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A Study on the Crop evacuation process of Oil Palm Fresh Fruit bunch (FFB)

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ABSTRACT

Palm oil industry remains as one of the major contributors to the Malaysia GDP. This industry supplies more than 17 million tons of worldwide requirement. The increasing demand of palm oil every year has created tremendous pressure for the palm oil supplier to ensure a sustainable supply of this commodity for market consumption. One of the critical areas for sustainable operation in this industry is to ensure no interruption at the upstream process of evacuation of the oil palm Fresh Fruit Bunch (FFB). The efficiency in the FFB evacuation process will ensure continuous and sustainable operation at the processing center. The study has adopted a quantitative research method using a mass survey to extract the information. Seventy-four (74) respondent which is a manager from thirteen (13) plantation estate has contributed to the survey. The result suggests six (6) values that critically influence the efficiency of FFB evacuation process identified based on priority as driver skills, terrain, insufficient labor, wheelbarrow, not regular maintenance the road, and harvest technique. The findings in this study serves as a reference for future research in order to improve and enhanced the efficiency of evacuation process of FFB. It helps to provide a knowledge to the palm oil producer to tackle the main issue related to the efficiency of FFB evacuation process in Malaysia.

Key words: Supply Chain Management, Logistics management, Network supply, Palm oil Industry.

1. INTRODUCTION

The palm oil industry is the fourth highest contributor to the Malaysian gross income which contributes RM 52.7 billion in 2014 [1]. Approximately 80 percent of palm oil products have been used for human consumption and it has become an utmost source of edible oil [2]. Good acceptance on the palm oil is reflecting the advantageous of the palm oil compares to other vegetable oil. High requirement of the market on this commodity requires serious commitment from all the stakeholder in the business process to ensure the sustainable supply of which is the subject interest in this study.

2. BACKGROUND OF RESEARCH

This study is conducted to investigate the efficiency of the crop evacuation process of oil palm Fresh Fruit Bunch (FFB) from the plantation to the mill at Thirteen (13) oil palm estate located in Johor. Most of these palm estate is planted with more than 50 acres of the Palm oil tree which is suitable for the investigation to identify the problem faced by the palm oil producer on the subject research.

3. PROBLEM STATEMENT

The expensive price of other vegetable oil, especially from another country such as canola oil, corn oil, soy oil, olive oil, and sunflower oil makes the demand for palm oil is increasing every year and created tremendous pressure for a large producer of palm oil such as Malaysia to ensure the sustainable supply. Despite a proven capability to supply and producing high quality of oil palm product for the international market. Most of the Palm oil producer in Malaysia is struggling in maintaining the upstream quality process of FFB which can influence the quality of downstream oil palm products. The efficiency of the FFB evacuation process will be the focal point in this study to understand the influence factor contribute to the process.

4. EVACUATION PROCESS OF OIL PALM FRESH FRUIT BUNCH (FFB)

As a second largest producer of oil palm, Malaysia needs to keep increasing the output of oil palm and this causes a high pressure for all the stakeholder are involved in this industry, especially producer from the start of the plantation until delivery of FFB to the mill which is the scope of this study. To maintain the quality standard, require by the international market, the palm oil producer is to ensure the oil palm Fresh Fruit Bunch (FFB) is evacuated from the plantation to the mill within 24 hours after harvesting to ensure no deterioration in the quality of the Crude Palm Oil (CPO). This evacuation process for FFB requires commitment and proper coordination and planning among the stakeholder. Figure 1 shows a Supply network of oil palm process in Malaysia.

