

YANGON UNIVERSITY OF ECONOMICS
MASTER OF DEVELOPMENT STUDIES PROGRAMME

A STUDY ON THE CHALLENGES OF RUBBER MARKET
IN MYANMAR
(CASE STUDY: MON STATE)

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EMDevS - 34 (15th Batch)

DECEMBER, 2019

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Master of Development Studies (MDevS)

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ABSTRACT

Rubber plays an important role in many Asian countries including Myanmar. It is a useful raw material and an important foreign exchange earning item. Rubber production is a key livelihood activity of smallholder rubber farmers and a driver of job employment in Mon State. This research focused the current situation of rubber production and export of Myanmar and examined the existing challenges in the rubber market. This study applied descriptive method. To get production and marketing related information qualitative approach was used by interviewing thirty-five farmers and conducting three Key Informant Interviews with each stakeholder group in rubber market. It was found that rubber planting area has grown rapidly during the last two decades. Due to lack of proper technology and inefficient processing, rubber quality and yield was low, reducing the value and affecting the ability to diversify into new export markets. Therefore, the rubber sector in Myanmar needs structural changes to increase productivity, competitiveness and sustainability for the better economy of the nation.

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ABBREVIATIONS

AFTA	-	ASEAN's Free Trade Area
ANRPC	-	Association of Natural Rubber Producing Countries
AOTS	-	Association for Overseas Technical Cooperation & Sustainable Partnership
ASEAN	-	Association of South-East Asian Nations
CEC	-	Chairman of Executive Committee
CEPT	-	Common Effective Preferential Tariff
DOA	-	Department of Agriculture
DICD	-	Department of Industrial Crop Development
EU	-	European Union
FESR	-	Framework for Economic and Social Reforms
GDP	-	Gross Domestic Product
GPSNR	-	Global Platform for Sustainable Natural Rubber
IRRDB	-	International Rubber Research & Development Board
IRSG	-	International Rubber Study Group
JRMA	-	Japan Rubber Manufacturers Association
METI	-	Ministry of Economy, Trade and Industry- Japan
MIC	-	Myanmar Investment Commission
MICDE	-	Myanmar Industrial Crops Development Enterprise
MNRQTL	-	Myanmar Natural Rubber Quality Testing Laboratory
MOALI	-	Ministry of Agriculture, Livestock and Irrigation
MOC	-	Ministry of Commerce
MOECF	-	Ministry of Environmental Conservation and Forestry
MOFA	-	Ministry of Foreign Affairs
MOFR	-	Ministry of Finance and Revenue
MOI	-	Ministry of Industry
MOLES	-	Ministry of Labor, Employment and Social Security
MOT	-	Ministry of Transport
MoU	-	Memorandum of Understanding
MRPPA	-	Myanmar Rubber Planters and Producers Association
MSR	-	Myanmar Standard Rubber

MST	-	Ministry of Science and Technology
NCDP	-	National Comprehensive Development Plan
NES	-	National Export Strategy
NR	-	Natural rubber
PCFD	-	Perennial Crops and Farm Division
RSS	-	Ribbed Smoked Sheets
RTAJ	-	Rubber Trade Association of Japan
SDC	-	Swiss Agency for Development Cooperation
SLORC	-	State Law and Order Restoration Council
SOE	-	State-Owned Enterprises
SR	-	Synthetic rubber
TSIs	-	Trade Support Institutions
TSR	-	Technically Specified Rubber
UMFCCI	-	Union of Myanmar Federation of Chambers of Commerce and Industry
US	-	United States
WRS	-	World Rubber Summit

CHAPTER I

INTRODUCTION

1.1. Rationale of the study

Rubber is the one of the useful agriculture products and play an important role in the economy of many countries. It can be found in our everyday life as a very useful commodity of living for many people around the world because of its various properties.

The flexibility of rubber is useful in making hoses, tires and rollers for devices ranging from domestic clothes wringers to printing presses. Its elasticity is suitable for making various kinds of shock absorbers and for specialized machinery mountings designed to reduce vibration. Its relative gas impermeability makes to produce air hoses, balloons, balls and cushions. It's resistance to water and most fluid chemicals leads rubber to use in rainwear, diving gear, and chemical and medicinal tubing, and as a lining for storage tanks, processing equipment and railroad tank cars. Having electrical resistance, it is used as insulation and for protective gloves, shoes, blankets, telephone housings, parts for radio sets, meters and other electrical instruments. Resistance to abrasion makes rubber valuable for the treads of vehicle tires, conveyor belts, pump housings and piping used in the handling of abrasive sludge (Wikipedia, 2019).

The usefulness of rubber is countless. It can be used widely in the manufacture of several industrial products. Many people can get employment and make their living from the rubber plantation, processing, transporting, production and marketing of rubber goods. It is also a source of foreign earnings for the country by exporting rubber. Thus, rubber plantations contribute significantly to economic prosperity in rubber growing areas.

The requirement of natural rubber is increasing with world economic growth. The trading price increases the incentive to farmers in many countries to move on rubber production. Many Asian countries are the major rubber producers. The top rubber producers are Thailand, Indonesia, Malaysia, China, Vietnam, and India. The major rubber importers are China, USA, Japan, Republic of Korea, and Germany respectively. Improvements in the transportation system and more purchases of motorized vehicles increase tyre consumption dramatically (Dublin, 2017). Myanmar

is also influenced by surrounding and important rubber producers and markets such as Thailand, China, Vietnam, Lao PDR, India and other ASEAN member states.

Commercial rubber plantations were established in Myanmar since early 1900s. Rubber cultivation has expanded throughout Myanmar. Mon state, Tanintharyi, Bago and Ayeyarwaddy are the major rubber production regions. Hundreds of thousands of hectares of land are leased to investors for rubber plantations. The planted area is rapidly increased during the last two decades and reached to 657,000 Ha in 2017-18 as per MOALI data. Despite of a large expansion of rubber cultivation and production, yields are relatively low (899 pounds per acre) compared with those of larger producers, for example, it is less than 40 percent of those achieved in Thailand (FAO, 2016).

According to Myanmar Rubber Planters and Producers Association (MRPPA), Myanmar's rubber export competitiveness remains weaker than that of other countries in the region. Producers in the rubber sector face high production costs and low earning due to production of rubber lacks quality control and many other challenges. Most of the locally produced rubber is of low and inconsistent quality, which forces local producers to become price takers during negotiations.

Myanmar rubber has been a disincentive for rubber production and exports despite its potentials to bring prosperity of rubber producers and to increase country foreign earnings. There is room for Myanmar to become a more significant rubber producer on the world market. Therefore, this study is conducted to understand the current situations of rubber production and export in the case of mon state and to identify the challenges faced by farmers and stakeholders in the rubber sector and opportunities for the rubber market development in Myanmar.

1.2 Objectives of the Study

The objectives of the study are to examine the current situation of rubber production in Myanmar and to identify the challenges and opportunities in the rubber market.

1.3 Method of Study

This study used descriptive method based on previous studies. More specifically, the study reviews relevant literature and secondary data from Department of Agriculture under Ministry of Agriculture, Livestock and Irrigation (MOALI),

Myanmar Rubber Planters and Producers' Association (MRPPA), Library of Yangon University of Economic, relevant Journals and Internet website. For primary data, the study used quantitative approach by collecting data from 35 farmers to understand the current rubber market. In order to identify the challenges faced by the stakeholders, the study conducted five key informant interviews with stakeholder groups. The stakeholders include fifteen key informants who are from Government Officers from Ministry of Agriculture, Livestock and Irrigation (MOALI), members of Myanmar Rubber Planters and Producers Association (MRPPA), Company Agents, Wholesalers and Village Collectors. SWOT Analysis method was applied to analyze the identified challenges in the rubber market.

1.4 Scope and Limitation of the Study

Mon State was selected for this study as it has the largest rubber plantation and tapping area in the country. There are total ten townships in Mon State and rubber is planted in all the townships. Among the ten townships, the study focused on rubber market of Thaton, Mudon and Yee townships because rubber planted area was more in these townships compared to that of others. The current situation of rubber market starting from production to selling to local market or exporting to foreign countries was examined in this study. The rubber plantation areas outside Mon State in Myanmar were not covered under this study.

1.5 Organization of the study

The study is organized in five chapters. Chapter one is introduction. Chapter two describes literature review on world rubber sector. Chapter three states overview of rubber sector in Myanmar. Chapter four presents data analysis of rubber market in Mon State and chapter five concludes the study with findings and suggestions.

CHAPTER II

LITERATURE REVIEW

2.1 Overview on the development of Rubber Industry

History of rubber use has been unstable for both natural rubber (NR) and synthetic rubber (SR). Most of world rubber supply is consumed by the automotive sector. Tire technology developments have changed the demand for NR and SR. The oil-crisis and subsequent recession also have impact on the demand and price of natural and synthetic rubber (Grilli, Agostini, Hooft-Welvaars, & Grilli, The world rubber economy : structure, changes, and prospects, 2010).

Natural rubber can be produced from numerous trees, plants, vines and shrubs. However, only *Hevea Brasiliensis* and *Guayule* have been commercially planted in anywhere. *Hevea* trees have been the major source of NR since the late 19th century. Rubber may be obtained by tapping the bark of the tree trunk, i.e, controlled wounding of the tree. The relative advantages of this species *Hevea Brasiliensis* trees over the others are producing high yield of latex during a sustained period and resistance to diseases and insect pests. *Guayule* is a bushy perennial crop that can grow best in well drained soils. It has an elaborate root system to help it grow in rather dry areas. It is only growing in Mexico and some Southern parts of the USA in the early 19th century. When *Hevea* came on the market, *Guayule* became unpopular in the 1920's because quantities of relatively cheap (Hurley, 1981).

Depending on the species of the plant, rubber constitutes 10-25 percent of the total (dry) weight of the plant. Most of the rubber are produced mainly from the stem and branches and a small amount form the root. Most roots can re sprout and grow into new shrubs so fast. One-year old bush grown form the roots is as large as that of two-year old form the seedling. Generally, replanting with seedlings is more expensive than re sprouting from the roots (Verheye, 2010).

Natural rubber was used for a variety of purposes by the indigenous peoples of the Amazon basin. The commercial history of rubber was centered in Brazil from the late 1700s through 1900 and presented by relatively low levels of production, high wages, and very high prices. After 1910, it was centered in East Asia as a result of rapidly increasing production, low wages, and falling prices (Zephyr Frank, 1870).

Large scale production of synthetic rubber (SR) emerged when supply of NR was insufficient due to blocked supply-lines during the Second World War. SR was produced in North America and Western Europe. At the same time, Guayule plantations were set up to assure supply of rubber during the Second World War. A temporary shortage of general-purpose rubbers led to a shift towards SR use (Smit. H.P, 1984).

NR is produced from the latex derived naturally from rubber trees, while the SR is manufactured from chemicals sourced from petroleum refining. SR is identified as the substitute product of NR. The price and growth of the market is affected by the consumption behavior of consumers between these two types of rubbers, technical and economic factors such as raw material prices, processing cost, transportation cost, import and export duties (ISRG, Story of Rubber, 2017).

