

Community Empowerment through the Application of Technology to Increase Copra Production for Farmer Groups in Saweli Village, Taniwel, West Seram

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Abstract: West Seram Regency has a coconut plantation area of 8,326.10 hectares, with a total production of 7,390.5 tons and an average productivity of 0.89 tons per hectare. Nearly all parts of the coconut plant can be utilized, including the trunk, leaves, fruit, husk, and shell. The use of mature coconuts for copra production is one of the ways to increase the income of coastal communities, particularly in Saweli Village, located in West Seram Regency. However, copra production in Saweli Village, which is generally carried out using traditional or home-industry methods, has not yet reached optimal results in terms of production time and output quantity. One of the main challenges faced by the community is the lengthy process of removing the coconut husk and shell during copra production. The current pre-processing stage remains conventional, as coconuts are peeled manually using traditional tools. Therefore, through this Community Empowerment Program (PMS), we aim to introduce transformative learning to help develop and empower the local community, particularly in Saweli Village, Taniwel District, West Seram Regency, Maluku. This initiative focuses on supporting small-scale entrepreneurs whose production processes have not yet met market standards.

Keywords: Saweli, Copra, Technology, Husk Peeler, Shell Peeler.

Introduction

Maluku is rich in natural resources both on land and at sea in the eastern region of Indonesia. This is due to Maluku's geographical location in the tropics. The presence of sunlight almost all year round and high rainfall make the land and sea in this region fertile with biodiversity.

The Central Statistics Agency (BPS) of Maluku Province recorded the production of cloves at 18,153.94 tons, nutmeg at 6,068.81 tons, and coconut at 91.00 tons. The Central Statistics Agency (BPS) of Maluku Province recorded the production of cloves at 18,153.94 tons, nutmeg at 6,068.81 tons, coconuts at 91,085.17 tons, sago 952.07 tons, coffee 424.03 tons, cocoa 8,331.88 tons, rice 92,601.06 tons, and fisheries 518,615 tons (Badan Pusat Statistik Provinsi, 2024). Horticultural, agricultural, and plantation crops are not only consumed but also

cultivated as a source of income for the community (Jannah et al., 2025). One of the agricultural food potentials is coconut, which is widely cultivated by the community (Purnamawati, 2007). Maluku Province's 2022 statistical data, specifically for coconut plantations, shows that they are spread across almost all districts/cities. One of them is West Seram Regency, which has a coconut plantation area of 8,326.10 hectares with a total plantation production of 7,390.5 tons and an average production of 0.89 tons/hectare. Almost all parts of the coconut plant can be utilized, from the trunk, leaves, fruit, fruit skin, and fruit shell (husks). Young coconut fruit can be drunk for its water and consumed directly as food, coconut water can be used as a base ingredient in the production of soy sauce, vinegar, and nata de coco, while the fruit flesh can be used as an additional ingredient in the production of vegetable- and meat-based dishes (Pattiasina et al., 2024).

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Specifically, the flesh of mature fruit can also be processed by being removed and dried into an economically valuable commodity known as copra. Copra is dried coconut flesh, which is one of the most important coconut byproducts as it serves as the raw material for coconut oil production (Pangemanan & Rori, 2017). The copra commodity in Indonesia is very promising given the large number of companies operating in the food sector. Therefore, household industries producing copra will continue to be needed as suppliers of copra to these companies. In addition, white copra is also generally exported overseas (Siloto et al., 2017).



Figure 1. Coconut Potential in West Seram Regency

The use of old coconuts as a material for making copra is one way to increase the income of people living in coastal areas, especially in Saweli Village, located in West Seram Regency. Traditional or home industry copra production by the Saweli Village community has not been optimal in terms of production time and the amount of copra produced. Copra produced by the local community is still made traditionally, where old coconuts are split manually using a machete (large knife), then dried in two ways, namely drying under the sun for several days until the coconuts are dry and drying with heat using fire. The local community still depends heavily on the sale of products processed from these natural resources for their livelihood. However, the income they earn is only enough to meet their daily needs and is not sufficient to improve the standard of living of the local community. In fact, these natural resources have a high selling value if their potential can be optimally processed, thereby having a positive impact on the regional economy and supporting food security in Maluku (Sangadji et al., 2022).