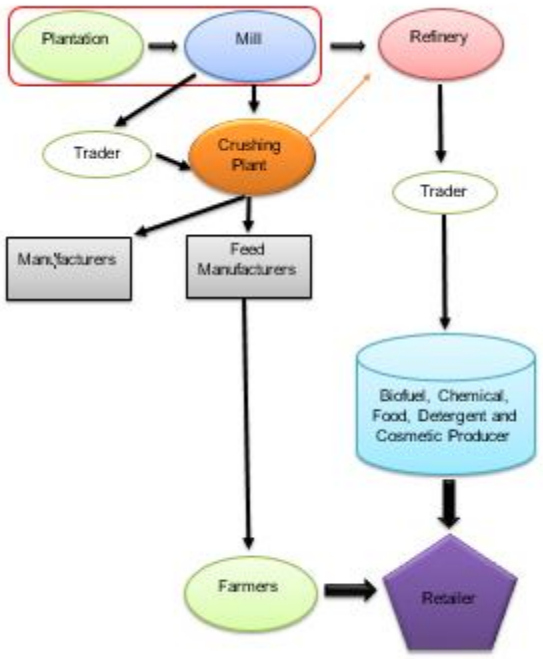

Figure 1: Supply Network Map for Malaysia Oil Palm Industry

5. FACTOR INFLUENCING THE SUPPLY NETWORK

In the plantation industry, logistics operation is among the important activities to make sure the smooth operation of evacuation process of FFB. However, previous studies on palm oil supply network revealed other factors that equally important discussed in the following subheading.

5.1 Technical

Technical aspect in the oil palm industry can cause one of the factors delayed in the evacuation of oil palm Fresh Fruit Bunch (FFB). It looked at the field mobility and accessibility suitability of the machines for the field condition. According to [3] a wheeled tractor has little ground contact which somewhat restricts its traction and could lead severe rutting of the mechanical parts, especially in the coastal estates which subsequently will affect the machine productivity. A proper selection of tires and traction aids will improve the tractors, field mobility and minimize the creation of ruts. The issue from this will affect the delays in the evacuation of oil palm Fresh Fruit Bunch (FFB) to the mill because of the movement of goods is not smooth. Wheel tractors with four-wheel drive are widely used in oil palm plantation for infield oil palm Fresh Fruit Bunch (FFB) evacuation because it will result in maximum traction efficiency and of lower rolling resistance. But the using of wrong technical aspect will reduce speed, bad mobility and increase the operation cost especially the usage of tractor fuel. One of the successful technical aspects is using the right tractor wheel in the right surface with the right air pressure and the right type of tires. The right tires and wheel will improve field mobility in wet seasons. [3] points out the cage wheel were most effective in improving machine productivity during crop evacuation operation, the productivity increase by 35 percent due to better traction.

5.2 Technology

The introduction of modern technology in a plantation will increase productivity and reduce the cost. It will reduce labour usage, which is the normal method for harvesting and evacuate the oil palm Fresh Fruit Bunch (FFB). The plantation is the most usage of labor compared with other industries. [4] stated that new technology machines reduce the time for harvesting, Fresh Fruit Bunch (FFB) evacuation, loose fruit collection and Fresh Fruit Bunch (FFB) evacuation to the mill. This will result in reducing the cost of production. So using the technology will speed up field operations to sustain the quality of oil palm Fresh Fruit Bunch (FFB). Using the right machine will reduce the operation time because it can increase the productivity of operation and reduce the time of the delayed Fresh Fruit Bunch (FFB) to deliver at the mill. Example the use of Mini Tractor Grabber (MTG) that requires only one operator to operate the tractor, load oil palm Fresh Fruit Bunch (FFB) into the trailer and dump it into the bin. This system can evacuate 18 to 24 tons of oil palm Fresh Fruit Bunch (FFB) daily as compared to a wheelbarrow that only capable to evacuate 1.8 to 2.5 tons of oil palm Fresh Fruit Bunch (FFB) a day. This equipment as suggested by [5] can reduce the lots of labour and production cost as well as speed up the crop evacuation process from plantation to mill with tremendously.

5.3 Geography Factors and Weather

Malaysia has a wide range of terrain has resulted in various economic activities can be carried out. Oil palm plantation is very closely related to the type of soil and the surface of the terrain to determine success and crop yields. In Malaysia, palm oil is very suitable planted on hilly land and undulating land because it is the great placed for oil palm to grow [6]. Based on [7], the right design of the terrace is critical to ensure high productivity of the Fresh Fruit Bunch (FFB) and speed up the evacuation process of oil palm Fresh Fruit Bunch (FFB) to the mill from the plantation.

