

# RETOOLING COCONUT PEELING MACHINE FOR COMMUNITY EMPOWERMENT IN PALOH PUNTI VILLAGE MUARA SATU

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## Abstract

*The partner in this PKM is Paloh Punti Village, Muara Satu, Lhokseumawe City. Paloh Punti Village is one of the villages in the Unimal Campus area which is 3 km from the Bukit Indah Campus. In general, the jobs of the people in Paloh Punti village are farmers and livestock breeders. Almost 80% of plantation land in this village is planted with coconut trees. Selling coconut plantation products is one of the main sources of income for the people of Paloh Punti village. So far, the selling value of coconuts in the Paloh Punti area is relatively low, ranging from 1,800 to 2,000 rupiah. This low selling value is due to the coconut plantation owners selling their produce intact, known in the community as round coconuts. To increase the selling value of these coconuts, the Community Service is trying to offer assistance in making a Coconut Skin Peeling Machine which will later be donated to the Paloh Punti Village Community under the coordination of the Village Leadership. This service will be carried out in stages, starting with counseling, introduction to peeling tools/machines, testing the tools, evaluating the economic value and handing over the coconut peeling machine to the village leadership. Counseling and training on the use of this tool begins with designing a tool using the ATM method (Observe, Imitate and Modify) from pre-existing types of equipment and adapt it to the needs of supporting machines.*

**Keywords:** PKM, TTG, Coconut Peeler, Community empowerment

## Abstrak

*Mitra pada PKM ini Desa Paloh Punti, Muara Satu, Kota Lhokseumawe. Desa Paloh Punti merupakan salah satu desa di lingkungan Kampus Unimal yang berjarak 3 Km dari Kampus Bukit Indah. Secara umum, pekerjaan masyarakat di desa Paloh Punti adalah petani dan peternak. Hampir 80% lahan perkebunan didesa ini ditanami oleh pohon kelapa. Penjualan hasil kebun kelapa ini menjadi salah satu pendapatan utama masyarakat desa Paloh Punti. Selama ini nilai jual kelapa didaerah Paloh Punti tergolong rendah, yaitu berkisar antara 1.800 hingga 2.000 rupiah. Nilai jual yang rendah ini disebabkan karena pemilik kebun kelapa menjual hasilnya dalam keadaan utuh, yang dikenal dimasyarakat kelapa bulat. Untuk meningkatkan nilai jual dari buah kelapa ini, Pengabdian mencoba menawarkan bantuan pembuatan Mesin Pengupas Kulit Kelapa yang nantinya akan di sumbangkan kepada Masyarakat Desa Paloh Punti dibawah koordinasi Pimpinan Desa. Pengabdian ini nantinya akan dilakukan secara bertahap, yang diawali dengan Penyuluhan, Pengenalan Alat/Mesin Pengupas, Uji coba alat, Evaluasi nilai ekonomis hingga serah terima alat Mesin Pengupas Kulit Kelapa kepada Pimpinan Desa. Penyuluhan dan pelatihan penggunaan alat ini dimulai dengan mendesain alat dengan metoda ATM (Amati, Tiru dan Modifikasi) dari jenis peralatan yang telah ada sebelumnya dan disesuaikan dengan kebutuhan mesin pendukung.*

**Kata Kunci:** PKM, TTG, Pengupas Kelapa, Pemberdayaan masyarakat

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## INTRODUCTION

Indonesia is among the top 5 coconut-producing countries in the world, including India, Brazil, Sri Lanka and the Philippines. The market for processed coconut products abroad is very open, not only processed coconut meat, but processed coconut coir is also in demand in foreign markets. With the opening of the USA market, this is a breath of fresh air for coconut farmers in Indonesia, so farmers no longer need to worry about market absorption. Growing coconuts is a very profitable long-term

investment, because from flowers, fruits, leaves and even coconut trunks all have selling value. According to records from the Agricultural Quarantine Center, processed coconut products from PT BOF in Bintan in the form of dried grated coconut or dessicated coconut and coconut chips, successfully penetrated the USA market for the first time in 2022 with the export of dried grated coconut with a total of 12.4 tons and coconut chips of 5.6 tons, with an economic value of IDR 819.4 million. As an archipelago, Indonesia is a major coconut producing country in the world. In 2022, the coconut plantation area in Indonesia reached 3.34 million hectares. Then there are about 2.85 million tons of coconut produced [1].