The early uses of rubber were quite limited. Natural rubber is used for producing hoses, tires, industrial bands, sheets, shoes, shoe soles, and other products. After 1900, the “Rubber Boom,” was begun with the popularization of the bicycle that is followed by the development of the automobile industry and the expansion of the tire industry to produce car tires (Weinstein, 1983).

Nowadays, natural rubber is widely used as raw materials in both domestic and industrial applications. Rubber is produced in the form of the latex from the rubber trees, then refined into rubber ready for further industrial processing. There is great demand for rubber in a variety of industries from around the world because of its advantages including low costs, large stretch ratio, high resilience, and waterproof etc.,. Some of the most popular rubber products include tires, tubes, and plugs. Other significant uses of rubber are hoses, belts, matting, flooring, medical gloves, engineering appliances and many other products (AnirbanC, 2019). Hence, rubber became one of the crucial agriculture products and part in the economies of many countries.

2.1.1 Rubber Export in Global Rubber Market

According to the report of International Rubber Study Group (IRSG, 2019), the top five NR producing countries are Thailand, Indonesia, Malaysia, Vietnam and Myanmar contributing 86.5% to the global total output while the top four NR consuming countries are China, India, USA and Japan. Thailand ranked as the largest natural rubber producer in 2016 with the total output of 4.5 million tons and the share of 36.3% in world rubber market.

According to the statistics from the Association of Natural Rubber Producing Countries (ANRPC, 2017), the NR world production increased from 12.43 million tonnes in 2016 to 13.28 million tonnes in 2017. There was approximately 90% of the world NR supply is produced by ANRPC member countries especially from the top five NR producing countries having the optimal conditions for the growth of rubber trees. Also, about 70% of the global demand for NR derived from the top four NR consumers mostly for the automobile and auto-tire industries. On the other hand, the world NR consumption showed an increase of 1.4% and the total of 12.9 million tons as of year 2017 (Yi Chiun Fong, 2018) .

As per Global and China Natural Rubber Industry Report, 2017-2021, China is the world's largest consumer of natural rubber. Its rubber consumption in 2016 increased by 4.6% year on year to 4.89 million tons, of which 77.9% was consumed in the country's booming tyre industry. Driven by the steady development of the tyre industry, China's natural rubber consumption is expected to maintain 4.5% during 2017-2021 and reach 5.78 million tons by 2021 (Dublin, 2017).

In general, the global natural rubber output increased about 1.1% year on year while the global rubber consumption rose by 3.8% year on year resulting in the gap between rubber demand and supply (AnirbanC, 2018). This shows that Natural rubber on the world market has had big increases in demand and small increases in supply. In the context of steady growth in rubber demand and underproduction, International Rubber Study Group is expecting that the global natural rubber market will continue to be in short supply in coming years. The imbalance between supply and demand impacts the natural rubber price of the world market.

In terms of rubber exports, it was stated that global sales from natural rubber exports by country totaled US\$13.2 billion in 2018 and \$16.8 billion in 2014. That reflects an average -22.1% drop in value from 2014 to 2018. Among continents, Asian countries exported about 84% of international natural rubber sales and African countries exported about 8% followed by Europe about 5%. Accounting for a much smaller percentage of exported natural rubber were shippers in Latin America (1.2%) excluding Mexico but including the Caribbean, North America (0.8%) and Oceania (0.1%) led by Papua New Guinea (Workman, 2019) .

Top countries that exported the highest dollar value worth of natural rubber during 2018 are Thailand, Indonesia, Vietnam, Malaysia, Ivory Coast, Myanmar, Belgium , Laos and Guatemala (factfish, 2019).

Table 2.1 Countries exported the highest dollar value worth of natural rubber

Rank	Exporter (NR)	Natural Rubber Exports in 2014 (US\$)	Natural Rubber Exports in 2018 (US\$)	%World Total in 2018
1	Thailand	\$ 5.7 billion	\$4.6 billion	34.5%
2	Indonesia	\$ 5.9 billion	\$3.9 billion	29.9%
3	Vietnam	\$ 1.3 billion	\$987.3 million	7.5%
4	Malaysia	\$ 1.2 billion	\$936.5 million	7.1%
5	Ivory Coast	\$187.3 million	\$752.6 million	5.7%
6	Myanmar	\$ 98.0 million	\$260 million	2.0%
7	Belgium	\$114.2million	\$202 million	1.5%
8	Laos	\$ 35.3 million	\$168.3 million	1.3%
9	Guatemala	\$175.6 million	\$152.7 million	1.2%
10	Liberia	\$120.7 million	\$127.2 million	1.0%
11	Germany	\$ 188.6 million	\$115 million	0.9%
12	United States	\$124.3 million	\$101.1 million	0.8%
13	France	\$94.1 million	\$96.1 million	0.7%
14	Luxembourg	\$118.1 million	\$94.8 million	0.7%
15	Netherlands	\$27.0 million	\$94.2 million	0.7%

Source: factfish 2019

Among the top exporters, the fastest-growing natural rubber exporters since 2014 were: Myanmar (up 53.4%), Netherlands (up 28.7%), Ivory Coast (up 24.9%) and Laos (up 21.2%). Those countries that posted declines in their exported natural rubber sales were led by: Germany (down -64.6%), Vietnam (down -40.8%), Malaysia (down -33%), Thailand (down -24.2%) and United States (down -23.4%) (Workman, 2019).

2.1.2 Rubber Demand in Global Rubber Market

World Rubber Industry Outlook (WRIO) presents the latest long-term forecasts of world economy as well as the vehicle, tyre and rubber sectors for the next ten years. As per (WRIO, 2019), World NR demand has increased about 2.8% every year reached to 13.78 million tons in 2018. It is followed by a slower pace of growth by 2.3% in

2019. A further decrease of 1.8% is expected in 2020. World SR demand has increased by 1.6% in 2018 to 15.4 million tons and its growth is accelerated by 2.2% in 2019, reaching 15.74 million tons. The SR demand is forecasted to grow slightly faster (1.9%) than NR demand growth (1.8%) in 2020.

2.2 Rubber Producing Countries

The top rubber producing countries in 2018 are Thailand, Indonesia, Malaysia, India, China, Vietnam, Philippines, Cote d'Ivoire, Guatemala and Brazil accordingly. Most of the countries that produce rubber in large scale are from Southern Asia.

In Thailand, the rubber industry has developed gradually from some small-scale rubber plantations in the 1900s to today's top rubber producer and exporter in the world. The development of the Thai rubber industry is resulted from its advantages such as an abundance of natural resources, benefiting from its tropical climate, effective and advanced cultivation methods, effective and advanced cultivation methods improving production infrastructure, Thai rubber prices and a massive regional rubber consumption base (Adam Tanielian, 2018).

According to the report from Thailand Board of Investment (TBI, 2017), Thailand produces over 4.5 million tons of natural rubber every year from more than 3.5 million hectares of rubber cultivation area throughout the country. Annual growth rate of production is 5.81% and growth is consistent that could maintain the world's largest natural rubber producer for decades.

Thailand is also the world's largest rubber exporter. As per the latest trading statistics from International Trade Centre (ITC, 2017), Thailand exported over US\$ 4.4 billion worth or equivalent of 3.6 billion tons of natural rubber to the global market in 2016 taking 36.6% of the world's total rubber exports. China is the largest importer of rubber from Thailand followed by Malaysia, Japan, and the USA. The reputation of the rubber industry in Thailand could attract a significant number of buyers and traders from all over the world (Petchseechoung, 2017).

Due to pollution concerns, new car sales in the US and UK dropped 1.8% and 5.7% respectively in 2017, driven by higher taxes on diesel cars. Lower demand from US & UK decrease rubber prices. In addition, repeated floods in Thailand, firming up of US dollar against Asian currencies, and increased demand from China faced some supply tightness in 2017. To stabilize the market, the Natural Rubber Policy Committee

has offered a 10-billion-baht loan program, raised domestic demand for natural rubber and decreased the export volume (NNT, 2107). Domestic consumption is increased through rubber road construction, rubber mixed paving, promoting processing and the use of para -rubber products locally (MCOT, 2011).

There has been rapid expansion of rubber planting in Thailand, Indonesia and Vietnam in the recent years. When these trees matured, rubber supply is increased in the market while demand is decreased. Global rubber prices have plunged due to oversupply. To ensure the price stability of rubber, Thailand, Indonesia and Malaysia held a meeting to find ways together. They agreed to reduce exports in the first three months of 2018, to disseminate information of rubber markets to avoid rubber speculation (Bangkok Post, 2019).

In 2019, export volume of rubber has increased with a relatively high price, but the higher cost has led to lower production in some rubber producing factories. Government has provided some effective and strong support able to further strengthen the country's leading position in the global rubber industry. Cooperation between the enterprises and the research organizations is facilitated to raise the level of value-added rubber industry products. A Rubber City is established to serve as a sourcing and investing hub for rubber products made in Thailand (AnirbanC, 2019).

Indonesia is among top related rubber producers globally. There are about 3.5 million hectares area of rubber plantation and small-scale farmers are the major owner of rubber plantations. 90% of the harvested rubber is exported and the rest is used in domestic manufacturing industries and automotive sector. Indonesia exports its rubber to USA, Singapore, China, Brazil and Japan. The annual production is about 3,088,400 metric tons occupying 27.3% of the global production (Jegade, 2019).

Malaysia is the greatest sole exporter of latex and became the third largest rubber producer in the world. Malaysia exports rubber to more than 190 countries worldwide. Germany, Japan and USA are some of the greatest importers of Malaysia rubber. The country's annual production is about 996,673 metric tons taking 8.8% of the global production. It is the leading exporter of medical gloves, condom and Foley catheters (Jegade, 2019).

India is one of top related rubber producers. Harvested rubber are exported to China, Indonesia, Turkey, Spain, Nepal and Sri Lanka. Exported rubber products are footwears, tires, tubes, belts, hoses and pharmaceutical goods. According to the data from United Planters Association of South India (UPASI, 2019), rubber production

increased gradually from 2016-2019 after a drastic decline in the production form 2012-2015. Further improvement is expected in the following years. It said that increased total output with decreased total import in 2017 caused rising demand but the price was not rise significantly. It is known that the fall in imports was caused by some restrictions on import of natural rubber in 2016. Only two ports are allowed to import for natural rubber that affects to the cost and delay of user industries located far away from these two ports. Also, imposing 25 per cent import duty on natural rubber made small price difference between domestic and international price that caused decrease in import (GRM, 2018).

The tyre industries asked for zero import duty on natural rubber. UPASI said that any reduction in import duty would be impacted to the interest of 13.1 lakh growers and 4.93 lakh workers depending on this business. Thus, it is needed to impose safeguard duty on natural rubber to protect the livelihood of small producers and to maintain the country's natural rubber production capacity. UPASI suggested to make efforts for further production as a priority instead of zero import duty (GRM, 2018).

