

CHAPTER I

INTRODUCTION

This chapter consists of background of the problem, formulation of the problem, objectives of the research, scopes of the problem, and outline of the report.

1.1 Background

According to the *Badan Pusat Statistik* (2018), rubber plantations in Indonesia based on their operations are divided into Massive Plantation (MP) and Smallholder Plantation (SP). Massive Plantation consist of State Massive Plantation (SMP), and Private Massive Plantation (PMP). The statistics show in 2018, Indonesia has 189.58 thousand hectares of State Massive Plantation (SMP) and 246.05 thousand hectares of Private Massive Plantation (PMP), while the total area Smallholder Plantation of rubber is 3113.42 thousand hectares. The development of rubber plantation area according to *Badan Pusat Statistik* (2018) can be seen in **Figure 1.1**.

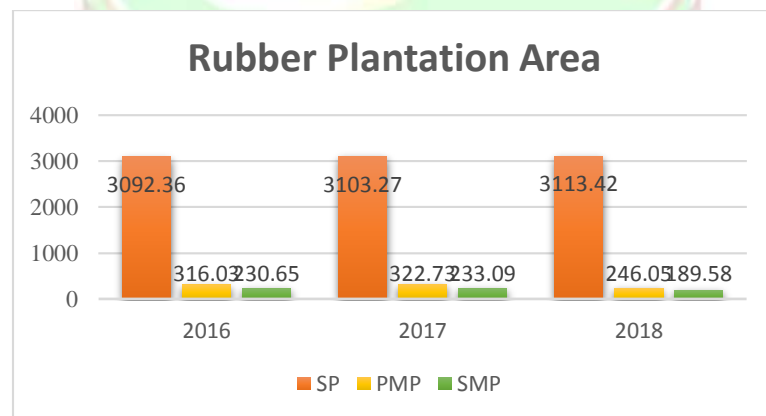


Figure 1.1 Rubber Plantation Area from 2016-2018 (*Badan Pusat Statistik*.2018)

The amount of rubber plantations area in Indonesia have an effect on the quantity produced of natural rubber. Basically, most of Indonesia's natural rubber is exported overseas and the rest is marketed domestically. In 2018 the highest five

destination countries of Indonesia's natural rubber exports are United States, Japan, China, India and Korea (*Badan Pusat Statistik*, 2018). Total of Indonesia's natural rubber exports for the past eleven years have fluctuated, which can be seen in **Figure 1.2**.

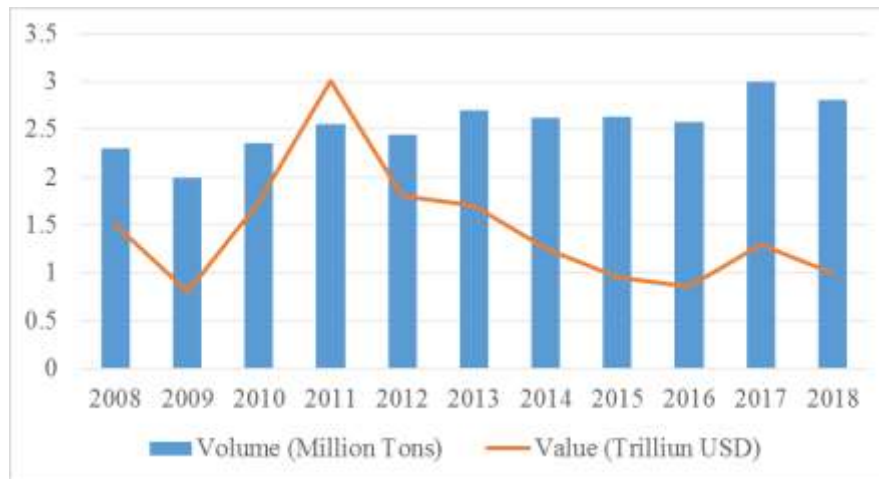


Figure 1.2 Quantity and Value of Natural Rubber Exports in 2008-2018 (*Badan Pusat Statistik*, 2018)

When compared to other natural rubber producing countries such as Thailand and Malaysia, the variety of rubber products produced and exported by Indonesia is still of limited type and generally dominated by primary products (raw materials) and semi-finished products. Thus, the export value that can be achieved is lower than the other countries that have produced and complete a variety of processed rubber products. Therefore, there is a need to optimizing the level of production.

