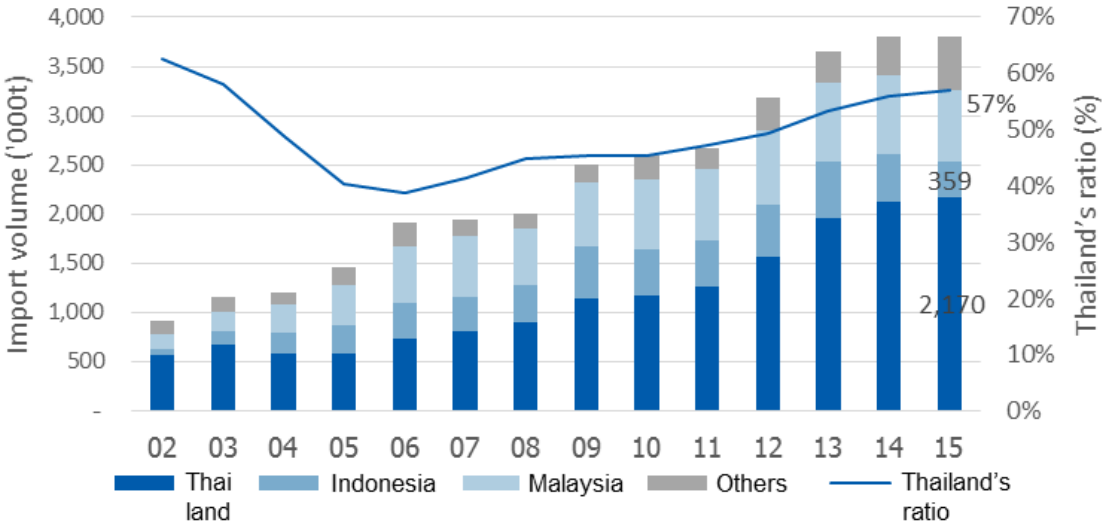
- Thailand expanded its exports to China in response to increasing Chinese demand. In 2015, this expanded China's dependence rate to 58 percent. (In the same year, China's dependence rate on Indonesia was only 13 percent.)
- 57 percent of China's import volumes also come from Thailand.
- However, Japan's imports from Thailand decreased from 69 percent in 2012 to 34 percent in 2015, while imports from Indonesia increased.

Figure 1-5: Trends in Thailand's export volumes by destination country



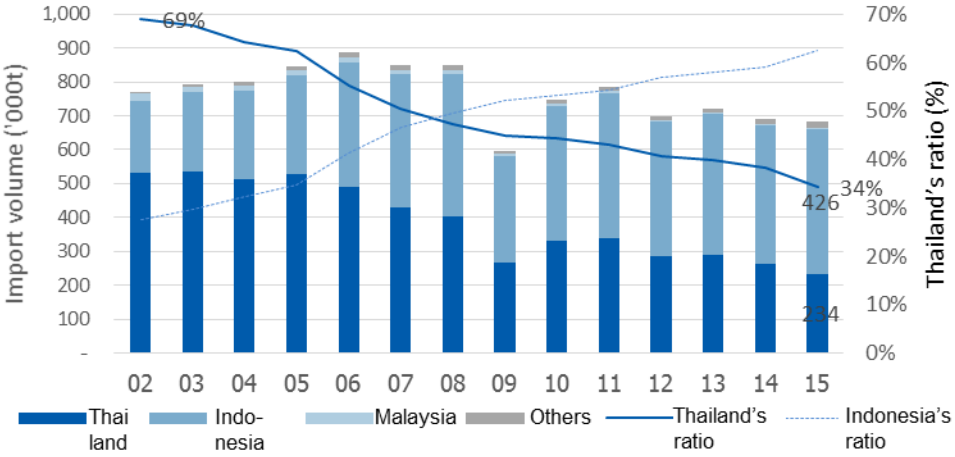
Source: IRSG statistics

Figure 1-6: Trends in China's import volumes by country of origin



Source: IRSG statistics

Figure 1-7: Trends in Japan's import volumes by country of origin



Source: IRSG statistics.

1.1.4 NR production increases in Thailand

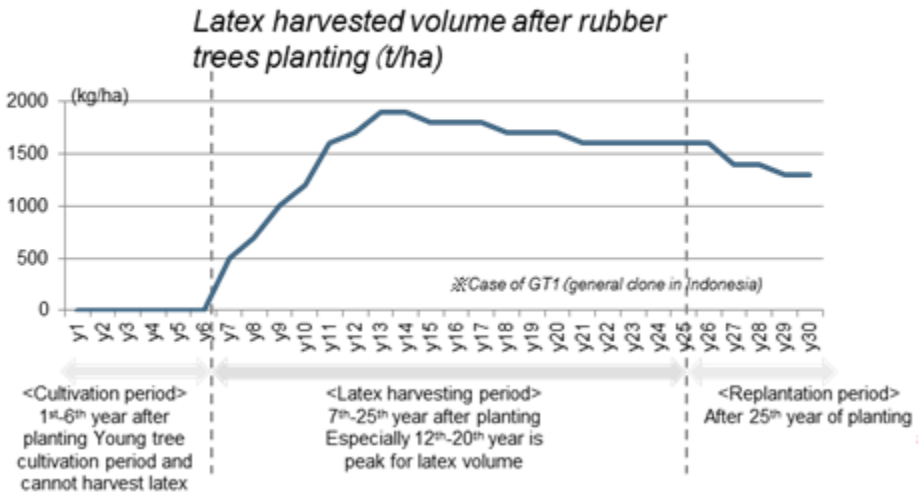
Active farm development in the 2000s made production adjustments more difficult and increases in production are expected to continue into the future.

- Thailand has expanded new farm development since 2005. Thailand's production volume has continued to increase because production expansion in new farms has an impact only after 7 years. (For example, a farm that was developed in 2011 will only start producing from 2019 onwards.)

- However, replanting has made limited progress because production adjustments have not been implemented as planned.

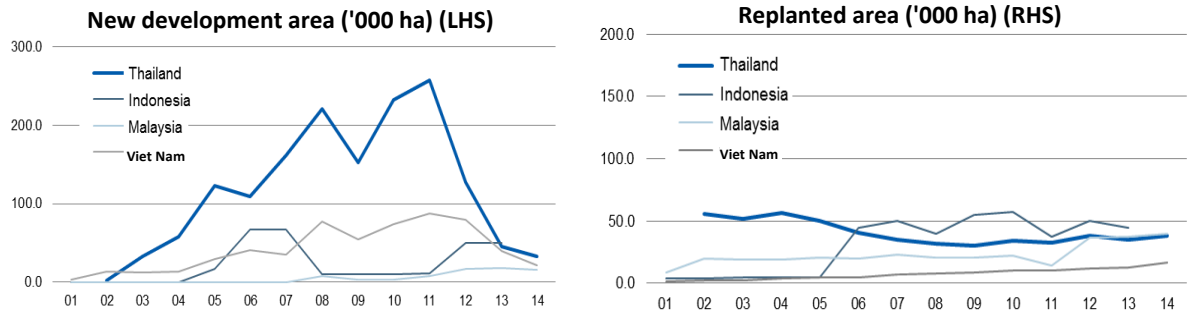
As shown in Figure 1.8, in order to increase harvested volume, it is necessary to develop new farms or replant mature trees over 25 years' old to increase latex harvest efficiency.

Figure 1-8: Life cycle of rubber farms



Source: NRI

Figure 1-9: New farm development and the trend in replanting areas in major producing countries



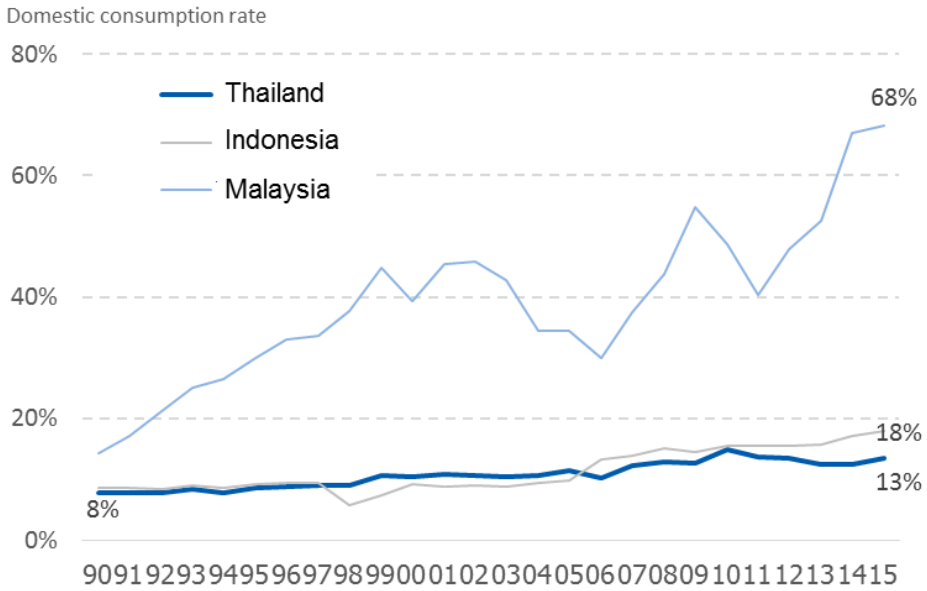
Source: IRSG Statistics.

1.1.5 Thailand's domestic demand for NR

As seen in Figure 1-10, although cluster integration of the automotive industry is ongoing, the domestic consumption rate is at a low level of around 10 percent. Thailand is dependent on domestic consumption of only 13 percent and relies on exports for almost 90 percent of its production volume. This implies that the industry cannot create added value within the country. In contrast, Malaysia is focusing on the development of the downstream industry concentrated in the glove industry, and Top Glove Corporation in Malaysia has the highest share in the world for rubber gloves.

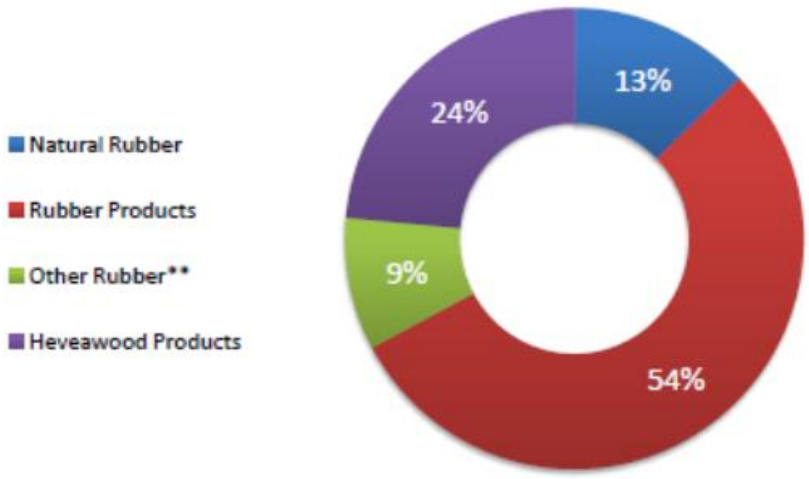
Figure 1-11 and Figure 1-12 illustrate the situation in the NR downstream industry in Malaysia.

Figure 1-10: Trend of domestic consumption rates in major producing countries



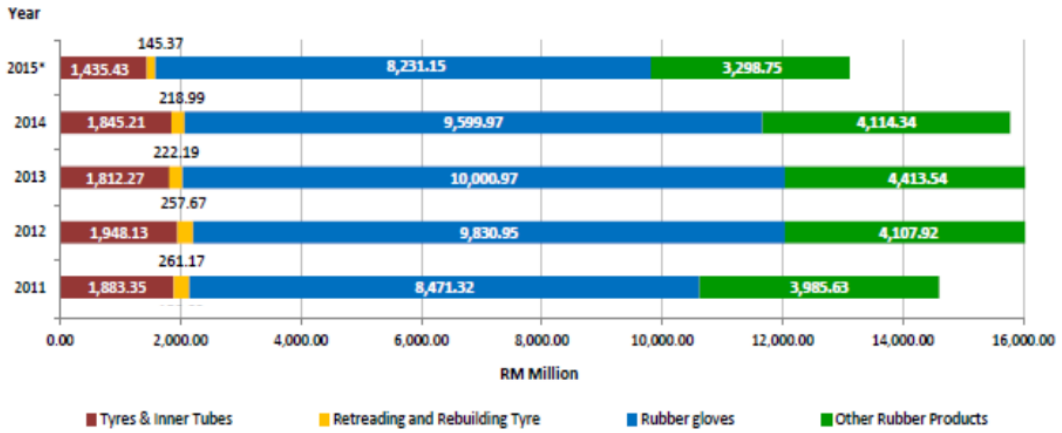
Source: IRSG statistics.

Figure 1-11: Export value structure of rubber-related industries



Source: MRB Stats 2015.

Figure 1-12: Sales Value (ex-factory) of Locally Manufactured Rubber Goods (RM Million)



Source: MRB Stats 2015.

1.1.6 (Ref) Asian production base development situation of domestic tyre makers

Table 1-1: Asian production base development situation of domestic tyre makers

	Raw material rubber factory	Tire factory
Thailand		
Indonesia		
Malaysia		
China		

Note: This could be imprecise as it is possible that it counts subsidiaries as one factory.

Source: Website of each company.

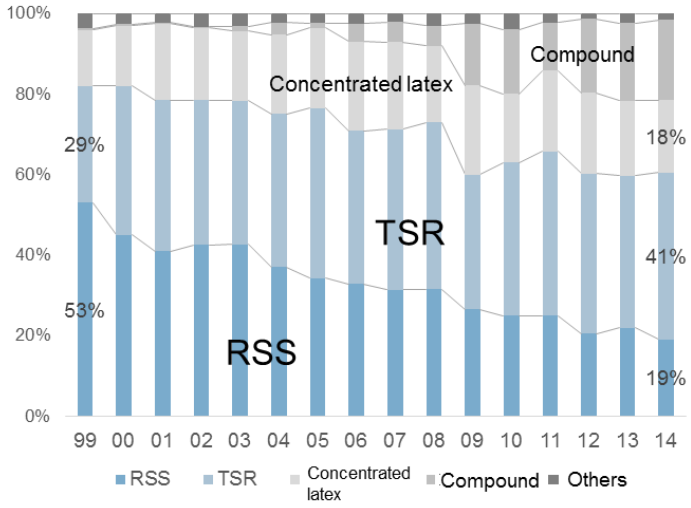
1.2 Issue of the Thai NR Upstream Industry

1.2.1 Structural change of product – Change of RSS main production

The production structure once dominated by RSS has changed towards a TSR structure during the rapid expansion of rubber demand.

- High value-added RSS had been mainstream in Thailand, but in recent years there has been a rapid expansion in low value-added TSR production.
- There appear to be three factors explaining the reason for the rapid increase in TSR production.
    - There has been farm development by farmers using low technology and new entrants in response to the sharp rise in rubber prices, and the new entrant layer produces up to cup lump.
    - For farmers producing RSS, this requires labour and man-hours, but it may be difficult over time to maintain labour as wages rise. Therefore, there is a tendency to change production to cup lump.
    - With expansion of export to China, demand for TSR increased, as Chinese market requires cheaper material.

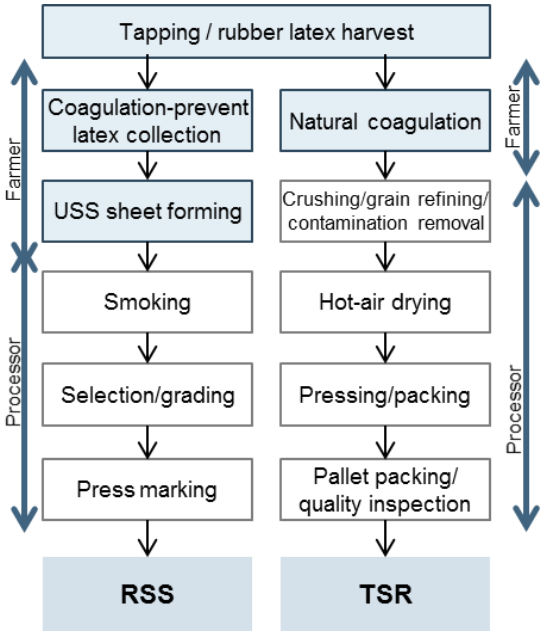
Figure 1-13: Trends in NR raw material production in Thailand



Note: A compound is raw rubber mixed with synthetic rubber. It is not NR so CESS is exempt when exported to China. However, synthetic rubber content in a compound if it is raised from 1% to 10% due to the law amendment in China to make it more difficult to mix. As a result, it is expected that compound production volume will decrease.

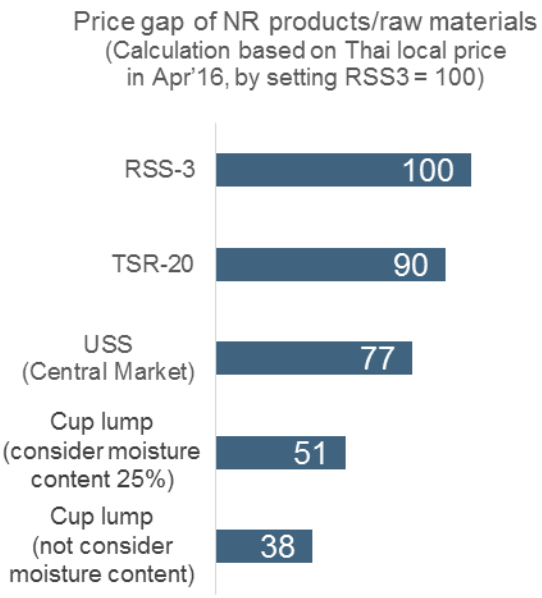
Source: Thai Rubber Association Stats.

Figure 1-14: NR processing



Source: NRI

Figure 1-15: TSR/RSS price gap



Source: NRI

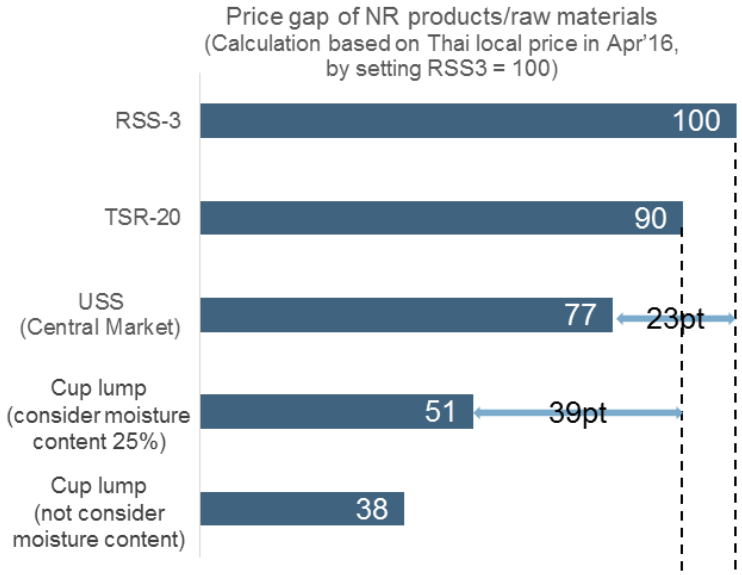
- In Thailand, spot trading markets (central markets and local markets) have been established in various places across the country to enhance market accessibility and the price bargaining power of farmers. Also, RSS can be kept in a half-finished product form, so farmers can consider market conditions and choose when to stock or sell.

Table 1-2: Overview of NR market in Thailand

	Name･Number	Role and overview
International market	International Commodity Exchange *5 places in the world*	• Spot and futures trade • RSS and TSR • Trade by rubber users and investors • Make index for international price (SICOM,TOCOM)
Thai local market	Central Market *6 places in domestic*	• Spot trade focusing on USS • Sales by collectors and agricultural institution, purchase by processors • Make index for domestic price
	Local Market *108 places in domestic*	• Spot trade of USS, cup lump • Sales by farmers, purchase by collectors/makers • Maintain by current RAOT (Rubber Authority of Thailand)

Source: NRI.

Figure 1-16: Price situation of NR products and raw materials



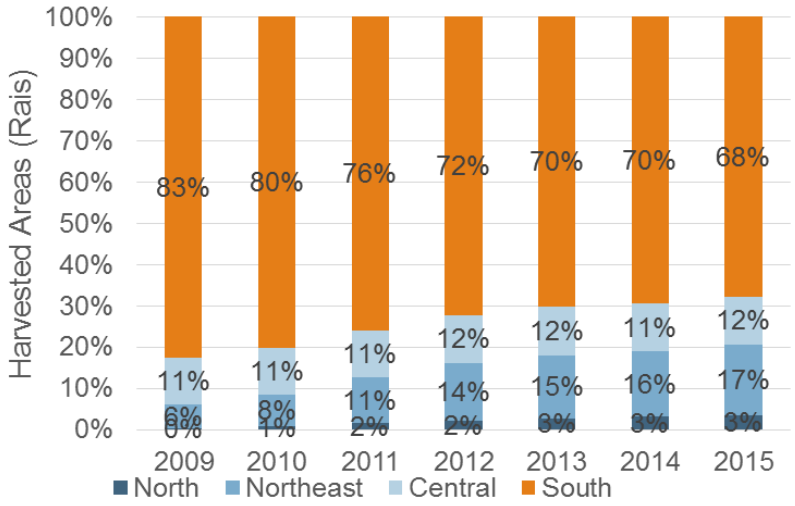
Source: NRI.

1.2.2 Location of major NR processing factories and regional characteristics

In Thailand, the development of new NR plantations occurred after the 2000s. Since many TSR process factories are located in the Northeast and Central regions, TSR is a major product in these regions.

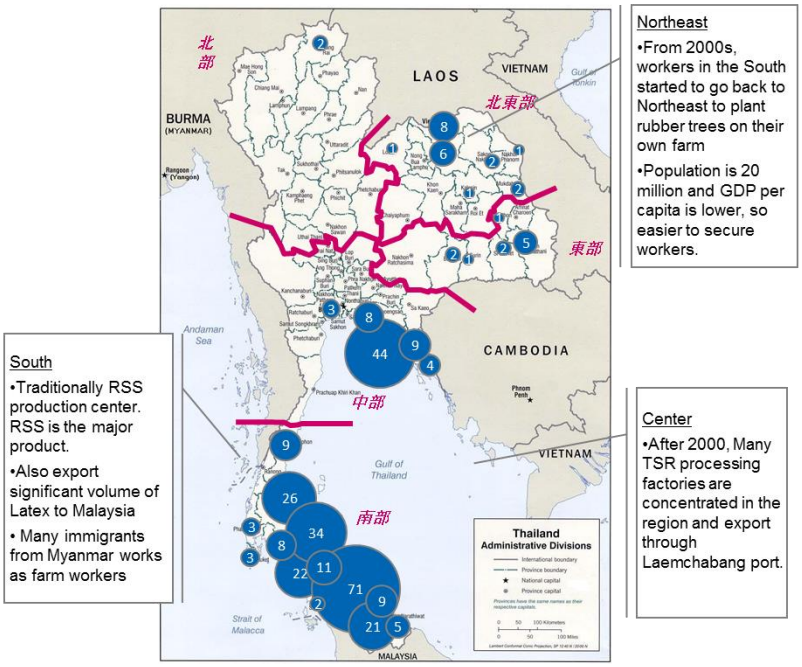
Since harvesting of new plantations can only start 7 years after planting, these plantations are now entering their peak harvest period. The production environment for palm oil is also not as good as in Indonesia or Malaysia, so it is more difficult for Thai NR farmers to switch to other crops. These two factors make it difficult for Thailand to control production volumes even when the NR price drops.

Figure 1-17: Rubber's harvested areas in Thailand, by region



Source: The Thai Rubber Association.

Figure 1-18: Location of major NR processing factories and regional characteristics



Source: Various sources.

1.2.3. Price competitiveness against Indonesia – CESS and the shift in tyre makers

CESS, a fund for agricultural development measures, is one factor behind Thailand's low competitiveness in terms of price. Tyre makers have also reduced their RSS usage.

- Thailand and Malaysia collect tax (CESS) from exported rubber and use this to fund replanting seedling distribution for farmers and NR R&D for the NR research institutes in each country (for example, the development of high-productivity seedlings).
- Indonesia does not collect CESS, so a price gap occurs between producing countries. Indonesia also does not distribute seedlings to farmers, etc., and the support framework offered by the government is very weak. Therefore, unit yields have remained at around half of those found in Thailand.