5.4 Infrastructure

The establishing of a proper route to transport the FFB to processing center is crucial to ensure a good quality of CPO. According to [6], a good design of terrain to the evacuation of FFB has required a convex road surface with clean side drain and if it has a puddle on the road, it must be repaired immediately. This will make sure the smooth flow of water during rain and not disturb the movement of vehicles cause of stagnant water in the puddle which will slow down its. In addition, oil palm tree fronds near the road also should be

pruned often to make sure the surface of the road is exposed to sunlight and increase the drying process water after rain. The disadvantage of the wetting road will lead to a slippery condition that will increase the risk of an accident. [8] points out a great infrastructure of main roads will provide efficient crop evacuation and agricultural processes. It needs regular maintenance by keeping infrastructure well maintained to ensure the evacuation operation run smoothly.

5.5 Abbreviations and Acronyms

[9] concludes plantation owner should ensure their production activities are efficiently managed so palm oil products such as Fresh Fruit Bunches (FFB), Crude Palm Oil (CPO) and Processed Palm Oil (PPO) can be reliably supplied to other palm oil supply chain players and so that the customers demand for a good quality and an attractive price for palm oil products can be met. Most of the plantation owner was comfortable with conventional ways of managing their logistics activities and deny to improving the efficiency of logistics activities. This will cause problems in the future to fulfill the increasing demand for oil palm based product because nowadays everything is moving faster. Without using proper management methods for planning the logistics operation will cause lots of disadvantages to the plantation owner especially increased the delay time for Fresh Fruit Bunch (FFB) from plantation to mill.

[10] says that if right management is applying and well executed that recommended the appropriate mechanism will increase the productivity of Fresh Fruit Bunches (FFB), the efficiency of evacuation and revenue. When the organization is managing the plantation especially for the large plantation, it needs proper planning before start operation to avoid delayed by delivery the oil palm Fresh Fruit Bunch (FFB) from plantation to mill. If delay the delivery of Fresh Fruit Bunch (FFB) it will cause loss of lots of revenue. This happens because, after harvesting process finish, oil palm Fresh Fruit Bunch (FFB) need to be processed at the mill as soon as possible before 24 hours [11]. After that, the quality of Fresh Fruit Bunch (FFB) will decrease as a 'B crop' grid and if more than 48 hours it will be changed to the 'C crop' grade. If the quality of Fresh Fruit Bunch (FFB) was sent to factory quality is low, then the quality of the oil produced from it are also low. The oil must be high quality to be easily sold at world market because Malaysia is the world largest exporters of palm oil and it is the main source of income for primary sectors of the national economy. The successful implementation right management of the evacuation operation in plantation has depended on the commitment from the all level staff in the organization and the ability of top management to track where problems might occur, not when there have occurred [12].

A conceptual framework was developed in guiding the research shown in Figure 2.

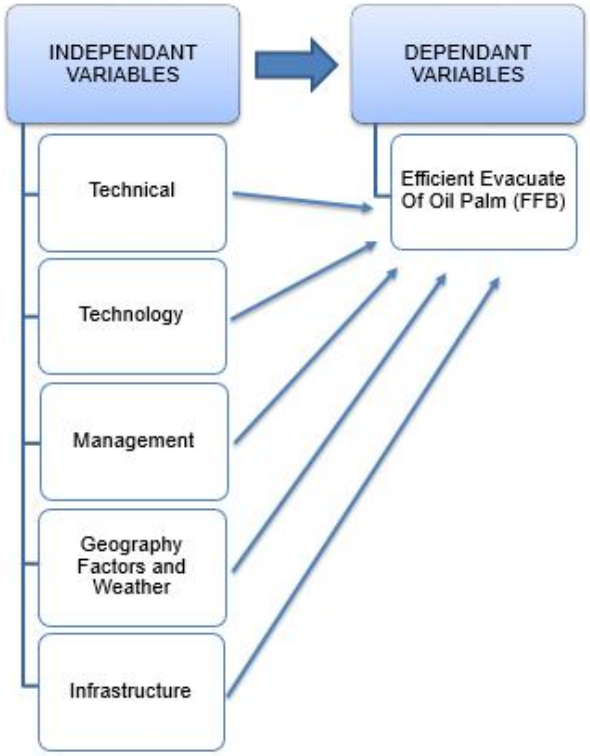

Figure 2: Conceptual framework on the efficient Network Supply for Palm Oil.