One of the problems currently faced is the lengthy process of peeling coconut husks and shells in copra production. The current pre-processing is still conventional, with coconuts being peeled manually using traditional tools, which is time-consuming and

ineffective. Production capacity also depends on the availability of raw materials, equipment, and coconut husks for heating, which causes production quantities to be uncertain and lower in number. In addition, production costs have also increased, while the selling price is determined by the national market. This low copra production is largely due to the fact that processing by the community is done traditionally, using only basic equipment, so that the processing work is quite time-consuming and labor-intensive.

Based on previous research (Santosa et al., 2019), in order to increase production, through the Community Empowerment Program, we implemented appropriate technology in the form of coconut husk peelers and modified coconut shell peelers. These two tools are expected to help community partners in the pre-processing stage, resulting in faster processing, higher production, and better quality than before. This will have a direct impact on the pre-processing of coconuts into derivative products in the household industry as a solution to improve food security and the economy of the Saweli Village community. This Community Empowerment Program aims to help address the problems faced by partner farmer groups in the process of processing coconuts into copra. Through this activity, partners can directly utilize appropriate technology to process coconuts into copra. The community is also assisted in improving production facilities and using advanced technology to increase copra production.

Method

The implementation of community service activities through the Community Partnership Program, which aims to increase production while paying attention to quality, is carried out in three stages, namely increasing partners' knowledge about processing coconuts into copra, using technology in the production process, and connecting entrepreneurs, in this case partners, with the market.

The stages of implementation consist of preparation, socialization or counseling, training, technology application, as well as assistance and evaluation.

Result and Discussion

The development of local product processing businesses often faces obstacles in the field of technology. The methods or techniques used in local product processing businesses are closely related to technology, whereas those that have been passed down from generation to generation are more traditional in nature (Prayogi et al., 2018). Teaching communities to

use technology in production will increase production and product competitiveness. This process is known as transformative learning.

Modified Coconut Husk and Shell Peeling Machine Design

An overview of the transfer of science and technology (learning transformation) carried out through this program is shown in Figure 2. The appropriate technology applied in the process of processing coconuts into copra is the Coconut Husk Peeling Tool and the Coconut Shell Peeling Tool.

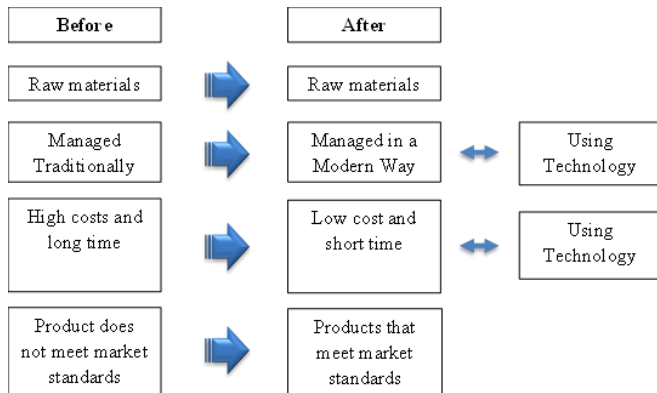


Figure 2. Schematic representation of science and technology transfer

The Coconut Husk Peeling Tool is a tool that can be used to peel the skin (husks) of coconuts from their shells, while the Coconut Shell Peeling Tool can be used to separate coconut shells from coconut meat, which will be used as copra. The designs of the coconut husk peeling tool and coconut shell peeling tool that have been created can be seen in Figure 3.

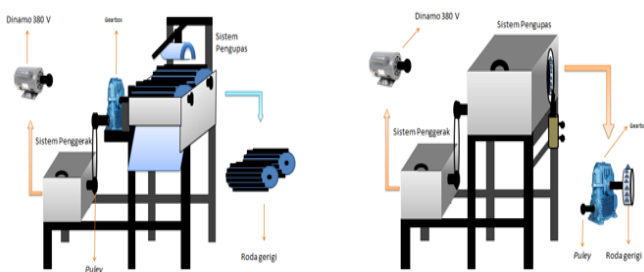


Figure 3. Design of the coconut husk peeler and coconut shell peeler

The specifications for both peeling tools consist of a tool frame, a drive system in a square box using a 380 V electric dynamo, a peeling system consisting of a gearbox and gear wheels in a square box, and an outlet channel. The difference between the two tools lies in the gear wheels. The coconut husk peeling tool uses two blunt gear wheels with a certain distance between them

in a cylindrical shape that rotate in opposite directions, while the coconut shell peeling tool uses a single sharp gear like a fang attached to an iron wheel.