China has the largest market for natural rubber that relies heavily on imports. It takes half of the total global consumption. China's natural rubber import varies from year to year within the past five years. Reliance on import remains high at 76% to 77%. The import and export of natural rubber is closely related to the international and domestic economic environment. Most of the imported rubber are used in china for manufacturing tires that are exported to the US. Less demand from the automotive industry and the trade war between US and China caused the slowing down of rubber market in 2018 (Manesh Samtani, 2019). According to Global and China Natural Rubber Industry Report, 2019-2025 (Dublin, 2017), China Securities Regulatory Commission has announced the approval of three new futures contracts in urea, rubber and glutinous rice, and stainless-steel. Rubber futures traded on the Shanghai International Energy Exchange is starting. The aim is to provide open, consistent and transparent price signals as well as effective risk management tools for related industries, to explore opening futures products to overseas investors to boost China's global pricing power.

Vietnam is one of the top rubbers producing countries and has over 910,500 hectares of rubber plantation. It produces 789,653 metric tons annually which contributes about 7 percent global production. It is the leading exporters of latex. More than 40% of their latex are exported to China (Jegade, 2019).

Philippines is famous for its expertise in manufacturing variety of high quality rubber products that meets customers' need. It has the largest area of rubber plantation about 4,000,000 acres and annual production is estimated at 547,861 metric tons. It is a powerhouse in rubber production having many investors (Jegade, 2019).

Sri Lanka has been known for its high quality rubber products and specialised industrial rubber tyres segments. According to the Export Development Board (EDB), Sri Lanka tyre manufacturers supply about 20% of the global solid tyre demand. It is known that the rubber industry of Sri Lanka has made a tremendous contribution to the country since 1876 and is a pioneer in the natural rubber industry in Asia. It is learned that Sri Lanka is a nation that successfully produces increasing quantities and higher quality of environmentally and socially responsible natural rubber. This gives Global Rubber Industries GRI utmost confidence in its source of high quality raw material. As stated in the Rubber Industry Master Plan 2017 – 2026, its rubber sector produces 153,000 metric tonnes /year and estimate to become a US\$4 billion/year industry by 2025 (Pringiers, 2018).

2.3 Brief Review on SWOT Analysis

SWOT is an acronym representing for Strengths, Weakness, Opportunities and Threats. “SWOT Analysis is a simple but powerful tool for sizing up an organization's resource capabilities and deficiencies, its market opportunities, and the external threats to its future” (Thompson A. A., 2007). SWOT analysis consists of two dimensions called Internal and external. Internal dimension has organizational factors: strengths and weaknesses. External dimension has environmental factors: opportunities and threats.

Strength refers to a resource, skill, or other advantage relative to competitors or a distinctive competence that gives the organization a comparative advantage in the market place. It can be strong financial resources, good image, market leadership, buyer/supplier relations, and other factors (Pearce, 1991).

Weakness refers to something an organization lacks or does poorly in compare to others or a condition that puts it at a disadvantage (Thompson A. A., 1989). It can be a limitation or deficiency in resource, skills, facilities, financial resources, management capabilities, marketing skills, and brand image (Pearce, 1991).

Opportunity refers to conditions in the external environment that allow an organization to take advantage of organizational strengths, overcome organizational

weaknesses or neutralize environmental threats (Harrison, 2004). It can be an advantage or driving force or situation or condition suitable for an activity to take place.

Threat refers to a disadvantageous situation or an element that makes it difficult or impossible to reach the organizational goals. It can be all environmental factors that can impede organizational efficiency and effectiveness (Ülgen, 2010).

External factors are economic, social, cultural, demographic, environmental, political, legal, governmental, technological, and competitive trends and events that could significantly benefit or harm an organization in the future. Opportunities and threats are often beyond the control of a single organization. Internal factors are management, marketing, finance/accounting, production/operations, research and development, and management information systems activities of a business that are performed especially well or poorly. Strengths and weakness are controllable activities by an organization (David, 2003).

SWOT analysis was used in the Small and Medium Enterprises development and the creation of business and marketing plans since 1980. It is widely used in the analysis of internal and external environments to support strategic decision situations. SWOT gives the opportunity to focus on positive and negative aspects of internal and external environment of the organization. ‘Two-by-Two Matrix’ is used to describe SWOT Analysis (Emet GÜREL, 2017) .

However, there are some criticisms to SWOT Analysis stating that it is an analysis technique having a problem in terms of quality and quantity. Many factors can be identified in applying SWOT analysis, but quantity does not mean quality. Prioritization of identified factors in SWOT analysis is impossible taking account in detail, developments and conflicts in different dimensions, views and suggestions based on different data and analyses. Classification of variables into one of the four SWOT quadrants is challenging. The same factor can be fitted in two categories. A factor can be a strength and a weakness at the same time, for example, strengths that are not maintained may become weaknesses. Opportunities not taken, but adopted by competitors, may become threats. The categorization of a variable depends on the purpose of the practice (Emet GÜREL, 2017) .

Despite the critics, SWOT Analysis has been a very popular method used for business management and marketing. It could reveal current situation, help to focus on minimizing weaknesses and taking the greatest possible advantage of opportunities available to develop future action plans. If the technique is used properly, it can provide

a good basis for strategy formulation (Pahl, 2009) . Thus, SWOT analysis in this study was used to identify the existing challenges faced by rubber market participants with available opportunities in rubber sector to raise awareness and make it useful for the future rubber market development in Myanmar.

2.4 Review on Previous Studies

P. K. Viswanathan & Ganesh P. Shivakoti, (2007) from Amrita Vishwa Vidyapeetham, Kochi Campus, India and Asian Institute of Technology conducted empirical analysis to examines the influence of important socio-economic, institutional/policy level factors in determining the adoption/non-adoption of rubber-integrated farm-livelihood systems from the Indian context. The study shows that adoption of rubber-integrated farming systems has a lot of potential benefits, such as provision of food, employment, timber and non-timber forest products, and fodder to cattle, and ecological benefits including soil conservation, water and air quality improvement, and forest and biodiversity conservation. Thus, recasting the policy and institutional intervention regimes specific to the traditional rubber regions are crucial to strengthen the economic base of most of the small and marginal rubber producers especially in the context of the growing market uncertainties in the era of free trade (P. K. Viswanathan & Ganesh P. Shivakoti, 2007).

Wendy Pei Qin Ng & Hon Loong Lam, (2013) from the University of Nottingham, Malaysia overviewed on economics and technology development of rubber seed utilization in Southeast Asia. The results showed that rubber seed has high potential to act as an alternative biofuel source for local use and partial substitution towards crude palm oil for biodiesel production other than the application of rubber seed in value-added products manufacturing. The development of rubber seed biomass industry is expected to bring benefits to the social economic development in rural sector. The on-going research done by various institutions and countries are exploring further application of rubber seed biomass. However, current palm biomass processing technologies can be adapted to process rubber seed biomass with minor upgrading, which in return, decreases the capital cost investment for rubber seed biomass processing. Southeast Asia has high potential to become one of the central rubber biomass processing and distributing centers in future (Lam, 2013).

Ye Myint Naing, (2011) from Yangon Institute of Economics had studied Rubber Plantation and Rubber Related Industry in Myanmar. The findings showed that

planting and exporting of rubber not only improved the local industry but also earned foreign currency by exporting high-quality raw material. However, rubber production industry in Myanmar needed to be advanced. Using old technology with old method of production led to weaken in market competition with the neighboring countries (Ye Myint Naing, 2011).

Thein Aung Than (2010) from Department of Agricultural Economics Yezin Agricultural University studied and analyzed the factors affecting adoption of intercropping and high yielding clone practices in rubber plantation. The results showed that intercropping in immature rubber land had lot of benefits such as income generation, good rubber growth by reducing weeds, protection from fire hazards and having good nutrition by crop residues (Than, 2010).

Fox J., Castella J.C., (2013) from East-West Center, Honolulu, Hawaii, USA and Institute de Recherche pour le Developpement (IRD), Indonesia studied on the expansion of rubber in Mainland Southeast Asia and found out the prospects for smallholders. The study shows that smallholder rubber production is effective proposition in moving households and communities out of poverty while many farmers Laos, Cambodia and Myanmar are struggling to maintain their lands and forests in the face of growing pressures from investors and government institutions to impose concession arrangements. To promote the establishment of a vibrant smallholder rubber sector, the state needs to establish and effectively implement national policies, legislation and institutional structures to support smallholder rubber cultivators. In addition to access rights, national agencies need to support smallholders through integrate efforts to provide extension, credit, transport and marketing facilities. These institutional arrangements by policy makers is vital to support the sustainability and economic viability of smallholders' rubber production (Fox J., 2013).

T.V.Ushadevi & V.N.Jayachandran(2001) from Centre for Development Studies (CDS), Cochin University studied on socio-economic profile of rubber tappers in the small holding sector. The finding showed that decline in the world rubber economy and trade liberalization policies of the nation have strongly affected the price of the natural rubber that in turn adversely affect the income of small-scale rubber growers and the socio- economic conditions of rubber tappers (V.N.Jayachandran, 2001) .

CHAPTER III

RUBBER PRODUCTION AND EXPORT MARKET IN MYANMAR

3.1 Institutional Framework for Rubber Market

Rubber is classified as a priority crop in national development plans in 1979. State Law and Order Restoration Council (SLORC) adopted market-oriented economic policies in 1989. Since 1990s, government has been focused on the promotion of largescale estate forms of rubber production by private agribusiness (Kenney-Lazar M. , 2016).

Myanmar has entered ASEAN in 1997 and has committed to ASEAN's overall goal of shared regional progress and stability. Being exposed to global and regional competition, Myanmar's agriculture sector is needed to modify its tariff structure within the free trade regulations of ASEAN's Free Trade Area (AFTA) and Common Effective Preferential Tariff (CEPT).

Government policy on liberalization occurred in the agricultural sector in 2004, when state-controlled prices and the compulsory sale of rubber, sugar and cotton to State-Owned Enterprises (SOE) was raised. Agricultural policy and planning in Myanmar are formulated within a context of policies, plans, and regulations that include the National Comprehensive Development Plan (NCDP), the Framework for Economic and Social Reforms (FESR), the Foreign Investment Law, and the National Export Strategy (NES). Each of these documents address general issues, not being specific to agriculture but contains several important implications for agricultural development including to rubber.

The National Comprehensive Development Plan (NCDP) prepared in 2011 contain five-year plans covering 2011-2031. The long-term vision related to agriculture and rural development is to increase incomes and living standards of rural people who are depending on the agriculture sector in Myanmar more than those of neighboring countries and keeping abreast of developed countries.

The Framework for Economic and Social Reforms (FESR) is prepared in 2012. The framework targeted reforms and strategies to improve agricultural development through the opening of marketing systems to the private sector. Foreign Investment Law is enacted in 2012 and is replaced by the Myanmar Investment law in 2016. Types of investment, application procedures, long term lease agreements and tax incentives

are revised in the Myanmar Investment Rules by law. Under this law, investors can apply a permit to the Myanmar Investment Commission (MIC) for investments which are considered to have potentially negative environmental or social impacts (Overy, 2017) .

National Export Strategy (NES) 2015-2019 is a short-term trade strategy that identifies seven priority sectors and provide strategic guidance to increase value added production. The priority sectors are (i) rubber, (ii)rice , (iii)bean, (iv)pulses and oil seeds, (v) textiles and garments, (vi)fisheries and (vii) tourism. The main target of the strategy, for the rubber sector , is to increase the share of processed rubber in total rubber exports by 10% annually. It is aimed to do by improving downstream activities and increasing exports to non-traditional markets such as European Union (EU), United States (US) and Japan. The main policies on the upstream activities of rubber value chain are improving harvesting technology, improving land registration of rubber tenure, replanting areas with high yielding planting material to reach 100% productive trees, improving quality control in rubber sheet production, improving investment and training, eliminating the rubber export tax (Myanmar Ministry of Commerce, 2015) .

