

The Loose Fruit Collector (L.F.C)

Isaac Libu Forest¹ *, Iqwan Syahmil Abdullah², Mohammad Haziq Amdan³, Mohd Taufik Jamalludin⁴, Resty Joseph⁵, and Jati Kasuma Ali⁶

¹2021627316@student.uitm.edu.my, Undergraduate student, Faculty of Plantation and Agrotechnology

²2021864326@student.uitm.edu.my, Undergraduate student, Faculty of Plantation and Agrotechnology

³2021488852@student.uitm.edu.my, Undergraduate student, Faculty of Plantation and Agrotechnology

⁴2021834496@student.uitm.edu.my, Undergraduate student, Faculty of Plantation and Agrotechnology

⁵2021888252@student.uitm.edu.my, Undergraduate student, Faculty of Plantation and Agrotechnology

⁶jati@uitm.edu.my; Faculty of Business and Management, UiTM Sarawak

Abstract: *Smallholder farmers and large plantation companies both grow oil palm trees because palm fruit is getting better and making palm oil is becoming more profitable. Small farmers in rural areas can make a lot of money from palm oil because it is in high demand and gives high returns per hectare. Large companies use machinery on their plantations, but smallholders use traditional methods to get Fresh Fruit Bunches (FFB) and loose fruit seeds from oil palm trees because machinery is so expensive. The Loose Fruit Collector (LFC) is a new upgrade that was made to help workers in the palm oil industry be more productive. Machines like the LFC are made to make workers' jobs easier, cut down on hard work, boost productivity, and, in the end, make more money. Workers in the plantation industry must spend a lot of time and energy collecting seeds. Also, bending over for long periods of time to collect loose fruit seeds can be bad for their health. Our new idea is meant to solve these problems by making it easier, faster, and less physically demanding for both small farmers and large estates to collect their crops. By making the palm oil industry more efficient and caring for its workers, we can help protect its future and keep income and productivity from going down. This abstract talks about the importance of innovation and the possible benefits of the LFC for both smallholders and plantation companies.*

Keywords: plantation, farmers, companies.



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1. INTRODUCTION

Oil palm is a highly important agricultural crop in Malaysia, and the country is one of the largest producers and exporters of palm oil in the world. The oil palm industry in Malaysia plays a significant role in the country's economy, providing employment opportunities and contributing to export earnings. Malaysia is the second-largest producer of palm oil in the world, after Indonesia. The oil palm industry is a major contributor to Malaysia's economy, accounting for approximately 4% of the country's GDP. The palm oil produced in Malaysia is used in a wide range of products, including food items, such as cooking oil, margarine, and snack foods, as well as non-food products, such as soap, cosmetics, and biofuels. The oil palm industry in Malaysia is an important contributor to the country's economy, but also faces challenges related to sustainability and social responsibility. Ongoing efforts to promote sustainable and responsible oil palm cultivation are important for the long-term viability of the industry and for protecting the environment and human rights. Collecting loose fruit from oil palms in Malaysia can be a challenging task due to various factors such as the height of the palms, the spiky thorns on the trunk, and the hot and humid weather. Traditionally, fruit collection is done by handpicking, which can be time-consuming and labour-intensive. However, there are now mechanical solutions available, such as pole-mounted or handheld fruit harvesters, that can assist with the task. The Loose Fruit Collector (LFC) is a new creative update designed to boost worker productivity in the

palm oil industry. It has 2 functions, which is first used as a loading spike for the purpose of lifting Fresh Fruit Brunch (FFB) and used to collect the loose fruit (LF). The workers can do two works at the same time easily. Machines such as the LFC are intended to simplify workers' jobs, minimize arduous activities, boost production, and, eventually, raise profitability. Plantation workers encounter difficulties in terms of time and effort spent collecting seeds, as well as health risks caused by continuous bending to manually gather loose fruit seeds. Our idea attempts to address these issues by making collection easier, faster, and less physically demanding for small farmers as well as huge estates. We can help protect the palm oil industry's future by enhancing efficiency and worker well-being and preventing negative effects on revenue and productivity. Therefore, through this innovation, it is hoped that it will help especially the small farmers to facilitate and speed up the process of collecting FFB and LF. This can save time and increase productivity by minimizing the cost of production.

2. METHOD & MATERIAL

2.1 Method

The L.F.C tool is composed of two parts, namely the spike and the roller, which are used to collect loose palm fruit seeds. By using this tool, workers can minimize the number of items they bring to work. Once workers have harvested the palm bunches and transferred them to the truck, they can simply connect the roller to the spike iron to collect the fallen palm kernels. The spike has a length of 3 feet while the roller is 1 foot long.

