

The application of young coconut waste processing technology to the women farmer group in Kertasari, Ciamis Regency, West Java

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Abstract

Young coconut fruit is an agricultural commodity with high economic value. The utilization of young coconuts needs to be followed up with post-harvest handling, such as preservation, packaging, and storage because young coconuts are easily damaged. Currently, young coconut consumption is starting to increase because it is widely used as a toxin neutralizer or consumed to maintain body health and fitness. The problem that occurs among young coconut ice sellers is how to deal with young coconut shell waste. Therefore, there is a need for innovation that can help young coconut ice sellers to handle waste from young coconuts and turn the coconut waste into something useful. The solution for processing young coconut waste in this community service activity is carried out by processing young coconut waste into ready-to-use organic fertilizer and planting media. In addition to overcoming the problem of young coconut waste, this activity is aimed at enabling the Women Farmers Group to be able to utilize young coconut waste to be used as organic fertilizer and planting media by applying appropriate technology to reduce the impact of environmental pollution due to the abundance of this waste. As the results of these activities, the women farmer groups have been able to utilize young coconut waste to be used as material for making organic fertilizer and planting media which were initially not of economic value by using a chopping machine, so as to reduce the impact of environmental pollution caused by the abundance of this waste.

Keywords: *Technology; Waste; Women farmers group; Young coconut*

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INTRODUCTION

Waste accumulation is one of the many social problems that are often encountered in Indonesia. Talking about the accumulation of waste is not a recent problem. This is because waste is garbage or the result of disposal that comes from daily human activities (Hasibuan, 2016). In addition, waste also comes from household-scale industries and all their production processes which include the supply of raw materials, production processes, to the final product (Nasir, 2012). All forms of activities or activities carried out by humans will always produce waste. The existence of waste itself can become a social problem if it is not treated and disposed of in the right place, thereby disturbing the general public's comfort and harming the environment (Ganiron, 2013).

The problem of waste accumulation also occurs in Kertasari Village, Ciamis District, Ciamis Regency. Waste that accumulates in the area is in the form of young coconut coir and shell waste. Coconut is the most widely planted plantation crop in Indonesia, including in Ciamis Regency. According to the Central Statistics Agency and based on data obtained in 2018, the amount of plantation crop production is always increasing (Ayu et al., 2021). Coconut is one of the plantation commodities that is excellent in Indonesia because of its high economic value and almost all parts of the plant can be processed and used commercially. Parts of the fruit stems, leaves, the roots of the coconut plant can be processed and used for various human needs (Alouw & Wulandari, 2020). Starting from the process of production and utilization of coconut plants, it produces waste, for example, coconut fiber and shells (Barrett et al., 2016).



The solution that is considered appropriate to overcome the problem of the accumulation of coconut waste in Kertasari Village is to process the waste into innovative and useful products. Coconut coir is a natural fiber that can be processed into various types of useful products or appliances, such as doormats, palm fiber brooms, cocopeat, and coco fiber. The processing of coconut coir waste in Kertasari Village into organic fertilizer and planting media has the potential to become a new and promising business opportunity. If we look at the current conditions, the number of plant activists is increasing and sales of plants and their planting media have also increased dramatically. Therefore, processing coconut waste into organic fertilizer and planting media is the right solution to overcome the problem of waste accumulation in Kertasari Village.

The potential for coconut resources is very large and allows for developing a strong agribusiness, with an interrelated agro-industrial structure from upstream to downstream. One of the efforts to increase the income of coconut farmers is to process all components of the fruit into high-value products, so that the value of coconuts will increase, including the use of coconut waste which has not been utilized so far, has no economic value and has the potential to pollute the environment (Bakti et al., 2018). The major coconut-growing countries are India, Indonesia, Malaysia, Philippines, Sri Lanka, and Mexico. At present, more than 90% of the global supply originates from Asia, a prominent income source for many countries (Kalina & Navaratne, 2019; Becker et al., 2018).

Young coconut fruit is a high economic value agricultural commodity. The needs for young coconuts utilization should be followed up with post-harvest handling, including preservation, packaging, and storing since they are easily damaged, as explained by Tumbel and Manurung (2018). Young coconut consumption is currently starting to increase for coconuts are widely used as a toxin neutralizer or consumed to maintain body health and fitness (Sinaga et al., 2022; Jean et al., 2009). Total production of 15.5 billion coconuts per year makes Indonesia the largest coconut producing country in the world. Coconut fruit consists of coir, shell, and coconut meat, of which coconut fiber is the largest part that it contains about 35% of the weight of the coconut fruit (Purnomo & Janari, 2015). However, the waste of used coconut shells is often ignored by sellers. So that the waste from the coconut shells is increasing and it becomes difficult for sellers to find a place to dispose of them.