Labour law is mainly in application for manufacturing industry operations. Rubber planters are considered as farmers and thus any labour laws and regulations are not applicable for them. The planters are solely responsible for the welfare of their workers. Therefore, there are no apparent unions in the rubber products sector in Myanmar. The social and environmental conditions surrounding rubber production including labour rights, workers' use of protective gear, implementation of effective waste disposal methods, use of chemicals, etc. must be managed to strengthen the sector's development potential (Myanmar Ministry of Commerce, 2015).

There are some institutions providing policy support, important trade and business services directly or indirectly to the rubber sector in Myanmar. The institutions include Ministry of Environmental Conservation and Forestry (MOECF), Ministry of Agriculture, Livestock and Irrigation (MOALI), Ministry of Industry (MOI), Ministry of Commence (MOC), Ministry of Science and Technology (MST), Ministry of Finance and Revenue (MOFR), Ministry of Transport (MOT), Ministry of Foreign Affairs (MOFA) and Ministry of Labor, Employment and Social Security (MOLES). The role of each institution in the rubber market of Myanmar is stated in the following Table 3.1.

Table 3.1 Institutions with supported activities and services to rubber sector

No	Institutions	Description related to rubber sector
1	MOECF	Ministry of Environmental Conservation and Forestry is taking responsible for Management of forestry land
2	MOALI	Ministry of Agriculture, Livestock and Irrigation is taking part in management of land usage, providing planting and production techniques, planting material production, research and development, (R&D) in upstream and downstream industries of rubber, Training and education.
3	MOI	Ministry of Industry' role is to issues business licenses, to do standardization, manage State-owned enterprises and to promote small and medium-sized enterprises
4	MOC	Ministry of Commerce is managing Trade promotion (fairs, business matching, trade information), Statistics , Trade policies , Import / Export licenses, Border control, Training and issuing Commerce Journal
5	MST	Ministry of Science and Technology has to do Research on products, including polymers and rubber
6	MOFR	Ministry of Finance and Revenue has to do Customs and trade facilitation, Foreign exchange , Commercial bank lending rules
7	MOT	Ministry of Transport is for Shipments and clearance of commodities at port
8	MOFA	Ministry of Foreign Affairs is responsible for Trade and investment intelligence and promotion
9	MOLES	Ministry of Labor, Employment and Social Security is issuing the rules and regulations for the factories to comply and planter to register under this Ministry

Source: National Export Strategy, rubber sector strategy 2015-2019

Addition to the government institutions, there are some organizations or non-government agencies providing a wide range of trade related services to public and private stakeholders of the sector. These are Subcommittee for the Standardization of Rubber and Rubber-Based Products, Myanmar Rubber Planters and Producers Association (MRPPA), Union of Myanmar Federation of Chambers of Commerce and

Industry (UMFCCI), Myanmar International Freight Forwarders Association and Myanmar rubber products sector civil society network. Their activities and services to rubber sector are also stated in table 3.2.

Table 3.2 Organizations with supported activities and services to rubber sector

No.	Organizations	Description related to rubber sector
1	Subcommittee for the Standardization of Rubber and Rubber-Based Products	Subcommittee is established in 2012 under the chairmanship of MOI with the aim of standardizing Myanmar's natural rubber and rubber products in line with internationally accepted specifications and standards. It was formed with public and private stakeholders.
2	MRPPA	MRPPA is composed of Member of International Rubber Research and Development Board and rubber producers. There are branches at state and regional levels. It serves and lobby as intermediary between Government and producers. They recommend free on-board price to Government. They are also providing training , sharing information and organizing events such as rubber submit, forum.
3	UMFCCI	Union of Myanmar Federation of Chambers of Commerce and Industry is dealing with trade delegations, Trade fairs , Business matching ,Training (business), market access, etc.
4	Myanmar International Freight Forwarders Association	It is leading rubber products business support network and facilitating shipment and Customs clearance.
5	Myanmar rubber products sector civil society network	It consists of General media for information on rubber (television, radio, newspapers), e-Trade Myanmar (private media), and associations, or major representatives, of commercial services providers used by exporters to effect international trade transactions.

Source: National Export Strategy, rubber sector strategy 2015-2019

It is found that all the institutions are not totally engaged in the rubber sector's trade-related activities. However, they are important opinion-leaders to represent rubber sector's export potential and socioeconomic development. Ministry of Foreign Affairs MOFA and MOC are considered the most influential ministries for policy making , export and trading. MOALI is crucial to provide support in technology and quality production. Advocacy role is also important to raise awareness about certain critical issues affecting the development of trade and export of rubber products. None of the institutions is stated a high advocacy role. General media is currently sharing information on rubber and rubber sector development

3.2 Rubber Production in Myanmar

Rubber was planted commercially in Myanmar a century ago. It had been introduced to Myanmar in 1876. Commercial rubber plantations were established since early 1900s by British companies followed by Chinese and Myanmar. The planted area in 2005 to 2006 was around 226,000 Ha (Hectares) and increased nearly triple within a decade reaching to 650,000 Ha in 2015-2016. It gradually increased afterwards and reached to 657,000 Ha in 2017-2018. The production also rose from 64,000 MT (Metric tons) in 2005-06 to 209,000 metric tons in 2015-2016 and 237,000 metric tons in 2017-2018 respectively. Detailed comparison of rubber planted area, tapped area, the yield per hectare with Production and export per year in Myanmar from 2005 to 2018 are shown in the table 3.3.

Table 3.3 Planted Area, Production and Export of Rubber in Myanmar from 2005 to 2018

Year	Planted	Tapped	Yield	Production	Export	Export Value
	Area('000 ha)	Area('000 ha)	(kg/ha)	('000Mt)	('000Mt)	(Million USD)
2005-06	226	108	595	64	53	63
2006-07	295	123	597	73	47	77
2007-08	380	139	639	89	62	116
2008-09	428	144	647	93	42	73
2009-10	463	167	671	112	80	133
2010-11	504	187	690	128	91	304
2011-12	543	198	750	150	78	312
2012-13	581	214	770	164	87	265
2013-14	610	232	760	177	84	196
2014-15	641	259	770	198	77	112
2015-16	650	281	743	209	89	101
2016-17	654	293	757	222	130	156
2017-18	657	304	778	237	136	179

Source: MOALI , 2019

Having increased planting of high-yielding cultivars in the past two decades, yields have slightly increased in recent years from 595 kg/ ha in 2005-2006 to 743 kg/ha in 2015-2016 and reach to 778 kg/ha in 2017-2018. However, the productivity of rubber in Myanmar remains very low compared with the productivity of other rubber producing countries in the region where the average yield is ranging from 1,500 to 1,700 kg/ha as per FAO data (FAOSTAT, 2019).

Major rubber growing areas in Myanmar are Tanintharyi Division, Mon State, Bago Division, Kayin State and Shan State according to the data stated in table 3.4. There is also some rubber in Kachin State, Yangon Division, Ayarwaddy and Rakhine to a lesser extent.

Table 3.4 Rubber planted area (Acre) in Myanmar by State and Region (2012-2018)

State /Region	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Kachin	63,503	74,589	76,537	78,950	80,411	80,530
Kayah	36	36	36	10	66	66
Kayin	213,027	223,144	260,838	266,820	268,274	269,055
Chin	9	9	9	9	9	9
Sagaing	9,789	10,642	12,622	12,995	12,241	12,491
Tanintharyi	298,356	319,816	334,051	343,052	345,834	347,487
Bago	107,707	110,999	115,129	116,693	118,096	118,096
Mon	470,066	480,224	489,053	491,100	493,290	494,840
Mandalay	381	381	114	114	114	114
Magwe	80	80	80	80	80	80
Rakhine	35,400	36,719	36,523	35,522	35,529	35,592
Yangon	40,293	40,829	42,233	43,415	42,510	43,105
Shan	172,287	182,362	183,320	183,394	184,449	185,121
Ayarwaddy	24,997	27,037	33,570	35,274	35,274	36,754
Myanmar	1,435,931	1,506,867	1,584,115	1,607,428	1,616,177	1,623,340

Source : MOALI, 2019

It is found that Mon State has the largest rubber planting area about 494,840 acres in 2018 followed by Tanintharyi region with 347,487 acres, and kayin state with 269,055 acres. The planting area in those state and regions are increased gradually year on year. It is known that the soil , topography and agroclimatic condition in this area are suitable for rubber plantation. There is still a large area of culturable waste land

suitable for rubber in the rubber growing zone of Myanmar. However, Chin, Kayah, Magwe and Mandalay region have a very few rubber plantations and found no progress.

In Myanmar, rubber was produced by two distinct types of enterprises, i.e., estates and smallholders. The former can be categorized into private estate and government estate enterprises depending on the ownership of plantation. Both private owned estates and smallholders were included in private sector in Myanmar. Ownership of rubber plantation in Myanmar is shown in the following Table 3.5.

Table 3.5 Ownership of rubber plantations in Myanmar

Year	Planted acres		Total production	
	Private	State-owned	Private	State-owned
1989	90.40%	9.60%	83.40%	16.20%
2007	94.20%	5.80%	94.10%	5.90%
2011	97.40%	2.60%	97.70%	2.30%

Source: Perennial Crops Division, Department of Agriculture, MOALI 2016

Data recorded by Perennial Crops Division, Department of Agriculture stated that the state (government) owned only 2.6% of total rubber planted area and produced 2.3% of total natural rubber production, while the private sector occupied 97.4% of total rubber planted area and produced 97.7% total production.

There are the three main types of natural rubber traded in the international market, namely RSS, TSR and latex concentrate. Myanmar produces only the first two types, i.e. RSS and TSR, and does not produce any synthetic rubber. RSS (Ribbed Smoked Sheets) is graded and marketed according to the international type specification of RSS No. 1 to No. 5. TSR (Technically Specified Rubber) is graded according to Myanmar's own specification of Myanmar Standard Rubber 5, 10, 20 and 50 respectively, where 5 refers to the highest quality. In general, the natural rubber produced is of very low quality, with RSS No. 3 and No. 5 and TSR 20 and 50 being the principal grades, which fetch low prices in international markets. That might probably be the limitation in technology, investment, infrastructure, electricity, quality inputs, processing procedure and quality control system required to produce quality products in Myanmar.

90 % of the total number of producers are small holders with less than 20 acres of planting. Only 10 % of total producers are entrepreneurs working on rubber

plantations larger than 100 acres in size. Most of smallholders produce unsmoked sheets, which are sent to smokehouse processors to produce RSS. There are some factories owned by private planters and companies able to process RSS. After processing, the RSS are graded according to the international standard. There are also state-run factories and private factories that process TSR, but smaller quantity of TSR is processed rubber (Myanmar Ministry of Commerce, 2015).