Table 1-3: Taxation (CESS) in major producing countries

	Taxation condition	Tax amount	JPY
Thailand	RSS price ≦ 40 THB/kg	0.9 THB/kg	2.7 JPY/kg
	RSS price 41~60 THB/kg	1.4 THB/kg	4.3 JPY/kg
	RSS price 61~80 THB/kg	2.0 THB/kg	6.2 JPY/kg
	RSS price 81~100 THB/kg	3.0 THB/kg	9.3 JPY/kg
	RSS price > 100 THB/kg	5.0 THB/kg	15.5 JPY/kg
Indonesia	None	None	None
Malaysia	Uniform taxation regardless of processed products price	0.14 RM/kg	3.9 JPY/kg
Viet Nam	In Dec 2013, reduced CESS from 3-5% to 1% of processed product price, and abolished CESS since Oct 2014		None

※ As of Apr 2016, 3.1 JPY/THB, 27.7 JPY/RM

Source: NRI

Table 1-4: NR selection by tyre makers

Difference between RSS and TSR	✓ RSS price is higher than TSR price around 10% ✓ RSS has visual inspection for every sheet so contamination rate is low ✓ RSS has higher Po (Plasticity) and PRI (Plasticity Retention Index) than STR, and it has advantage in term of strength ✓ For anti-vibration rubber, conveyor belt, etc., mainly use RSS ✓ Listed product of TOCOM is RSS only
Trend of tire makers' selection	✓ In the past, they produced tires by focusing on RSS ✓ TSR usage rate increases as technology development since '90-'00 with the purpose of procurement cost reduction by using TSR ✓ RSS has been distributed in 110kg bale so need machine to handle, while TSR is 35kg bales so it is easy to handle ✓ Currently TSR usage rate is higher that RSS ✓ It is prospect that tire makers also proceed technology development to enhance TSR usage rate in the future

Source: NRI

1.2.4 Difficulty of implementing a price support policy

The rice pledging scheme by the previous government contributed to regime collapse and a subsequent coup d'état in Thailand. As a result, the current government has resisted implementing excessive price support/intervention measures.

- Thai government policy has focused on supply adjustments through replanting promotion, together with domestic demand expansion through downstream industry development to support the NR price. At the same time, the government acted on the spot purchase of 100,000 tons of rubber in January 2016 as an emergency measure to tighten the supply and demand gap.
- The government needs to consider exit solutions after this purchase, taking into consideration lessons learned from the previous rice pledging scheme by the previous government. As such, it may be difficult to select excessive purchase and intervention policies.

Table 1-5: Overview of NR price policy by the Thai government

	Policy	Overview	Budget
Production adjustment	Replantation・plant change promotion	• Promote 110k ha of replantation • Compensate income during replantation period to farmers who do replantation/change plant	120 bn JPY/ 7 years
	Bridge loan	• Provide low-interest loan to farmers for sideline	30 bn JPY/ Multiple years
Market intervention	Spot purchase	• Spot purchase of 100,000-ton RSS from central market (Jan'16)	15 bn JPY/time
	Utilization promotion	• Allocation use of purchased rubber focusing on infrastructure sector by ministries	
Downstream industry development	Industry development	• Develop downstream industry with target of domestic consumption rate from 10%→30%	N/A
	Rubber City concept	• Form rubber industry cluster in Songkhla in South and attract manufacturers	

Source: NRI.

Table 1-6: Overview of the rice pledging scheme

Overview of rice pledging scheme	✓ Loan to rice farmers with amount of assumed yield before cropping x government fixed price (around 1.5 times of actual market price) ✓ Loan repayment complete when farmers deliver cropped rice. It is purchase system from substantial government
Failure under Yingluck government	✓ Implemented under Yingluck government from '11 to '13 ✓ 1.9 million households of farmers received loan in 2013 rainy seasons ✓ Since purchase price is different from actual market price, they were afraid of loss, then sales and stock digestion did not progress, policy funds depleted in 2 years ✓ Loss from this policy was 1.8 trillion JPY (Ministry of Finance (Thailand))
Rice policy under Prayuth government	✓ Stop rice pledging scheme ✓ Do not implement income compensation system (implemented under Abhisit government) ✓ Promote production cost reduction (fertilizer price reduction, etc.) ✓ Lump-sum payment (paid farmers in average of 12,000 THB in '14, budget was 120 bn JPY)

Source: NRI.

1.3 Measures for the Issuance and Direction of Policy Proposals

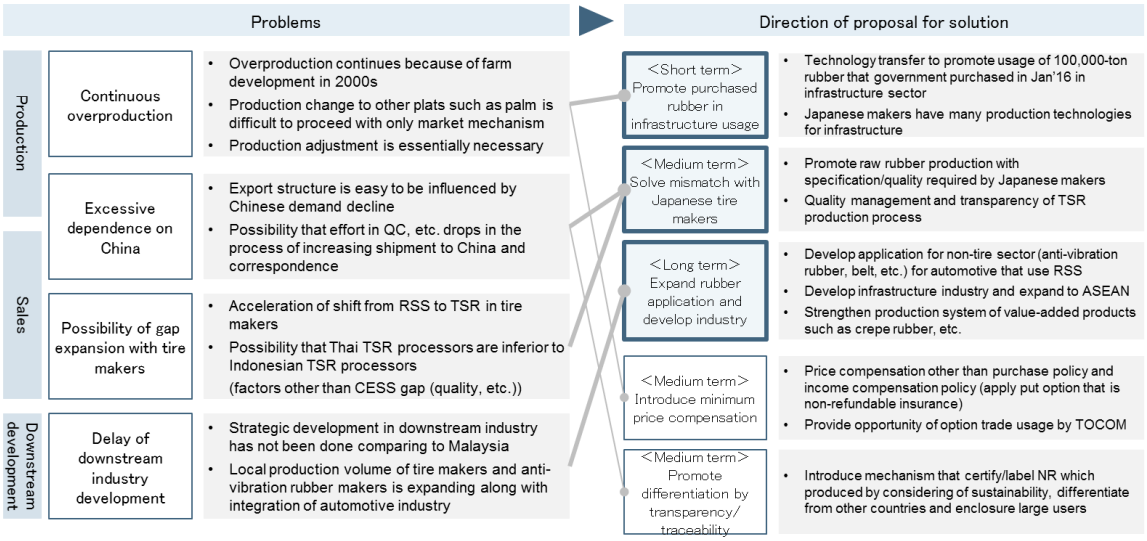
1.3.1 Issues in the Thai NR industry and the direction of proposals for solutions

Table 1-7 shows the problems and the directions of possible solutions and highlights that production adjustments are essential. However, a needs gap between processors and large users such as tyre makers may have developed, so it could be necessary to find a way of closing this gap.

In the long term, downstream industry development that increases added value by domestic consumption is required.

1.3.2 The Thai government announced domestic utilisation plans for the purchase of NR in January 2016, mainly for the infrastructure sector as mentioned below.

Table 1-7: Problems and the direction of proposals for solutions



Source: NRI.

Table 1-8: Thai government's plan for NR utilisation

Ministry	Project	Rubber Use (Tons)	Budget (MB)	Year
Ministry of Defence	Road construction and roadworks in 3 southern border provinces	813	164	
	Macadam road (76 areas)	285		
Ministry of Public Health	Purchasing of surgical gloves, Foley Catheter and condoms		1,050	Q2 of year 2016
Ministry of Education	Sports ground improvement, road pavement in schools	N/A	25,231	
Ministry of Tourism and Sports	Road construction in 12 provinces	230	120	2016
	Football ground, rubber pavement for racetrack	763	389	
	Rubber lucky doll, welcome gift set	2,500	329	
	10 sports stadiums	108	114	
Ministry of Transportation	Tires for automobiles Mixing in asphalt (modified asphalt)	57,713 (latex)	36,503	2016-2017
Ministry of Interior	Sport stadium construction 46 projects Road construction and maintenance 2,071 projects	9,808 (latex)	13,130	2016-2017
Ministry of Agriculture and Cooperatives	Rubber pavement for footpath Road surface improvement Pond coating (water-resistant coating) 	36,606	16,395	2016-2017
Ministry of Industry	Open more rubber industrial factories	N/A		

Source: Nation TV news.

1.3.3 In terms of NR infrastructure utilisation technology, Japanese rubber makers have products and technology in various fields as mentioned below.

Table 1-9: Infrastructure-related products of Japan rubber makers and their applicability to Thailand

Field	Product	Use application	Applicability in Thailand and concern	Maker (★: Interview destination)
Footpath / ground pavement	Chip/elastic pavement for sports ground	Elastic pavement using rubber for impact mitigation	• As NR is not strong enough, reinforcement material (black carbon) is required. In that case, it is high hiding power of black and difficult for coloring. • NR concern is degradation. Poor heat resistance. Tires can use anti-aging agent that has stain property but it is difficult to use for infrastructure. • For usage that does not appear on the surface (putting sponge sheet underground, etc.: micro foam is needed), it is possible to use NR. • Construction requires technological capability for urethane binder mixing. • Sumitomo Riko and 3 tire makers did experimental study at Civil Engineering Research Institute about rubber pavement for road with noise prevention purpose in the past, but does not put into practical use.	★Toyo Rubber Chip ★Sumitomo Riko Muraoka Rubber
	Elastic block	Same as above		
Road pavement	Modified asphalt	Asphalt spill prevention, road performance improvement (slip resistance)	• If there is no performance requirement same as Japan, it is also possible to use in Thailand. • However, as company uses macromolecular polymer without using NR, there is no technology reserve for NR usage in the company.	★Nichireki
Sports facility	Coating in facility	Impact mitigation and falling prevention in facility	• NR usage volume is limited because of thin layer coating and high usage ratio of macromolecular polymer.	★Sumitomo Rubber
	Rubber chip for artificial grass	Tennis court Football ground	• Use as cushion material installing under resin layer of green surface is possible consideration. However, tire scrap is more proper for cost and performance. • Because rubber processing and utilization technology is not that high.	★Toyo Rubber Chip ★Sumitomo Rubber
Waterway infrastructure	Rubber dam	Flood countermeasure	• Total volume of rubber used for bag is SR. Using NR is difficult due to weak light and heat resistance. It may not have makers that use NR.	★Bando Chemical Sumitomo Electric
	Impermeable sheet for civil engineering	Waterproof pond/reservoir Shrimp pond	• NR had been used in the past, but now focus on SR. NR maybe difficult to use.	★Bando Chemical Maeda Kosen
Harbor	Fender	Impact absorption when ships come alongside the pier	• There is large usage volume of NR for each product. However, they do not have continuous demand. The technology is not high comparing to tires, etc.	★Sumitomo Rubber Yokohama Rubber, Bridgestone
Earthquake resistance	Seismic isolation rubber for bridge and construction	Earthquake countermeasure	• If there is no needs for earthquake resistance, it is difficult to diffuse	3★Sumitomo Rubber Yokohama Rubber, Bridgestone

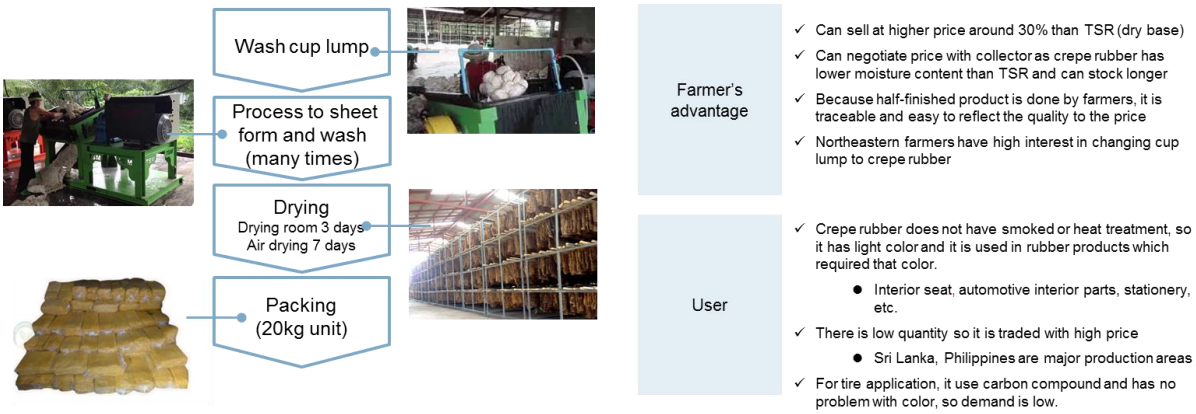
Source: Based on Sumitomo Rubber, Sumitomo Riko, Bando Chemical, Nichireki interview.

1.3.4 Improvement of the production environment for low-quality rubber in new production areas in the Northeast

Crepe rubber is processed NR that uses a creper machine (including washing) to change coagulated cup lump into sheet form. It can add value at farmers' farms or at agricultural institutions by processing in addition to selling cup lump for TSR. However, crepe rubber-making machines are expensive, at around JPY10 million, so it can be assumed that such machines would be shared by an institution or a community unit.

Consideration should be given to various options, such as cost reductions of the processing machines, promoting the shared use of machines, etc.

Figure 1-19: Process of crepe rubber production



Source: Rubber Economics Magazine.

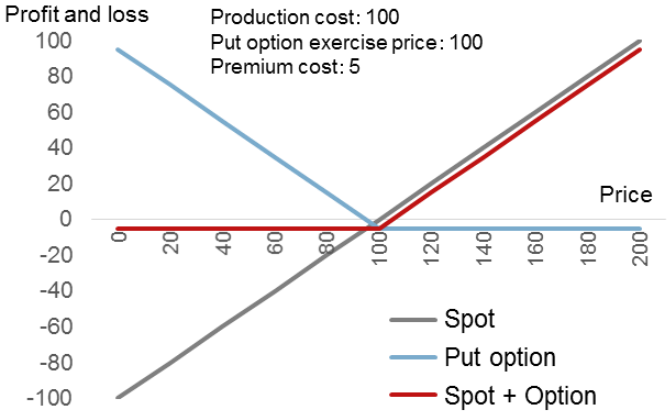
1.3.5 Introduction of a minimum price compensation mechanism through options trading, etc.

The Tokyo Commodity Exchange (TOCOM) is also interested in establishing an NR options trading market.

If options trading on the Tokyo Stock Exchange could be linked to create a put option for minimum price purposes, this should directly contribute towards price stability support.

However, further consideration is needed regarding how to set the premium cost and whether there is PIC on the Thai government side for funding and operating.

Figure 1-20: Minimum price compensation by using options trading



NR option trade market	✓ There is futures market but no option trade market ✓ Have trade market for major agricultural crops such as wheat ✓ TOCOM is willing to open option trade market

Source: NRI.

Figure 1-21: Senior Thai official of the Ministry of Agriculture and Cooperatives' expresses interest in options trading

Mr. Lertviroj Kowattana
Deputy Permanent Secretary
of the Agriculture and Cooperatives

- It is very interesting to use option trade as tool of minimum price compensation, and it is worth to consider. It is welcome if Japan supports the implementation.
- First, how about signing MOU for option trade feasibility study between Japan side and Thailand side (Ministry of Agriculture and Cooperatives)
- In case there is policy proposal from Japan including option trade, MOAC will be window contact while implementing organization will be RAOT.
- In addition, there is also interest in MOU for technological cooperation especially for downstream products.
- When implement option trade, it is high possibility that implementing organization of Thailand side will be RAOT.

Note: Deputy Permanent Secretary (NR policymaker) interview by NRI Thailand on 15 March 2016.

Chapter 2

Production and Distribution Environment of Natural Rubber Farmers

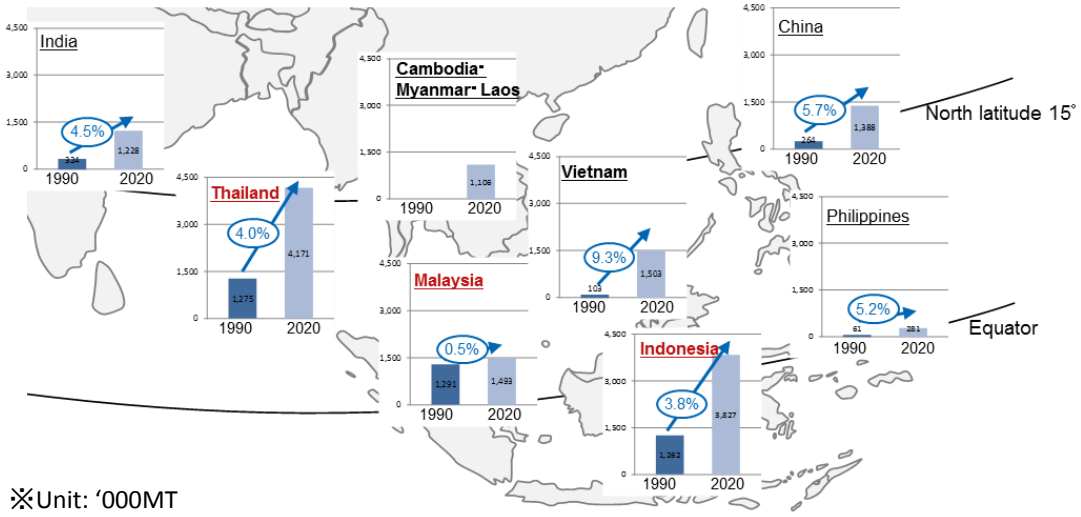
2.1 Production Environment of Farmers

2.1.1 Analysis of productivity and cost comparing Thailand with Indonesia and Malaysia

a) General rubber production trends and the oversupply issue in Thailand and the region

The majority of NR farmers in Thailand are smallholders. As shown in Figure 2-1 and Table 2-1, of production yields, Thailand has high productivity at around double that of Indonesia and Malaysia. Malaysia has more high technology but has many extensive farms in order to maximise business profitability and this has pushed average productivity down. Meanwhile, Indonesia has made little progress in using high yielding clones and its low technology tapping technique has also led to low productivity.

Figure 2-1: Main production countries of NR and trends in production volumes



※Unit: '000MT

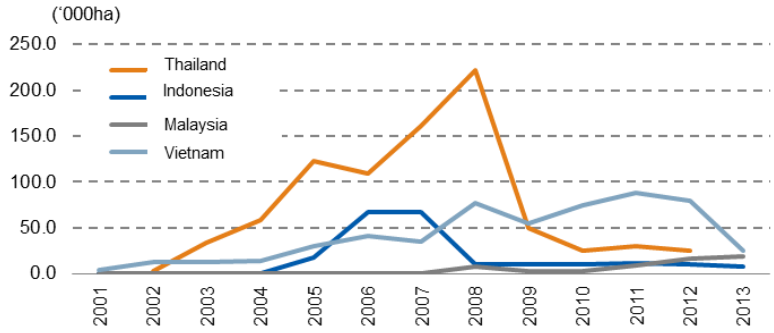
Source: NRI prepared based on IRSG Statistics Data.

Table 2-1: Main production countries of NR and trends in production volumes

		Thailand	Indonesia	Malaysia
Qualitative index (CY2011base)	Production vol. ['000 MT]	3,394	2,982	996
	Growth(08-11,12-20)	3.3%、2.2%	2.7%、3.0%	1.0%、4.3%
	Total are ['000 ha]	2,322	3,437	1,233
	Growth(08-11,12-20)	-1.3%、0.2%	0.2%、0.4%	0.0%、1.5%
	Yield [kg/ha]	1,426	681	837
	Growth(08-11,12-20)	0.4%、2.0%	-6.0%、2.8%	-0.6%、2.8%
	Estate ratio	9.6(2004) ⇒ 9.6(2010)	15.1(2004) ⇒ 15.6(2010)	9.9(2004) ⇒ 6.3(2010)

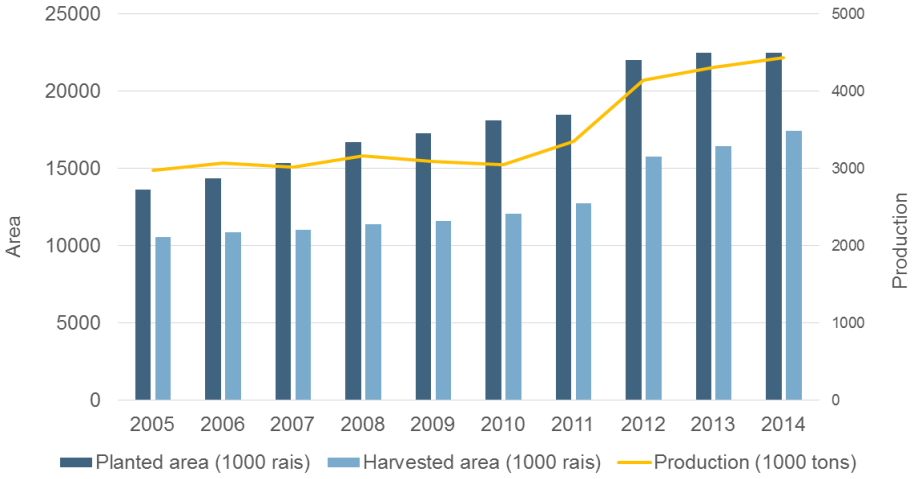
Source: NRI prepared based on IRSG Statistics Data

Figure 2-2: New farm development areas in main production countries



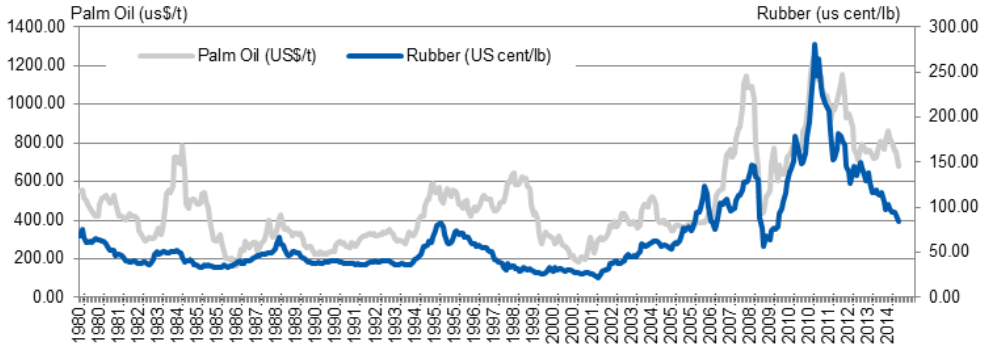
Source: IRSG

Figure 2-3: Para rubber: Areas and production, 2005-14



Source: Agricultural Statistics of Thailand, 2014

Figure 2-4: Price trends of NR and palm oil



Source: IRSG

Table 2-2: Rubber production increases and adjustments by major producing countries

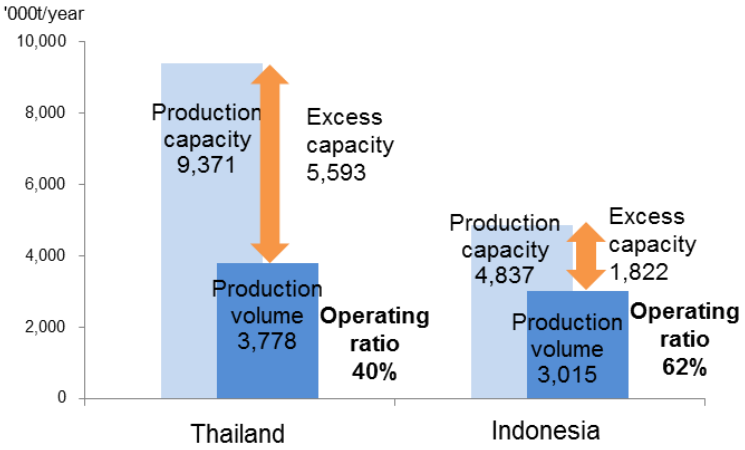
Thailand	✓ Since 2002, new farms have been actively developed even in northeastern of Thailand above north latitude 15° . However, there is small room for new development, so forecast that it is difficult for extra. ✓ As rubber price is declining in recent years, government encourages replantation of existing farms and changing to palm, and proceed the production adjustment
Indonesia	✓ Since 1980, palm production has been driven all over country. The estates change from rubber farms to palm farms. ✓ When rubber price was high in around 2008, there was return to rubber, but when price decrease, they change to focused on palm again.
Malaysia	✓ There is ratio development to focused on palm (around 80-90%) and rubber (around 10%) with a focus on large estates. ✓ There is no production adjustment activity. However, willingness to increase rubber production is declining due to price decrease. ✓ Smallholders have land ownership problem as barrier, so it is difficult to increase production of rubber farm.