Apart from the economic aspect, coconut also plays an important role in the lives of Indonesian people. Coconuts are used in various traditions and ceremonies, and the coconut tree is often considered the "tree of life" as all parts of the plant can be utilized. In the modern era, coconut is increasingly recognized as a sustainable and environmentally friendly resource. The implementation of sustainable agricultural practices and innovations in coconut processing are the focus to support the sustainability of the coconut industry in Indonesia, especially in Aceh. The challenges in utilizing coconut fruit is the husking process, which is a critical step in the processing of coconut products. The manual labor of peeling coconut fruit is often time-consuming and labor-intensive, and can increase the risk of worker injury [2]. Therefore, the use of a coconut peeling machine is an effective solution to improve efficiency and safety in this process.

Economic development in Paloh Punti Village is supported by agriculture, trade and home industry. Productivity and access are importantly supported by agriculture, such as honey papaya, rice fields and other young crop agriculture [3]. The social condition of the community in Gampong Paloh Punti is running normally where community activities are running well, the condition of the occupation settlement is still not organized where the settlement is not organized and there are still many vacant lands whose utilization is not so optimal.

Almost the entire community in this village has a large residential land, besides being used as a garden, some of them are used as a kandang for livestock business. The gardens owned by the community are generally planted with coconut trees [4]. Coconuts are part of the main income of Paloh Punti villagers and are sold at a relatively cheap price, ranging from 1,800 to 2,000 rupiah, because these old coconuts are sold still in one piece or round coconuts. While coconuts that have a relatively high selling value are 3,000 to 3,500 rupiah, with the state of the coconut that has been peeled off the skin. During this time, coconut owners do not do the skin peeling process because it takes a long time if done manually. Most coconut plantation owners also have farming and cattle breeding activities. From the urgency of the problems that occur in Paloh Punti village, the service team chose to continue the Community Service Program for productive youth to improve soft skills in using a coconut skin peeling tool / machine which can later become a pioneer in making other tools that are appropriate. The final process of this service has donated a coconut peeler to Paloh Punti Village [4-7].

## **METHOD**

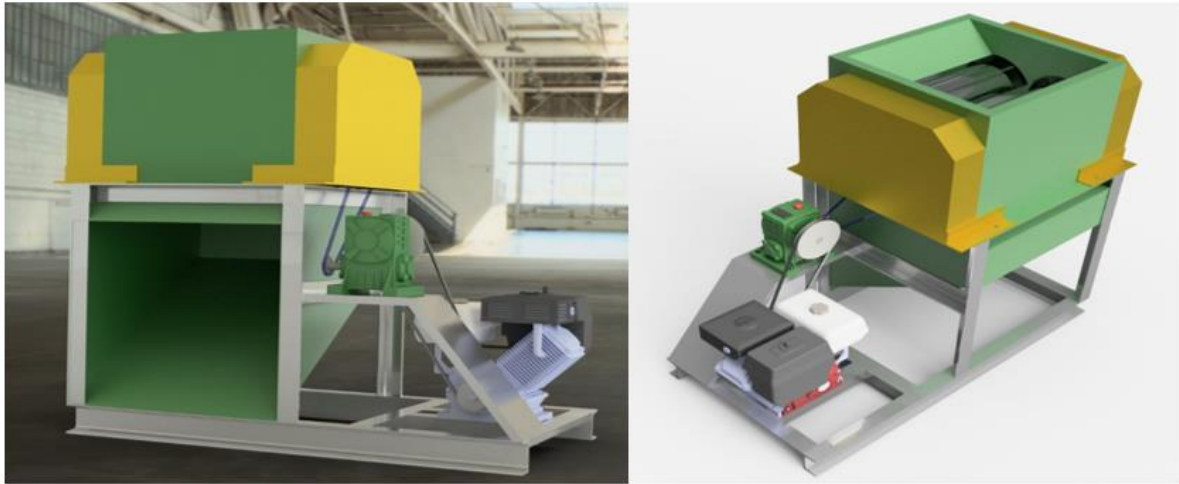
The method of activities carried out by training or workshop method starts from observing the chopping tools that are available on the market, analyzing the needs and capacity of the chopped results of the designed tool. Then the chopping tool is redesigned in accordance with engineering science and the application of the manufacturing process. This counseling and discussion was carried out in a structured manner which was divided into: (1) Introduction to the Types of Peeler Tools; (2) Introduction to the Process of Using Peeler Tools; (3) Introduction to the Economic Value of Tools and Production Results.

After the counseling and discussion process, the next training/workshop process was carried out at the Malikussaleh University Mechanical Engineering Laboratory which consisted of: (1) Determination of production capacity of the initial design; (2) Techniques for calculating and cutting material requirements; (3) Assembly Techniques and Installation of tools; (4) Testing of tools resulting from the manufacturing process; (5) Evaluation of Assembled Results.