Rubber Products in Myanmar fall under three main categories; 1) rubber and rubber-based articles, 2) footwear, gaiters and 3) rubber wood products. Under the first category, TSR and RSS are currently commercialized. Others include tyres, tubes and pipes of rubber. Compounded rubber is made traditionally but could not commercialized well. There are many other products under this category that are not produced in Myanmar. Outer soles of rubber and sandals under the second category are currently commercialized. Rubber timber and rubber wood furniture are produced as rubber wood products.

3.3 Rubber Market in Myanmar

Myanmar is a small player in the global rubber market, ranking thirteenth in world exports with a global share of 0.76 % in 2012. Improvement is seen in recent years. With reference to Table 2.1 showing countries' rubber export value comparison (factfish, 2019), export is continuously increasing its world market share for natural rubber account for 1.6 % in 2014 thereby slowly catching up with other exporters in the region ranking sixth in the world exports with a share of 2% in 2018. However, export earning of Myanmar is little and insignificant compared to that of top five countries such as Thailand, Indonesia, Vietnam, Malaysia and Ivory coast. Four ASEAN member states are holding the highest rank.

Taxes involved in the exports of natural rubber is identified. Exporting rubber products is incurred several cumulative taxes in Myanmar. Ministry of Finance and Revenue impose an advance 2 % tax for exporters, the 'income tax in advance', then income is taxed according to the rate of income. Then, corporate tax of 25 % is imposed on companies. Finally, 5 % commercial tax is imposed to the product. Rubber is the only agricultural commodity to pay commercial tax while all other agricultural products are exempt from commercial tax. All the market participants involved in the whole supply chain (producers, processors, traders and exporters) have to pay the commercial tax repeatedly for the same commodity. Exporters have to pay other charges such as

the online license fees for membership to MRPPA for each ton exported (the range is between 100 and 1,000 kyats). In addition, there's informal fee to export commodities and shipment. Agricultural taxes, industrial business taxes, financial product taxes, etc. are charged to rubber because natural rubber is categorized as not only an agricultural product, but also a raw material for industrial products and a financial product.

Whatsoever, repeated taxation makes production cost high and informal trade routes by illegal exporters who try to evade taxes, hence putting legal traders at a disadvantage. In 2014, MRPPA request on revision of the 5 % commercial tax levied on raw rubber to 0 %, to be in line with all other agricultural and industrial crops. It was agreed by Deputy Minister of MOFR and was approved at Parliament.

The highest levels of employment are required in rubber planting and immature maintenance areas and tapping or harvesting areas. Being a driver of job creation, the development of the rubber sector could have a high socioeconomic impact. MRPPA estimated employment in rubber sector contributed to 350,000 to 400,000 jobs in 2012 to cover 0.9 million acres of planted immature maintenance areas and 0.5 million acres of tapped areas. In 2018, 560,000 jobs were employed for 0.8 million acres of planted immature maintenance areas and 0.7 million acres of tapped areas. Developing Rubber products industry could support job creation and generate indirect employment alongside the value chain. At present there is no labour management system specific for rubber industry that should be established in accordance with requirements of local laws and regulations.

Infrastructures relating to the rubber processing in Myanmar are needed for improvement. The electricity supply is still largely insufficient and unstable, considerably affecting business, running of factories, production cost, quality of products.

The price of rubber is varied depend on the type and quality of rubber. the Average rubber prices per year from 2014 to 2019 in Myanmar compared to that of Thailand market is provided in the following table 3.6.

Table 3.6 Rubber Price (USD per Metric Tons) in Thailand vs Myanmar

	USD PER MT									
Type	RSS 1		RSS 2		RSS 3		RSS 4		RSS 5	
Year	Myn	Thai	Myn	Thai	Myn	Thai	Myn	Thai	Myn	Thai
2014	2,300	1,980	2,250	1,970	2,000	1,960	1,800	1,950	1,700	1,940
2015	1,738	1,930	1,655	1,912	1,577	1,896	1,477	1,887	1,376	1,873
2016	1,225	1,528	1,044	1,509	1,045	1,495	955	1,487	860	1,474
2017	2,442	2,985	2,225	2,968	2,210	2,953	2,201	2,944	2,189	2,931
2018	1,395	1,788	1,313	1,769	1,231	1,752	1,149	1,743	1,067	1,729
2019	1,475	1,549	1,402	1,529	1,329	1,511	1,257	1,502	1,184	1,487

Source: MOC Ministry of Commence, 2019

According to Myanmar Rubber Planters and Producers Association, the country is exporting more than 90 per cent of locally produced rubber, allocating the rest of nearly 8 per cent for local use. China is the largest buyer for Myanmar rubber (about 70% of rubber yield). Majority of rubber export is done through Muse border trade camp and Chinshwehaw border trade camp on China Myanmar border. In addition to China, Myanmar also exports rubber to regional neighbors such as Malaysia, Singapore and Indonesia. South Korea, Japan, Taiwan and India also buy Myanmar rubber in small quantities. MRPPA estimated that only 40% of annual rubber produced is being exported through formal trade, with the rest going on informal trade.

CHAPTER IV
ANALYSIS OF RUBBER MARKET IN MYANMAR

4.1 Survey Profile

Mon State has the largest rubber planted areas about 31 % of Myanmar total rubber planted areas and largest tapping areas in Myanmar. It produces about 50 % of Myanmar total rubber production. As per MOALI data in 2019, it has 494,840 acres of rubber planting area and 66% of those are productive area. 325,971 acres are tapped and produced 242,707 metric tons of rubber in 2018. The average yield is 720 lb./acres which is also the highest compared to that in the other regions. There are two districts named Thahton and Mawlamyaing under Mon State. Mawlamyaing District has 6 townships and occupied about 74% of State total rubber planted areas while Thahton District has 4 townships having 26 % of state rubber planted area.

Table 4.1 : Rubber Planted Area and Production in Mon State (2017-2018)

No.	Township	Planted Area		Tapped	Yield	Production	
		Acres	%	Area (ha)	(lb/Acre)	pound	%
1	Kyaikhto	36,562	7%	14,068	655	9,214,520	4%
2	Beelinn	24,622	5%	18,171	622	11,310,357	5%
3	Thahton	46,781	9%	24,420	723	17,643,450	7%
4	Paung	19,272	4%	9,008	691	6,220,114	3%
Sub total	Thahton District	127,237	26%	65,667	2,690	44,388,441	18%
5	Mawlamyine	2,225	0%	1,698	725	1,231,550	1%
6	Chaungson	5,926	1%	4,990	740	3,692,600	2%
7	Kyaikmayaw	82,539	17%	47,706	799	38,124,250	16%
8	Mudon	60,032	12%	39,988	750	29,994,990	12%
9	Thanphyuzayat	65,015	13%	50,875	740	37,655,132	16%
10	Yee	151,866	31%	115,047	762	87,620,553	36%
Sub total	Mawlamyine District	367,603	74%	260,304	4,516	198,319,075	82%
	Total	494,840	100%	325,971	7,207	242,707,516	100%

Source: Department of Agriculture, MOALI, Mon State, 2019

In this study, one township (Thahton) under Thahton District and two townships (Yee and Mudon) under Mawlamyaing District were selected as the study area. Thahton Township has about 9% of district rubber planted areas and largest tapping areas under Thahton District. Yee Township has largest rubber planted areas (about 31%) in Mawlamyaing township as well as largest production in Mon state. Mudon Township under Mawlamyaing District has about 12% of total district rubber planted areas and

all the market intermediaries were operating in Mudon rubber market. Hence, Mudon Township was also selected as the study area.

4.2 Survey Design

The survey was designed in use of both quantitative and qualitative data collection tools. Quantitative method was used to examine the current situation of rubber production in Myanmar with structured questionnaire whereas the challenges and opportunities in the rubber market were identified by Key Informant Interviews.

4.2.1 Sampling Design and Method

This study applied Random Sampling Method to conduct quantitative interviews with the farmers and gathered the rubber production related information and selected three Key Informant Interviews with each stakeholder group to identify the challenges in the Rubber Market. Under qualitative data collection, three village collectors, three wholesalers, three company agents, three members form Rubber Associate and three government officers were interviewed. Three informants form each stakeholder group are selected to represent each from the three selected townships named Thahton, Mudon and Yee.

Table 4.2 Number of Rubber farmers and Key Informant Interview

Participants	Number of Respondents
Rubber Farmers	35
Village collectors	3
Wholesaler	3
Company agents	3
Rubber Associate Members	3
Government Officer	3
Total	50

Source: Survey Data, 2019

Both quantitative and qualitative primary data were gathered to demonstrate the function of rubber markets. The gathered quantitative data were the age of respondent, working experience in year, family size, farm ownership, area planted, amount of production, cost of marketing, current rubber price, etc. In the qualitative data, the data correlated to the functioning of rubber market and the education level, mode of

transport, buying and selling methods, problems encountered in production and marketing of rubber, other market connected activities.

4.2.2 Survey Question Design

For primary data, questionnaires are designed to get descriptive statistics of demographic characteristics (age, experience, education level and family size), agricultural characteristics (land holding, variety use, tapping system, tapping method, number of tapping days, average total production and yields of rubber), and marketing characteristics (time of selling, type of selling, storage, marketing channel, activities and important opinion) of sample farmers. They will be presented by using tables. And qualitative questionnaires for KII with stakeholder groups are prepared and were also presented by narrative description. Finally, SWOT analysis is applied to identify strength, weakness, opportunities and threat of the rubber sector in Myanmar based on all the findings.

4.3 Analysis on Survey Data

The study approach both quantitative and qualitative data collection in order to meet both the objectives. The quantitative data includes information on demographics of the farmers, rubber production and marketing activities in order to examine the current situation of rubber production in Myanmar. The qualitative data includes responds from each key informant group and presented in the following respectively.

4.3.1 Demographic Information of Farmers

The average age of the sample rubber farmers was around 42 years, ranging from the youngest (18 years) to the eldest (70 years) old. Experience of farming was around 20 years in average within the range between 4 years to 40 years. The family size ranged from 2 to 11 persons and average family size was 6 persons. Majority of family labor in the farm was not dominated by male. The level of education of the farmers is important for decision making of farming system and marketing practices. Among the sample farmers, most of the farmers finished secondary education, 17% can read and write, 26% have high school or undergraduate education and the rest 17% are graduate farmers in the study area. The overall education level of the respondents can be easily seen in the following Table.

Table 4.3 Education Levels of Respondents

No.	Educational levels	Frequency	Percentage (%)
1	Monastic Education	6	17%
2	Primary	6	17%
3	Middle	8	23%
4	High	9	26%
5	University	6	17%
Total		35	100%

Source: Survey data 2019

(i) Agricultural Characteristics of Sample Farmers

Rubber land holding size and cultural practices of sample farmers : Land holding is the important for the economy of scale production. If it is very small, crop production cannot be done economically. In this study land holding is ranging from 4 to 200 Acres. 29% of sample farmers had planted non-budded rubber plant, 37% was budded rubber and 34% of farmers had planted both non-budded and budded rubber.