Source: NRI prepared based on IRSG Statistics Data

The overcapacity issue has also affected the downstream level. Figure 2-5 shows the operating ratio of processing factories in Thailand compared with those in Indonesia. This implies that in Thailand, NR processing factories have lower factory utilisation ratios and thus have less price bargaining power versus buyers compared with Indonesia and others.

Figure 2-5: Operating ratios of processing factories in Thailand/Indonesia

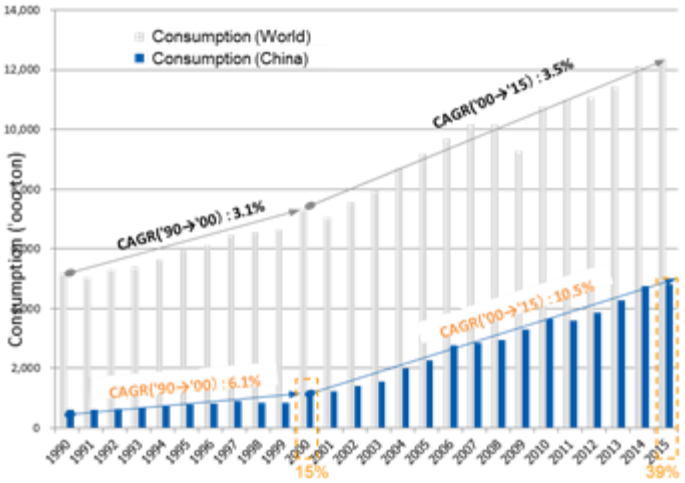
(2012 actual data)



Source: NRI

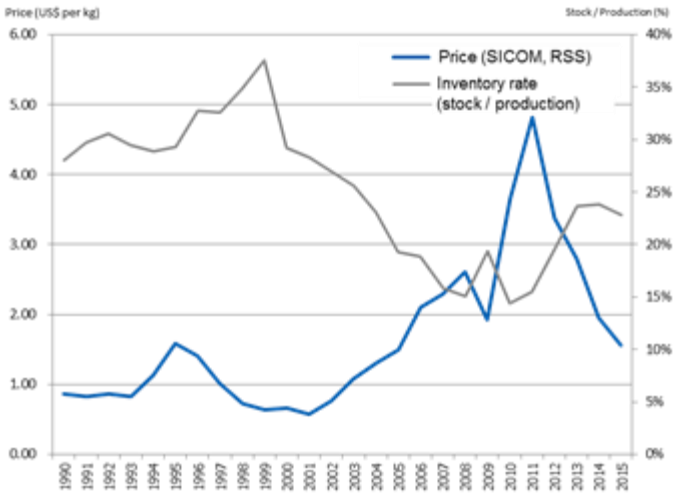
The reason behind the rapid increase in NR production in Thailand and the subsequent rise of oversupply is largely attributable to the "China factor". As shown in Figure 2-6, China's consumption of NR has increased rapidly since the early 2000s due to the rapid motorisation of the country, entailing an increase in both vehicle and tyre production. Not surprisingly, the country's share of global demand jumped from 15 percent in 2000 to 39 percent in 2015, making it the largest NR user country. This sudden sharp rise in Chinese demand contributed to the soaring NR price from 2005 to 2012, while the drop in demand from China since 2012 has produced the reverse effect, namely the rise in global NR inventory levels and the subsequent decline in NR prices as shown in Figure 2-7.

Figure 2-6: Trends in NR consumption prices



Source: IRSG statistics

Figure 2-7: Trends in NR inventory levels

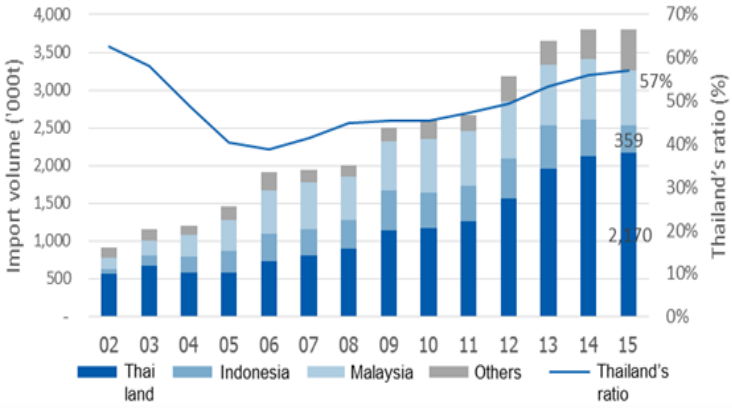


Source: IRSG statistics

Thailand has benefitted considerably from the "China boom", as demonstrated by the country's high share in China's NR imports in Figure 2-8, steadily increasing to reach 57 percent in 2015. Likewise, the share of Thailand's NR exports going to China also increased to reach 58 percent in 2015, in sharp contrast to Indonesia, where dependence on China was only 13 percent in the same year. However, Thailand's share of Japan's NR imports declined

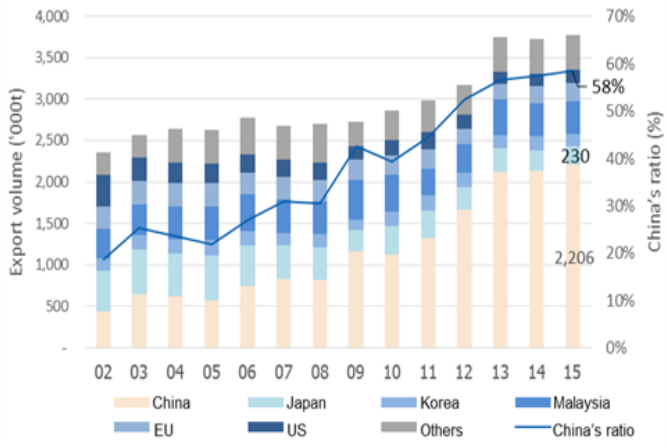
and was overtaken by Indonesia in the mid-2000s, as shown in Figure 2-9, the reasons for which are discussed in the following section. Thailand's high dependence on China in turn aggravated the impact of slowing demand from China on Thailand's NR farmers and processors compared with other NR producer countries, as discussed later.

Figure 2-8: Trends in China's import volumes by country



Source: IRSG statistics.

Figure 2-9: Trends in Thailand's export volumes by country



Source: IRSG statistics.

2.1.2 Structure change of Thailand's NR production

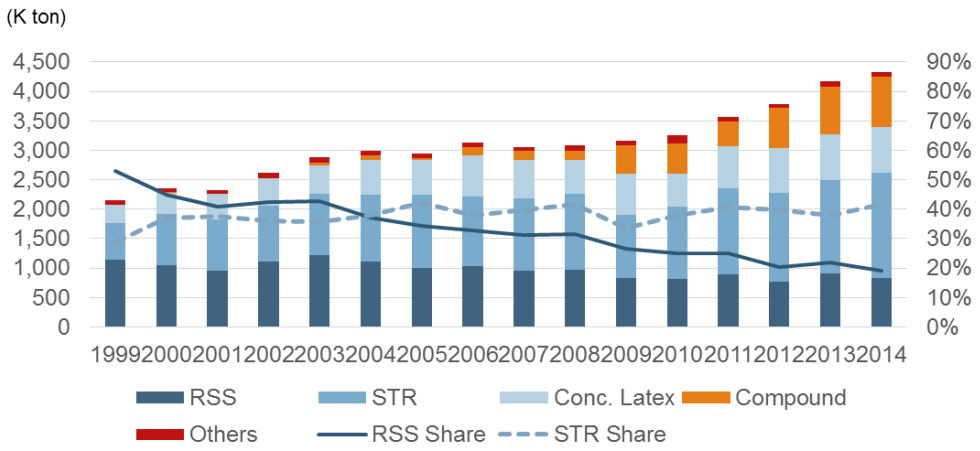
Thailand has traditionally been the largest producer of RSS (Ribbed Smoked Sheets) in the world and, until recently, it was the dominant NR product in Thailand. The quality of RSS from Thailand has achieved the highest level in the region, thanks to close cooperation between Thai processors/ exporters and Japanese tyre makers in the 1960s and 1970s, who were the world's largest NR users at the time and provided technical advice to Thai NR suppliers. Since then, it has been common for Thai farmers or tappers working on farms to process USS (Unsmoked Sheets) from latex using simple rolling press machines at their farm sites and supply USS to collectors who in turn sell to midstream processors for smoking to make RSS. Farmers who can afford to buy machines prefer to sell USS than latex, as the USS price is higher than latex, and also as it can be kept and stored when the selling price is low.

From 1990s onwards, the Thai government subsidised farm cooperatives to set up smoke facilities in order to expand grassroots level production of RSS. This reflected its policy of empowering and improving the status of smallholders through the development of cooperatives.

In sum, the success of Thailand in becoming the global hub of RSS production is attributable to demand-side factors, as well as to supply-side factors; the former coming from Japanese tyre makers who required high quality RSS, and the latter coming from Thai NR producers, who improved quality to cater for their users' requests. The dominance of smallholders among NR producers and the government policy of targeting smallholders also favoured the production of USS/RSS, which required highly labour-intensive processes and less investment for processing, in contrast with TSR or concentrated latex, which require high investment from large-scale processors.

However, the structure of rubber production has undergone major changes from the mid-2000s, as shown in Figure 2-10.

Figure 2-10: Rubber production trends in Thailand (1999-2014)



Source: Rubber Research Institute Department of Agriculture

Changes in the supply of NR are described below.

First, RSS is no longer the dominant NR product, as its production share decreased from more than 50 percent in the early 2000s to less than 20 percent in 2014.

Second, TSR (Standard Thai Rubber), the Thai standard of TSR (Technical Standard Rubber), has become the largest product, with its share increasing from 30 percent to over 40 percent in the same period. If the "compound" is included in STR, its share reaches over 50 percent, as the "compound" is a derivative product from STR, mixed with a small percentage of synthetic rubber to avoid import duties in China, which protects NR producers from NR product imports. Processors/exporters mix 1 percent of emulsion SBR with NR to make a "compound" to avoid import duties in China. However, in 2015, the Chinese authorities raised the content level of synthetic rubber to 10 percent and so the share of compound is expected to plummet.

Third, the share of concentrated latex also increased in the period, as the global demand for gloves and other sanitary rubber products expanded.

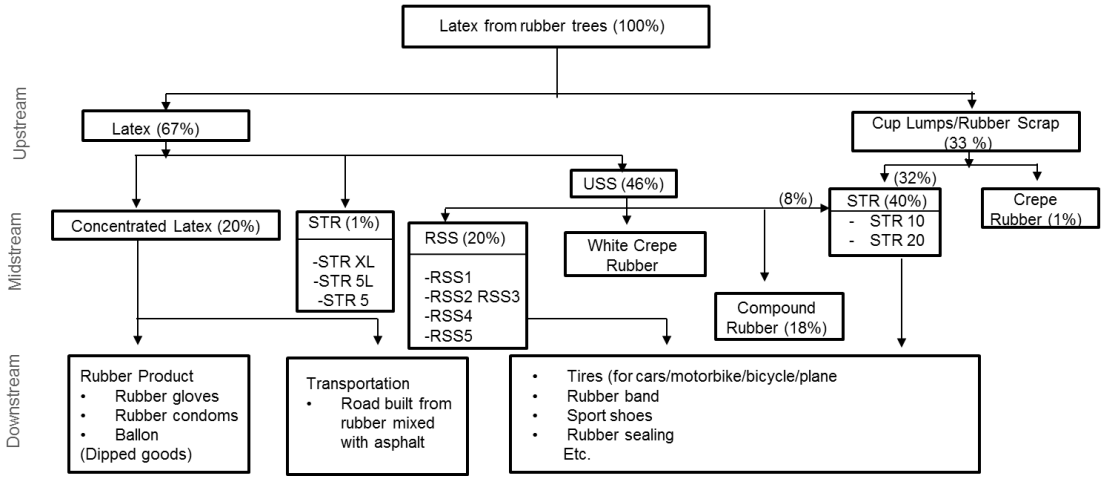
The increasing share of TSR in the downstream industry has also impacted the upstream industry of NR production, as shown in Figure 2-11 in the structure of NR production from the viewpoint of the total supply chain. Latex is still the largest upstream product comprising 67 percent of the total, more than two-thirds of which is processed to USS. This is followed

by cup lumps which makes up the rest, at 33 percent, nearly 100 percent of which is processed into STR.

As shown in Figure 2-12, reflecting an increase in TSR production in the downstream stage, cup lumps have increased by more than fourfold in the past 15 years from 8 percent to 33 percent, while latex has declined to around two-thirds of total production.

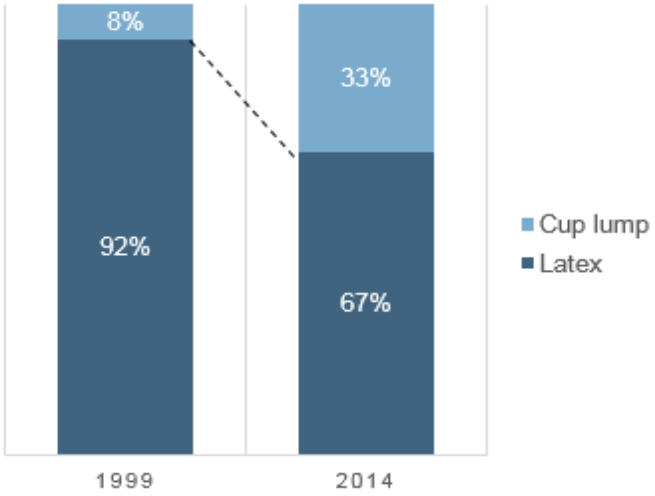
USS is still the largest product in the mid-stream, as it can be used for both RSS and STR, comprising 46 percent of mid-stream products. One half of USS volume is processed into RSS and the other half is mixed with cup lumps to be processed into TSR and make "compound".

Figure 2-11: NR supply chain structure in 2014



Source: Central Market

Figure 2-12: Production by upstream products

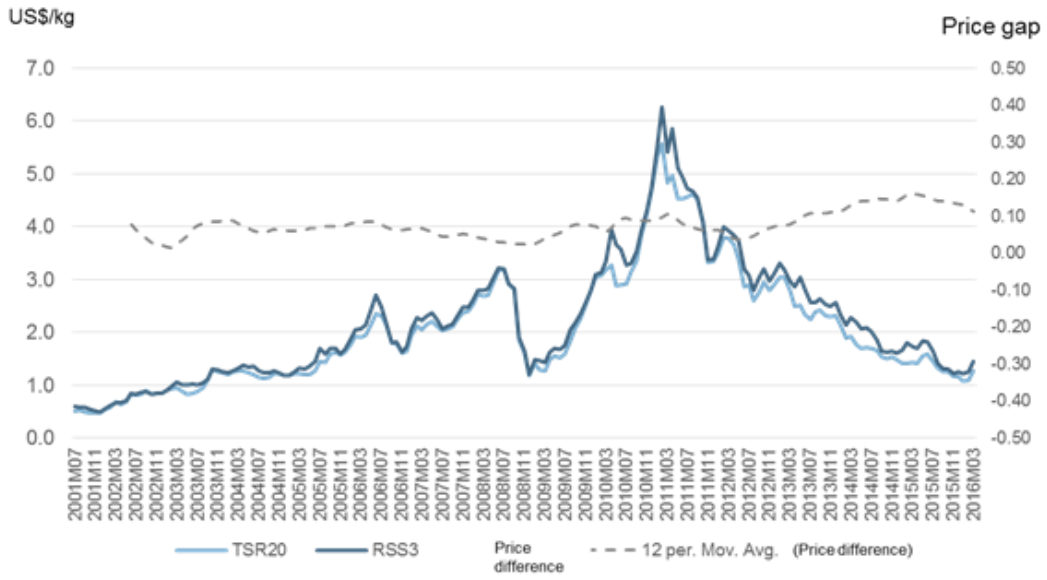


Source: Central Market

2.1.3 The “China factor”: Demand factor

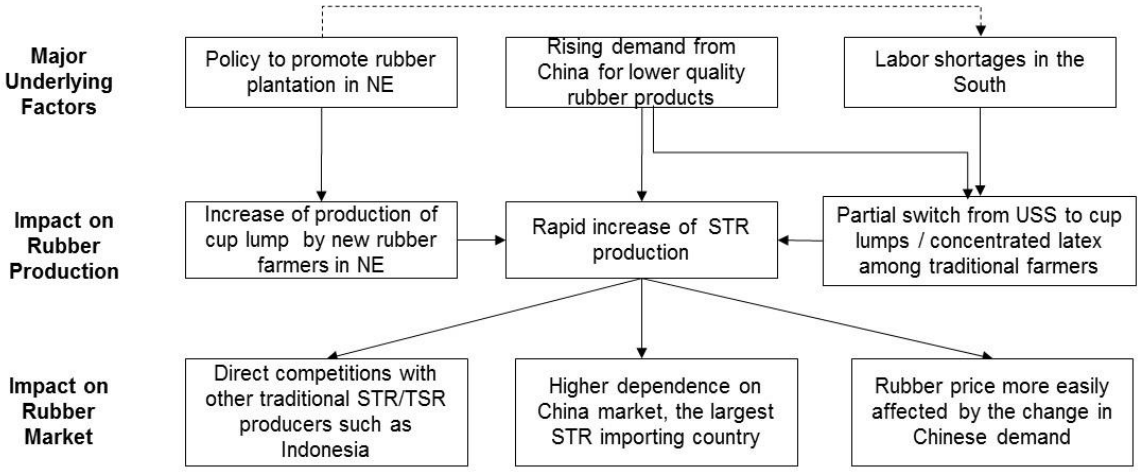
The recent hike in the production of TSR in Thailand is attributed to several factors. First, and most importantly, is the “China factor”. This has played a critical role in the transformation, as China uses mainly TSR as a cheaper tyre material, while traditional export destinations such as Japan and Europe use more RSS, which has higher quality but more expensive, at around 10 percent more than TSR, as shown in Figure 2-13. Second, there has been an increase of NR production in non-traditional NR producing regions, such as the Northeast, which mostly supplies cup lumps for TSR. Third, but less important, the lack of labour in the South may have accelerated conversion from latex to cup lump to a certain extent, as the region is dependent on foreign migrant workers. In sum, the rapid increase in TSR production has developed hand-in-hand with Thailand’s deeper dependence on the Chinese market.

Figure 2-13: Price of NR ($/kg, SICOM)



Source: World Bank

Figure 2-14: Major factors affecting NR production structure and market



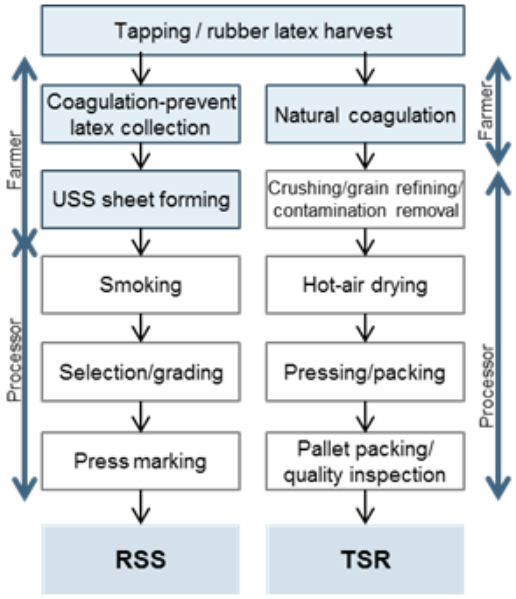
Source: NRI

It is important to understand the difference between RSS and TSR, as explained below.

RSS, a more traditional NR processing method, is costlier in nature as it uses more labour in latex collection, USS sheet making, and quality checking in each process. RSS is higher quality, as manual labour during sheet making and quality checking helps to reduce impurities at each stage of the process.

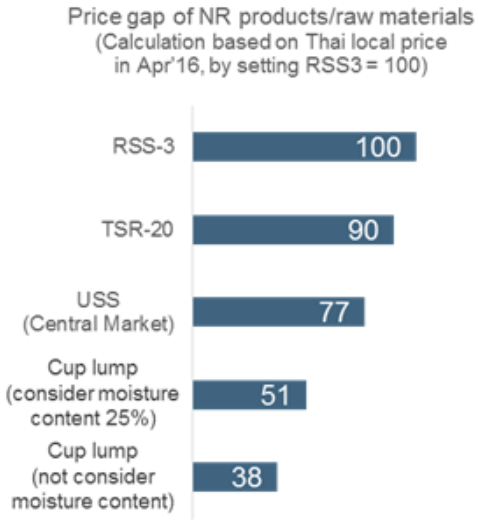
Meanwhile, TSR, a more recent mechanised technology, uses cup lumps as its NR material, which has more impurities than field latex, and uses machines to reduce impurities (dirt and ash). Although TSR can save costs through labour-saving technologies, it still has a higher level of impurities. In Thailand and elsewhere, STR20 (equivalent to TSR20), a mid-quality grade, is the dominant product, accounting for more than 95 percent of TSR exports.

Figure 2-15: NR processing



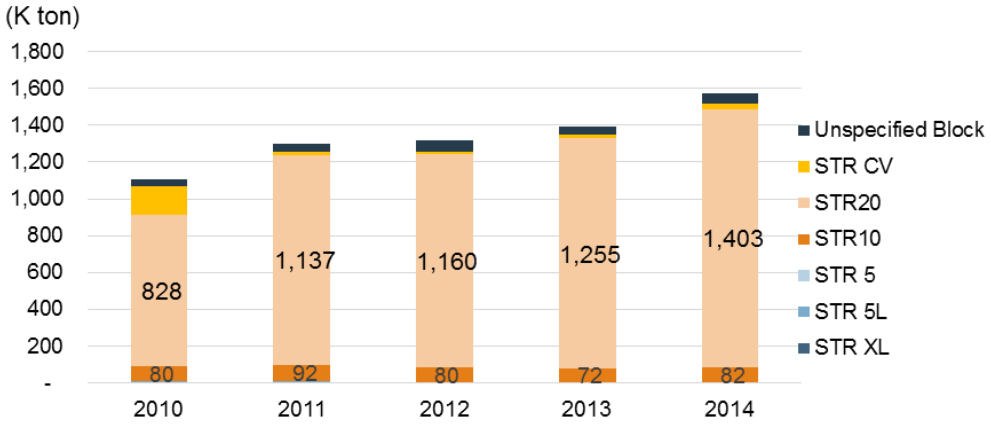
Source: NRI

Figure2-16: TSR/RSS price gap



Source: NRI

Figure 2-17: Exports of STR (TSR), 2010-14



Source: Rubber Research Institute Department of Agriculture

Table 2-3: Comparison of STR (TSR) characteristics

Parameters	STR-CV	STR-L	STR-S	STR-10	STR-20	STR-50
Dirt content,%wt, Max	0.05	0.05	0.05	0.10	0.20	0.50
Ash content, %wt, Max	0.60	0.60	0.50	0.75	1.00	1.50
Nitrogencontent,%wt, Max	0.60	0.60	0.50	0.60	0.60	0.60
Volatile matter % wt, Max	0.80	0.80	0.80	0.80	0.80	0.80
Initial wallace plasticity Po, Min	-	30	30	30	30	30
Plasticity Retention Index (PRI Min	60	60	60	50	40	30

Source: Various sources.

- Thailand export trends by rubber product

Table 2-4 indicates that dependence on the Chinese market differs by product, as TSR has the highest dependence at 63 percent, while RSS and concentrated latex are around 30-35 percent.

Thailand's share of world TSR trade has increased as a result of increases in its exports to China using its advantage of geographical proximity.

Thailand's dependence of concentrated latex exports to Malaysia is high, as the country is the largest producer of rubber gloves in the world. However, RSS has less dependency on any particular country, and is more widely spread across various major destinations, such as China, Japan and US.

Table 2-4: Thailand's export trends by rubber product

Product	RSS	STR	Concentrated latex
Thailand Share in world export (2014)	28.6%	30.7%	34.2%
Annual growth of world imports (2014)	-8%	-8%	-6%
Annual increase of the world share of Thailand (2014)	- 6.5%	3.3%	- 3.2%
Major export destination (2014)	China:29% Japan:20%(revise) US: 10%(revise)	China:63%	Malaysia: 49.9% China:30%

Source: Trade Map, International Trade Center

2.1.4 New NR production in the Northeast and changes in the South: Supply factor

Another factor behind the increasing share of TSR is attributed to the supply factor, the increase in production in the regions outside the South, such as the Northeast and other areas that mainly grow cup lumps to be processed as TSR.