The process of developing the concept of tool design begins with a literature study conducted on existing equipment and modifications that have been made by other designers. Furthermore, active participation from brainstorming of service team members who have educational backgrounds and experience in Engineering Design, materials, production processes and machine elements. This concept development stage consists of several activities, including: First, forming a Focus Group Discussion (FGD) consisting of service providers and the general public as users of coconut fiber peeling machines. Second, conduct a Focus Group Discussion (FGD) to identify the user's needs for the coconut husk peeling machine. Third, conduct a discussion with a participatory team consisting of the Pengabdian and the community to determine the specifications of the coconut husk peeling machine based on the results of the Focus Group Discussion (FGD). Fourth, compile a concept consisting of concept design drawings and a brief description of the concept design.

### ***Design and Manufacturing***

The principle of designing the manufacture of coconut skin peeling machines starts from the design of the tool. From literature studies, observations and in-depth analysis of equipment mechanization, with the principles of observation, imitation and modification, the servant determines the peeler model whose image is presented in the Working Image of the Tool, as shown in Figure 1.



**Figure 1.** Design of coconut peeler tool.

The working principle of the coconut skin peeling machine is inserted into the machine through the hopper and then the fruit peeling process will occur when the peeler tube rotates with each other. where in the peeler tube there are two drums that rotate opposite to the cutting edge along the drum. These cutting edges are specially designed with a rough surface to be able to peel the dry skin from hard old coconuts. After the coconut is peeled to a smaller size, then by design, the coconut will be taken using the guide on top of the coconut peeler.

#### ***Estimation of Production and Community Empowerment Evaluation***

For a machining industry it is imperative to know some of the actual costs of manufacturing a product/machine component. By knowing the selling price of the product or the bid price of the contract manufacturing of a product (sub-contract parts), it can be imagined that the profit will be obtained. In reality, calculating the cost of manufacturing is not always easy, depending on the size of the company, the variety and complexity of the products it handles and the cost accounting structure adopted by the company concerned. The cost of a product is determined by material costs (basic materials), production costs and administrative costs / preparation / production planning which may consist of a combination of several steps of the manufacturing process.

In the process of community service, various concepts related to the assisted community, methods and theories of needs analysis that have relevance to community needs are needed. This program is a form of combining the elements of education, service, and community service in the frame of the Tri Dharma of Higher Education.

To maintain the quality and sustainability of community service activities, it is necessary to carry out monitoring and evaluation. The implementation of monitoring and evaluation of community service activities emphasizes two things, namely: (1) Assessment of the progress of work implementation and prediction, when the remaining unimplemented service work will be completed. The achievement of the activity is the percentage of work that has been done by the implementing team;

and (2) The assessment of creativity emphasizes efforts to identify the feasibility of these service activities for funding the following year.

## **RESULTS**

In the implementation of the community service program process with the fostered village category funded by the PNBP 2023 Internal Fund of Malikussaleh University, the chairman and members at the beginning of the activity coordinate with partners in Paloh Punti village. Partners here are participants who in the previous service have made a business entity in the form of a welding workshop under the name Baburrahmah.

In early September 2023, pengabdian has been finishing the working drawing design of the coconut skin peeler. The results of this design are used as a reference for purchasing the materials needed to make the tool. The estimated processing time required for the production process of this peeler is 1 month. As a result of the discussion between the leader and the service members, it was decided to involve a third party in making the peeler based on the design drawings. This was done because of the short time for the implementation of the service which is planned to be carried out in early November 2023. Figure 2 shows the implementation of the peeler that has been completed in accordance with the initial design designed by the team.



***Gambar 2.*** *Implementation of coconut peeler tool.*

The initial activity was in the form of counseling introduction and discussion of service carried out on Saturday, October 14, 2023, at the mosque in Paloh Punti Village. where the topic raised was the introduction of the manufacturing process of the old coconut skin peeling machine in Paloh Punti village.

### ***Impact for Local Community.***

The Assisted Village Service which took place in Paloh Punti Village with Dayah Baburrahmah

partners formed from previous service, requires upgrading skills for workers in the workshop who are part of the Paloh Punti Village Youth. This training for youth is carried out to be able to educate and run this coconut skin peeler equipment continuously, because this tool will be donated to Paloh Punti village to be utilized by the surrounding community.

This training is also assisted by Faculty of Engineering students, especially from the field of Manufacturing in assembling existing tools. This tool will later be placed in Dayah Baburrahmah, where the position of this Dayah is also a community religious center and close to the community's coconut plantation in Paloh Punti Village.

