

THE BENEFITS OF USING SUGARCANE LOADER FOR THE CUTTING-LOADING-TRANSPORTING MANAGEMENT AT SUGAR CANE FACTORY DJATIROTO, LUMAJANG

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ABSTRACT

This study aimed at investigating economic benefits, technical benefits, community empowerment benefits of sugarcane loaders towards cutting-loading-transporting management at the sugar factory (PG) Djatiroto, Lumajang. This study also examined the effectiveness of a manual cutting-loading-transporting method by using sugarcane loader at PG Djatiroto, Lumajang. Using a qualitative descriptive method, this study employed a purposive sampling technique. Interviews, observations, and documentation were among data collection techniques used in this present study. The selection of the key informants was determined on the basis of the expertise. Six people such as a general manager, a garden manager, a mechanization service provider, a farmer assistant, a farmer, and an operator sugarcane loader became the key informants of the study. This study had the following research steps: to process and prepare data for further analysis, read the entire data, analyze data in more detail by providing codes, apply a coding process, show how to present descriptions and themes in narrative or qualitative reports, and interpret interpret data. The results of this study indicated the economic benefits of the use of sugarcane loader were hardly found because the system was not running optimally. The technical benefits of using sugarcane loader were feasible in the sense that the capacity of sugarcane loader has exceeded that of the manual. The benefits of community empowerment were not fully perceived as cutting employees for there was still resistance among female and male employees.

Keywords: *Sugarcane Loader, Cutting-Loading-Transporting Management, Sugar Cane Factory*

INTRODUCTION

Agriculture plays an important role in Indonesia's economic development. The majority of the people work in this sector. Agriculture in the broadest sense encompasses all activities utilizing animate objects such as plants, animals, and microbes for the benefits of people. An agricultural enterprise involves multiple sectors or subjects altogether for the sake of efficiency and profits. All agricultural enterprises are essentially economic activities requiring the same basic knowledge of the management of a business place, selection of seeds, methods of cultivation, product collection, product distribution, product processing and packaging, and marketing (Mareta, *et al.*, 2011). One of the growing sectors is plantation. Soetrisno (2006) explains

plantations are widely available in the country. Plantations in Indonesia become one of the potential agricultural sectors that can improve Indonesia's economy.

The demands for sugar in Indonesia will continue increasing as the population and income increase. The International Sugar Organization states sugar consumption is growing to 4% annually in order to meet the needs of 240 million people nationwide. Data in 2012 showed the total requirement of sugar consumption was 2.5 million tons per year (Kurniasari, 2015). Sugar cane is a strategic commodity because it serves primary raw materials for sugar manufactures. In 2014, 97 sugarcane industry companies were established in Indonesia. PTPN XI is one of the major state-owned companies that have a core business in the field of sugar. This company is the only state-owned company (SOE) that has a single commodity business, namely, sugar whose contribution is about 16-18% of the whole national production.

The cutting-loading-transporting activity is one of the most important tasks in plantation. The accuracy and precision in planning and implementation affect a series of harvest cultivation and process in order to obtain maximum results. The cutting-loading-transporting should be done properly during the harvest so that high qualities of sugar and supplies for sugar cane raw materials can be sustainably obtained to accommodate the interests of *Tebu Sendiri* (TS) and *Tebu Rakyat* (TR). Harvesting of sugar cane can be done in two ways: manual and mechanical harvesting. The load carriers are also divided into two types: manual and mechanical loading tools. Mechanical loading transporting equipment are using sugarcane loaders.

LITERATURE REVIEW

Botanical and Sugar Cane Cultivation (*Saccharum officinarum* Linn)

According to Leovici (2012), sugar cane was a plant originating from India. A lot of literatures mention sugarcane came from Polynesia. According to Nikolai Ivanovich Vavilov, a Soviet botanist who had made expeditions in 1887-1942 to several regions of Asia, Europe, Africa, South America, and the entire Soviet Union, ensured the origin of this plant were from India and Indo Malaya.

Sugarcane plants have similar morphology with from grass families. This plant is 2-5 meters tall. Sugarcane is a family of grasses (graminae). The roots of sugarcane include a fiber root with one meter long. The main function of the root is to absorb water and minerals from the soil through the surface of the root feather that has a very strong water or nutrient absorption. The ability of form seedlings and numbers of stems are the characteristics of each variety. Numerous saplings that reflect the number of stems per hectare of land are influenced by sunlight, temperature, nutrition, humidity, and spacing.