On average, the coconut fruit industry still focuses mostly on products and fruit processing. Moreover, there are still many processed by-products of these objects that are still processed traditionally (Maulana et al., 2019). Due to the abundance of waste from these natural resources, and considering the characteristics of these raw materials, there is a huge potential to be utilized in the form of organic fertilizers and planting media. Based on these problems, this community service activity aims to overcome the enumeration problems above by assisting in the application of appropriate technological equipment for coconut waste chopping machines to women farmer groups in Kertasari village.

METHODS

The method used in this community service is a learning method followed by practice, crushing young coconut waste from ice sellers, and using a young coconut waste chopping machine. After the implementation of the activities is carried out, then an evaluation is carried out to determine the level of success, and also an analysis of the feasibility of the report material is also carried out. The final results of the activities carried out will be presented in seminars and leaflets will be made as information.

The need for the coconut processing industry is to have an optimal machine for efficiency. Some machines are also developed for specific purposes (Shoup, 2018; Deokar et al., 2017). This activity initially departed from surveying the level of coconut production in West Java, as well as in the districts, and studying existing machines in the literature and the field. Seeing its enormous potential, coconut coir processing can be a promising business. This activity also considers the variable capacity, simplicity, and price of the machine. The working principle of this coconut shell decomposition machine is to beat the separate parts of the coconut fiber and dust that have been fed into the machine funnel. This machine can produce coir (coconut fiber) and cocopeat which have high economic value (Putera et al., 2022).



Implementation of Activities

The process of applying technology through the processing of young coconut waste into organic fertilizer and planting media is carried out in several stages. The stages are namely: socialization and counseling, training on the use of a young coconut shell chopping machine, the practice of making planting media and organic fertilizer from coir waste and young coconut shells, and observation and monitoring.

Socialization and counseling

The socialization of young coconut waste processing technology to the Kertasari Women Farmers Group was carried out at this stage through a presentation to the Women Farmers Group. The material presented was regarding the dangers of young coconut shell and fiber waste, the utilization of young coconut waste as a planting medium and organic fertilizer as well as training plans for using young coconut shell chopping machines.

In its implementation, the socialization of young coconut waste processing technology to the Kertasari Women Farmers Group uses a participatory approach, namely assistance efforts to empower communities in solving social problems in their regions (Mustanir et al., 2019). That way, the community will be directly involved in the process of solving social problems. In its implementation, assistance, and empowerment efforts are carried out through socialization and training in processing young coconut coir waste into planting media and organic fertilizer. The results of the socialization and training in the form of planting media and organic fertilizers can have quite large opportunities for benefits for the surrounding community (Ariatma et al., 2019).

Training on the use of a young coconut shell chopping machine

After understanding the material and planned activities to be carried out, the next step is to carry out training activities on the use of young coconut shell chopping machines. The women farmer group was taught the stages of the process of using tools, processes, how to chop young coconut shells, cleaning tools, machine maintenance, and the initial stages of making planting media. This is done so that the machine to be used is following the needs in overcoming the problem of young coconut waste in Kertasari Village.

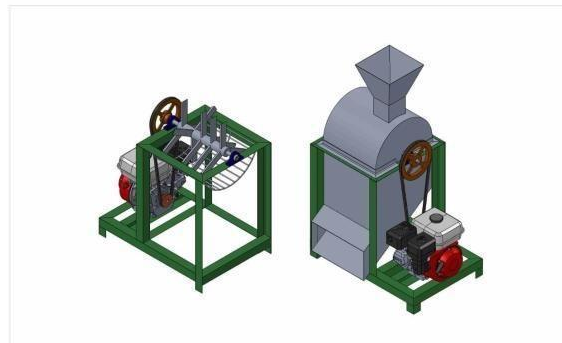


Figure 1. Young Coconut Shell and Fiber Chopping Machine.

The practice of making planting media and organic fertilizer from coir waste and young coconut shells

To make planting media and organic fertilizer from coir waste and young coconut shells, the community service team conducted training and mentoring for 10 members of the Farmer Group. Implementation of activities included face-to-face counseling, explaining how to use young coconut coir waste obtained from young coconut ice sellers to be used as planting media and organic fertilizer, and the use of coir chopping machines and young coconut shells (Figure 2).



Figure 2. Socialization of the Use of Young Coconut Chopping Machines.