Optimizing the production level of a product is highly important for companies using production planning. Production planning is carried out to utilize the limited production resources effectively and efficiently, especially to fulfill customer demand and generate profits for the company. In production planning, inventory needs to be highly considered. Inventory is a material provided at idle or waiting for the future sales. Inventory is one of the most expensive assets in the company which reflects 40% of the invested capital (Tersine, 1994). Companies can reduce inventory costs by reducing the level of inventory they have (on hand inventory), but this can cause

customer dissatisfaction if the product ordered is not available (stock out). Therefore, a company must be able to balance the inventory investment with the level of customer service (Render et al, 2001). Inventory is one of the most risky decisions in logistics management. Without proper handling of inventory, it will caused serious marketing problems in increasing income and maintaining customers (Waters-Fuller, 1995). Raw material inventory planning can also be decisive for manufacturing operations. Incorrect inventory planning can disrupt the production activities. Lack of raw materials can stop production or change production schedules, which in turn will increase costs and cause shortages of finished products (Render *et al.*, 2001).

The raw material itself is a production resource that supports the continuity of the factory production process. The amount of raw materials that exceeds daily needs, can result in a buildup of raw materials in the storage (Ikhsan, 2017). This accumulation of raw material costs will result in an increase in inventory costs. However, if the amount of raw material less than the daily production needs, it will have difficulty to fulfill the production targets that has been planned. Shortage or excess inventory is a factor that can trigger the increased costs.

PT. P&P Lembah Karet is one of the rubber production companies in West Sumatra and is a supplier of SIR 20 Crumb Rubber. The product of this company are sent for export to several destination countries such as US, Canada and China. The product of PT. P&P Lembah Karet are used as a raw material for well-known tire companies such as Cooper, Continental, Goodyear, Dunlop, Bridgestone, GT-Radial, SMPT, R1 AMERICAS, RCMA, PT BSIN, and S.R.I. Based on production data in 2007-2011 PT. P&P Lembah Karet is able to produce SIR 20 Crumb Rubber of 140,988 tons, while the export needs are 141,077 tons. This shows that PT. P&P Lembah Karet is unable to fulfill all the export demand.

Recently, PT P&P Lembah Karet has implemented a Make to Stock production system. SIR-20 crumb rubber production planning is carried out by considering the

amount of raw material inventory in the form of natural rubber available in the warehouse as well as the customer needs. Based on the results of interviews with Mr. Robby as Quality Assurance Manager, PT. P&P Lembah Karet still experiences problems in production planning of SIR-20 crumb rubber and controlling the raw material supply. Problems with production planning and raw material inventory control are found in the SIR-20 crumb rubber production planning which is not suitable with the realization of production and handling raw material supplies in the storage. Problem of raw material inventory arises due to the absence of determining the size of the shipping lot from suppliers to companies. Suppliers routinely ship when the stock is sufficient to produce.

Based on the data from Production and Quality Control Section of PT. P&P Lembah Karet, there is a mismatch between the demand and the realization of production during the January-December 2019. This difference would certainly affect the production costs. **Figure 1.3** shows production quantity of SIR-20 Crumb Rubber from January to December 2019

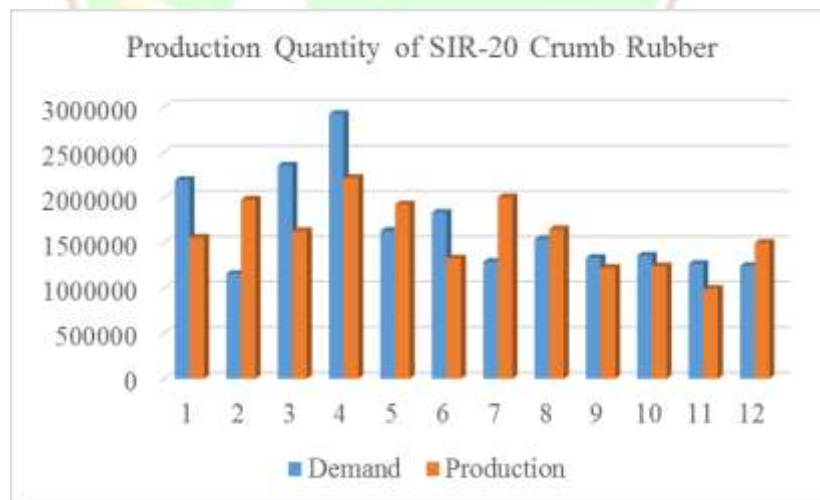


Figure 1.3 Production Quantity of SIR-20 Crumb Rubber

Figure 1.3 shows the difference between demands from customer and production realization during 2019. It can be concluded that PT. P&P Lembah Karet cannot fulfill the demand for several months. The difference of demand for SIR-20 crumb rubber

and the realization of rubber production according to Mr. Robby (Quality Assurance Manager) can be caused by several factors, including demand from customer that tends to fluctuate and the uncertainty of raw materials. The uncertainty of raw materials can be seen in the **Figure 1.4**.