Traditionally, the South has always been the largest producer of NR, as the climate there is best suited for growing rubber trees. Also, since the inception of ORRAF in 1960, the replanting policy to replace aging trees with high yielding clones was mainly focused on the South—a relatively underdeveloped region at the time—achieving huge success and converting the region into a rubber monoculture.

The dominance of the South in NR production continues today but, as shown in Figure 2-18, since 2013, the harvested area in South has decreased from 70 percent to 66 percent, while the area of Northeast region has increased to nearly 20 percent. This is the result of several factors. One is the saturation of rubber planting area in the South, which accounted for 80 percent of total farming area (Jocelyne Delaurue, 2011) by the mid-1980s. The other reason is the recent policy to promote rubber plantations in the Northeast to reduce poverty in that region. The Northeast has traditionally been harvest areas for rice and tapioca and is less well suited to growing rubber. However, governments since the 1990s have promoted rubber as an alternative cash revenue for farmers through the extension of low interest loans and the distribution of clones better suited to the Northeast.

Particularly during 2004-12, the government implemented a populist rubber policy to encourage farmers to harvest rubber as a means of diversifying farmers' revenues and to benefit from rising rubber prices at that time. Farmers in the Northeast were also more

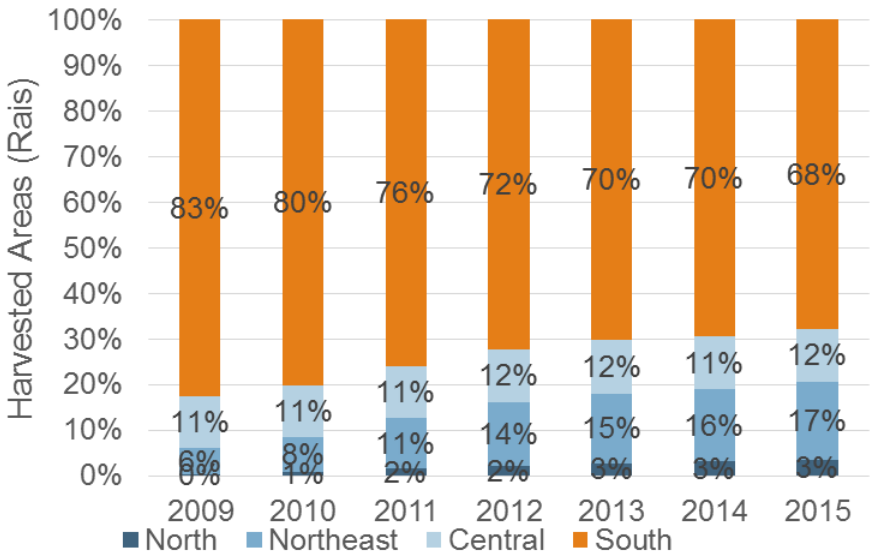
interested in rubber due to rising prices and many who worked as migrant workers tapping in rubber plantations in the South returned home to start in their own rubber plantations.

Table 2-5: The government's major policies in the Northeast

Year	Major policies in Northeast
1989-1991	➢ Farmers started rubber plantation since 1989 since people from south came to Northeast to plant as the sample. ➢ Then Government began to have an important role since 1991 by providing rubber seeds and production factors such as fertilizer.
1997	➢ rubber price rose and more farmers were interested to plant rubber
2004-2007	➢ Government had project to provide rubber seeds 1 million rais (all over Thailand).
2009	➢ government supported in providing production factors for 800,000 rais

Source: Interviews in Nongkhai

Figure 2-18: Rubber's harvested areas in Thailand, by region

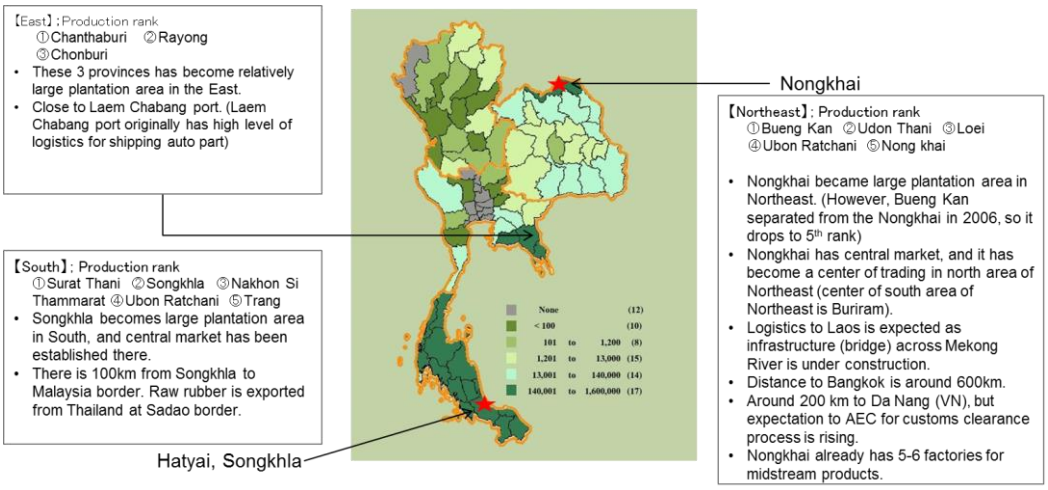


Source: The Thai Rubber Association

- The field survey in major rubber plantation areas

The major rubber plantation areas are located in three regions, namely the South, the (Central) East and the Northeast. A field survey was conducted in the major rubber plantation areas in two regions: in Hatyai in the South and in Nongkhai in the Northeast, as shown in Figure 2-19.

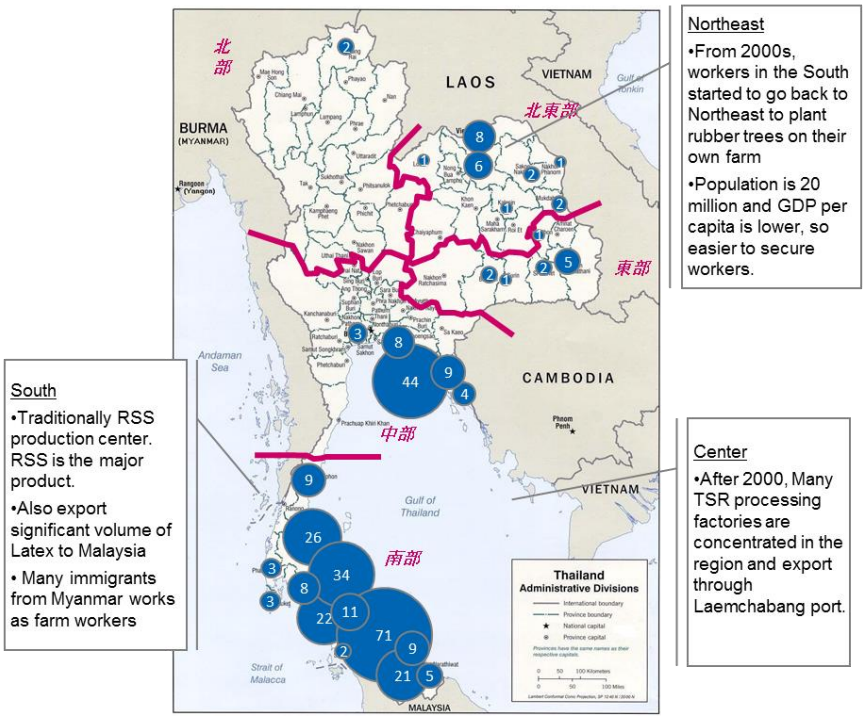
Figure 2-19: Rubber plantation areas in each region in Thailand



Source: Agriculture census

Figure 2-20 demonstrates that many companies from the South set up TSR processing plants in the Northeast, which encouraged production of cup lumps in the region.

Figure 2-20: Major locations of NR processing factories and regional characteristics



Source: Various sources

Table 2-6 shows the types of NR producers in the South compared with the Northeast. Table 2-6 indicates that cup lumps for TSR processing have spread mainly in the Northeast, while the spread to the South is limited, as the region is a traditional producer of USS/RSS. With the increase in demand for concentrated latex in recent years and the South's proximity to Malaysia, incumbent rubber farmers in the South have been converting from USS/RRR to latex suppliers.

Table 2-6: The type of NR producers in the South compared with the Northeast

	USS/RSS	Cup Lumps	Concentrated latex
South	• Incumbent small farmers (latex, USS) • Cooperatives (USS/RSS)	• Limited spread to incumbent farmers	• Incumbent small farmers converting from USS/RSS • New investors in farms
Northeast	• Virtually None: No incumbent farmers	• NE Tappers retuning home from the South • Traditional Farmers of rice/tapioca, converting to rubber plant	• Virtually None: No incumbent farmers

New entrants/ or conversion from incumbent farmers

Incumbent producers

Source: NRI Field Survey

2.1.5 A comparison of characteristics of rubber farmers between the Northeast and the South

According to Table 2-7, Northeast farmers mainly make cup lumps, while they make very little RSS/USS, due to several factors mentioned below:

- Northeast farmers have lower skills in rubber sheet making, as the majority have only recently started their rubber plantations.
- Northeast farmers are usually multi-crop farmers, unlike the farmers in the South who are mono-crop farmers, and would rather produce cup lumps, which need less frequent collection and less processing after collection.
- There are few factories or collectors in the region that makes RSS, so demand for RSS is low.
- Recently, demand for TSR has increased rapidly due to strong demand from China.

Table 2-7: Characteristics of Northeast rubber farmers compared with the South

	Northeast	South
Experience in NR	Short (started harvesting from early 2000s)	Long (since 1950s)
Major products	Cup lumps	USS/RSS
Area	10 rai	8-12 rai
Mixed harvesting with other crops	High (traditionally harvested rice, tapioca)	Less (traditionally relied on rubber crop only)
Development of cooperatives	Limited (only consolidate cup lumps for bidding)	More developed (RSS smoke facilities promoted by ORRAF)

Source: Interviews in the South and NE

2.2 Issue of competitiveness of Thai rubber products

According to interviews with users as illustrated in Table 2-8, mainly Japanese tyre makers, Thailand has a strong advantage in USS/RSS due to its long experience of making the product. There are few competitors, as Indonesia, the second-largest producer of NR, concentrates on TSR. RSS is easier for Thailand to differentiate from other countries, as the competitive factors of USS/RSS are not only cost, but also quality and supply chain management from upstream to mid-stream. The latter is supported by a unique close and extensive network of farmers, cooperatives and collectors.

However, when it comes to TSR, the competitive landscape is completely different. Thailand is losing its competitiveness to Indonesia, which has now become the largest TSR producer. Although Thailand remains the largest exporter of TSR to China, its position is declining relative to Indonesia in other markets such as Japan. The background of Thailand's loss of competitiveness in relation to Indonesia in TSR is attributable to two factors. First, Thailand has CESS levied on the NR export price, while Indonesia has no CESS. Since 2005, Thailand has raised CESS to THB 5 (US$0.14), from THB 2 (US$0.06), which has resulted in a greater price difference between the Thai and Indonesian products. Second, the labour cost in Thailand is higher than in Indonesia by 10-40 percent depending on the region. Comments and evaluation of Thai NR products by users are shown below. These demonstrate that some expectation gaps are occurring between Japanese major users and processors, with regard to price, quality and delivery. Moreover, Thai processors may need to improve their differentiating factors, such as adding special attributes to make it easier to process for users, in order to compete with Indonesia more effectively.

Table 2-8: Evaluation of Thai NR products by user

Product	Evaluation of Thai product by users	Comparison with Indonesia
RSS	■ RSS of Thailand has established d good reputation since long time ago and has strong competitiveness ■ RSS is hand made by farmers who take out dirts/foreign particles by hand and make it to sheet one by one so requires much skilled labor but can make good quality . ■ Sheets are gathered and pressed as a block of 150g and then shipped to downstream manufacturers. ■ We do not accept the view that Thai rubber competitiveness is comparatively low because the majority of farmers are small scale farmers and thus product quality is not uniform . ■ On the contrary, it is precisely because the producers are small scale farmers, they can supply USS. ■ RSS requires much manual labor process, which is hard to be replaced by mechanization, and has limited	■ Indonesia produces few USS/RSS and so cannot compete with Thailand in RSS
STR	■ STR uses cup lumps collected from farmers which are put through industrial process for product transformation , requiring few manual labor process compared to RSS. ■ Quality of STR depends on the ■ It is therefore difficult to ■ The production scale is much higher than RSS> ■ STR uses machine to get rid of foreign particles so its rubber quality grade is quite low so much that it is more popular among Chinese and Thai local tyre maker. ■ Thai STR and Indonesia SIR used different production process but do not result to have much quality difference.	■ STR from Thailand is around 5 cent / kg higher than SIR from Indonesia ■ Thai price premium partly derives from CESS which collects around 3-4 cents / kg and also from labor cost difference, as labor cost in Indonesia is around 70-90% of Thai cost . ■ Quality-wise, Thailand was better than Indonesia before but the gap between the two is quickly reduced due to quality improvement from Indonesia side. ■ Delivery from Indonesia is more stable as there is no dry season

Source: Interview from Japanese tire makers in Thailand

Below is a cost analysis by supply chain of the product.

The cost of TSR has dropped below the production cost of rubber according to farmers in the Northeast. The production cost of Thai rubber mid-stream products is around THB 45 to 50 per kg, higher than the market price, which fell to THB 30 to 40 per kg in early 2016.

According to interviews with users and industry experts, the upstream product cost in Thailand is not so different from other developing counties such as Indonesia and Viet Nam, since the clone seeds, climate and soil properties are relatively similar in these countries.

Regarding production costs, although the tapping cost may be higher than other developing countries, this may be easily offset by the higher skills of tappers and higher yields from the rubber plants. The cost differences may arise more from the processing costs at the mid-stream to downstream levels, as Thai labour costs are higher than those in neighbouring developing countries, especially for TSR, as processing is not a simple labour process, involving pressing into blocks, cutting and scaling. As for USS/RSS, this requires greater skill for sheet making and therefore is more advantageous for Thailand, which has more skilled labour.

The large global supply of TSR and new competition from developing countries has contributed to the sharp price decline of TSR products and this has affected the price of other rubber products, such as USS/RSS.

Table 2-9: Competitiveness of Thai rubber products

	Upstream	Mid stream	
Product	**Field latex/ cup lump**	**TSR/ STR**	**USS/RSS**
Production cost competitiveness	Not different among major producing countries (higher tapping labor cost of Thailand offset by higher yield and higher tapping skills)	Thailand higher labor cost may be disadvantage for TSR/STR due to simple skills needed However, proximity to China, major market of TSR/STR, give advantages for Thailand	Competitive due to higher skills for sheet making However, problem of labor shortages in the South may affect its competitiveness in future.

Source: Interviews and field survey

2.2.1 Mechanisation to improve productivity

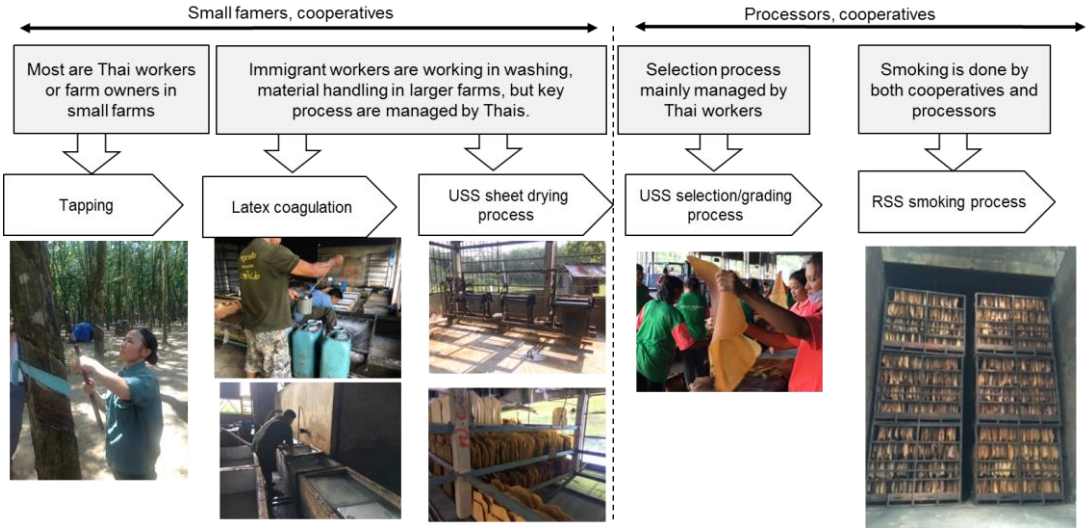
In this chapter, we will look closely at major NR products, such as RSS, TSR and concentrated latex, and their respective processes, and then analyse the possibility of applying further mechanisation to improve productivity in the upstream to mid-stream levels. We also look into crepe rubber, a niche product, which could be promoted in the Northeast as a more value-added intermediate product from cup lumps.

2.2.1.1 RSS processing process

As shown in Figure 2-21, Thailand has traditionally been the largest producer of USS/RSS. Thai rubber farmers in the South have actively undertaken mid-stream processes from tapping to USS making, which require a minimum level of mechanisation in the processing, such as sheet pressing.

As traditional Thai rubber farmers already use sheet pressing machines and RSS/USS uses a relatively simple mechanised process, there is little scope for any further mechanisation at the farm level.

Figure 2-21: RSS processing process



Source: Central Market

2.2.1.2 TSR processing process

Figure 2-22 illustrates the mechanised process of TSR. It indicates that TSR typically has more mechanised or semi-automated processes, such as washing/ milling /crushing process, and requires large-scale investment in equipment and land. It is thus mostly undertaken by large-scale mid-stream producers/exporters.

Since small scale farmers mainly provide cup lumps to large processors and the prospects for them to participate in the mid-stream process are low, there is little need to support mechanisation for farmers producing TSR.

Figure 2-22: TSR processing process

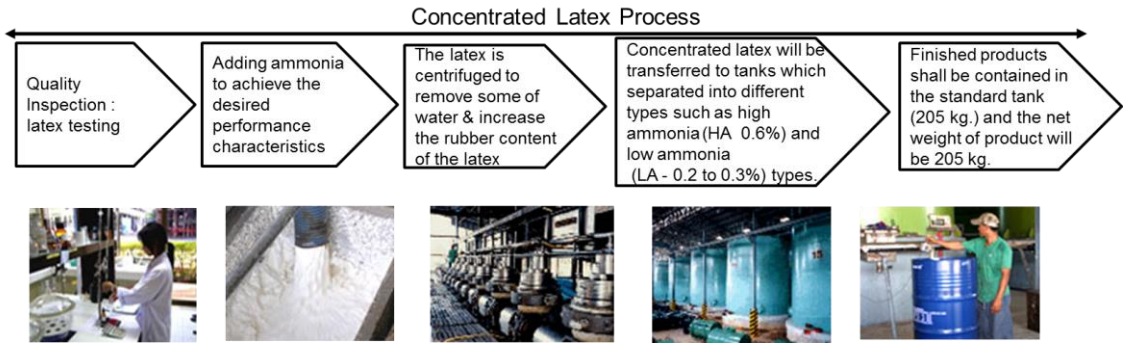
Source: Thai Hua Rubber.

2.2.1.3 Concentrated latex process

As shown in Figure 2-23, for concentrated latex the product also requires more investment, at about THB 10 million, or US$286,000, compared with RSS. Also, due to the requirement for large-scale investment and a network with overseas buyers, concentrated latex processing is mainly undertaken by processors/exporters. Moreover, it is difficult for small-scale farmers who collect latex for concentrated latex to enter the mid-stream process.

Consequently, there is not much need to support mechanisation for farmers to produce concentrated latex.

Figure 2-23: The process of making concentrated latex



Source: Thai Hua website; Chemionics Corporation website

As summarised in Table 2-10, the requirement for further mechanisation in the mid-stream process is rather limited for major NR products. USS/RSS is labour-intensive and cannot be mechanised further, while TSR and concentrated latex are already mechanised for large-scale production and so smallholder farmers and cooperatives have little chance to participate in the mid-stream process.

Table 2-10: Summary of rubber production requirements in upstream and mid-stream

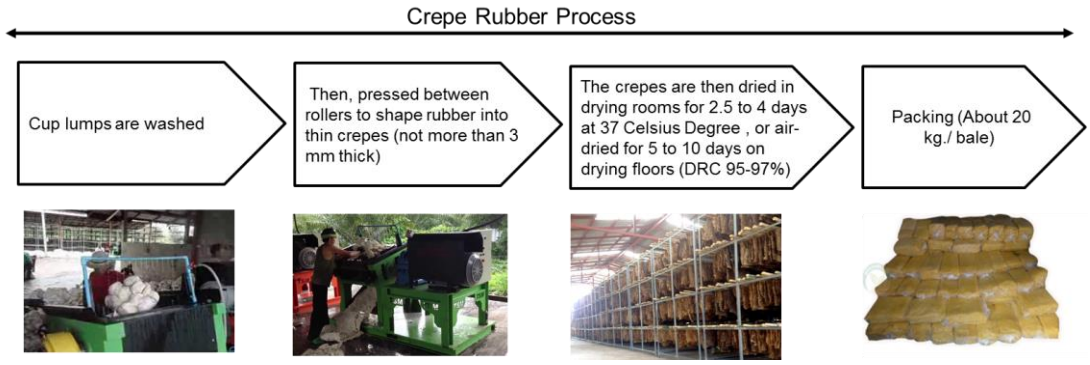
		Upstream		Midstream		
		Field Latex	Cup lumps	RSS/ USS	STR	Concentrated latex
Major producers		Small farmers (South)	Small farmers (NE)	Farmers (USS) , Cooperatives(RSS) Processors/ exporters	Processors/ exporters	Processors/ exporters
Production cost	CAPEX	Minimum; bucket, tapping tools, coagulant, etc	Minimum; bucket, tapping tools, coagulant, etc	Medium: investment for sheet rolling machine	High: Investment for mechanized process	High investment ; centrifuge and latex storage space(286K US$)
	OPEX	Labor cost: higher due to collection needed every 2 days.	Labor cost: lower due to collection needed every 8 days.	Medium: Cost of production (USS) : 5 Baht/kg 7-8 persons needed for USS process	High: High energy cost (electricity for machine and water for cleaning/ crushing process)	
Price (FOB. BKK on Apr 1)		Medium: 40-41 Baht/kg	Low: 21 Baht per kg	High :USS 44.15 Baht/kg, RSS: 54.7Baht/kg	Medium: STR 20: 48.7 Baht/kg	Medium; 43.5 Baht/kg
Labor issues		Skilled workers required for tapping	Easier to get workers as it requires less skills	Labor shortage of skilled workers	Less skilled worker as process is mechanically controlled	Less skilled worker as process is mechanically controlled
Level of mechanization		-	-	Low scale	High scale	Medium scale
Requirement for further mechanization		-	-	- Very limited as labor intensive by nature	- Already highly mechanized	-Already mechanized

Source: Result from field survey and RAOT

2.2.1.4 Crepe rubber process

Crepe is a crinkly lace rubber, obtained when coagulated latex or any form of field coagulate (tree lace, shell scrap, and earth scrap, etc.) is processed through rollers (a rubber crepe machine) and the resultant material air dried at ambient temperature. The manufacturing process of crepe (Estate Brown Crepe) is shown in Figure 2-24. The characteristic of crepe rubber is its light colour, as it does not undergo smoking or any heat treatment process, but instead is air dried. The highest grade of crepe rubber, such as PLC1, has a very light colour and is ready for application to exterior parts, such as footwear soles. Sole crepe, a dried and cut product from PLC, is used especially for footwear soles. Crepe rubber as a final product is not directly used for making tyres, which do not require any specific colour, while crepe from cup lump is widely used as an intermediate product to process SIR (Specified Indonesia Rubber) in Indonesia.