Installing this tool is a straightforward process. After transferring the fruit into the truck, workers only need to attach the roller to the end of the spike. The roller is equipped with a pin lock to prevent it from detaching easily from the spike rod. Then, the cable attached to the outside of the roller is connected to the opening switch on the spike handle. When the switch is pulled, it will trigger the switch connector on the roller, pulling the iron roller to open it and release the seeds from the hole. The L.F.C tool has a maximum weight capacity of 2kg.

When the L.F.C tool is not in use, workers only need to open the cable connected to the spike switch and remove the lock pin on the roller. They can then pull it out and separate it from the spike. The tool is easy to use, simplifying the work of employees and reducing their workload and time spent on the job.

2.2 Materials

The Tool that we develop will have two distinct components. The first component is a spike, and the second component is a device that may be used to harvest the palm seeds after they have fallen from the fruit bunch. We use sturdy iron for the initial portion of the instrument, which is called the spike. This is the same material that is used to produce the spikes that are used by fruit pickers on the estate. Only when we purchase spikes directly from the manufacturer do we get supply. For the second section, which is known as the L.F.C. (Loss fruit collecting) component, we employ P.V.C steel that has a medium level of hardness. In addition, there is a spring, a lock pin, a cable, and a roller located on the L.F.C. component. We made a roller that can be attached to the spike after purchasing all these supplies and putting them together ourselves. Additionally, we got all these tools from the shop. After the cable has been pulled, the spring's function is to cause it to retract so that the palm kernels may be removed. The lock pin's job is to ensure that the connection between the spike and the roller stays in place. It is the job of the cable to draw the roller to remove the palm kernels, and it is the job of the roller to gather the palm kernels that have fallen.

3. FINDINGS

For our data collection methods on our LFC tool, we used quantitative analysis methods. We did this so that we could find out if this LFC tool succeeds at attracting customers so that oil palm farmers can use it in their daily work. We use a survey method to ask questions of a group of people who are ready to answer our questions.

3.1 Survey Method: Google Form

Our group has used Google forms as one way to gather information. With this way, it's easier to find out what other people think about our LFC tool. By studying data on Google forms, we choose and collect detailed data that helps us make it easier to ask people what they think about LFC tools.

Here are the responses and results we got from 44 people that are willing to do the survey for our group innovation.

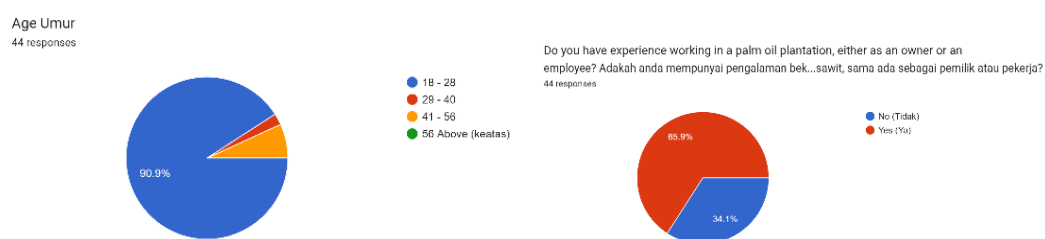


Figure 1: Age

It is highly likely that the majority of those who completed the form (90.9%) belonged to the age bracket of 18 to 28 years. This can be attributed to the fact that individuals who are employed in oil palm plantations are typically within this age group. However, it cannot be discounted that there were also people aged 41 to 56 who participated in the survey, as they may have extensive experience in the field or may even own the oil palm plantation or estate. The survey results indicate that approximately 65.9% of respondents reported having prior experience working in an oil palm plantation.

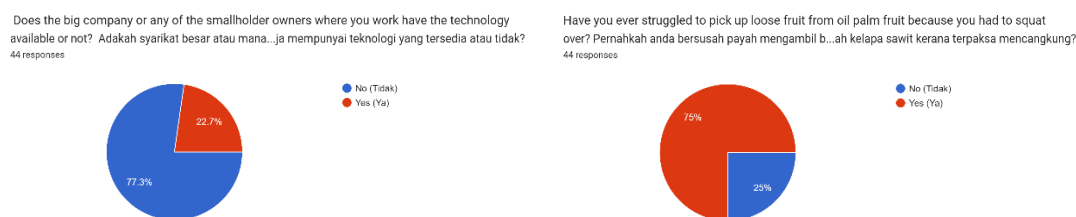


Figure 2: Technology Assessment

According to the survey results, a mere 77.3% of the respondents claimed that their workplace lacked modern technology or mechanization in their oil palm plantation. This implies that most workers are still relying on traditional methods of harvesting, which could be time-consuming and physically strenuous. Furthermore, the survey found that 75% of the respondents reported experiencing difficulties in picking loose fruit, which often required them to squat. This is a laborious and uncomfortable task that can lead to physical strain and prolonged work hours.