Among these factors, irradiation becomes the most reliable factors causing the multiplication of tillers. Sugarcane plant (*Saccharum officinarum*) has benefits as raw material of sugar and vetsin. The age of sugar cane plants can reach 1 year. Cane plant can be used for refined sugar products, food or drink sweetening. Cane bagasse can be used for animal feed and composts and green manure. Dry cane leaves have high calories and can be used as fuel for cooking. They are cheaper than kerosene or gas. In the sugar factory, dried cane leaves can be used for production processes and power plants (Fitriani, 2013). Role of Management and Management Functions

"Management is the attainment of organizational goals in an effective and efficient way through planning organizing leading and controlling organizational resources" (Daft, 2003). Management concerns the achievement of goals effectively and efficiently through planning, organizing, directing and controlling. Planning has a sense of determining goals for future organizational performance as well as deciding the tasks and resources necessary to achieve those goals. Lack of poor planning or planning can destroy organizational performance. In its own agribusiness, planning consists of product planning, business location planning. Product planning includes the selection of product types and numbers of products to produce. Business

location planning is the selection of business location that can give benefits to business in the future. Environmental conditions, sources of materials, and markets are factors to consider in selecting locations (Team of writers PS, 2008).

Cutting-Loading-Transporting Management (TMA)

A cutting-loading-transporting activity is one of the most important tasks in sugar mills. This activity prioritizes the accuracy in planning and carrying out a series of harvest cultivation and process to obtain maximum results of raw materials for sugar. The duties and responsibilities of cutting-loading and transporting are to harvest to obtain the highest quality of sugar and provide the demands for raw materials to mill according to the capacity of the factory continuously and accommodate the interest of *Tebu Sendiri* (TS) and *Tebu Rakyat* (TR).

Cutting-loading-transporting management consists of four functions: planning, organizing, implementing, and supervising. Planning is a formulation of the issues of what and how a work will be carried out, including preparation for administrative measures. Organizing is an action that focuses on job distributions, including their types and functions that skillful people do. Organizing divides large activities into smaller ones. The implementation is divided into three parts: leadership, direction, and coordination (Sulaiman, 2015). The sugar cutting-loading-transporting system includes cutting, loading, transporting, and discipline queuing. Many factors influence cutting-loading-transporting system in a sugar factory. Commonly used systems are manual, mechanical and/or semi-mechanical systems. Particularly selected cutting-loading-transporting system will affect the productivity and overall rates of plant efficiency. The yield of produced sugar may increase. The analysis of cutting-loading-transporting system is done by observing the process in sugar factory. Observations are made by following the process flow: from cutting, loading sugar cane to conveyance, transporting sugarcane from the garden to the factory, and conducting queuing system in the cane yard.

Sugarcane Loader

Harvesting sugar cane can be done in several ways: (1) green cane harvesting (green cane), and (2) harvesting of burnt cane. Based on the main source of energy used, harvesting of sugar cane can be done in two ways: (1) harvesting of sugarcane manually, and (2) mechanical harvesting of sugar cane. Harvesting of green cane is directly done without any other treatment before it is harvested. Harvesting of burned sugar cane is done after sugar cane plant is burned to clean the sugarcane leaf waste. Manual harvesting is done in two ways: loose cane, and cane bundle.

The yields using a loose cane method are in the form of loose sugarcane and loaded into vehicles via sugarcane loader. The harvest using a bundle cane-shaped method is in the form of bound formed cane and loaded into the vehicles using human power. Mechanical harvesting method is a way of harvesting using machine. These tools are more effective and efficient than the manual. A lot of tools belong to mechanical method, one of which is a sugarcane loader. A sugarcane loader is a mechanization tool for lifting and collecting pieces of sugarcane that have been harvested. This tool is considered more effective because it saves the harvest time. Sugarcane loader HY9600 is used in this research. The sugarcane loader of this type weighs 9,600 kg, and the weight of the sugar cane reaches 1,200 kg, making it easier for the farmer to load sugarcane after being harvested.