Figure 2-24: Crepe rubber process



Source: Rubber Economics Magazine

There are different types of crepe rubber depending upon the type of raw materials, as follows:

Table 2-11: Major types of crepes

Product type	Characteristics	Major application	Equivalent TSR grades
Pale Latex Crepe (PLC) & Sole crepe	Higher grade as processed from field latex, resulting to few impurities (dirt, etc) and to light color suited for application to exterior (Footwear., etc) Premium price will be added to lighter color grades. TheFour different grades of PLC available in the market are; PLC 1x, PLC 1, PLC 2 and PLC 3	Footwear, injection bottle caps	PLC1=TSR - 3CV PLC=TSR5
Technically Specified Crepe Rubber	Techinically specified, rather than visually specified.	Medical, Engineering, Retreading, Automobile and Footwear	TSR5 &TSR3
Estate Brown Crepe (EBC)	Cup lumps and other higher grades of field coagulum are used for making EBC.	Cycle tires, Footwear, etc.	TSR50

Source: Thomson rubber website, interview result from Tire makers

According to the field survey in Nongkhai, one of the major NR production centres in the Northeast, farmers and cooperatives there have shown a strong interest in producing crepe rubber for the following reasons;

a) Crepe rubber can be processed from cup lumps, which Northeast farmers mainly produce.

b) Crepe rubber has a higher value than cup lumps, thanks to its lower impurity content and low DRC; the crepe rubber price is around 30 percent higher than cup lump.

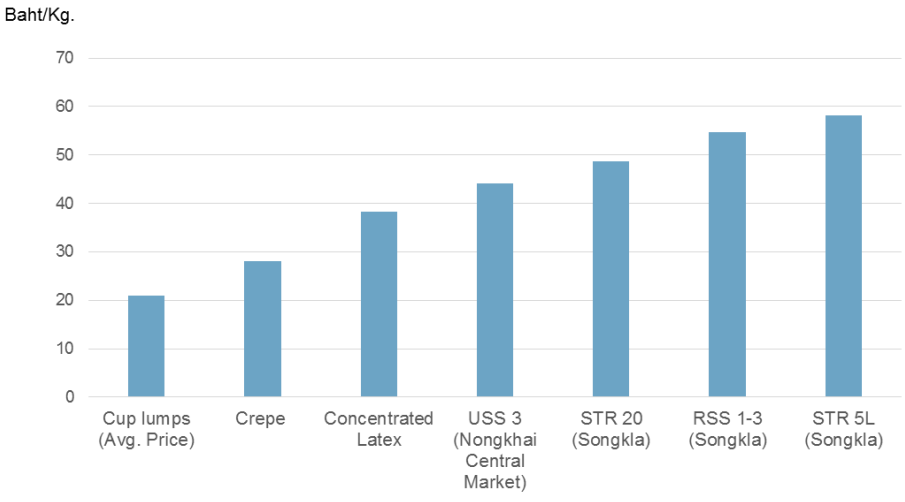
c) The investment required for processing crepe lumps is around THB 3 million (US$85,000), which is lower than other NR products, such as TSR and concentrated latex.

Table 2-12: Crepe rubber process

	Cup lump for STR	Crepe Rubber
Process	➢ Few process involved for farmers	➢ More processing for crepe making at farmer level
Investment for middle stream	➢ Beyond capacity of farmers or cooperatives for investing STR processing	➢ 3 million baht (85,000 US$) for crepe making machine
Farmers bargaining power	➢ Many farmers have disadvantages in Dry Rubber Content (DRC) measurement as collectors like to lower the price by lower the percentage of DRC than it should be	➢ Crepe rubber sheets have no water, it helps to avoid taking advantage from collectors.
Traceability of farmer origin	➢ Difficult due to mixing cup lumps from different farmer origins at the factory	➢ Easier due to semi-finished product processed at farmer site
Price	➢ Cup lump price ;21THB (0.71USD) in Nongkhai on Apr 6th ➢ Around half of USS price	➢ Crepe price is 28 THB price (9.8ThB), higher than cup lump more than 7 THB (0.02US$)

Source: Field survey at Nongkhai, 2016

Figure 2-25: Average price of rubber, by type (April, 2016)



Note: *Cup lump price is only available at Nongkhai Central Market

** RSS price is average price of RSS 1-3

Source: RAOT website and Central Market

2.3.1. Minimum labour cost, employment of immigrant workers, industrial relations in farms

2.3.1.1. Status of rubber workers' incomes

A field survey was conducted in Hatyai to understand the impact of the NR price decline on livelihoods, and the industrial-relations of workers and farm owners, as summarised in Table 2-13.

Farmers in the South are generally divided in two groups; medium-to-large farmers over 50 rai or 8 ha, and smallholder farmers with less than 50 rai or 8ha. Farmers owning more than 50 rai or 8 ha usually hire workers for tapping and processing USS and distribute 40 percent of their revenue to workers, while keeping the remaining 60 percent. Many of the workers in large farms come from Myanmar and Lao PDR, and there is long tradition of utilising migrant workers in the rubber industry since the 1990s, when the issue of labour shortages was problematic in the South. The labour shortage became more critical when migrant workers from the Northeast returned home to plant their own NR in the 2000s. Usually, large farmers also plant other crops such as oil palms, and have other businesses, so their revenue is less affected by the decline in NR prices. Medium farmers also hire workers from outside and share revenue with their workers.

Typical smallholder farmers of 15 rai or 2.4 ha usually tap rubber trees by relying on family members and neighbours, and do not depend on outside workers. In this case, family members keep 100 percent of the revenue. The revenue of smallholder farmers is THB 1,000-1,200 or US$29-34 (THB 100 = US$2.86), basing on the current NR price,

It is often pointed out that farmers in the South have been more severely affected by the decline in NR prices than those in other regions, as they are mono-culture farmers and must buy basic staples from the market, while farmers in the Northeast plant staple foods such as rice and other cash crops, including tapioca, fruit and vegetables. Farmers in the Northeast also plant and tap trees using family members, so they can avoid revenue outflows to outside workers.

Many farmers in the South are heavily indebted, as they bought luxury durable goods such as cars and motorcycles when the NR price was high. Despite this, they can survive with some support from other family members who work outside farming.

The status of workers is far more serious in the South. Most of them come outside the farming community and they have little other support. Tappers usually work in pairs and a

pair makes US$15 per sheet per day, or around THB 875-1,050 in total revenue, of which THB 350-400 is shared with workers. Consequently, revenue per worker is THB 175-200, much lower than the minimum wage of THB 300. Workers receive few forms of social welfare and usually live in cramped conditions with their families in small cottages provided by the farm owner inside the rubber plantation area. Many workers work under a patron-client relationship, with the farm owner lending money to their workers and recovering these debts through deductions made to the workers' revenue shares.

According to a tapper interviewed in the South, workers are demanding an increase in their revenue share following the price decline, but there has been no response as yet from farm owners. Some workers are leaving the farms to find better jobs elsewhere.

Table 2-13: Status of income of farmers and rubber workers by size of farm

Size of Farm	Area	workers (tapping/USS)	Revenue share	Revenue	Revenue Assmution
Small	15 rai (2.4ha)	Family members or neighbors	Farmers:100%	Farmer:1000～1200 THB/day per household	2.5kg / rai x 15 rai =37.5kg
Medium	15-50 rai (2.4-8ha)	ouside workers	Farmers:60% Workers:40%	Farmer: 1200～2160 THB/ day Worker: 175～200THB/ day (per worker)	2.5kg / rai x(15～50) rai =37.5～125kg
Large	>50 rai (>8ha)	ouside workers, foreign migrants	Farmers:60% Workers:40%	Farmer: >2160 THB/ day Worker: 175～200THB/ day (per worker)	2.5kg / rai x 50 rai =125kg

Source: Field Survey in Hatyai (Feb 2016)

2.3.1.2 Life of rubber farmers (results from a field survey) as shown in Table 2-14

- The price decline has adversely affected the lives of farmers through declining incomes and increasing debt levels, although not to such an extent that they have fallen into destitution.
- Facing plummeting incomes, some small-scale farmers have opted to find other sources of income by having family members work outside of the farm.

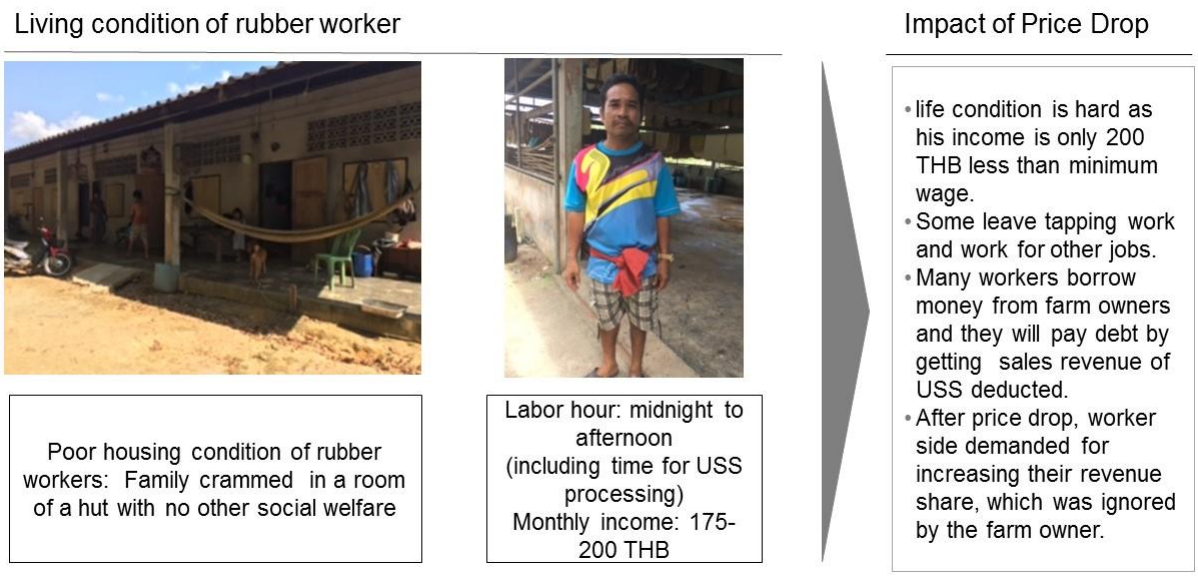
Table 2-14: Status of small-scale farmers' incomes

Topic	Answers
Farmer profile	• own rubber plantation (10 rais) • Hire no workers, only household workers (himself and his wife • Production : 60 kg/day
Impact of NR price drop	• It affected him in terms of the decreasing of income to pay for installments car and other expenses, but he does not suffer much from falling price as he has another job as an employee of rubber processing company.
Relation with buyer	• normally he will sell latex to collectors. (not sell to cooperatives because they give lower price such as 35 Baht) • Collectors will give higher price (Gap 2-3 Baht). • Some people who do not hurry to get cash will sell to cooperatives
Evaluation of NR policy by government	• Most of policies are short run solution so there are not useful. • He wants government to do anything which can increase price (60 Baht is acceptable) and not interested in other subsidies

Source: Field Survey in Hatyai (Feb 2016).

2.3.1.2.1 Living conditions of rubber workers

Figure 2-26: Status of rubber workers



Source: Field Survey in Hatyai (Feb 2016)

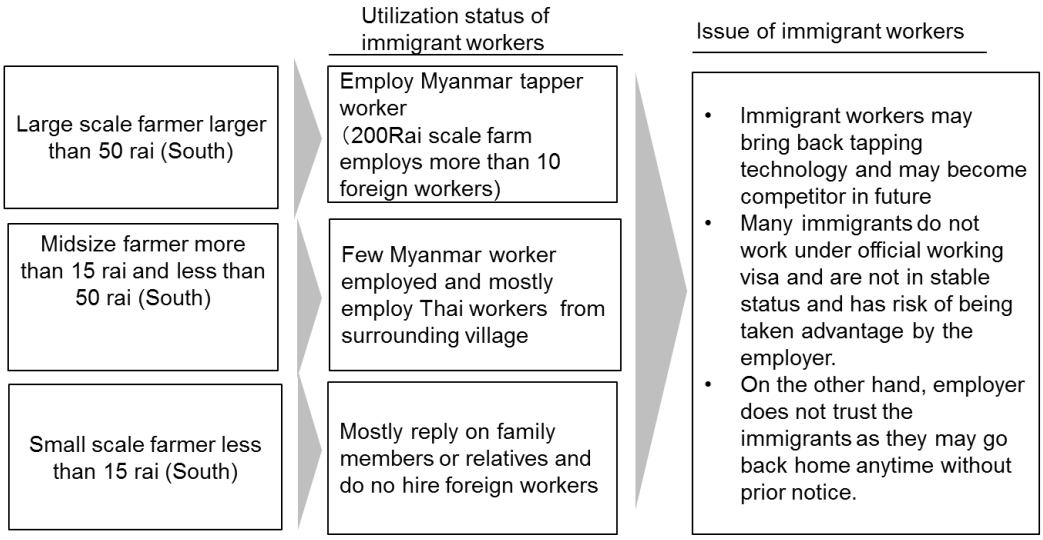
2.3.1.3 Utilisation of foreign migrant workers

As stated earlier, migrant workers from Myanmar started to arrive from the late 1990s. They are usually employed by large-scale farmers as tapping workers, while medium-scale farmers employ Thai workers and small-scale farmers rely on family members work and employ no

workers. In the mid-stream level of RSS, many foreign workers are employed in non-essential processes, such as washing USS, material transport and packing. Key processes such as USS quality checking, controlling smoke facilities and final shipping are usually managed by Thai workers. TSR uses more migrant workers than RSS, as it involves fewer skilled processes.

In sum, foreign migrant workers are already utilised extensively, especially in the South, and further dependence on foreign migrant workers will hinder the industry's competitiveness. Indeed, it could jeopardise the advantages that Thailand already has, as these migrant workers may go back to their own countries to plant rubber and could compete with Thai rubber farmers in the future (Figure 2-27).

Figure 2-27: Utilisation status of foreign migrant workers



Source: Field Survey in Hatyai (Feb 2016).

Chapter 3

Transactions with Rubber Processers

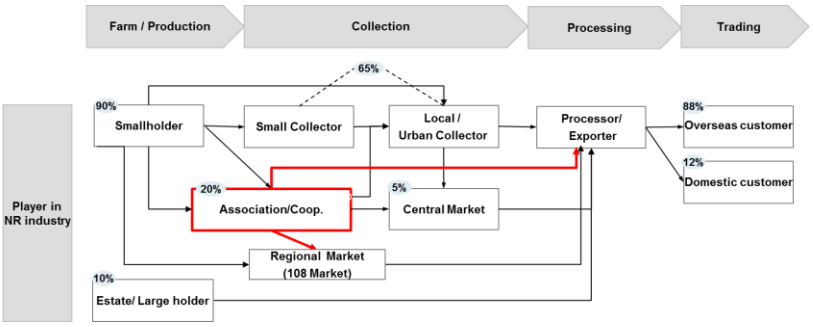
3.1 Pricing, Terms of Payment and Delivery, and the Role of Traders and Dealers

As shown in Figure 3-1, 90 percent of NR is supplied by smallholders, while 10 percent comes from estates/large-scale holders. Most NR rubber transactions are from farmers through collectors, accounting for 65 percent. Transactions from farmers up to processors pass through two or more middlemen, resulting in wider price margins, which can rise to up to 8 percent of the FOB price (around 4 percent per middleman). However, transactions via associations/cooperatives account for around 20 percent of transactions. Associations/cooperatives purchase USS/latex and smoke to RSS, then sell to processors, etc. The central markets comprise only about 5 percent of the total.

Farmers are well informed of the market price, which is basically the price set by the central markets and publicised daily through a website. Farmers then negotiate their own prices with collectors, referring to the central market price.

Each sales route has advantages as well as disadvantages, resulting in competitive relationships between the various routes, especially between collectors and associations/cooperatives. One of the main attractions for farmers of selling through collectors is same-day cash payments. Although the purchase price is slightly lower, easy cash conversion is attractive for smallholders.

Figure 3-1: Terms of rubber transactions



Source: Field Survey in Hatyai (Feb 2016).

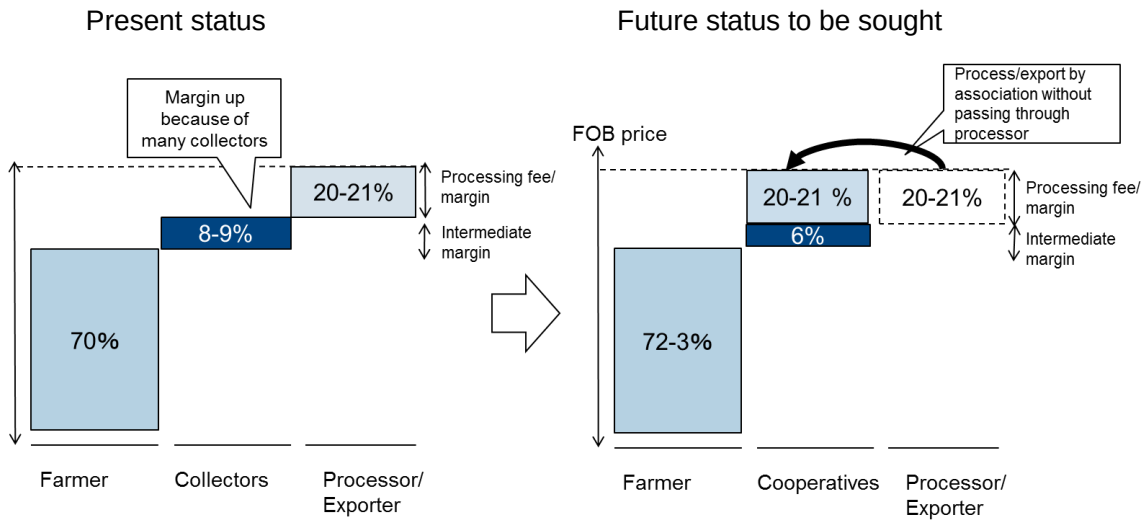
Table 3-1: Terms of payment and delivery by sales route

	Collector	Association/Cooperative	Central market
Distance from farmer	Set up the purchase location near farmers, so it can save most transportation cost/traveling time for farmers.	As number of associations/cooperatives is limited, it is inconvenient for farmers who are far from cooperatives.	Located in town that far from farmers.
Term of payment and delivery	Cash payment on the same day	Payment on several days later	Payment on several days later
Trade product	USS/RSS/cup lump/ latex	USS/RSS	USS/RSS
Margin	5-9%	Little cheaper than collector, in addition, stock dividend is paid to members from association's profit.	None

Source: Field Survey in Hatyai (Feb 2016)

In order to reduce collectors' intermediary costs and to increase farmers' revenues, Thai rubber-related authorities such as the Rubber Thai Authority of Thailand (RAOT) are considering promoting cooperatives/associations in order to encourage direct trade from farmers to associations/cooperatives and then from association/cooperatives to foreign buyers. This may help to reduce the margins taken by collectors and processors, and to increase the prices paid to farmers as illustrated in Figure 3-2. As mentioned in Chapter 4, the strengthening of cooperatives/association is one of priority policy areas on the agenda of the Master Plan (2016-2020).

Figure 3-2: Trade margins for each sales route (present and future)



Source: Field Survey in Hatyai (Feb 2016).

3.2 Comparison of Distribution Structures with Malaysia and Indonesia

When compared with the distribution structures of other countries such as Malaysia and Indonesia, Thailand's distribution structure is relatively complex, as there are several distribution routes (collectors, cooperatives, and local markets) and several chains of distribution (several chains of collectors from local collectors to city collectors). The bargaining power of Thai smallholders is not as strong as smallholders in Malaysia, where they are supported by purchasing made through state agencies. However, it is better than in Indonesia where there is no pricing or market information provided by central markets.

Table 3-2: Comparison of distribution structures in Thailand, Indonesia and Malaysia

	Production structure	Distribution strucuture	Bargaining power of farmers
Thailand	Small holders:90% Government& Private Estate :10%.	Distribution strcucture is complex as small holders usually sell through several chain of collectors	Though farmers still much depend on collectors for distribution, they can negotiate price by refering to Central Market price
Indonesia	Small holders (<40ha):80% Government and Private Estate (>40ha) :20%.	Small holders largely depend on collectors for distibution due to limited distribution network	Small holders have limited access to market information and thus have weak bargaining power as
Malaysia	Small holders: 94%, Estate: 6%.	Distribution structure is quite simple as small holders directly sell to government agencies/ state companies such as RISDA, FELDA for distribution	Government agency supports income of small holders by processing NR to higher value added product and by shipping abroad.

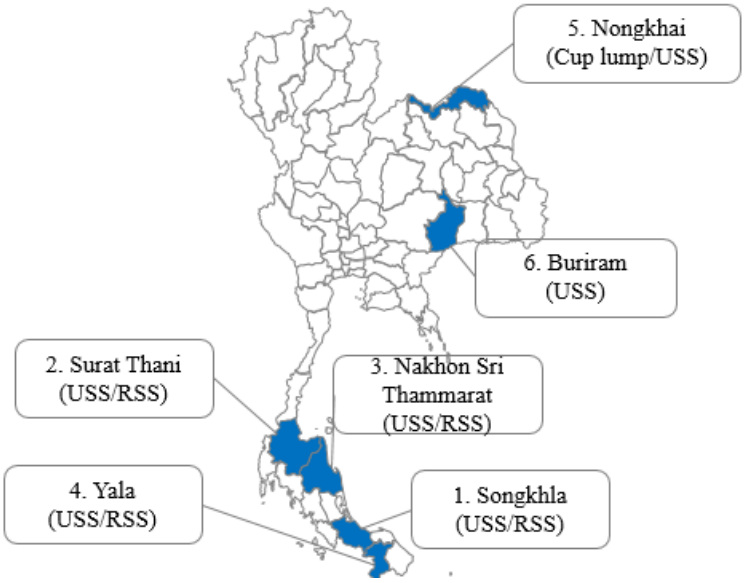
Source: NRI

3.3 Utilisation and Transactions of Central Markets

3.3.1 Overview of central markets

In 1991, the first central market was established by the Rubber Research Institution of Thailand (RRIT) in Hatyai in order to offer higher profits for farmers (Delarue, 2011). Today there are six locations across the country with central markets, accounting for about 5 percent of total NR transactions.

Figure 3-3: Central markets in Thailand

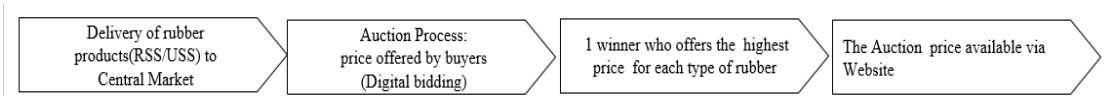


Source: Rubber Thai Information Center

3.3.2 Transaction volumes of central markets

Auction information at the six nationwide central markets is released on a website and contributes towards improving farmers' price bargaining power, as it is used as a benchmark price when farmers negotiate with collectors.

Figure 3-4: Rubber price decision process at a central market



Source: Central Market

Table 3-3: Auction prices: Unsmoked Sheet / RSS (25 February 2016)

Rubber Market	Price (Baht/Kg.)				
	Unsmoked	Unsmoked Sheet 3-5% Moisture	Unsmoked Sheet 5-7% Moisture	Unsmoked Sheet 7-10% Moisture	Unsmoked Sheet 10-15% Moisture
Songkhla	41.25	40.85	40.25	-	-
Suratthani	40.39	40.06	39.10	-	-
Nakorn Srithammarat	40.29	39.80	-	-	-
Yala	39.92	39.92	39.92	34.69	32.00
Buriram	-	-	-	-	-
Nongkhai	38.79	37.79	-	-	-

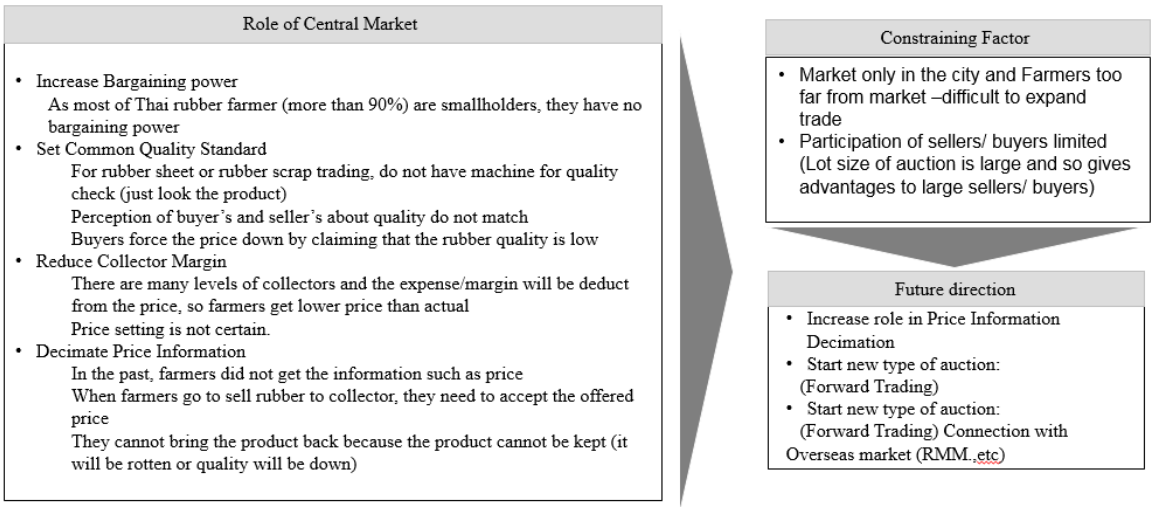
Rubber Market	Price (Baht/Kg.)				
	RSS 1-3	RSS 4	RSS 5	RSS Bubble	RSS Cutting
Songkhla	42.33	41.85	40.95	39.77	35.53
Suratthani	42.37	36.36	35.35	32.32	30.30
Nakorn Srithammarat	42.13	41.49	39.45	39.53	35.77
Yala	-	-	-	-	-
Buriram	-	-	-	-	-
Nongkhai	-	-	-	-	-

Source: Central Market

3.3.3 Issues concerning transactions

The role of central markets is focused on the market information transmission function rather than on the expansion of physical transactions. Central markets are now looking into network expansion into overseas markets, such as RMM (see Appendix). It is suggested that central markets connect with local markets such as 108, which is small scale but deals in all types of NR products.