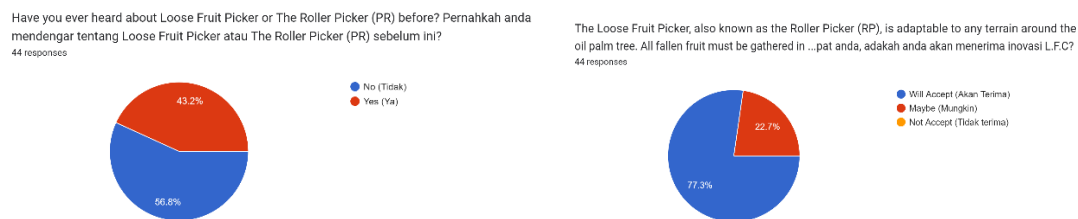


Figure 3: Loose Picker Awareness

The survey results revealed that a mere 56.8% of the respondents were aware of the existence of Loose Fruit Picker or The Roller Picker (RP), which are innovative tools designed to aid in the collection of loose fruit in oil palm plantations. This suggests that there is a lack of knowledge and awareness among workers in the industry regarding the latest advancements and technologies. However, despite the limited awareness, a significant percentage of the respondents (77.3%) expressed a desire to have access to LFC tools and other similar technological innovations in their workplace. This indicates that workers are open to incorporating modern technologies in their work processes and are keen to enhance their productivity and efficiency.

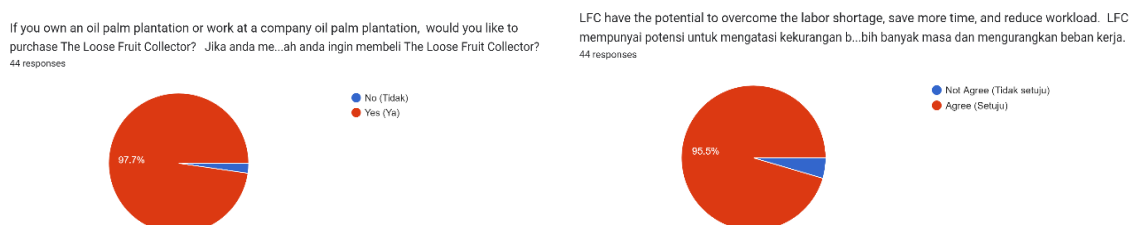


Figure 4: Respondent Perception on the product

The survey findings revealed that an overwhelming majority of respondents, approximately 95.5%, believed that the Loose Fruit Collector (LFC) tools could address the labor shortage in the oil palm industry, significantly reduce workload, and save valuable time. This implies that the introduction of such innovative tools could enhance productivity and improve working conditions for workers in the industry. Furthermore, a staggering 97.7% of the respondents expressed their willingness to purchase LFC tools from our group's innovations. This indicates a significant demand for modern technologies and equipment in the oil palm industry, which could potentially boost the growth and development of the sector.

Respondents were willing to buy and use our LFC tools as they believe it would save time and energy in picking loose fruit, indicating that our project has succeeded in attracting potential customers.