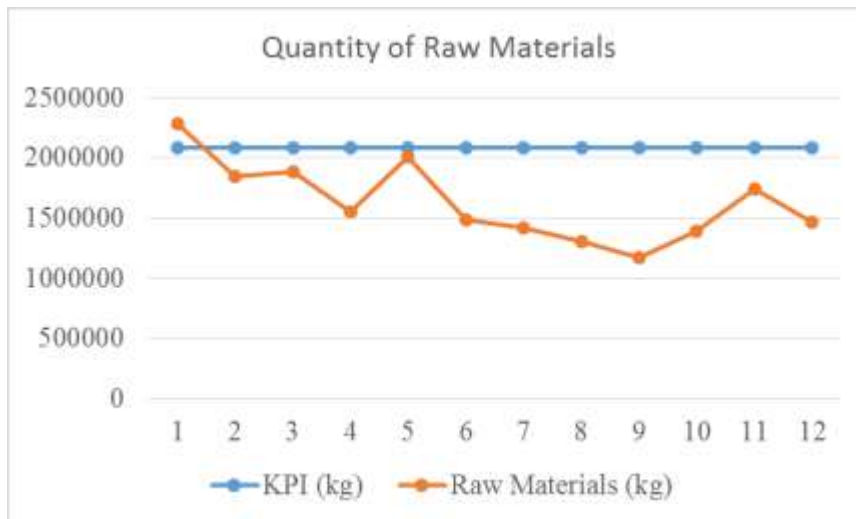


Figure 1.4 Quantity of Raw Materials in PT. P&P Lembah Karet

Based on the data from Production and Quality Control Section of PT. P&P Lembah Karet in 2019, there is a difference between the average value of the KPI (Key Performance Indicator) of inventory and the average actual inventory value of gross raw material stock in the storage. KPI (Key Performance Indicator) is a target of the average inventory of raw materials that must be available in the storage for each month. Basically, the KPI (Key Performance Indicator) value is set by the company with the value of 2,083,333 kg for each month. The KPI value is determined based on the historical data of average raw material requirements from the previous five years. Standard raw inventories that unfulfilled the KPI value will affect to the company's production planning.

In order to fulfill the availability of natural rubber raw materials, PT. P&P Lembah Karet has several suppliers located around West Sumatra Province. Currently, the suppliers distribute the natural rubber to companies with different quantities based on company needs and taking into account the supplier's capacity. The company has a

problem to determine the optimal order quantity of raw material from each supplier, therefore the company faces obstacles in controlling the availability of raw materials in the warehouse. Thus, it is needed to determine the inventory planning of raw materials in order to minimize the risk of stock out.

1.2 Problem Formulation

The formulation of the problem in this research are:

1. How to determine production planning of SIR-20 Crumb Rubber in PT.P&P Lembah Karet?
2. How to determine the optimum level of raw material inventory of SIR 20 Crumb Rubber in PT. P&P Lembah Karet?
3. How to determine the lot size for shipping raw material of SIR-20 Crumb Rubber in PT. P&P Lembah Karet?

1.3 Research Objectives

The objectives of this research are to:

1. Determine the production planning of SIR-20 Crumb Rubber in PT.P&P Lembah Karet.
2. Determine the optimum level of raw material inventory of SIR 20 Crumb Rubber in PT. P&P Lembah Karet.
3. Determine the lot size for shipping raw material of SIR-20 Crumb Rubber in PT. P&P Lembah Karet.

1.4 Research Scopes

The scopes and assumptions of the so that research in this final project are as follows:

1. The price of raw material is constant toward the quantity of raw material ordered
2. The order cost is constant for each order and the inventory cost is proportional to the price of the item and the storage time.
3. Raw material of SIR-20 Crumb Rubber is obtained from many suppliers.

1.5 Outline of Report

The outline of this Final Project report is as follows:

CHAPTER I INTRODUCTION

This chapter contains background of research, problem formulation, research objectives, research scopes and assumptions, and outline of report.

CHAPTER II LITERATURE REVIEW

This chapter contains several references and theoretical basic that support the processing of data from the research conducted and solving the problems to be discussed. The literature review consist of production planning and control, inventory system, and integrated model of production-distribution between buyer and supplier.

CHAPTER III RESEARCH METHODOLOGY

This chapter contains the steps that must be done to solve the problem, which includes the stages in conducting research, from preliminary studies, literature studies, formulation of problems, data collection, data processing, analysis and conclusions.

CHAPTER IV DATA COLLECTION AND PROCESSING

This chapter describes the data collection and processing in the research, the data collected is then processed to determine the inventory policy for raw material of SIR-20 Crumb Rubber in PT. P&P Lembah Karet.

CHAPTER V DISCUSSIONS

This chapter describes the analysis of the results from data processing. It consists of analysis of SIR-20 Crumb Rubber production forecasting, analysis of production strategy result, and the analysis of inventory control method.

CHAPTER VI CONCLUSIONS

This chapter consists of conclusions based on the results of the research as well as the suggestion for the future research.