Figure 3-5: Role/constraints/future of central markets



Source: Field Survey in Hatyai (Feb 2016)

3.3.4 Local markets: 108 market

Thai farmers also have the choice of selling to local markets such as 108. Since RIIT and ORRAF are now under the same organisation, namely RAOT, policymakers should push for a closer connection between central markets and local markets, for example with price information sharing and transaction integration.

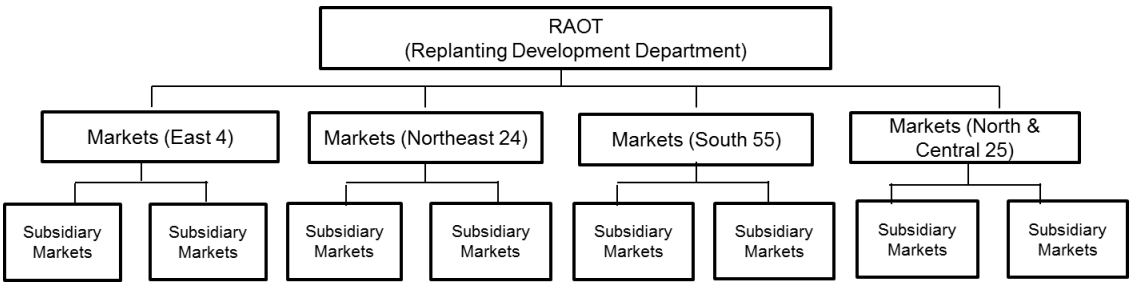
3.3.4.1 Rubber market 108

Rubber market 108, or the rubber ORRAF market, are physical markets in local areas that are supported by ORRAF. The purpose of these markets is to offer locations where farmers, farmer groups, or farmer institutions under the responsibility of ORRAF can come to sell rubber.

The process of trading in rubber market 108 as explained below:

1. General auction: bringing rubber to market place > rubber grade evaluating > weighing > agreeing on a price from the various bids made by buyers.
2. Electronic rubber market: sellers set a minimum price, then bidders have to offer more than the minimum price (not more than THB 0.05 each time).
3. Send rubber to those buyers who win the bidding process (using the reference price from the central markets).

Figure 3-6: The structure of market 108



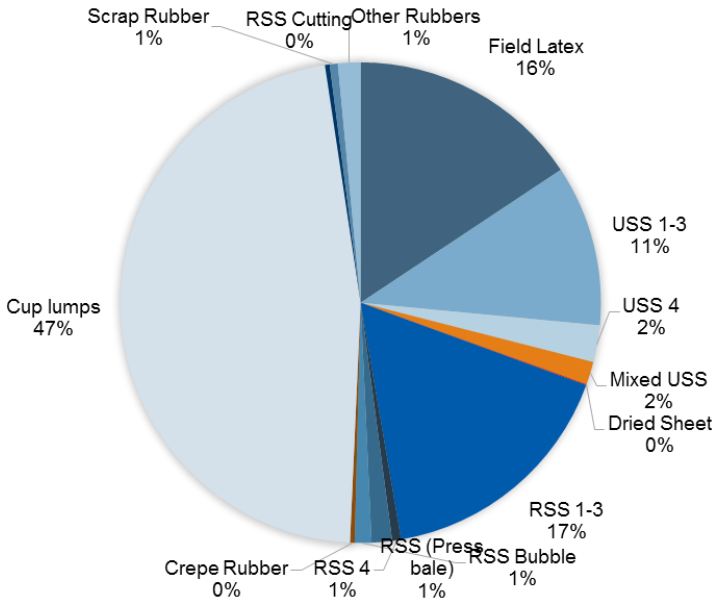
Source: ORRAF

Table 3-4: Function/characteristics of 108 compared with central markets

	108 Market	Central market
Function	Organized by ORRAF to promote local trade	Organized by RRIT to establish the standard price of the market and dessimate knowledge about product standards/price among farmers/traders
Geographic locations	108 markets set up near cooperatives and farmers	5 locations in major rubber producer cities
Tradable rubber products	All kinds including field latex and cup lumps	Mainly RSS/USS(no field latex) and Cup lump in only Nongkhai
Major sellers	Small scale farmers near the local market / cooperatives	Farmers near central market/ cooperatives

Source: Interview to RAOT and Central Market

Figure 3-7: Trading of rubber products in market 108 (2015)



Source: ORRAF

Chapter 4

Agricultural Policy for Natural Rubber Farmers in Thailand

In this chapter, recent government policies on NR are studied, focusing on the replanting policy to control or reduce NR production, the establishment of the Rubber Authority of Thailand (RAOT) and the government's NR purchase policy (100,000 tons) to help support farmers' incomes.

4.1 Government Policy Outline

Current government policies can be classified into three: supply-side policy (reduction of NR plantations), demand-side policy (expansion of domestic consumption), and social policy (farmers' income support) to tackle declining prices and the impact on farmers' livelihoods.

Figure 4-1: Government policy outline

		Short term policy	Mid/long term policy
Supply side Policy	Reduction of supply		• The project of production and plantation area control
Demand Side Policy	Increasing of demand for rubber	• 100,000 tons Rubber Purchase Policy • Direct purchase from farmers 200,000 tons by Public Warehouse Organization (budget 12,000 MB) to sell to Sinochem	• The plan of seeking new markets for rubber exports • The project of investment support in rubber products in Thailand /support for rubber product's traders • Rubber City • Loan support to agricultural institution to transform rubber
Social Policy	Farmer income support policy	• A buffer fund scheme to stabilize rubber prices • Subsidy for rubber farmers 1,500 baht/rai • The project of solving rubber system's problems, year 2014/ Support production factors for farmers	• The project of producing for income support based on the sufficiency economy theory • Credit support for small rubber farmers to do part-time self-employment
Technology support			• Market development project (The structural adjustment policy of rubber market)

Source: NRI.

4.1.1 Government policy outline: Master Plan (Table 4-1)

The Prayuth government has recently announced its Master Plan of the Rubber Authority of Thailand (2016-20).

Organisational Indicators

- The average income of rubber farmers/households is over THB 200,000/year.
- The level of rubber consumption in Thailand at the end of the year plan (2020) will increase to 650,000 tons, or at least 20 percent more than the level of rubber consumption in 2014, which was 541,000 tons.
- The number of rubber farmers, institutions and entrepreneurs who obtain knowledge from technology transfer of production processes should be implemented (not less than 10 percent of the target).

Table 4-1: Master Plan (2016-20)

<table>
<tr><td>Strategic 1: Improve production efficiency
1.1 The number of replanting areas that used to plant higher quality types of rubber trees instead of type RRIM 600 must be more than 50%/year of the replanting target.
1.2 The number of replanting areas compared with the target number must be not less than 90%.</td><td>Strategic 4: Improve earnings and implement efficiencies in organisations
Rubber exports that are tariffed must be not less than 60% of total rubber exports.</td></tr>
<tr><td rowspan="2"></td><td>Strategic 5: Improve rubber farmers and rubber agricultural institutions
Develop rubber farmers, rubber agricultural institutions, and rubber entrepreneurs.</td></tr>
<tr><td>Strategic 2: Research and develop supporting production efficiency and value creation</td><td rowspan="2">Strategic 6: Efficiencies in organisational management
6.1 Individual development plans.
6.2 Information system management plan.
6.3 Efficiency improvements in administration.</td></tr>
<tr><td>Strategic 3: Improve market and logistic efficiency
3.1 Develop and increase market potential.
3.2 Improve potential in logistic management and supply chain.</td></tr>
<tr><td></td><td>Strategic 7: Supporting government policies
7.1 Making rubber system development plan.
7.2 Follow the policies assigned by government.</td></tr>
</table>

Source: Rubber Authority of Thailand.

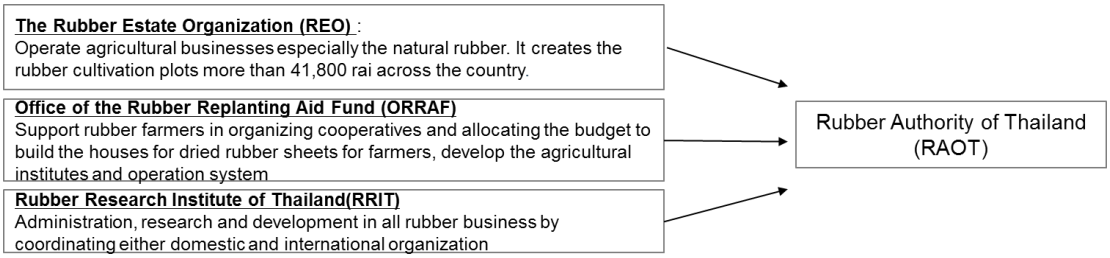
4.1.2 Government policy outline: Establishment of RAOT

Three rubber-related organisations, the Rubber Estate Organization (REO), the Office of the Rubber Replanting Aid Fund (ORRAF), and the Rubber Research Institution of Thailand (RRIT), have been combined into the "Rubber Authority of Thailand (RAOT)" since July 2015 to operate with one policy direction and with greater efficiency:

The purpose behind establishing RAOT is as follows;

- Central organisation to manage Thailand's overall rubber industry, and fund and promote the country to become a centre for rubber products.
- Encourage and support study, R&D, and information distribution related to para rubber.
- Encourage and support rubber farmers, farmer associations and rubber businesses to increase revenue and improve the quality of life.
- Stabilise rubber price levels.
- Encourage and support alternative plantations and new plantations.

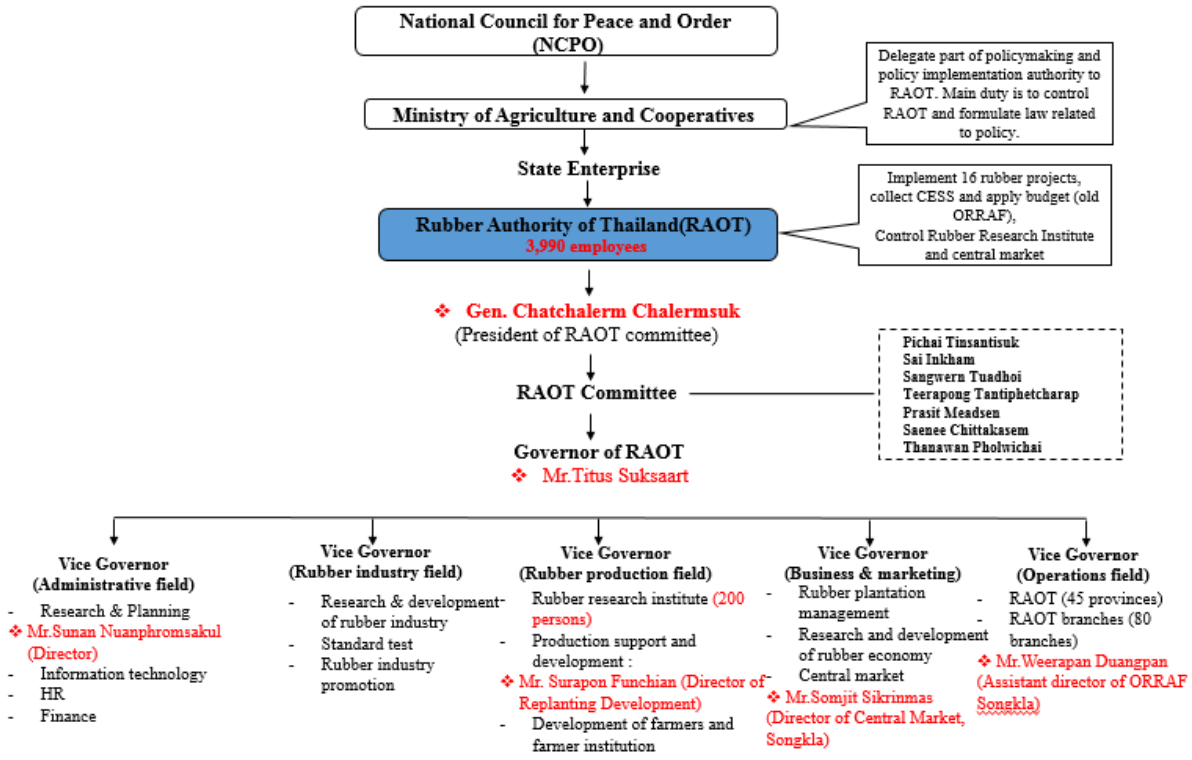
Figure 4-2: Unification of rubber organisations in Thailand



Source: Rubber Authority of Thailand

The Rubber Authority of Thailand (RAOT) was founded as a state enterprise under the Ministry of Agriculture and Cooperatives. Not only does it implement government policy, but it is also responsible for strategy planning. As a state enterprise, it can start new businesses to earn alternative revenues.

Figure 4-3: Organisational chart of RAOT



Source: Thai PBS.

4.2 Subsidies and Their Application: 16 Projects

Sixteen projects have been implemented under the Prayuth government to tackle the decline in NR prices. The largest of these projects is the reduction in the number of plantations that use budget from CESS.

Table 4-2: Projects to reduce production

Measure/Projects	Organization	Budget (MB)/ (Budget source)	Period
1. Reduce production			
The project of production and plantation area control (cutting rubber plants (700 thousand rai, 7 years)	- The Ministry of Agriculture and Cooperatives - Ministry of Natural Resources and Environment	42,144 (CESS)	Oct 14 – Sep 21 (7 years)
Income compensation program for rubber farmers 1000 baht/rai; maximum 15 rai/household (Target 850,000 households)	Bank for Agriculture and Agricultural Co-Operatives	8,200 (from BAAC)	Oct -31 Mar 2015 (6 months)
Credit support for small rubber farmers to do sideline jobs (maximum 100,000 baht/person) Interest rate 5%/year (farmers 2%: gov. 3%) / Target 100,000 households		10,000	Start 21 Oct 14

Note: MB= Million THB

Source: Office of the Permanent Secretary for the Ministry of Agriculture and Cooperatives

- RAOT also implements farmers' support policies through agricultural institutions (cooperatives) that purchase NR from farmers and sell to the central markets.

Table 4-3: Projects to increase liquidity

Measure/Projects	Organization	Budget (MB)	Period
2.Increase liquidity			
Loan support (revolving fund) to rubber traders with interest rate 5%/year (entrepreneur 2%: gov. subsidy 3%)		10,000	Start 21 Oct 14
Revolving fund support for agriculturalist's institution to purchase rubber from rubber farmers to sell to central market or local markets of ORRAF	- The Ministry of Agriculture and Cooperatives - Bank for Agriculture and Agricultural Co-Operatives (BAAC)	10,000	1 Nov 14 - 31 Dec 15
Loan support to agricultural Institution to transform rubber		5,000	1 Sep 14 - 31 Aug 24 (10 years)
Loan support to private corporation to transform rubber	- Ministry of Industry Thailand - Government Savings Bank	15,000	1 Sep 14 - 31 Aug 24 (10 years)

Note: MB= Million THB

Source: Office of the Permanent Secretary for the Ministry of Agriculture and Cooperatives

The government also plans to pursue an NR purchase policy, and at the same time to strengthen the role of central markets to improve connectivity between producers and markets.

Table 4-4: Projects to increase production and marketing efficiencies

Measure/Projects	Organization	Budget (MB)	Period
3. Increase efficiency of production and marketing			
A buffer fund scheme to stabilize rubber prices (first round in Nov 2014-Mar 2015) buying rubber 120,000-130,000 tons for moving stock) • 6,000 MB approved on oct 2014 • Approved more 6,000 MB on feb 2015	The Ministry of Agriculture and Cooperatives	Credit limit 20,000 (loan from BAAC)	18 months (Nov 14 - Apr 16)
Market development project (The structural adjustment policy of rubber market) - Central market development in rubber supply chain to have more linkage between product management system, information, marketing and monetary system - Rubber quality development by using technology transfer of the experts	- The Ministry of Agriculture and Cooperatives - Ministry of Commerce - Ministry of Finance	1,369 (From CESS 600 MB)	Oct 14 - Sep 17 (3 years)
The plan of seeking new markets for rubber exports (Assign to Thai commercial emissaries in each country to seek for rubber market)	Ministry of Commerce	(Budget from Ministry of Commerce)	2015 onwards
Reducing cost production' s project	The Ministry of Agriculture and Cooperatives	179 (Ministry's budget)	Oct 14 – Sep 15
The project of producing for income enhancement based on the sufficiency economy theory - Plant other crops on empty area in rubber farm such as cover crops - Replantation aid fund	The Ministry of Agriculture and Cooperatives	25.6 MB /year Total 179.20 (From CESS)	Oct 14 – Sep 21 (7 years)

Note: MB= Million THB

Source: Office of the Permanent Secretary for the Ministry of Agriculture and Cooperatives

■ Launch a production cost reduction policy, while also strengthening agricultural institutions (cooperatives) in order to help farmers.

Table 4-5: Projects to increase rubber consumption in country

Measure/Projects	Organization	Budget (MB)	Period
4. Increase the rubber consumption in country			
The project of technology transfer for reducing cost of rubber production	The Ministry of Agriculture and Cooperatives	NA (Ministry's budget)	Oct 14 – Sep 15
The project of solving problems of overall rubber system , year 2014/ Support of production factor costs for farmers (2,520 baht/rai) ; max. 25 rai/person)	The Ministry of Agriculture and Cooperatives	21,000 (approximately)	
The project of investment support in rubber products in Thailand / support for rubber product's traders	BOI	(BOI's budget)	2015 onwards
The project of setting up the rubber industrial development institution (cooperatives)	- The Ministry of Agriculture and Cooperatives - Ministry of Industry Thailand		

Note: MB=Million THB

Source: Office of the Permanent Secretary for the Ministry of Agriculture and Cooperatives

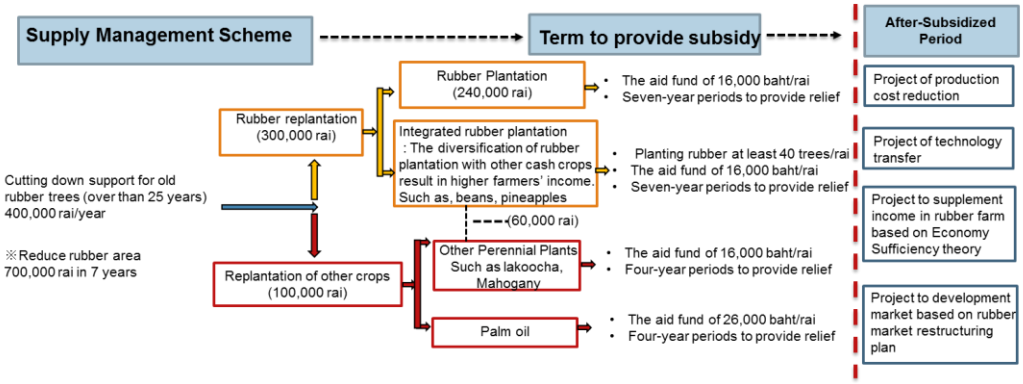
4.3 Subsidies and Their Application: Rubber Plantation Control Plan

Implement a rubber plantation control plan to resolve oversupply and improve production efficiency

The rubber production reduction plan is as mentioned below: (Figure 4-4)

- Support for felling rubber trees aged 25 years and over.
- Support rubber farmers who planted rubber trees in inappropriate areas to change to other agricultural activities or other types of tree.
- Take legal action to fell rubber trees in invaded forest (3-4 million rai)

Figure 4-4: Rubber plantation control guidelines



Note: *Period plan 7 years (Oct 14 – Sep 21.

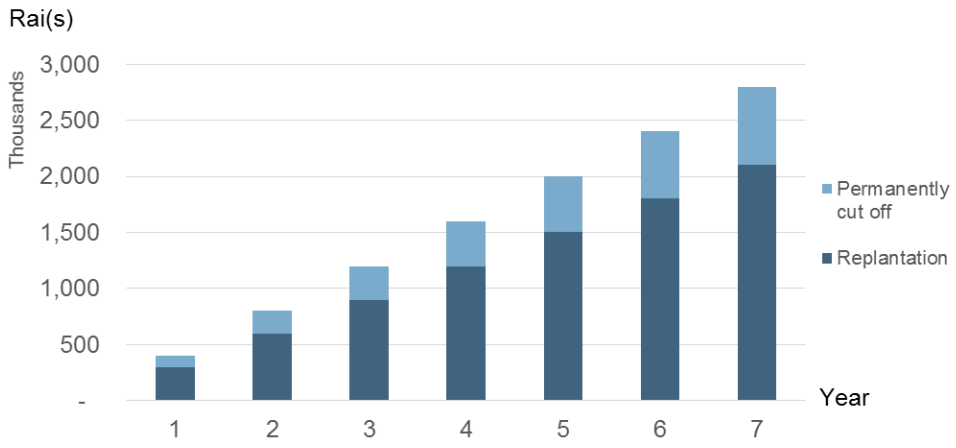
*Reducing of production about 100,000 tons/year

*Budget: 42,143 MB for 7 years by CESS

Source: Office of the Rubber Replanting Aid Fund

In total, 2.1 million rai will be replanted in 7 years, or 0.3 million rai will be replanted per year, while 0.7 million rai in 7 years, or 0.1 million rai per year, will be felled. The expenses incurred in replanting/felling are supported by the CESS fund in full.

Figure 4-5: Rubber replanting plan

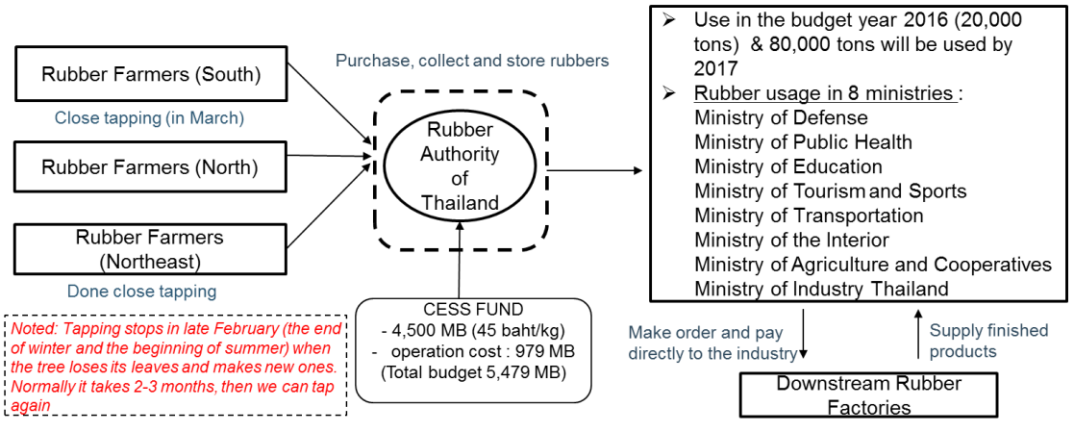


Source: ORRAF, RAOT

4.4 Trends and budget on spot price purchases and financial resources

Under the 100,000-ton purchase policy announced in January 2016 by the Prayuth government, RAOT will directly purchase 100,000 tons of rubber from Thai rubber farmers (150 kg/farmer) in order to address the declining NR price.