Table 4.4 Type of Rubber Planted by Sample Farmers under Tapped area

No.	Types	Frequency	Percentage (%)
1	Non-budded	10	29%
2	Budded	13	37%
3	Both	12	34%
Total		35	100%

Source: Survey data 2019

Number of tapping years indicates the economic life of a rubber farm. Rubber tree can tap more than 25 years, but maximum yield normally obtains between 6 to 11 tapping years depend on the variety. Number of mature rubber tree influences greatly on productivity of rubber. The tapping days within a year also significantly effects on rubber yield per hectare. Small number of mature trees per unit area and less tapping days per year can greatly reduce productivity of a unit area.

Table 4.5 Tapping Methods & Systems used to Sample Farmers in study Townships

No.	Practices	Frequency	Percentage (%)
	Tapping methods		
1	Downward tapping (DWT)	30	86%
2	Upward tapping (UPT)	3	9%
3	Slaughter tapping (ST)	2	6%
Total		35	100%
	Tapping system		
1	S1 d1 (Whole spiral and daily tapping)	1	3%
2	S2 d1 (Half spiral and daily tapping)	26	74%
3	S2 d2 (Half spiral and one day alternate tapping)	6	17%
4	S2 d1 4d/5 (Half spiral and four days tap and one day rest tapping)	0	0%
5	S2 d1 6d/7 (Half spiral and six days tap and one day rest tapping)	2	6%
Total		35	100%

Source: Survey data 2019

The average tapping years for non-budded rubber and budded rubber were around 12 and 8 while both non-budded and budded rubber was 9 years. The recommended tapping method and system in Myanmar is downward tapping method and S2 d2 (Half spiral and alternate day tapping) system. In the study area, 86% of the sample farmers used downward tapping method, 9% of upward tapping and 6% of the rest used slaughter. Only 3% used (S1 d1) system to replant their farm. Only 17% of farmers followed the recommended tapping system (S2 d2). Among the sample farmers, 74% of farmers used S2 d1, 6% used S2 d1 6d/7 and none of them used S2 d1 4d/5.

(ii) Marketing activities of sample farmers

The average yield of budded rubber is more than that of non-budded rubber. Small holder's rubber in most of the countries was processed and marketed as sheet

rubber. Water content in rubber sheet depended on the farmer desire and their processing technique. Some farmer produced thick rubber sheet more than 1.0 cm and they sold it after one day sun dry, while some produced about 0.3 cm thick rubber sheet and they sold it after 3-day sun dry. But some farmers produced thin rubber sheet about 0.3 cm and made it completely sun dry and sold as Air Dried Sheets (ADS) only at high price. Thickness of rubber sheet before sun dry and number of sun dry days influenced the water content in rubber sheet. And very thick rubber had more weight than thin rubber sheet. Generally, thickness of rubber sheet more than 0.5 cm with moisture 10-20% can only produce RSS5 grade rubber sheets and those of about 0.3 cm to 0.5 cm with moisture 7-10% can produce RSS3 rubber sheets after smoking process in the rubber smoke house (Latt, 2011).

In this study, 11% of sample farmers produced and sold un-smoked rubber sheets (moisture 15-20 %), 14 % produced un-smoked rubber sheets (moisture 7-10%) and 9% smoked Sheet >0.5cm (Moisture 15-20%) . Also 6% of sample farmers produced Smoked Sheet <0.5 cm (Moisture 7-10 %). In addition, 23% produced air-dried rubber sheets and most of them 37% sold as latex because the price of latex is paid higher than that of unqualified sheets or sometimes the same as ADS. It is known that wholesalers are asking village collectors to buy more latex that are processed in their smoked house or factories to produce better quality sheet.

Table 4.6 Types of Rubber Selling by Sample Farmers

No.	Types	Frequency	Percentage (%)
1	Latex	13	37%
2	Un-Smoked Sheet (Moisture) 15-20%	4	11%
3	Un-Smoked Sheet (Moisture) 7-10 %	5	14%
4	Air Dried Sheet (ADS)	8	23%
5	Smoked Sheet >0.5cm (Moisture) 15-20%	3	9%
6	Smoked Sheet <0.5 cm (Moisture) 7-10 %	2	6%
Total		35	100%

Source: Survey data 2019

Time of rubber selling after harvesting in study area was very simple. About 11 % of sample farmers sold every day for their one-day sun dry rubber sheet, 9 % of sample farmers sold their three days sun-dried rubber sheet every day, 37% of sample

farmers sold field latex every day and 43% of sample farmers sold their products (Air Dried Sheets and smoked sheets) at high price.

Table 4.7 Time of Selling by Sample Farmers

No.	Selling time	Frequency	Percentage (%)
1	Every day (1-day sun dried rubber sheet)	4	11%
2	Every day (3 days sun dried rubber sheet)	3	9%
3	Every day (Latex)	13	37%
4	At high price (Air Dried Sheets)	15	43%
Total		35	100%

Source: Survey data 2019

There were various categories of market participants in rubber marketing channel of Myanmar. Rubber flowed initially from farmers through different channels to ultimate consumer. The highest percentage of farmers 57% sold to village collectors and 3% to company agents, 34% sold their rubber to wholesaler. Only a very few percentages of farmers 6% sold to both wholesalers and companies in the study area. All the sample farmers sold their produces at current price with cash down system.

Table 4.8 Selling to Different Buyers of Sample Farmers

No.	Main buyers	Frequency	Percentage (%)
1	Village collectors	20	57%
2	Wholesaler	12	34%
3	Company agents	1	3%
4	Both Wholesaler and Company	2	6%
Total		35	100%

Source: Survey data 2019

Most of farmers (about 40% in the study) sold their products in the nearest market. Place of Transaction and Mode of Transportation influenced the price of the products. For example, if village collectors came directly to the home and bought the rubber, there was no cost of transportation or nothing to do for marketing function by farmers. But, price of rubber is less than the price paying in other place by wholesalers or companies.

Table 4.9 Place of rubber Transaction by Sample Farmers

No.	Place of Transaction	Frequency	Percentage (%)
1	In local village	14	40%
2	At home	7	20%
3	At town	11	31%
4	Both in local village and at town	3	9%
Total		35	100%

Source: Survey data 2019

In the study, the use of tricycle and motorcycle was the common mode of transportation in the study area because they were convenient, cheaper and accessible to narrow roads compared to cars. The use of car is relatively high because it is convenient, can carry loads of products at a time and road access are improved in some area. Bicycle and trishaw were still used being the cheapest system.

Table 4.10 Mode of rubber Transportation by Sample Farmers

No.	Mode of Transportation	Frequency	Percentage (%)
1	By motorcycle	11	31%
2	By bicycle/Trishaw	3	9%
3	By Tricycle	12	34%
4	By Car	9	26%
Total		35	100%

Source: Survey data 2019

The price of the rubber is depending on its quality that is determined mainly by the moisture contents of the rubber sheets and foreign matters content. Some farmers sold as one day or three days sun dried sheet rubber to the village collectors and/or wholesalers and/or companies after processing the field latex to sheet form. Day to day selling price is decided by wholesalers and most of the farmers has known the price through village collectors. Those farmers who would not like to accept the price of village collectors said & paid, are inquiring price information from their friends, neighbors and local wholesalers in nearest markets. Only a few percent 6% said they get information from company and through internet. From the collected data, wholesaler was the main source of the price information for farmers. None of the

sample farmers said they got price information from government office, Myanmar Rubber Planters and Producers Association (MRPPA), TV/Radio and other sources in the study area.

Table 4.11 Price Information Sources of Sample Farmers

No.	Sources of Price Information	Frequency	Percentage (%)
1	Friends/neighbors	10	29%
2	Village collector	9	26%
3	Wholesaler	12	34%
4	Company	2	6%
5	News	0	0%
6	Internet	2	6%
Total		35	100%

Source: Survey data 2019

(iii) Technological information and practices of the sample farmers

Processing technology information: The processing technology plays very important role to improve quality of rubber sheets in all rubber producing countries. In Myanmar, Perennial Crops and Farm Department (PCFD) under MOALI and Myanmar Rubber Planters and Producers Association (MRPPA) are the responsible institutions to transfer rubber processing technology to the farmers able to produce high grade rubber sheets. There are some other CSOs and NGOs who are providing trainings and sharing technological information.

As per the survey data, 23% of sample farmers got the information of recommended rubber sheet producing technologies from extension workers, 17 % of farmers received from friends and another 20% of farmers received the technologies from both friends and extension workers. There were 31% of sample farmers who had no sources of information for recommended rubber sheet producing technologies. Only a few 3 % of the farmers said they received the information form the Mon State Agricultural Department and training organized by CSO.

Table 4.12 Information Sources of Sample Farmers for Recommended Rubber Sheet Producing Practices

No.	Sources of Information	Frequency	Percentage (%)
1	Friends/neighbors	6	17%
2	Extension workers	8	23%
3	Both friends and extension workers	7	20%
4	Institutions	1	3%
5	NGOs/ Civil	1	3%
6	Books	0	0%
7	Internet through mobile	1	3%
8	No sources	11	31%
Total		35	100%

Source: Survey data 2019

Rubber sheet processing practices adopted by the farmers in their daily work play crucial role in the production of quality rubber sheets and latex. Cleaning of plantation, spouts and collecting cups before tapping, latex collecting baskets and coagulation pan before use were important to avoid foreign matters content in the production of high-grade rubber sheet.

Table 4.13 Farmers' Adoption of Recommended Rubber Practices

No	Recommended practices	Frequency	Percentage
1	Cleaning of plantation before commencement of tapping	29	83%
2	Cleaning of spouts and collecting cups before tapping	33	94%
3	Cleaning of latex collecting baskets before use	33	94%
4	Cleaning of coagulating pan before use	30	86%
5	Use of a properly constructed bulking and settling tank	12	34%
6	Use of 60 mesh stainless steel sieve for straining	19	54%
7	Use of trained tappers	26	74%
8	Use of anti-coagulant	9	26%
9	Use of formic acid for coagulation	19	54%
10	Use of a night standing filtrate water for dilution of latex	18	51%
11	Final thickness of the ribbed sheet is (1/8)" or 0.3 cm	18	51%

Source: Survey data 2019

Most of the farmers 83% said they cleaned their plantation before commencement of tapping. More than 94 % of farmers were practiced cleaning of spouts and collecting cups, latex collecting baskets and coagulation pan. Use of a properly constructed bulking and settling tank is important to settle sand which contaminated in the latex but only 34% of farmer used it in the study area. 54% of sample farmers used 60 mesh stainless steel sieves for straining. All the farmers said they want to use the trained tappers, but skilled tappers are not available as many as they want and collected data shows 74% used trained tappers. 26% of farmers used ammonia solution as anti-coagula especially in raining day. 51% of farmers produced (1/8)" or 0.3 cm final thickness of the ribbed sheet. More than half of the farmers used one night standing filtrate water and formic acid for coagulation in production processes of ribbed rubber sheet.

4.3.2 Analysis on Qualitative Data

The study gathered qualitative data from key informants in order to examine the current situation of rubber production in Myanmar. The key informants include village collectors, wholesalers, company agents, rubber association members and government officers from MOALI. Information gathered from each stakeholder group is presented separately in the following.