4. DISCUSSION

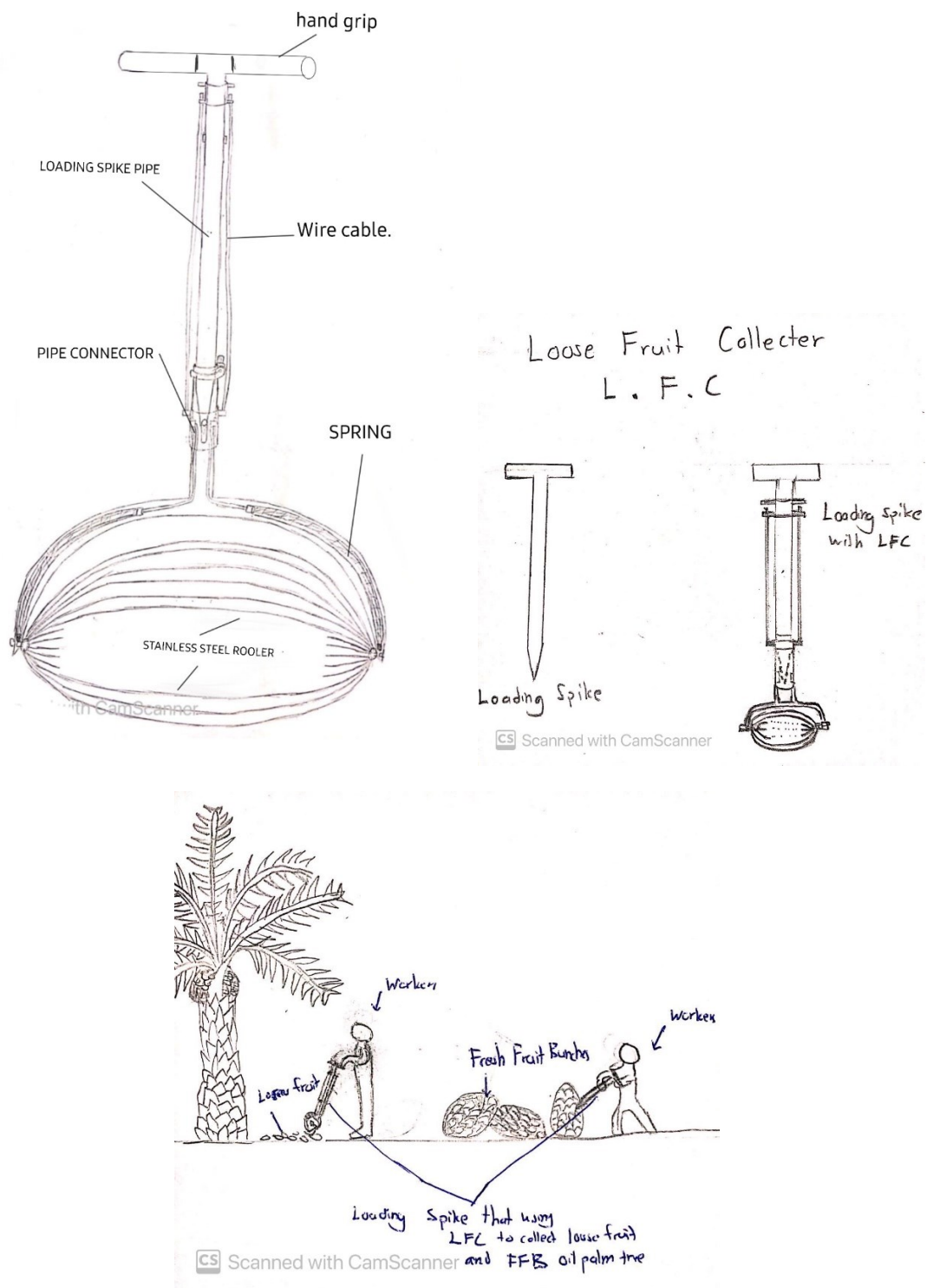


Figure 5: The Loose Fruit Collector (L.F.C) sketch

When The innovation known as the Loose Fruit Collector (LFC) has the potential to assist smallholder farmers in overcoming some of the obstacles that stand in their way throughout the process of gathering palm fruits. Smallholders may improve their job efficiency, save time and energy by using the LFC, and lower the risk of experiencing back discomfort because of their labour.

It's reassuring to know that the LFC has a competitive price point and is constructed with high-quality components. This will make it possible for smallholders, some of whom may not have the financial wherewithal to invest in costly apparatus or equipment, to take advantage of the opportunity. Utilizing the LFC could not only be beneficial for the smallholders, but it might also have some beneficial effects on the environment. It is possible that there will be less harm to the soil and the flora that is around the area if the amount of time and personnel necessary for hand harvesting is reduced.

The Loose Fruit Collector (LFC) has limitations and potential hazards that need to be considered while using it in the oil palm plantation. The LFC has a weight limit of 2kg and exposure to rain or moisture can cause rusting. Improper installation can result in slipping, and the sharp spikes can be hazardous if not used properly. However, by following proper procedures and maintaining the tool, it can be used effectively and safely in the plantation.

In general, the Loose Fruit Collector has the potential to be a helpful instrument for smallholders working in the palm oil business. It is essential to maintain research and development efforts directed toward the creation of breakthroughs such as this one, which has the potential to enhance working conditions, boost productivity, and further the cause of sustainable development. We inquired among those who were prepared to fill out the Google form as to whether our innovation project, which is LFC, would assist in the enhancement of our plantation and agrotechnology in the foreseeable future. Most respondents provided an affirmative response, citing the significant amount of time and energy savings that would result from the proposed change.

5. CONCLUSION

In conclusion, LFCs (loose fruit collectors) are an intriguing idea that has the potential to increase farmers' output while also saving them money, time, and effort. Second, LFC will prevent farmers from using manual labour (handpicking) to remove debris from the ripe fruit. Next, it can safeguard the future of the palm oil sector by boosting efficiency and worker morale and warding off any detrimental effects on farmer income or industrial output. Finally, this invention may bestow further advantages upon farmers and the oil palm business in Malaysia by reducing the need for human labour.

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