The party from Paloh Punti Village represented by the village secretary hopes that Malikussaleh University can always help the Paloh Punti village community in solving engineering, social and economic problems, where community insight can increase with the routine of this service activity. In the future, it is also hoped that the community can play a more active role when activities are was conducted.

## CONCLUSIONS

Community service activities in the form of counseling, training and pilot project work have not been completed. The design process on the peeler has no significant obstacles. Adjustments between Working Drawings and the size of some equipment components from the calculation results, are not available in the market, so it takes time to order machine components from outside the area. Tools that have been made in the testing period, where there are correction factors needed for the perfection of the mechanism of the equipment, due to complicated in the process of tool development.

## REFERENCES

- [1] Reza P, T. Hafli, Muhammad, aljufri. 2022 "Pelatihan Aplikasi Desain dan Manufaktur terhadap jenis-jenis mesin Pencacah Organik" Jurnal HURRIAH. P-ISSN: 2774-8480.
- [2] Tulasi, L. M., Prima, F., & Ivanto, M. 2022, "Rancang Bangun Mesin Pengupas Sabut Kelapa Menggunakan Variasi Roller Blade". JTRAIN: Jurnal Teknologi Rekayasa Teknik Mesin, 3(1), 104-108.
- [3] Derlini, D. (2022, July). "Perancangan Dan Pengembangan Alat Pengupas Sabut Kelapa Dengan Metode Quality Function Deployment". In Seminar Nasional Teknik (SEMNASTEK) UISU (Vol. 5, No. 1, pp. 215-221).

- [4] Prima, F., Japri, B. A., Kurniawan, E., Lubis, G. S., Ivanto, M., Ivontianti, W. D., & Oktaviani, E. P. (2021). Perancangan Alat Pengupas Sabut Kelapa Menggunakan Metode VDI 2221. *Journal of Industrial & Quality Engineering* p-ISSN, 2303, 2715.
- [5] Putera, P., Intan, A., Mustaqim, F., & Ramadhan, P. (2019). Rancang Bangun Mesin Pengupas Sabut Kelapa (Design of Coconut Fiber Separator Machine). *Agroteknika*, 2 (1), 31–40.
- [6] Harsono Wiryono Sumarto, Toshio Okumura, 1979, “ Teknologi Pengelasan Logam “, Pradya Paramita Jakarta.
- [7] Noviyanti, M. Ridwan, Nuha D.A, Odi F, David Y. 2018. Rancang Bangun Komposter Rumah Tangga Komunal Sebagai Solusi Pengolahan Sampah Mandiri Kelurahan Pasirjati Bandung. *CR Journal* vol 3 no 2. BP2D Jawa barat.
- [8] Subandriyo, Didi D.A, Hadiyanto, 2012. Optimasi Pengomposan Sampah Organik Rumah Tangga Menggunakan Kombinasi Aktivator EM4 Dan Mol Terhadap Rasio C/N. *Jurnal Ilmu lingkungan UNDIP*. Volume 10 Issue 2: 70-75(2012) ISSN 1829-8907.
- [9] Sudjatmiko, 2005, rancang bangun alat pencacah (pemotong) sampah secara mekanik dalam upaya pembuatan kompos guna meningkatkan produktivitas, *Jurnal TRANSMISI*, Vol-1 Edisi-2/ Hal. 81- 90
- [10] Ramli Soehatman, 2010, “Sistem Manajemen Keselamatan & Kesehatan Kerja”, Dian Rakyat, Jakarta.
- [11] Jalaluddin, J., Nasrul, Z. A., & Syafrina, R. (2017). Pengolahan Sampah Organik Buah-Buahan Menjadi Pupuk dengan Menggunakan Effektive Mikroorganisme. *Jurnal Teknologi Kimia Unimal*, Vol. 5: No. 1, pp. 17-29.
- [12] <https://palohpunti.wordpress.com/2016/06/15/first-blog-post/> diakses pada 22-06-2023
- [13] <https://www.cnnindonesia.com/ekonomi/20220202140455-532-754072/data-bps-aceh-masih-jadi-provinsi-termiskin-di-sumatra> diakses pada 8 Juni 2023
- [14] <https://rangkaatapbajaringanbogor.com/usaha-bengkel-las/> diakses pada 9-06-2023

- [15] Aljufri, Reza P, 2018, “Pengaruh porositas las terhadap kekuatan tarik pada material AISI 1050 yang menggunakan Kampuh las v 90°”, Seminar Nasional Sains dan Teknologi, Semnastek UMJ.
- [16] Hafli, T., dkk, 2019, Pemilihan Bahan II, Sefa Bumi Persada, Aceh. ISBN – 978-602-0768-78-6