(i) Village Collectors

Village collectors are small scale buyers who collect rubber produces directly from the farmers at their home or plantation or village and sell them at the wholesalers. Purchasing types are varied depend on the relationship with farmers and collector. Most of the farmers and collectors liked the cash down system transaction. Generally, farmers needed money and took in advance which was less than the expected market price at harvesting time. So, some collectors used both cash down and advanced payment in the study area. Sometimes, village collectors bought the rubber on credit from farmers, then payment money would be given on next transaction time, duration was not more than two weeks. All collectors used cash down system in this study area because the farmers desired current price setting and cash down system purchasing.

All the village collectors purchased all type of rubber, not only rubber sheets(smoked, unsmoked and air-dried sheets) but also latex. They also buy cup lump and rubber scraps. Types of selling by primary collectors were observed as commission and profit basis. Commission fee was given by wholesalers or company agents or companies to village collectors in term of purchased rubber volume. Collectors used to buy rubber at the price determined by the owners. Most collectors used the money prepaid to them by the wholesalers. They bought rubber from farmers and sold to wholesaler or other persons for getting the profit. During the survey, all the collectors liked the profits from transaction. Only a few of them used a small share of their own fund to wholesaler' to get extra profit.

The mode of transportation system was motorcycle and tricycle. Most of village collectors sold every day, some sold at every two days and the rest sold at every three days. No village collector was needed to sell with the price less than current price at the selling time because wholesalers didn't want to create profit from them, but they wanted the collectors to work for them.

Major buyers for village collectors were wholesalers and companies in rubber market. Most transaction are made in village. Price information is mainly received from

wholesalers and sometimes from Companies because village collectors worked with wholesalers more than companies. They did not get price information from TV/Radio , extension offices, Myanmar Rubber Planters and Producers Association and others.

(ii) Wholesalers

Wholesalers purchase rubber from farmers/collectors, wash and process the rubber, grading and smoking or re-smoking the rubber sheets that are stored in the warehouse. Then send to the next buyers such as company agents or companies or local users. The business is started more than a decade, during the rubber boom. Most of wholesalers are doing rubber with other business of rice farmers, fertilizer dealers and others.

All wholesalers bought both smoked or un-smoked rubber sheet and air-dried sheets. Main buyers of wholesalers were from companies in Mawlamyaing, and Thahton Districts. They bought, processed and exported rubber. Some wholesalers also sold to local users from Mandalay, Yangon to use in slipper making enterprises. Wholesalers also sold to the other wholesalers in local market. Purchasing and selling types of the wholesalers were not different. All of them used both advanced and cash down purchasing systems. Majority is cash down system but sometimes they had to wait about two to four weeks to get all the money. When selling, they sometimes use banking system for cash disbursement.

The products were transported by truck. Destinations of wholesaling were companies in Mon State, Yangon, Mandalay and Musae. All wholesalers owned smoked houses where they smoked ribbed rubber sheets and store houses to store the products before they sold it. The average marked amount by wholesalers was 544.60 metric tons per year. Most of them said they had their own fund as the capital source to operate marketing activities. Some used a small share of their own fund to fund received from other sources (loan, Companies...)

(iii) Company agents

Not all the companies work their marketing with agents. Agents are responsible for grading and collecting the rubber bought by the Companies. They do market survey, collect price information from other competitive companies in the local as well as other area and then have to share the collected information to the Companies they work for. All agents worked only rubber marketing as their business.

All agents from companies bought mainly Un-Smoked Rubber Sheet (USS) and Air-Dried Rubber Sheet (ADS). Agents said that unlike in the past, other types: latex,

cup lumps and scraps are bought by some companies where these are processed with proper technology and modified into Technically Specified Rubber (TSR) which got high price in the export. Both advanced and cash down purchasing systems were practiced by all agents. The price setting was determined by the current price at the market on the specific time. This current price was set by their company. All the agents not only bought rubber from wholesalers in the Townships of Mon State (including study townships), but also from Townships in Tanintharyi division and Kayin State. Type of selling for all the agents was a commission basis. Major mode of transportation for all the agents was by truck.

Some Companies bought ribbed smoked sheets, unsmoked sheets, cup lumps and scraps. Ribbed smoked sheets and undried sheets, along with selling coagulum and scraps to crumb rubber processors are mainly sold. Companies often had large storage facilities that helped them withstand price fluctuations; at times of high prices they could sell their rubber stocks, and at times of low prices they could buy to refill the stock.

The products were exported to China and the rest sold to both China by border trade and to Malaysia by seas. For domestic market, companies sold to both Yangon and Musae market. All the companies had smoked houses and store houses where they produced ribbed smoked sheets and stored at their store houses before transaction. The average marketable amount by the company was 2,200 metric tons per a year and they had on own capital. Companies got the price information mostly form internet websites (80%) and the price source from both internet websites and their customers.

(iv) Rubber Associate Members

The study approached rubber associate members and explored the information on rubber marketing channels in Mon State and the responds are as follows. A marketing channels consist of the people, organizations, and activities necessary to transfer the goods from the point of production to the point of consumption. Different trade routes are used to export rubber from Mon State. Based on the export market destination, there main trade route has been found in the study area. Route 1: Around 70 _ 80% of the rubber (mainly low quality unsmoked and ribbed smoked sheets) sold in Mon goes to China through Mandalay and the border crossing at Muse. It has the advantage of established value chain and large volumes could be sold while there are little incentives for quality and very price competitive.

Route 2: About 20% of the rubber (mainly high-quality RSS, TSR, crepe rubber) goes to Yangon, where it is either directly exported as RSS or further processed into TSR and then exported by sea to Singapore, Malaysia and other countries. Although there is high quality requirement, higher prices are paid for value added products.

Route 3: The remaining 10% of the rubber (mainly low-quality RSS, scraps, crumbs) goes to Yangon where it is sold as RSS or further processed and used by local industries. There is large domestic market, but the constraints are in the industrial fabric which is small and having limited skill workers.

China purchases almost all types and grades produced by Myanmar. Malaysia purchase inferior grades of rubber to process into value added higher grades and for tyre production. To access other international markets and gain high price, the quality of the rubber must be high. There is needed to produce high quality products in the local and challenges are waiting ahead.

(v) Government Officers

As per interviewed with government officers, the state government is supporting the rubber sector development in the Mon State. Rubber sector development is one of the five pillars set by the state government for the state development. The strategy includes information sharing , showcasing model plantation with advanced technology, demonstration on proper tapping and rubber processing, providing training on processing and post harvesting.

The main challenges found are insufficient human resources and skills resulting a significant limitation in coordinating their service delivery. There's a need to improve the skills level of the staff of these institutions aligning with the need of organizations and the community. In general, country's allocation of public budgets is limited in industrial development and most institutions are considered as financially constrained.

4.4 SWOT Analysis on Identified Challenges

To understand more about the market forces and how those can be exploited to create future opportunities for Natural Rubber market in Myanmar, SWOT analysis is applied. Strength determined what the rubber sector does best. Weaknesses are the facts that are struggle with or lack in the rubber sector and need to overcome them. Opportunities are useful for future growth and success. Threats can hinder the success and need to consider in making informed and strategic decisions.

As per above data analysis and findings, strength, weaknesses, opportunities, and threats of rubber sector is studied, and the following analysis table is some benefits of study.

Table 4.14 SWOT Analysis for the Rubber Production and Export Market in Myanmar

<p>Strength</p> <ul style="list-style-type: none"> ▪ Suitable geographic position, weather and soil for rubber growth ▪ Strategic location for exports ▪ Improved regional integration and connectivity with ASEAN ▪ Having long term strategy and investment plan 	<p>Weakness</p> <ul style="list-style-type: none"> ▪ Low productivity and quality of planting materials and inputs ▪ Poor access of farmers to timely and quality inputs, market information and processing technology ▪ High cost of labour at the time of peak labour demand ▪ Limitation in expertise, capital, infrastructure, industrial partners, interaction between major stakeholders and policymakers ▪ High rate of using informal trade channel ▪ Little preparedness to market competition
<p>Opportunities</p> <ul style="list-style-type: none"> • Political and economic transformation • Growing interest of investors • Arrival of new technologies • Removal of external trade barriers • A developing market such as internet 	<p>Threats</p> <ul style="list-style-type: none"> • More market competitions from neighbors, ASEAN countries • Natural disasters, weather challenges, Climate change • Adverse government policies and economic slowdowns, inflation • Unsustainable use of natural resources

Source: Survey Data, 2019

CHAPTER V

CONCLUSION

Rubber production in Myanmar is the highest in Mon state. Rubber farming is one of the principle sources of agriculture income in Mon. Although there are many opportunities and potential for the development of rubber in Myanmar, a number of technological, trade, resources, information and enabling environmental challenges pervade rubber production in Mon State, Myanmar.

5.1 Findings

There are 494,840 acres of rubber plantation in Mon state and about 66% are trappable area. At the sample townships in Mon state, 69% of total 258,679 acres of rubber plantation are tapping. The rest plots are covered with tress not reaching to productive age and unproductive aged rubber trees. Although there are many large rubber plantations, majority of rubber growers are small and medium holders. According to the survey data in sample Townships, average age of the sample farmers was around 42 years, average experience of working in rubber plantation is around 20 years, most of the farmers have secondary education.

According to survey, it is found that planting materials and low yield plants have been using in many area and adoption of improved planting and harvesting technology is still weak. About half of the sample farmers grew low yielding non-budded rubber plant because of relatively cheap price with available large quantity. The recommended S2 d2 tapping system was not practiced by most of the farmers as they are following traditional way of daily taping assuming that can collect more latex. Half of sample farmers received information to improved planting, harvesting and recommended rubber producing sheets form extension workers, their friends and neighbors. Nearly one third of sample farmers are not receiving information for improved method. Instead of getting the information, many said that they have financial constraint to invest for the inputs such as quality seedlings, fertilizers, pesticides, materials, infrastructure, fuel, labor cost and other services for improved rubber processing process.

It is found that the productivity of rubber is increased because of increased plantation and tapping area, not because of the yield. The increase in yield is little and still far to reach to desired optimal level. Although the yield in Mon state is better than

any other states in Myanmar but current yield is less than those of all major rubber-producing countries. Several types of improved rubber varieties are available in Mon. Some of the wild variety could produce high-quality latex but the yield will be low unless appropriate amounts of fertilizer are used.

In the survey area, the farmers faced high labor cost and limited skill or trained labors for rubber processing. Mon state is very near to Thailand where wages are much higher in (12,000 MMK to 18,000 MMK per day) than in Myanmar (4,500 MMK to 7,500 MMK per day). Many Mon workers are crossing the border in search of better-paid opportunities. At times of peak labor demand, such as harvesting and planting, local wages are rise and the cost of production is high. The labor from neighboring regions (primarily Bago and dry Region) are hired and are needed to train for every step of processing.

In addition to the high costs of labor, the farmers faced low productivity of rubber and low profitability. Yields are low partly because of underperforming varieties, insufficient inputs use and method. Using outdated processing technology led to inferior products and further loss of value-added. Nearly half of the rural population and rubber farm in Mon State has no access to an electricity connection, and outages are frequent in the accessible area. Limited access to energy is one of the contributing factors for high production cost and low quality.