6. RESEARCH METHODOLOGY

In this study, a quantitative method was adopted to expand knowledge with the added benefits of a broader study to reveal more general findings. Seventy-Four (74) managers from thirteen (13) palm oil estate participate in this study. A Four (4) point Likert scale was used to measure the respondent towards the variable developed from the previous study. Descriptive analyses were used to interpret the result as a generalization of the total population finding shows in Table 1.

7. RESULT AND DISCUSSIONS

This section discusses descriptive statistics of the data focusing on technical, technology, geography and weather, infrastructure, and management as shown in Table 1.

The finding confirms the previous study on the influence of technical, technology, Geography & Weather, Infrastructure, and management to the efficiency of FFB evacuation process. Based on the mean value, the study suggests six (6) values that critically influence the efficiency of palm Oil network supply identified based on priority as driver skills, terrain, insufficient labor, wheelbarrow, not regular maintenance the road, and harvest technique.

Table 1: Descriptive Analysis

Factors		Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Std. Dev
Technical	Inappropriate Harvesting Equipment	4	7	24	39	3.320	3.320
		5%	9%	32%	53%		
	Worker Don't Know to Use Harvesting Equipment	6	14	23	31	3.060	3.060
		8%	19%	31%	42%		
	Wrong Harvesting Technique	3	7	20	24	3.410	3.410
		6%	13%	37%	44%		
	The Worst Condition Road Field Surface	4	4	29	37	3.330	3.330
		5%	5%	39%	50%		
	Driver Skills Are Important	2	5	17	50	3.550	3.550
		3%	7%	23%	68%		
Technology	Limited Technology Usage Decreases the Productivity	5	8	20	41	3.040	3.040
		7%	11%	27%	55%		
	The Minimise Usage of Mechanical Method	4	5	34	31	3.240	3.240
		5%	7%	46%	42%		
	Manual Method is Outdated	3	8	37	26	3.160	3.160
		4%	11%	50%	35%		
	The New Technology Machine is Difficult to Used	12	19	33	10	2.550	2.550
		16%	26%	45%	14%		
	Wheelbarrow is Ineffective	2	5	26	41	3.430	3.430
		3%	7%	35%	55%		
Geography & Wheather	Type of Soil	3	9	27	35	3.270	3.270
		4%	12%	36%	47%		
	Terrain Determines the Phase of Difficulty	2	3	24	25	3.510	3.510
		4%	6%	44%	46%		
	Weather Condition	2	2	38	32	3.350	3.350
		3%	3%	51%	43%		
	Monsoon Season	2	6	36	30	3.270	3.270
		3%	8%	49%	41%		
	Plantation Acreage	5	18	28	23	2.930	2.930
		7%	24%	38%	31%		
Infrasturacture	Worst Facilities Decrease the Efficiency	1	6	35	32	3.320	3.320
		1%	8%	47%	43%		
	Incomplete Plantation Infrastructure	2	5	34	33	3.320	3.320
		3%	7%	46%	45%		
	Not Strategic Route	3	4	35	32	3.290	3.290
		4%	5%	47%	43%		
	Not Regular Maintenance the Road Surface and Drain	2	5	26	41	3.430	3.430
		3%	7%	35%	55%		
	The Current Infrastructure	3	12	39	20	3.020	3.020
		4%	16%	53%	27%		
Management	Unfollow Schedule Plan	2	5	34	33	3.320	3.320
		3%	7%	46%	45%		
	Implement of Transport Planning	1	6	34	33	3.330	3.330
		1%	8%	46%	45%		
	Insufficient of Labour	2	2	29	41	3.470	3.470
		3%	3%	39%	55%		
	Unclear Instruction	3	7	36	28	3.200	3.200
		4%	9%	49%	38%		
	Current Planning	6	6	37	25	3.090	3.090
		8%	8%	50%	34%		

8. CONCLUSION

This study serves as a reference for future research in order to improve and enhanced the efficiency of evacuation process of FFB. It help to provide a knowledge to the palm oil producer to tackle the main issue in the subject research.

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