Figure 4-6: Flow chart of the 100,000 tons rubber purchase policy



Source: Rubber Authority of Thailand

- The Cabinet has approved the NR usage plan for seven ministries, not including the Ministry of Defence. NR usage volume is set at 108,825.18 tons with a total budget of THB 93,422.88 million (Table 4-6).

Table4-6: Rubber usage programmes of Thai government agencies

Ministry	Project	Rubber Use (Tons)	Budget (MB)	Year
Ministry of Defense	Road construction and roadworks in 3 southern border provinces	813	164	
	Macadam road 76 areas	285		
Ministry of Public Health	Purchasing of surgical gloves, Foley Catheter and condoms		1,050	Q2 of year 2016
Ministry of Education	Ground for sport improvement & construction; road enhancement in schools	N/A	25,231	
Ministry of Tourism and Sports	Road construction in 12 provinces	230	120	2016
	Football field, rubber racetrack & stadium	763	389	
	Rubber lucky doll, welcome gift set	2,500	329	
	10 sports stadiums	108	114	
Ministry of Transportation	Asphalt concrete paving (latex mixed with asphalt concrete)	57,713 (latex)	36,503	2016-2017
Ministry of the Interior	Sport stadium construction 46 projects ; road construction and maintenance 2,071 projects	9,808 (latex)	13,130	2016-2017
Ministry of Agriculture and Cooperatives	Rubber pavement for stall; Improving of road surface; road construction; Pond coating (latex mixed with reinforcement materials) and rail pads etc.	36,606	16,395	2016-2017
Ministry of Industry	Open more rubber industrial factories	N/A		

Source: Nation TV News

Figure 4-7: Major pilot projects of the government in the rubber usage plan

Source: Office of Industrial Economics

4.5 CESS Condition and Funds Utilisation

CESS is a tax levied on rubber exporters and is allocated in six parts (Table 4-7).

The CESS budget allocation changed significantly in 2015. The allocation for replanting was reduced from 85 percent to 40 percent, while support for domestic processing was increased to 35 percent, reflecting the change in priority from replanting rubber plantations to increasing local value for domestic consumption.

Table 4-7: The Rubber Act 2015, Section 49

Budget allocation of CESS		
Past	**Present**	
10%	10%	Administrative budget of The Rubber Authority of Thailand
85%	40%	Replantation support
-	35%	Promote and support farmer institution, processors, and also creating rubber products in country
5%	5%	Research and development
-	3%	Promote and support farmer's institution in education and strengthening farmers such as, training
-	7%	Expenses of welfare for rubber farmers

Source: Office of the Rubber Replanting Aid Fund

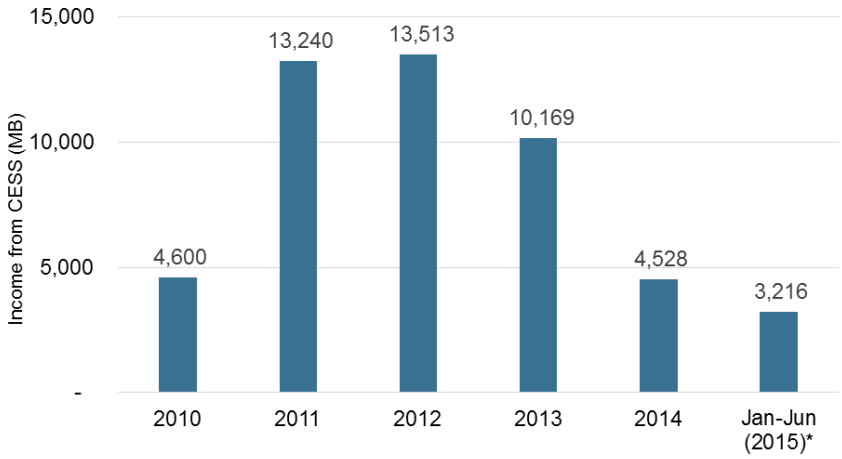
Table 4-8: CESS rate calculation (effective from 1 October 2010)

Rubber Price (Baht/kg)	CESS Rate (Baht/kg)
Not more than 40	0.90
41-60	1.40
61-80	2.00
81-100	3.00
More than 100	5.00

Source: Office of the Rubber Replanting Aid Fund

- CESS revenue has been affected by the decline in NR prices and has significantly decreased. This imposes limitations in terms of securing sufficient financial resources for supporting farmers in the future.

Figure 4-8: Income from CESS collection



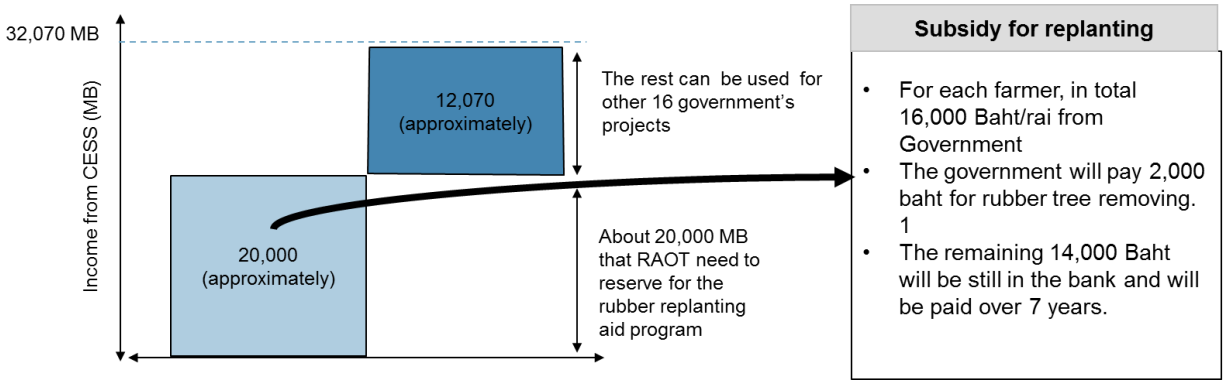
Note: MB=Million THB

Source: State Enterprise Policy Office

Total funding of CESS is about THB 32,070 million, of which about THB 20,000 million is allocated for replanting. (The replanting aid fund will be paid to farmers over 7 years after first felling their trees.) The rest is planned to be used to fund 16 projects, but may prove to be insufficient. This implies that RAOT will need to find new sources of revenue in order to support the 16 projects. The solutions mentioned by RAOT managers during the survey were: (i) subsidies from the government; (ii) borrowing money from the BAAC (Bank for Agriculture and Agricultural Cooperatives), which the government guarantees; and (iii) revenue from new enterprises which, as a state enterprise, RAOT can develop.

However, as of February 2016, the third option had not been utilised, as RAOT is still in the process of selecting its director and in managing the structure of the organisation

Figure 4-9: The budget of CESS



Source: Replanting Development Department, RAOT.

4.6 Issue of NR Purchase Policy by the Government

The government has conducted direct purchasing of NR on several occasions as a way of helping to support farmers' incomes. However, the direct purchase policy has encountered several issues and failed to produce the expected results. This implies that the effect of direct subsidies to improve farmers' livelihoods through direct purchases is somewhat limited and other policy options should be considered.

4.6.1 The 100,000-ton purchase policy in 2016

According to one RAOT official, RAOT encountered problems in conducting its 100,000-ton direct purchase policy, such as the purchase volume from farmers/cooperatives failing to reach the target volume. Since the project started on 25 January 2016, about 28,000 tons of rubber had been collected from farmers as at the end of February. This was because some farmers found it unattractive to sell rubber, due to the numerous rules for selling, such as the maximum volume to be sold by each farmer and the location of the sale.

Also, RAOT has not been informed on how much of each type of rubber, such as TSR, RSS, and latex, will be required and used by government agencies due to a lack of specific instructions.

Table 4-9: Limits of rubber purchasing

Major limiting factors	Details
The purchase quota per person is very low	Maximum 15 rais (10 kg./ rai) . So, totally 150 kg./person. So they think that it is not worth for transportation
Rubber types in purchasing condition and standards of each type	➢Some farmers think that they are not sure whether their products will pass the standard test as below - USS 3 (humidity not more than 3%) (Price 45 Baht/kg.) - Field latex: Dry Rubber Content(DRC) in latex is not less than 28% (Price 42 Baht/kg.)
The collecting points are hard to access	- Due to the limits of RAOT's staff in each province, thus, the purchase points are not enough. Also, staffs who has been sent from the military government and the Agricultural and Cooperatives ministry have no knowledge about rubber so they cannot determine the quality of latex and rubber sheets.
Tight time limit	- Need to purchase from each farmer registered with in the limits of time (End: Jun,30, 2015). It is hard for RAOT's staffs to know that which areas have farmers who will have the rights to sell rubber.

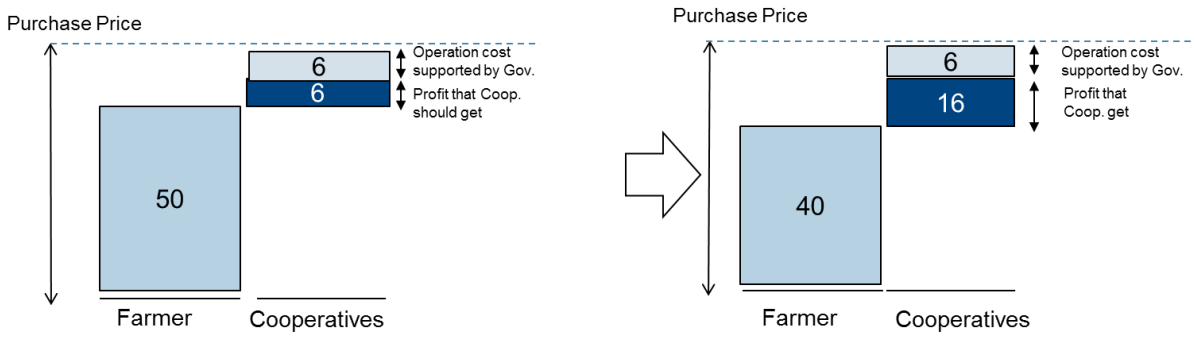
Source: ORRAF & Manager Newspaper Website.

4.6.2 Purchase policy in 2015

Another purchase policy implemented in 2015 also faced problems. Contrary to initial policy intentions, cooperatives took higher margins under the purchase policy, resulting in lower-than-expected purchase prices from farmers. Ultimately, the policy was not as effective as intended (Figure 4-10).

- In the buffer fund scheme to stabilise rubber prices (October 2014 to March 2015), the government set the price for purchasing rubber from farmers at THB 62/kg. Government support to cooperatives for the operation cost THB 6/ kg. (THB 62-6 = THB 56/kg.)
- Government let cooperatives purchase latex from farmers at THB 50 (so the profit would be THB 6). However, some cooperatives bought latex from farmers at THB 40 (lower than the price set by the government) in order to make higher profits by claiming that the quality of latex was not good and the price should therefore be lower (Figure 4-10, LHS). The government expected farmers to receive THB 50 and the profit for the cooperatives to be THB 6 (Figure 4-10, RHS). In fact, the cooperatives purchased latex from farmers at THB 40/kg, so the cooperatives made profits of THB 16/kg.

Figure 4-10: Initial plan to support farmers (LHS) and the actual project (RHS)



Source: Replanting Development Department, RAOT.

Chapter 5

Feasibility of Introducing Options Trading by the Government

5.1 Interest of the Thai Government in Developing Options Trading

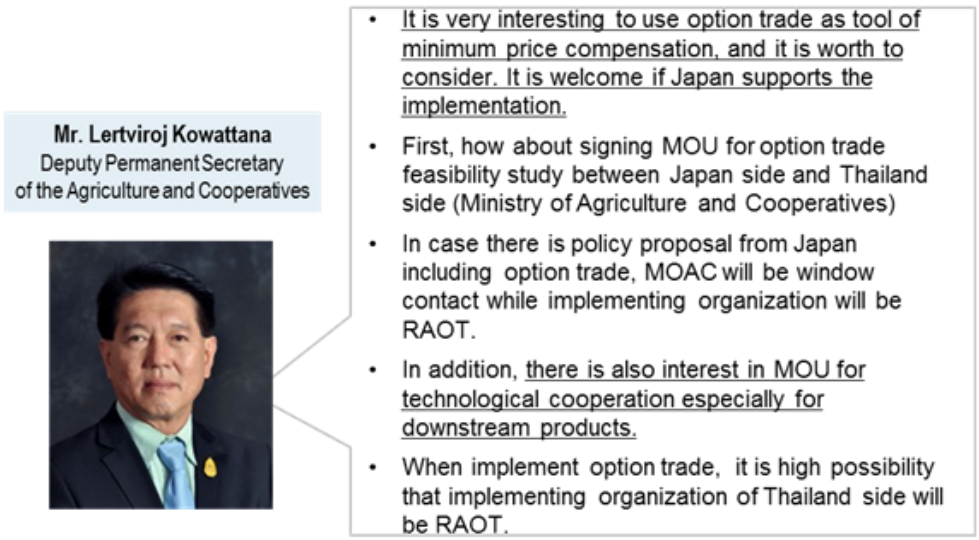
Options trading transactions could help to mitigate the risk of price fluctuations by setting up future selling or buying prices, called exercise prices. The seller pays a certain amount, or premium, to a buyer to have their option to sell at the exercise price (for example THB 100). This is different from futures, as the seller can sell at the market price if the market price rises above the strike price (for example THB 110) at the point of sale. Options trading has been adopted by several governments for primary goods such as corn in the US to support corn farmers and oil in Mexico, in order to mitigate price fluctuations. In both these cases, the respective governments provided funds from budget to buy premium. Options trading provided an alternative to direct income subsidies, as no direct purchase of goods by the two governments was required, reducing the financial burden on the state.

In discussion with Thai agencies, a number of officials have showed interest in options trading, and notably the Deputy Permanent Secretary from the Ministry of Agriculture and Cooperatives (MOAC) has proposed a joint study into the possibility of applying options trading in NR market.

The official mentioned that RAOT could be assigned as the seller agent for options trading as the organisation has been delegated by the MOAC as responsible for policy implementation related to NR.

However, the financing method for the required funding for options trading is still unclear, so more fine-tuning by policymakers is needed. RAOT may use CESS to buy premium. RAOT's policy implementation funds, including those for the 100,000-ton purchase policy, come from the CESS budget. However, the CESS budget will be used for the replanting project and the 16 projects mentioned earlier in Chapter 4, so ROAT may need to seek finance from state-run financial institutions such as BAAC.

Figure 5-1: Interview with Thailand's Minister of Agriculture and Cooperatives, Mr Lertviroj Kowattana, Deputy Permanent Secretary

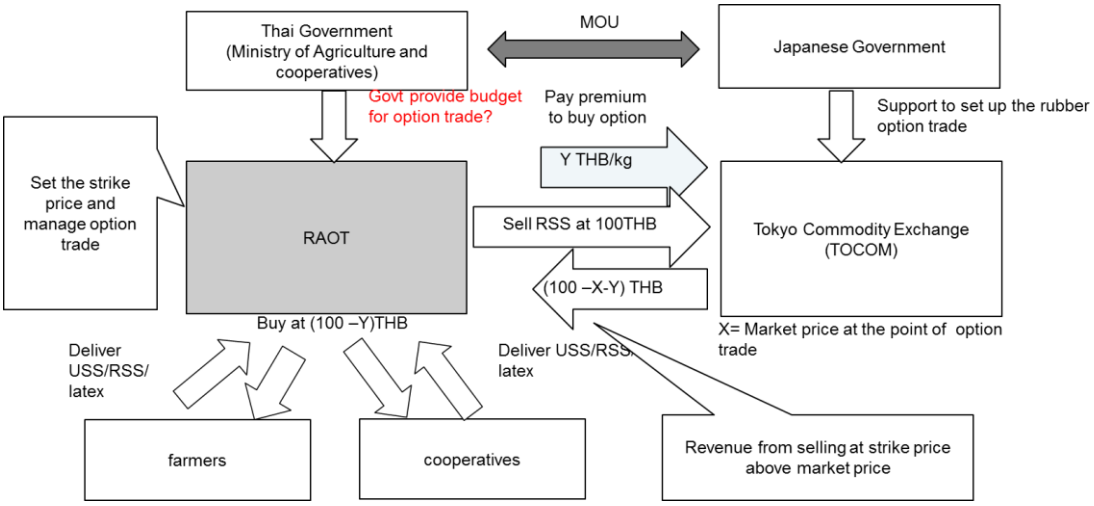


Source: Interviewed by NRI.

5.2 Issues Concerning the Introduction of Options Trading

Two of RAOT's objectives are to stabilise the price of NR and support farmers' incomes. If options trading supports these objectives, then ROAT could become the main organisation involved. As mentioned, the biggest issue remains the financial source required to pay the premium. The Tokyo Commodity Exchange (TOCOM) stands ready to help set up an options trading system.

Figure 5-2: Options trading (concept)



Source: NRI.

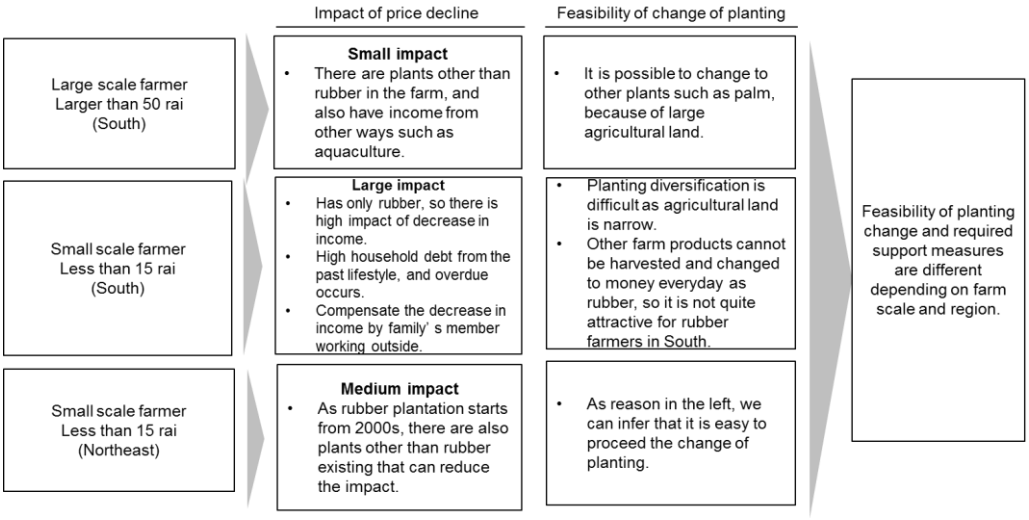
Chapter 6

Structural Change in the Rubber Industry

Issue of the Change in Planting to Stabilise Farmers' Incomes

It is relatively easy for large-scale farmers to change their planting, but planting diversification is more difficult for small-scale farmers, as their areas of agricultural land are too small to easily switch to alternative plants. Also, it is difficult to find alternatives for rubber that can be sold to generate cash on a daily basis, while other crops can be harvested only few times a year. Farmers in the South, who are accustomed to mono-cultures and a way of life with daily cash revenue, find it especially difficult to change their behaviours and covert to other plants. In contrast, farmers in the Northeast are more adaptable, as they have only recently started to plant NR and they are more accustomed to planting other crops and vegetables.

Figure 6-1: Rubber farmers' incomes and the feasibility of planting changes



Source: Field Survey in Hatyai (Feb 2016).

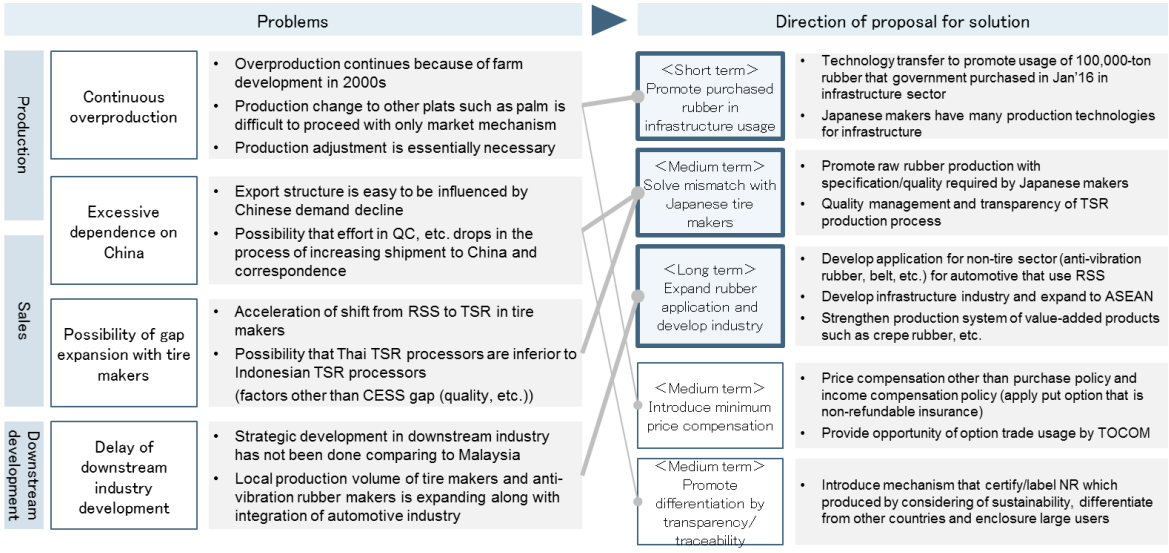
Chapter 7

Policy Proposal Points for the Thai Government

7.1 Issues in the Thai NR Industry and the Direction of Proposals for Their Resolution

Production adjustments to balance supply and demand are necessary. However, a needs gap between processors and large-scale users such as tyre makers may have emerged, in which case it will be necessary to narrow this gap. In the longer term, the development of the downstream industry is required to increase value added through domestic consumption.

Table 7-1: Issues and directions of proposals for their resolution



Source: NRI.

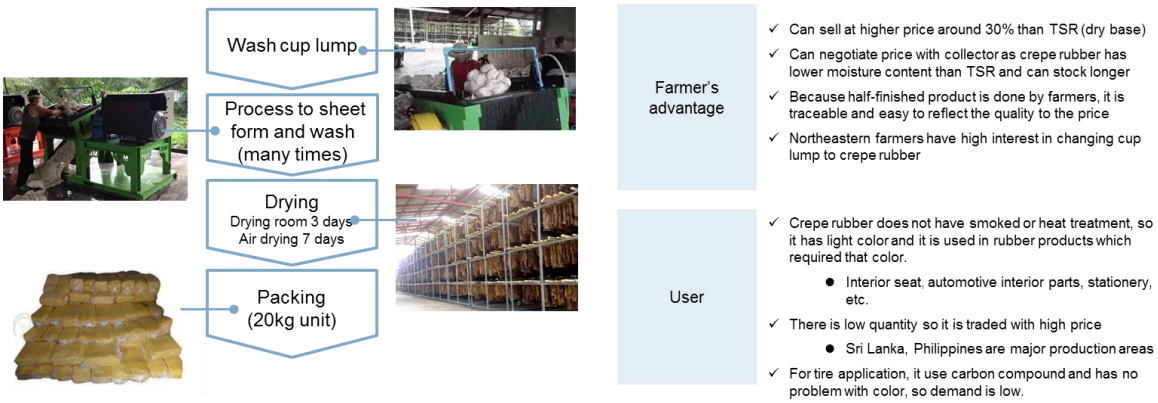
7.2 Improvements to the Production Environment for Low-Quality Rubber in New Production Area in the Northeast

Crepe rubber is processed NR that uses a creper machine (including washing) to change coagulated cup lump into sheet form. This can add value at farmers' own farms or agricultural institutions by processing rather than selling cup lump for TSR. However, crepe rubber-making machines are expensive at around JPY10 million, so the assumption is that

most machines will be shared through institutions or community units.

Consideration could be given to reducing the cost of processing machines by promoting the shared use of machines.