Processes of quality management improvement is found weakly focused in the study area. Quality of rubber is decided by the company agents and wholesalers. There is no proper quality control mechanism. There is poor access to information and education of planters and processors to produce high quality rubber in Myanmar. Government support to Quality control systems and third-party certifications is not well functioning yet. Wholesaler and companies bought all types rubber produced from the farmers. The produces are then refined in their smoked house and grading before selling to their destination markets.

As per the exporting companies, about 70% of rubber sheets from sample farmers are mainly low quality unsmoked and ribbed smoked sheets. Rubber buying system used by all market intermediaries was depended on water content, sheet thickness and the constituent of foreign matter in the sheets by seeing it. There was limited information of price, traded volume, exported quality, transaction cost. The price information was transmitted by companies to wholesalers, village collectors and farmer. It is found that companies had more marketing power.

In the study area, both advance payment and cash down purchasing systems were practicing by most companies. Rubber were exported to China and Malaysia via border trade and normal trade. It is found that nearly 70 % of rubber from the study area were exported to China through informal trade. China purchases almost all types of rubber regardless of grades produced by Myanmar with competitive price that are far less than the regional stock price. In addition, current low price of rubber caused less profit and incomes. Despite increase in the volume exported, revenues generated from exports of natural rubber decreased because of the price depreciation of low-grade rubber in international markets. Having repeated taxation in the formal trade system and getting low profit margin, most of the traders are using existing informal trade channels to the old markets.

International rubber prices have fluctuated significantly over the past decades, there was a sharp increase up until 2011 then decreasing again till 2016. World rubber production and consumption is steadily increase from 2011 to 2018 but the price is fluctuating due to a slowdown in demand in international markets especially China. Rubber prices in Myanmar follow international rubber prices and the demand in China. Production yield and demand of neighboring rubber producing countries, and exchange rate fluctuations also affect Myanmar's rubber price. The sharp drop of rubber prices, a cash crop grown in almost all of Myanmar's regions and states, in the 2013-14 fiscal year, drove almost a million farmers and workers at rubber plantations into financial hardship. Driven by favorable exchange rates and higher demand from China and Malays, a small price increase is found in 2016-2018.

The main issue for Myanmar's rubber in the international market is quality. There is a lack of control and related regulations for the production, processing, trading and export of rubber in accordance to type specification along the whole supply chain. Unskilled workers are not following standard operating procedures for RSS. The technology used in the process of rubber is inadequate. These partly explains the overall poor quality of domestic production.

In this study, it is found that access to information on buyers' requirements is not readily available to the market participants. The absence of trade information prevents exporters from adopting the market requirements. Policies related to rubber sector are present but fragmented in different policies and laws. Many attractive trade routes are open resulting from political and economic transformation. Government is putting effort towards a sustainable development of agricultural industry. National

Export Strategy including rubber sector is developed with a focus on increasing production and value-added of rubber. Many institutions and organizations have their mandate to support rubber sector development. Having other important competitive priorities in the development of the nation during transformation period, the institutions and organizations' capacity, resources and support are still limited. There is little cooperation among different government organizations and private stakeholders.

The main issue for Myanmar's rubber in the international market is quality. Falling prices and rising costs of labor, the profitability of rubber farms is now compromised. Revitalization of the rubber sector is in need of value-chain approach to raise productivity and quality and thereby increase competitiveness, on international markets.

5.2 Suggestions

Many of the challenges faced in rubber sector can be overcome by the use of existing strength with local initiatives and government support. The lack of consistency in quality and reliable certification standards have prevented Myanmar rubber from entering international markets and competing with neighboring and ASEAN countries.

To increase productivity, yield and quality of rubber, education programs, trainings and extension services are necessary to raise awareness of best practices for purchasing planting materials, planting rubber, using fertilizer, tapping, harvesting and processing steps. Smallholders will also need to be trained in field-level processing. Smallholders should be made aware of the different processing inputs available and their uses.

To replace the low yielding rubber plant with high yield one, high initial investment cost for gestation period (about 6-7 years) can be the biggest barrier for rubber farmers. Appropriate replanting program should be implemented through provision of replanting loan with low interest rate to farmers to substitute those low yielding non-budded rubber plants with high yielding budded one. An efficient extension service was needed for rubber farmers. The benefits of intercropping high yielding clone practices in rubber plantation and animal husbandry in rubber plantation is worth to introduce. Farmers are encouraged to adopt these integrated farm-livelihood systems to have alternative livelihood income and sustain environment benefiting soil

conservation, water and air quality improvement, and forest and biodiversity conservation

Farmer groups and concerned stakeholders at the local level need to adopt proper technology, best practices and cooperate to strengthen rubber cultivation, tapping, processing and marketing. Provision of market information is very important for rubber market development. Public price information system is also necessary for further development of the rubber economy. Therefore, policy makers should encourage and support on contribution and elaboration of the NGO organization such as Myanmar Rubber Planters and Producers Association for the building of public price information system in Myanmar. Media such as radio, newsletters and mobile communication should be used for transmission of price and market information.

There should be a laboratory that can test the quality of exported rubber before exporting. A rubber certification system is also necessary. Without a certification system, processors will receive lower prices and will not be able to access important rubber markets. A national standardized grading system was needed. Government and institution support are crucial. Cooperation between the enterprises and the research organizations is needed to raise the level of value-added rubber industry products. Domestic manufacturing industries, rubber wood products factories and automotive sector should be promoted to improve domestic consumption and market competition through value added quality export products.

Continued government support, revision on taxation, enforcement of policy and strategic measures can be taken for the sustainability & improvement of rubber sector to improve market share in the international market.

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APPENDIX

Questionnaire to Rubber Farmers

1	Age	
2	Experience of farming (years)	
3	Education level	<input type="checkbox"/> Illiterate <input type="checkbox"/> Learning in Monastery <input type="checkbox"/> Primary level <input type="checkbox"/> Secondary level <input type="checkbox"/> High school level <input type="checkbox"/> Graduate level <input type="checkbox"/> Post Graduate
4	Family size/members	<input type="checkbox"/> Adult Male <input type="checkbox"/> Adult Female <input type="checkbox"/> Children (<16 years)
5	# of family members who work	
6	# of family members who work in Rubber farming	
7	Rubber land holding size: - (Arce)Arce
8	The average number of mature trees per hectare (or) Rubber Plant /areca?
9	Type of plants (# or %)	<input type="checkbox"/> Budded plant% <input type="checkbox"/> No-budded plant% <input type="checkbox"/> Both%

10	Tapping Methods	<input type="checkbox"/> Downward tapping (DWT) <input type="checkbox"/> Upward tapping (UPT) <input type="checkbox"/> Slaughter tapping (ST) <input type="checkbox"/> Tapping system <input type="checkbox"/> S1 dl (Whole spiral and daily tapping) <input type="checkbox"/> S2 dl (Half spiral and daily tapping) <input type="checkbox"/> S2 d2 (Half spiral and one day alternate tapping) <input type="checkbox"/> S2 dl 4d/5 (Half spiral and four days tap and one day rest tapping) <input type="checkbox"/> S2 dl 6d/7 (Half spiral and six days tap and one day rest tapping)
11	Types of Rubber Selling by Sample Farmers	<input type="checkbox"/> Latex <input type="checkbox"/> Un-Smoked Sheet (Moisture) 15-20% <input type="checkbox"/> Un-Smoked Sheet (Moisture) 7-10% <input type="checkbox"/> Air Dried Sheet (ADS)
12	Time of Selling by Sample Farmers	<input type="checkbox"/> Every day (1-day sun dried rubber sheet) <input type="checkbox"/> Every day (3 days sun dried rubber sheet) <input type="checkbox"/> Every day (Latex) <input type="checkbox"/> At high price (Air Dried Sheets)
13	Main buyers	<input type="checkbox"/> Village collector <input type="checkbox"/> Wholesaler <input type="checkbox"/> Company <input type="checkbox"/> Both Wholesaler and Company

14	Place of Transaction	<input type="checkbox"/> In local village <input type="checkbox"/> At home <input type="checkbox"/> At town <input type="checkbox"/> Both in local village and at town <input type="checkbox"/> others
15	Mode of Transportation	<input type="checkbox"/> By motorcycle <input type="checkbox"/> By bicycle/Trishaw <input type="checkbox"/> By Tricycle <input type="checkbox"/> By Car <input type="checkbox"/> Others
16	Sources of price information received by farmers	<input type="checkbox"/> Friends/neighbors <input type="checkbox"/> Village collector <input type="checkbox"/> Wholesaler <input type="checkbox"/> Company <input type="checkbox"/> News <input type="checkbox"/> Internet <input type="checkbox"/> Others
17	Information Sources of Sample Farmers for Recommended Rubber Sheet Producing Practices	<input type="checkbox"/> Friends/neighbors 19 37.25 <input type="checkbox"/> Extension workers <input type="checkbox"/> Both friends and extension workers <input type="checkbox"/> Institutions <input type="checkbox"/> NGOs/ Civil <input type="checkbox"/> Books <input type="checkbox"/> Internet through mobile <input type="checkbox"/> No sources <input type="checkbox"/> others

18	Farmers' Adoption of Recommended Rubber Practices	<input type="checkbox"/> Cleaning of plantation before commencement of tapping <input type="checkbox"/> Cleaning of spouts and collecting cups before tapping <input type="checkbox"/> Cleaning of latex collecting baskets before use <input type="checkbox"/> Cleaning of coagulating pan before use <input type="checkbox"/> Use of a properly constructed bulking and settling tank <input type="checkbox"/> Use of 60 mesh stainless steel sieve for straining <input type="checkbox"/> Use of trained tappers <input type="checkbox"/> Use of anti-coagulant <input type="checkbox"/> Use of formic acid for coagulation <input type="checkbox"/> Use of a night standing filtrate water for dilution of latex <input type="checkbox"/> Final thickness of the ribbed sheet is (1/8)" or 0.3 cm
19	What are main challenges the farmers faced?	<input type="checkbox"/> Skill & knowledge <input type="checkbox"/> Financial investment <input type="checkbox"/> Land access <input type="checkbox"/> Rubber variety quality <input type="checkbox"/> Pest & disease (specify) <input type="checkbox"/> Marketing products <input type="checkbox"/> Others <input type="checkbox"/> No problem
20	What opportunities do they seen for future rubber market?	

21	what is your expectation?	
22	How is the weather changes and flood affect their farming?	
23	How do they think for planting together other corps with rubber?	

(Latt, 2011)

Questionnaire for KII

1. General information of the respondents?
Name, Age, education level and years of experience in rubber works of the respondent?
2. Could you please tell about your marketing activities?
 - Type of rubber buying :What types of rubber do you buy most?
 - Type of purchasing : What type of purchasing system have you used ? (cash down/ advanced...)
 - Type of price setting: How did you set the price?
 - Type of selling and selling time: When and how did you sell the products?
 - Mode of transport : How do you transport the products and materials?
 - Sources of capital: Have you invest your own fund or cooperate with others?
3. Selling Activities and Sources of Price Information
 - Major buyers : Who are the major buyers of the products?
 - Transaction place : Where and how do you make the transaction
 - Sources of price Information: Where do you get the price and market information?
4. What are main challenges/issues do you faced in this business?
5. What opportunities have you seen for future rubber market?
6. What is your expectation for this business?
7. What advices or suggestions do you want to provide for rubber sector development?