RESEARCH METHODS

This research used a descriptive qualitative method with in depth interview serving as data collection method. The primary data were directly obtained from key informants. This research was conducted at PG Djatiroto, Lumajang. The choice of this location was due to the

fact that PG Djatiroto, Lumajang was known as a high productivity sugar cane factory. PG Djatiroto, Lumajang has used sugarcane loaders for a quite long time. The area of PG Djatiroto covers the land of 5,450,414 Ha. PG Djatiroto becomes a sugar cane production center for Lumajang and surrounding areas.

The samples were purposively selected. The research time was carried out in May 2016. Data were in the form of numbers, information or anything trustworthy which later would be used for drawing conclusions (Siregar, 2014: 37). Data were classified into primary and secondary data. Primary data were directly collected from the main source of research. While secondary data consisted of published data and those belonging to the main source. There were two research data: qualitative and quantitative. Qualitative data are data in the form of opinions or statements in the form of words or sentences. Quantitative data were in the form of numbers that would be processed using statistical analysis. Interviews, observations and documentation were data collection (using tape recorders) techniques of this present study. The key informants as the source of data especially the employees of PG Djatiroto were selected on the basis of their expertise: experience, abilities to master agricultural tools including sugarcane loader and mastery of understanding of freight cutting methods. The samples for this study involved 4 people who were considered capable of understanding the whole process of a sugar cane harvesting technique.

RESULTS AND DISCUSSIONS

There were two types of cutting patterns in PG Djatiroto that is, TAS and TAPG. TAS was a self-cutting-transporting method commonly done by farmers. TAPG is a factory-cutting-transporting method sugar factory haulage. Both methods were equally employed, 50% and 50%, to meet the demands for raw materials to mill at PG Djatiroto. In TAPG, the factory took the whole responsibilities from the harvest sites to milling spots at factory. The authority varied from seeking manpower to cut the sugar cane plants from finding vehicles to load and transport the harvests. These findings were similar to the study by Bantacut (2012): to meet the demands for milling capacity not only using TS but also using TR. The cutting-loading-transporting methods were the combination of TAS and TAPG. The TAS system was with a written agreement between farmers and PG management in accordance with milling seasons. The factory did not bind the agreement with the farmers. Instead, the factory provided counseling and training, and conduct a comparative study to farmers who owned sugar cane fields. These strategies were intended to ensure the supplies for sugar cane from farmers were in a good quality so that they could be further processed in the mills.

There were 2 types of cutting-loading-transporting methods: manual and semi mechanized method by using a sugarcane loader. In the manual, it was the people who took care for cutting, loading and transporting activities. In reality, this method had some limitations, one of which was instability of man power in transporting the sugar canes. The same was also true when people began cutting down the plants. Man power was also influenced by climate factors. In a semi-mechanically system, such a work was shared by people and machines. Sugarcane loaders were machines people used to load and transport the harvest. Sugarcane loaders had a variety of benefits such as economic, technical, and community empowerment benefits. Economic benefits were hardly found by the company during normal seasons. However, in extraordinary seasons (Muslim Festival days) where it was hard to find people to cut, even if any the factory would pay two or three times higher than a normal wage, economic benefits could be easily identified.

Nowadays Djatiroto sugar cane factory has used sugarcane loaders in spite of high operational costs. The effectiveness of sugarcane was only 60-80 tons. This made operational costs of sugarcane loaders higher than those of manual cutting. The system was another factor that made the operational cost high. In practice, sugarcane loaders need much more fuel than trucks for mobility. The cost PG Djatiroto spent to pay people for their cutting service was

around 5,600 per kWintal. They had to spend another extra cost of 9,000, if they hired people to load sugarcanes. It was predicted that the use of sugarcane loaders at Djatiroto would be effective in 4-5 years to come when they would no more employ people to cut the sugar cane plants. Next generations were unlikely to work as sugar cane cutters. Semi-mechanization alternative would be a good solution in the future.

Infrastructure and systems needed to be improved. In so doing, there would be no errors in operating semi-mechanical cutting-loading-transporting systems. In the future, the sugarcane loader tool can also press the HPP. If manual cutting power decreased in number then the required wage would be increasing and exceeding the cost of the sugarcane loader itself (01/ES/VI/30-34). The technical benefits of using sugarcane loader promoted the productivity of the sugarcane loaders. The productivity of the sugarcane loader was to carry 5 quintals of sugar cane in one transport. Meanwhile, with a manual method, people could cut plants as wide as 80,000 ha to 90,000 ha or 9,000 tons. This work involved 4,000 to 5,000 workers. One person with one working day time could harvest 10-15 quintals. A manual method could supply sugar cane for 24 hours in 1 mill season.