The first step in using a young coconut shell and coir chopping machine is to prepare young coconut dregs which are collected from a young coconut ice seller and split into two parts. Next, separate the young coconut pulp into several parts so that the chopping process is faster. During the process of chopping young coconut dregs at a speed of 2500 Rpm to do the crushing. Next, enter the pieces of young coconut dregs that have been cut into several parts. To produce the fineness of young coconut fiber and shell, it is necessary to crush it three times with a chopping machine. From the results of breaking the dregs of coir and young coconut shells into the powder then put into sacks. The result is Fiber and young coconut shells that have become powder are used for the process of making planting media.

Observation and monitoring

The final stage is monitoring farmer groups in the Kertasari Village. This is done to find out the sustainability of waste processing from coconut coir and whether the chopping machine used is following the application and needs to be needed to overcome waste problems.

RESULTS AND DISCUSSION

Coconut coir is the outermost part of the coconut shell which is fine fibrous, where if the coconut coir is broken down it will produce fiber (coco-fiber) and fiber powder (cocopeat) (Indahyani, 2011). Coconut coir waste can be used as a material for making a variety of goods that have sale value and use. In addition, coconut coir as an organic waste also has other advantages such as being resistant to fungus, good at ambient temperature, durable, loosening the soil, and can absorb water three times the weight of the fiber (Ayu et al., 2021). Coconut coir waste is then processed by going through several stages. The result of the crushing process of coconut fiber produces a fine powder called cocopeat and the results of the crushing produce fibers called coco-fiber (Mariana, 2017).

The young coconut shell and husk shredder machine is designed for shredding the husks as the end product after the process of coconut shell crushing. The main objective of the machine is to reduce young coconut shell waste after the completion of the harvesting process. The machine is suitable for small farmers who can earn extra income besides farming by reusing the waste that was left behind. The targeted outcome from the shredding process is to be able to obtain the crushed coconut shells into finer pieces to produce organic fertilizer and planting media. The reason why the coconut shells are crushed into finer pieces is that the wastage from the coconut shells can be put to good use (Ariffin et al., 2020).

From the training on making organic fertilizer and planting media by utilizing coconut plant waste, namely coir and coconut shells, it was revealed that most members of the farmer group did not know how to make organic fertilizer so they were very enthusiastic about participating in the training and actively discussing techniques for making organic fertilizer. The results of activities that have been successfully carried out are the manufacture of organic fertilizer by utilizing coconut plant waste using a chopping machine. The introduction of this equipment will simplify and shorten the time for farmers in preparing organic fertilizers. The socialization of the Kertasari women's group in Ciamis Regency for handling waste of young coconuts to be used as organic fertilizer and planting media with machines applying the right technology.



Figure 3. The Enumeration Results.

From the results of counting coconut waste with a coconut chopping machine, some results can be used for planting media and organic fertilizer (Figure 3). The processing of coconut fiber waste is processed into a planting medium which has many benefits in the farming process. It is hoped that this processing can solve social problems that exist in Kertasari Village. It can add to the public's knowledge about planting media from coir and coconut shell waste, open up business opportunities that can be done from home, and make the environment cleaner and healthier. The determination of the mechanical properties of young coconuts is necessary for the design and development of harvest and postharvest machines (Pandiselvam et al., 2020). The development of the young coconut shells processing machine was necessary to enhance the agro-waste to value-added products and to avoid environmental pollution from the abandoned young coconut husk (Jusoh et al., 2020; Krishnapillai et al., 2020).

With fiber extraction technology, coconut coir, which so far has only been considered plantation waste, can be processed into fiber products that have economic value. Extraction technology can be carried out by biological and mechanical means. Mechanical fiber is the best choice because it is more practical, the processing time is shorter and, the processing capacity is higher, the production process and the quality of processed products can be controlled. If you only focus on processing coconut fruit on the fruit flesh, the highest coconut price will still be a very low income for farmers to live decently. One effort to increase the income of coconut farmers is to process all components of the fruit into high-value products so that the value of coconuts will increase (Adwimurti et al., 2022).

CONCLUSION

The process of implementing young coconut waste processing technology for women farmer groups in Kertasari village is carried out, one of which is through the process of processing young coconut waste into organic fertilizer and planting media. The participants showed high enthusiasm to participate in the processing of young coconut waste. Women farmer groups have been able to utilize young coconut waste to be used as material for making organic fertilizer and planting media which were initially not of economic value by using a chopping machine, to reduce the impact of environmental pollution caused by the abundance of this waste. The group of female farmers is now able to practice chopping machines for organic fertilizers and planting media.

Limitations and future direction

This program can be continued through village government programs related to efforts to increase village potential, especially the utilization of young coconut waste into products that have economic value so that Kertasari village becomes an example for other villages.

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Statement and Declarations

S.R. designed the community service, Z.A., T.S., and B.A.A. collected data. S.R., Z.A., T.S., and B.A.A. wrote, revised, and approved the manuscript. The authors state there is no conflict of interest.

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