Figure 7-1: Process of crepe rubber production



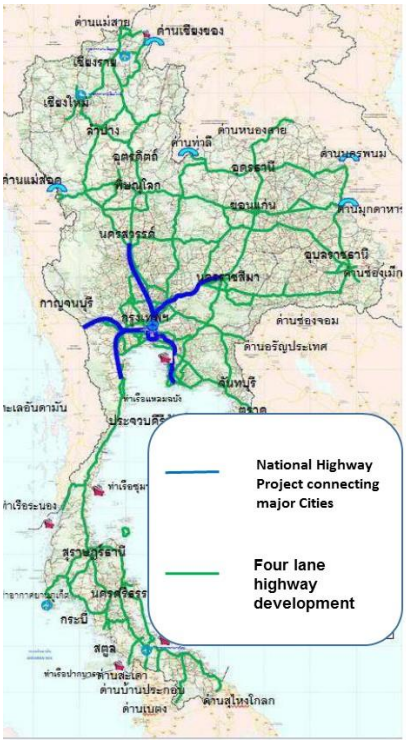
Source: Rubber Economics Magazine

7.3 Support for the Usage of Government-Purchased Rubber Promotion in the Infrastructure Sector

Infrastructure development, especially road transport, is one of the priority policies of the Thai government in order to attract investment and to strengthen the country's role as a logistics hub in the region. Under its Master Plan, Thailand is planning to expand its road network between the major cities and to expand regional roads to four-lane roads, as shown in Figure 7-2. The government is also planning to develop roads connecting to borders with Cambodia, Lao PDR and Myanmar, as part of the development of regional trade corridors, such as the East-West Corridor and the Southern Corridor.

In order to increase domestic consumption of NR, the Thai government plans to promote the application of NR to various fields as mentioned below, and one of the priority areas is its use in infrastructure. Countries with technology in this area should be encouraged to cooperate with Thailand to develop technology and infrastructure uses for NR, especially for road pavements, which seem to have the largest potential.

Figure 7-2: Major National Highway Development Plan under the Infrastructure Development Strategy (2015-2022)



Four lane highway development
- Highway No. 4 Krabi – Hoiyod
- Highway No. 12 Kalasin– Somdej section 2
- Highway No. 304 Kabinburi– Paktongchai
- Highway No. 314 Bangpakong– Chachengsao section 2
- Highway No. 3138 Banbeng– Bankai section 3

Regional highways maintenance
- Highway No.1 ,2 , 11 ,32 ,35 ,41 ,43, 117 , 331

Motorway development (Pattaya - Map Ta Phut Section)
Rural road development to support agricultural sector and tourism
Truck Terminal Development

Source: Ministry of Transport "Thailand's Transport Infrastructure Development Strategy 2015-2022".

Table 7-2: The Thai government's plan for NR utilisation

Ministry	Project	Rubber Use (Tons)	Budget (MB)	Year
Ministry of Defence	Road construction and roadworks in 3 southern border provinces	813	164	
	Macadam road (76 areas)	285		
Ministry of Public Health	Purchasing of surgical gloves, Foley Catheter and condoms		1,050	Q2 of year 2016
Ministry of Education	Sports ground improvement, road pavement in schools	N/A	25,231	
Ministry of Tourism and Sports	Road construction in 12 provinces	230	120	2016
	Football ground, rubber pavement for racetrack	763	389	
	Rubber lucky doll, welcome gift set	2,500	329	
	10 sports stadiums	108	114	
Ministry of Transportation	Tires for automobiles Mixing in asphalt (modified asphalt)	57,713 (latex)	36,503	2016-2017
Ministry of Interior	Sport stadium construction 46 projects Road construction and maintenance 2,071 projects	9,808 (latex)	13,130	2016-2017
Ministry of Agriculture and Cooperatives	Rubber pavement for footpath Road surface improvement Pond coating (water-resistant coating) 	36,606	16,395	2016-2017
Ministry of Industry	Open more rubber industrial factories	N/A		

Source: Nation TV News.

For example, Japanese rubber-makers have products and technology in various fields as mentioned in Table 7-3 and could cooperate in developing technologies and applications.

Table 7.3: Infrastructure-related products of Japanese rubber makers and their applicability to Thailand

Field	Product	Use application	Applicability in Thailand and concern	Maker (★:Interview destination)
Footpath / ground pavement	Chip/elastic pavement for sports ground	Elastic pavement using rubber for impact mitigation	• As NR is not strong enough, reinforcement material (black carbon) is required. In that case, it is high hiding power of black and difficult for coloring. • NR concern is degradation. Poor heat resistance. Tires can use anti-aging agent that has stain property but it is difficult to use for infrastructure. • For usage that does not appear on the surface (putting sponge sheet underground, etc.: micro foam is needed), it is possible to use NR. • Construction requires technological capability for urethane binder mixing. • Sumitomo Riko and 3 tire makers did experimental study at Civil Engineering Research Institute about rubber pavement for road with noise prevention purpose in the past, but does not put into practical use.	★Toyo Rubber Chip ★Sumitomo Riko Muraoka Rubber
	Elastic block	Same as above		
Road pavement	Modified asphalt	Asphalt spill prevention, road performance improvement (slip resistance)	• If there is no performance requirement same as Japan, it is also possible to use in Thailand. • However, as company uses macromolecular polymer without using NR, there is no technology reserve for NR usage in the company.	★Nichireki
Sports facility	Coating in facility	Impact mitigation and falling prevention in facility	• NR usage volume is limited because of thin layer coating and high usage ratio of macromolecular polymer.	★Sumitomo Rubber
	Rubber chip for artificial grass	Tennis court Football ground	• Use as cushion material installing under resin layer of green surface is possible consideration. However, tire scrap is more proper for cost and performance. • Because rubber processing and utilization technology is not that high.	★Toyo Rubber Chip ★Sumitomo Rubber
Waterway infrastructure	Rubber dam	Flood countermeasure	• Total volume of rubber used for bag is SR. Using NR is difficult due to weak light and heat resistance. It may not have makers that use NR.	★Bando Chemical Sumitomo Electric
	Impermeable sheet for civil engineering	Waterproof pond/reservoir Shrimp pond	• NR had been used in the past, but now focus on SR. NR maybe difficult to use.	★Bando Chemical Maeda Kosen
Harbor	Fender	Impact absorption when ships come alongside the pier	• There is large usage volume of NR for each product. However, they do not have continuous demand. The technology is not high comparing to tires, etc.	★Sumitomo Rubber Yokohama Rubber, Bridgestone
Earthquake resistance	Seismic isolation rubber for bridge and construction	Earthquake countermeasure	• If there is no needs for earthquake resistance, it is difficult to diffuse	3★Sumitomo Rubber Yokohama Rubber, Bridgestone

Source: Based on Sumitomo Rubber, Sumitomo Riko, Bando Chemical, Nichireki interview.

7.4 Promotion of Value-Added through the Sustainable Natural Rubber Initiative

Discussion on Sustainable Natural Rubber Initiative (SNR-i) has been developed under the IRSG. As the NR production system in Thailand has focused on smallholders, it is likely that problems such as child labour, etc., will be relatively low. (Not verified in this study.) As a result, it may be advantageous for Thailand to take the initiative in the following areas.

- Certification standards regarding sustainable farm production and processing plant operations as a measure of NR value added.
- Expand needs by operation and the promotion of a labelling system.
- Support label diffusion in Japan among both the public and private sectors.

SNR-i criteria by IRSG

- ***Criteria 1: Support improvement of farmers' productivity***

  1.1: Optimise planting of recommended clones

  1.2: Optimise planting density

  1.3: Optimise usage of fertiliser and pesticides

- ***Criteria 2: Enhance natural rubber quality***

  2.1: Commitment to NR quality

  2.2: Comply with quality inspection and classification rules

- ***Criteria 3: Support forest sustainability***

  3.1: Comply with related laws and regulations in the region

  3.2: Protect/maintain environmental conservation areas

- ***Criteria 4: Water management***

  4.1: Comply with related laws and regulations in the region and maintain water use rights of local residents

  4.2: Proper treatment of industrial wastewater

- ***Criteria 5: Respect for human and labour rights***

  5.1: Comply with the ban on child labour and the minimum working age

  5.2: Prohibit forced labour

  5.3: Secure the freedom of institutional activity and avoid curtailing agricultural institutions' businesses

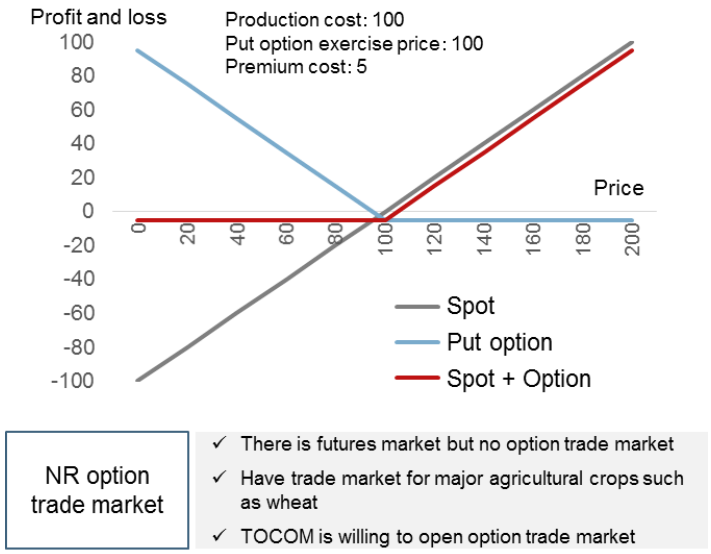
7.5 Introduction of a Minimum Price Compensation Mechanism through Options Trading, etc.

Several stakeholders in the rubber industry, such as the Ministry of Agriculture and Cooperatives, central market officials and natural rubber associations have expressed their interest in considering options trading as a means to mitigate the risks of NR price fluctuations for Thai farmers, while limiting the financial burden on the government budget compared with direct income compensation.

At the same time, the Tokyo Commodity Exchange (TOCOM) is also interested in establishing a NR options trading market.

If the establishment of options trading by the Tokyo Stock Exchange could also be linked to the form of put option usage with minimum price compensation, this should contribute to price stability support. However, further consideration is needed regarding how much the premium cost should be and whether there is PIC on the Thai government side for funding and operating the scheme.

Figure 7-3: Minimum price compensation using options trading



Source: NRI.

7.6 Proposal Outline

Table 7-4: Direction of proposals

	Problem and background	Direction of proposal for improvement
1 Improvement of production environment for low-quality rubber in new production area in Northeast	• TSR production in Northeast of Thailand has expanded rapidly due to China demand since 2000, and push total production volume up. • Thailand's rubber production environment with main product of high-quality RSS has changed. • TSR in Northeast has few processing/value added process, so there is competitive disadvantage on price against Indonesia rubber.	• Northeastern rubber farmers produce low value-added cup lump, and sell to processors. Therefore, promote the production change to high value-added product (crepe rubber). • Crepe rubber can be traded in spot market same as RSS, so it is expected to raise the price bargaining power of rubber farmers.
2 Support for usage of government-purchased rubber promotion in infrastructure sector	• Thai government made spot purchase for 100,000-ton rubber in Jan'16, and instructed to each ministry for inventory digestion. • Plan to use in modified asphalt and sports ground, but it is possible that the utilization will not be smooth due to technological issue, etc.	• Japanese rubber business coach for rubber product manufacturing technology in the infrastructure sector. • In long term, promote joint research of technology development in both countries for new applications to expand Thailand domestic processing ratio.
3 Promotion of value added by Sustainable Natural Rubber Initiative	• Discussion on Sustainable Natural Rubber Initiative (SNR-i) has been developing under IRSG • As NR production system in Thailand is focusing on smallholders, it is likely that problem structure such as child labor, etc., is less. (Not verified in this study)	• Set certification standards regarding sustainable farm production and processing plant operations as measure for NR value added • Expand needs by operation and promotion of labeling system • Support label diffusion in Japan among public and private sector
4 Introduction of minimum price compensation mechanism by option trade, etc.	• Problems occur, for example, farmers' income and living becomes unstable due to violent fluctuation in rubber price especially rapid fall in recent years, and wage payment for immigrant worker is delay, etc. • On the other hand, many farmers would like to sell at spot market when price is high, so futures trading, which is for stable income, does not progress.	• Provide financial instruments trade opportunity with the purpose of minimum price compensation by establishing option trade environment. • Advise for option trade fund management and implementation in form of RAOT, central market, etc. is representative of farmers.

Source: NRI.

Interview list

Organisation	Type	Name	Position
B. Right Rubber Co Ltd.	Processor / Exporter	Mr Juti Phanpipat	Assistant Manager (Factory Department)
Ministry of Agriculture and Cooperatives	Government	Mr Lertviroj Kowattana	Deputy Permanent Secretary
Nongkhai Central Rubber Market	Government	Mr Anusorn Ramlee	Director
Nongkhai Provincial Rubber Replanting Aid Fund Office	Government	Mr Suwit Srivilai	Director
		Mr Surat Suwanbutr	Head of Operation Planning Division
		Mr Udom	Head of Operation Planning Division
Rubber Authority Of Thailand	Government	Mr Prasit Meadsen	Board of Director
		Mr Sunan Nuanphromsakul	Director of Research and Planning
		Mr Surapon Funchian	Director of Replanting Development
Rubber farm (large)	Upstream	N/A	Tapper
Rubber farm (small)	Upstream	N/A	Owner
Rubber Fund Cooperatives & 108 Market (Nongkhai)	Cooperative	Mr Ngen	Director of Koodbong Cooperative, Nongkhai
		Mr Kaew	Director of Baan Pue Cooperative, Nongkhai
		N/A	Director of Prabath-Nasingha Cooperative, Nongkhai
Rubber Fund Cooperatives (Songkhla)	Cooperative	Mr Juthiang Sengsawat	Director
Songkhla Central Rubber Market	Government	Mr Somjit Sikrinmas	Director
		Mr Chakapong Amornsub	Agricultural Technical Officer

		Mr Somsak Khogsuk	Agricultural Technical Officer
Songkhla Provincial Rubber Replanting Aid Fund Office	Government	Mr Weerapan Duangpan	Assistant Director
Thai Rubber Association	Association	Mr Somboon Pruksanusak	President of TRA subcommittee (Factory Manager of Anvarparawood Co. Ltd.; Sri Trang Group)
		Mr Supadech Ongsakul	Deputy Secretary General (General Manager of Thaitech Rubber Corporation Ltd.)
		Mr Sujin Aekvanon	Executive Secretary
		Mr Prasit Petnoosed	Secretariat
T.R.I. Global Co Ltd. (The Rubber Magazine)	Private sector	Dr Sanit Samosorn	Managing Director

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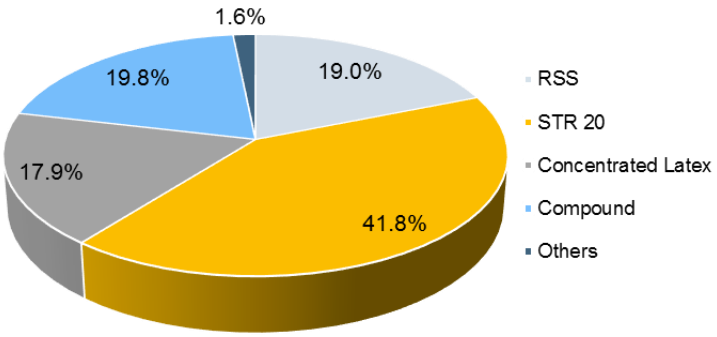
Appendix 1

Production environment of rubber farmers

1.1 Rubber exports by type

As represented in Figure A.1, the largest export product is STR, which makes up around 40 percent, followed by RSS with 19 percent of the market.

Figure A.1: Exports of rubber by type, 2014



Source: Rubber Research Institute Department of Agriculture.

1.2 Export Trends in RSS

RSS export trends are more evenly dispersed among countries as RSS is exported to various countries. Although China is the largest RSS export destination, export dependence on the Chinese market is 28.6 percent than for STR. As seen in Figure 2, the main importing market of RSS is China:

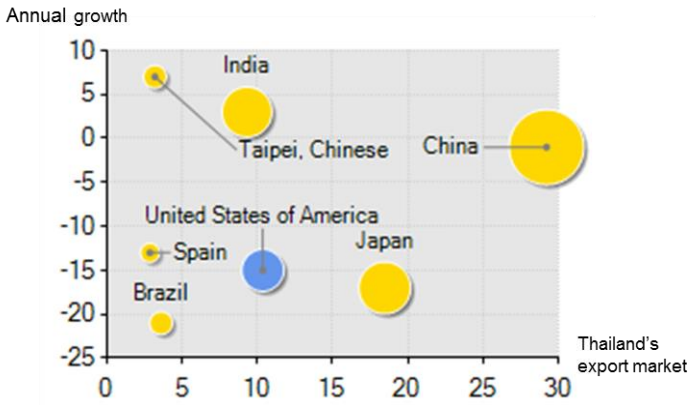
- Share of China in Thailand's export represents 29.21 percent.
- Annual growth in China's imports: -1 percent.
- Share in world imports: 28.6 percent.

- China import growth from the world is greater than Thailand's export growth to China.

As seen in Figure 3, growth of the national supply and international demand for RSS exported by Thailand in 2014 are as follows:

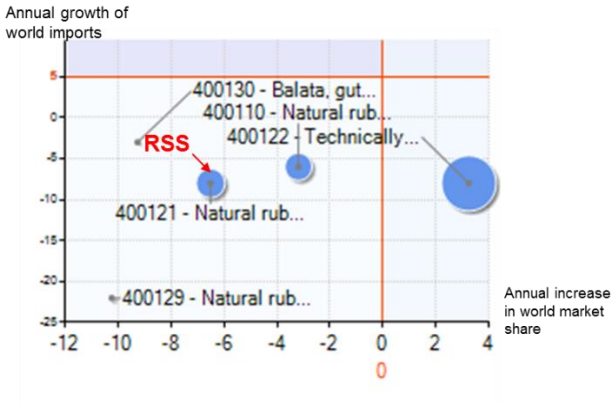
- Annual increase in the world market share: - 6.52 percent.
- Annual growth of world imports: -8 percent.
- Exports: US$1,493 million as a net exporter of RSS.

Figure A.2: Share of importing markets of RSS in 2014



Source: Trade Map, International Trade Center

Figure A.3: National supply and international demand in 2014



Source: Trade Map, International Trade Center.

1.3 Export Trends of TSR

TSR export trends: Export dependence of TSR on China is very high, which accounted for 63 percent of Thailand's total TSR export market.

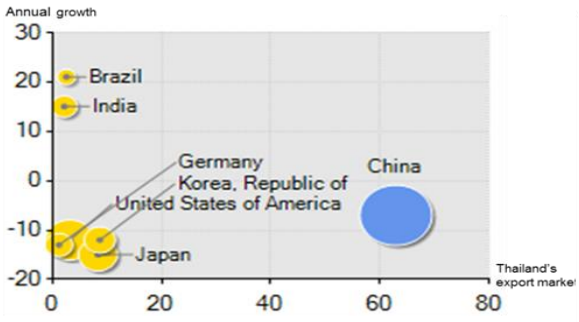
As seen in Figure A.4, the main importing market of TSR is China.

- Share of China in Thailand's export represents 63 percent.
- Annual growth China's imports: -7 percent.
- Share in world imports: 30.7 percent.
- China's import growth from the world is less than Thailand's export growth to China.

As seen in Figure A.5, growth of national supply and international demand for TSR exported by Thailand in 2014 are as follows:

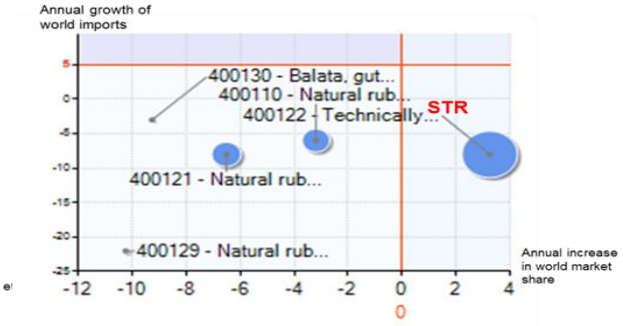
- Annual increase in world market share represents 3.26 percent.
- Annual growth of world imports: -8 percent.
- Exports: US$2,929.7 million as a net exporter of STR

Figure A.4: Share of TSR importing markets in 2014



Source: Trade Map, International Trade Center.

Figure A.5: National supply and international demand in 2014



Source: Trade Map, International Trade Center.

1.4 Export Trends of Concentrated Latex

Concentrated latex export trend: high dependence on Malaysia.

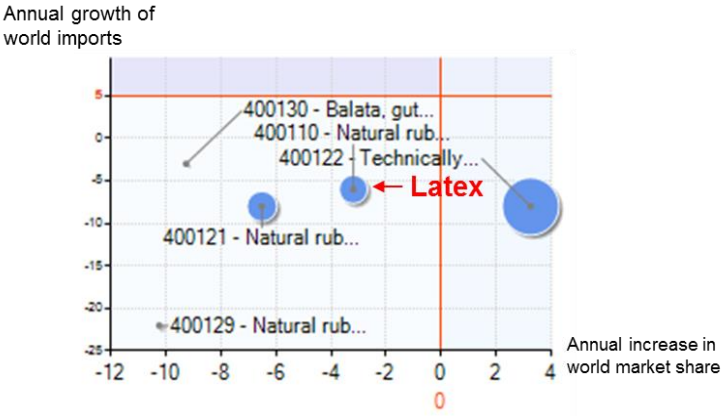
As seen in Figure A.6, the main importing market of natural rubber latex is Malaysia.

- Malaysian share of Thailand's exports represents 49.86 percent.
- Annual growth of Malaysia's imports: -4 percent.
- Share of world imports: 34.2 percent.
- Malaysia's import growth from the world is greater than Thailand's export growth to Malaysia.

As seen in Figure A.7, growth of national supply and international demand for Latex exported by Thailand in 2014 are as follows:

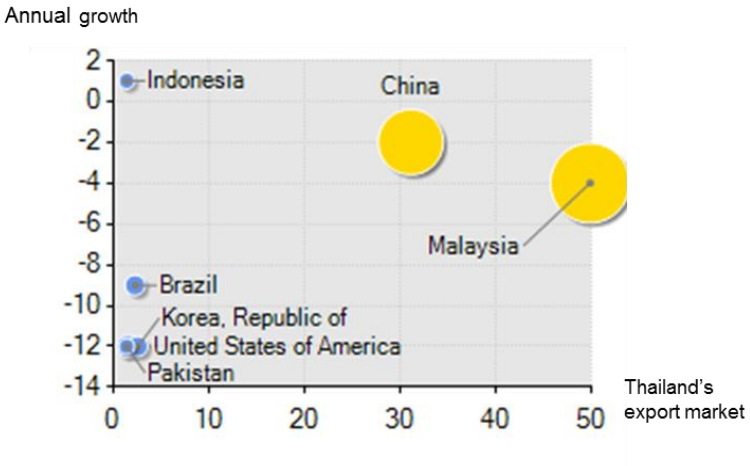
- Annual increase in world market share: - 3.19 percent.
- Annual growth of world imports: -6 percent.
- Exports: US$1,427.5 million as a net exporter of natural rubber latex, whether or not pre-vulcanised

Figure A.6: Share of importing markets of concentrated latex in 2014



Source: Trade Map, International Trade Center.

Figure A. 7: National supply and international demand in 2014



Source: Trade Map, International Trade Center.

Appendix 2

Reginal Rubber Market

(Reference) Regional Rubber Market as mentioned below;

- Background

The Governments of Thailand, Indonesia and Malaysia under the framework of International Rubber Consortium Limited (IRCo) need to develop the rubber market in region in order to strengthen the market position of rubber in Asian countries.

Mission: Be the reference market in the future

- The objectives of establishment

The objectives of establishment are to prevent rubber price fluctuations, to increase bargaining power in world markets, and to reduce the price reference from futures markets, including TOCOM and SICOM, which are the markets that have no physical delivery.

The concept of a Regional Rubber Market will focus on rubber transactions that have physical delivery in order to reduce speculation and increase rubber price stability.

The organisation in charge: IRCo

- Rubber product transaction: RSS3, TSR20 (for Thailand)

- Trading condition

In terms of buyers (both domestic and foreign) who are members of the regional market, they can come to the market to make an auction. For sellers, the regional market will set spec of RSS bale based on GMP/ISO.

- Current status

Now it is in the process of studying and planning. However, the market mechanism may be propelled and could be set up in 1-2 years.