The benefit of sugarcane loader for community empowerment was that to increase their income. Sugarcane loader was effective during the sugarcane harvest period. People no longer needed to transport into vehicles. When using these tools, people could increase their income by working on the clearing of sugar cane in a larger area. Therefore, with a sugarcane loader the community can increase their income by working on the cutting of sugar cane with larger land, due to the fatigue factor.

Farmers were required to move from one land to another when working with sugar cane plots. The cost for cutting down was Rp5,600 per cutting-loading work. If transport cost was removed and farmers cut down the cane in a larger area, this would increase their income. For transporting the sugar cane, people can use sugarcane loaders which could go faster than men. This condition would benefit PG Djatiroto because the capacity supply of the mill was quickly fulfilled. Nevertheless, female and male farmers had different opinions about sugarcane loaders. Female farmers favored these tools for they were unable to lift sugarcane into vehicles. They preferred to work in a wider area but only cutting down the plants. The numbers of people who took care for cutting-loading work in PG Djatiroto were about 3,500. They were from various regions such as Lumajang, Jember, Banyuwangi, Probolinggo, and Madura. Cutting farmers from coastal areas such as Madura were considered to have better performance than those from other regions. Working hours of sugarcane farmers in PG Djatiroto during the milling season was from 7 am to 4 pm. From 7 o'clock to 9 o'clock was rated as peak performance, and at 10 o'clock the performance of the farmers was decreasing.

Cutting-loading work haul hauling was reported and monitored via Whatsapp. The plant manager would ask the head of the plants along with their assistants if they could get appropriate capacities of sugar canes to send to the factory. If not, the plant manager would directly tell the general manager GM to do other plans to achieve the targets. Planning, organizing, implementing, controlling system at PG Djatiroto during the cutting milled season has been arranged well.

For planning is set at RKAP which is made every year, while for organizing done from General manager to assistant of garden, from each level have responsibility respectively. While the implementation carried out by sugar cane farmers through the supervision of the assistant garden. Monitoring was done through Whatsapp involving the general manager, plant manager, and garden assistant. The general manager checked the supplies every hour by asking how much sugarcane were ready to be sent. If the ready-to-pressed cane has not reached the company's target, the plant manager would coordinate with the general manager. The general manager then made decision to solve the problems. Managerial implications included planning, organizing, implementing, controlling during the milling season in PG Djatiroto. Planning at PG Djatiroto

has been listed in the annual RKAP. RKAP has been discussed: how many targets to harvest, how much capital is needed, how much labor is required. Organizing included duties and responsibilities PG Djatiroto put into consideration. It was Mr. Narwanto who had responsibility for cutting loading activities and transport sugar canes to mill. The evaluation was conducted about the target of sugar cane capacities, involving numbers of people such as the General Manager, plant manager, and garden assistants.

Conclusion

Based on the results of the study, the following conclusions are drawn. The economic benefits of sugarcane loader is hardly found. The reason is because the prevailing system is not running optimally: the cost of sugarcane loader is still much more expensive than that of manual loading power. The cost of using manual labor is Rp5,600/quintal. The cost of sugarcane loader reaches Rp6,000/quintal to load into vehicles. The technical benefits of sugarcane loader is relatively feasible because the achievement of sugarcane loader work reaches 80 tons/day. Meanwhile, manual cutting power reaches 10-15 quintals/day. The loading-transporting ratio is much larger than that of the manual. The benefits of using sugarcane loader for community empowerment have not been fully obtained. This is due to the resistance of the community. Male cutting farmers prefer not to use sugarcane loaders and choose to cut and haul in one area. Female cutting farmers prefer to use sugarcane loader, and they prefer to cut more in a larger area in order to increase their incomes. Sugarcane loaders should also go to areas with less population density or community with less agricultural subsistence. The effectiveness sugarcane loader is still not very effective compared to using manual loading power. Due to the system of sugarcane usage is still not perfect. As a result, the cost incurred is more expensive than that of the manual. Potential sugarcane loader itself is very good if applied with adequate systems and appropriate lands.

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