Modified Coconut Husk and Shell Peeling Machine

The modified coconut husk peeler is specifically designed to solve the problems of husk residue and slow manual peeling. It works on the principle of two cylinders rotating in opposite directions, equipped with blunt teeth. This design ensures maximum husk removal and efficiency in husking time. The blunt teeth serve to remove the husk completely, eliminating the problem of fiber residue that can affect the quality of copra. The continuous rotation of the cylinders pulls the coconuts in, enabling a fast and standardized husking process that is far superior to traditional methods, which require considerable labor and time.

The modified coconut shell peeling tool was created to mitigate the difficulty of separating coconut meat from hard shells, which is the most labor-intensive process. This tool uses an iron wheel with sharp serrated edges. Its function is to break and separate hard shells from coconut meat effectively and quickly. Using this tool eliminates the need for manual shell breaking with blunt tools, thereby significantly reducing the time required for shell separation.

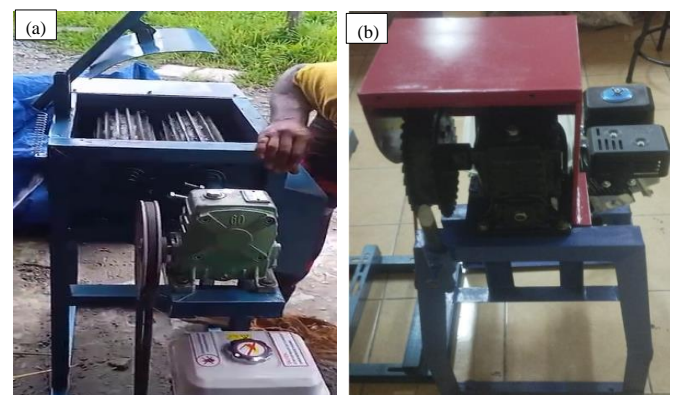


Figure 4. (a) Modified coconut husk peeling tool and (b) modified coconut shell peeling tool

Handover and Training on the Use of Modified Coconut Husk and Shell Peeling Machines to Partner Communities

The community service team has completed the development of an appropriate technology product in the form of a coconut husk and shell peeling tool. The first tool, the coconut husk peeler, features an innovation in the form of two cylinders that rotate in opposite directions, equipped with blunt teeth. This design ensures maximum husk removal and efficiency in husk removal time. The blunt teeth serve to peel the husk cleanly, eliminating the problem of residual fibers that can affect the quality of copra. The continuous rotation of the cylinders pulls the coconut in, allowing for a fast

and standardized peeling process, far superior to traditional methods that require a lot of energy and time. As a result, it only takes 10 seconds to peel one coconut. The second tool is a coconut shell peeler that has been modified with the use of iron wheels fitted with sharp serrated teeth. Its function is to break and separate the hard shell from the coconut meat effectively and quickly. The use of this tool eliminates the need for manual shell breaking with blunt tools, thereby significantly reducing the time required for shell separation. The time required to separate the shell from the coconut meat is only 25 seconds.

The use of this innovative technology greatly helps the community in the copra production process. This is because it is more efficient in preparing the coconut meat for the subsequent smoking process to make copra.

As a follow-up to the completion of the two tools, the Pattimura University community service team has conducted training on the use of the tools for the community of Saweli Village, Taniwel District, West Seram Regency. In this activity, the community was introduced directly to the operation of the tools, their working principles, and safety procedures for their use. Training participants were also given the opportunity to try out the process of peeling coconut husks and shells using these tools (Figure 5).



Figure 5. Handover and trial run of coconut husk and shell peeling machines by the Saweli village community

Through this training, the community gained a better understanding of the benefits and advantages of the appropriate technology introduced and became capable of operating it independently. The application of this innovative technology has proven to be very helpful to the community in the copra production process, as the preparation time for coconut meat has become much more efficient before the smoking process to produce copra. Thus, the use of this tool is expected to increase productivity, save labor, and encourage improvements in the quality and quantity of copra production in Saweli Village.

Conclusion

The community service activities that have been carried out can increase the knowledge of partners, in this case the copra farmer group in Saweli village, in transitioning from conventional to modern methods, thereby streamlining production time and increasing copra production.

Acknowledgments

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