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Processing Palm Trunk Waste into Plywood to Improve the Economy in Dharmasraya Regency

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ABSTRACT

Palm trunk waste is a potential material that can be processed into plywood to improve the economy in Dharmasraya Regency. This study aims to analyze the physical and mechanical properties of plywood made from palm trunk waste and compare them with commercial plywood. The palm trunk waste was obtained from a local palm oil plantation and processed into veneer using a rotary peeler. The veneer was then glued and pressed to form plywood. The physical properties of the plywood, including density, moisture content, and water absorption, were evaluated according to standard methods. The mechanical properties, including bending strength and modulus of elasticity, were also tested.
The results showed that plywood made from palm trunk waste had a similar density, moisture content, and water absorption to commercial plywood. However, the bending strength and modulus of elasticity of the palm trunk plywood were lower than those of commercial plywood. Nonetheless, the palm trunk plywood still met the minimum requirements for structural plywood and could be used for non-structural applications. Furthermore, processing palm trunk waste into plywood can provide economic benefits to the local community by creating new job opportunities and increasing income. This study highlights the potential of palm trunk waste as a raw material for plywood production and its contribution to sustainable development in Dharmasraya Regency.

Keywords: Economy ; Palm Trunk Waste; Plywood, Physical and Mechanical Properties; Sustainable Development.

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1. INTRODUCTION

Dharmasraya Regency is known for its abundant palm oil plantations. However, the utilization of palm trunk waste, which is the by-product of palm oil production, is still limited. This waste material has the potential to be processed into plywood, which can improve the local

economy and provide sustainable development opportunities. Plywood made from palm trunk waste can be used for various applications, such as furniture, paneling, and decorative purposes.

The palm oil industry has become an important sector in the Indonesian economy. However, it generates large amounts of waste, including the trunk of the palm tree. These trunks are usually discarded or burned, causing environmental pollution. Therefore, efforts to utilize the waste generated by the palm oil industry are necessary to create added value and reduce environmental pollution. One potential use of palm tree trunks is as raw material for plywood. Plywood made from palm tree trunks has the potential to be a sustainable alternative to wood-based plywood. In addition, the utilization of palm tree trunks as raw material for plywood can create new economic opportunities for communities in palm oil-producing areas.

Several studies have investigated the potential of using palm tree trunks as raw material for plywood. For instance, [1] examined the physical and mechanical properties of plywood made from oil palm trunk veneer with alkaline treatment. Kusumaningrum and Hidayat, 2021 [2] reviewed the potential of oil palm trunk as a raw material for plywood. Adhe Saputra, 2020 [3] investigated the effect of gluing temperature on the physical and mechanical properties of laminated veneer lumber made from oil palm trunk. However, research on the economic value of utilizing palm tree trunks for plywood in specific regions is limited.

Therefore, this study aims to investigate the potential economic value of utilizing palm tree trunks for plywood in Dharmasraya Regency, West Sumatra Province. This study also aims to identify the challenges and opportunities of utilizing palm tree trunks for plywood in the region. By identifying the potential economic value of utilizing palm tree trunks for plywood, this study contributes to the development of sustainable and environmentally friendly solutions for the palm oil industry in Indonesia.

2. LITERATURE REVIEW

Figure.1. Processing of Oil Palm Trunk Waste

Source: https://tabloid-desa.com/wp-content/uploads/2017/04/LIMBAH3.jpg

The palm oil industry is a significant contributor to the Indonesian economy. However, it generates a considerable amount of waste, including palm tree trunks, which are often discarded or burnt, causing environmental pollution. Therefore, finding ways to utilize this waste is essential for sustainable development and reducing environmental pollution.

One potential use of palm tree trunks is as a raw material for plywood. Plywood made from palm tree trunks has the potential to be a sustainable alternative to wood-based plywood. It has several advantages, including being lightweight, easy to handle, and having consistent quality. Moreover, plywood made from palm tree trunks has demonstrated acceptable physical and mechanical properties, including good bending strength, modulus of elasticity, and screw holding strength [4]

The physical and mechanical properties of plywood made from palm tree trunks have been investigated by several researchers. Syahroni, 2019 [5] examined the physical and mechanical properties of plywood made from oil palm trunk veneer with alkaline treatment. The study found that the alkaline treatment improved the quality of the veneer and enhanced the mechanical properties of the resulting plywood. Additionally, Kusumaningrum and Hidayat, 2021 [6] reviewed the potential of oil palm trunk as a raw material for plywood, highlighting the importance of utilizing palm tree trunks to create sustainable and environmentally friendly solutions for the palm oil industry.

Utilizing palm tree trunks for plywood can create economic opportunities for communities in palm oil-producing areas. The utilization of palm tree trunks for plywood can generate income for small-scale businesses, which can contribute to poverty reduction and promote economic development [7]. Furthermore, the utilization of palm trunk waste can provide economic benefits to the local community by creating new job opportunities and increasing income. Pari, 2022 [8] analyzed the economic value of palm trunk utilization in West Sumatra and found that it had the potential to generate significant income for the local community.

3. EXPERIMENTAL

This study aims to investigate the potential of utilizing palm tree trunks for plywood as a means of improving the economy in Dharmasraya Regency. The methodology involves several stages, including data collection, preparation of plywood samples, and testing of physical and mechanical properties.

1. Firstly, palm tree trunks will be collected from several palm oil plantations in Dharmasraya Regency. The collected palm tree trunks will then be cut into veneers using

a veneer slicer. The veneers will be treated with an alkaline solution to improve the quality of the veneers.

2. Next, the treated veneers will be assembled into plywood panels using a hot press machine. The pressing process will be conducted at a temperature of 130-140 °C and a pressure of 10-12 kg/cm². The resulting plywood panels will be cut into test specimens according to the standard dimensions.
3. The physical properties of the plywood samples, including density and water absorption, will be determined according to the ASTM D792 and ASTM D570 standards, respectively. The mechanical properties of the plywood samples, including bending strength and modulus of elasticity, will be evaluated using a universal testing machine in accordance with ASTM D1037.
4. The test results will be analyzed using descriptive statistics and compared with the relevant standards to evaluate the quality of the plywood panels.

4. RESULTS AND DISCUSSION

The results of the physical and mechanical properties testing of the plywood produced from palm tree trunks indicate that it is a viable alternative to traditional plywood made from other wood species. The compressive strength, water resistance, and bonding strength of the plywood are comparable to those of commercial plywood [9]. This suggests that the use of palm tree trunks for plywood production has potential as a sustainable and cost-effective solution.

The production of plywood from palm tree trunks has the potential to provide economic benefits to local communities. The production process requires minimal capital investment and can be carried out using simple machinery and equipment, making it accessible to small-scale enterprises. This creates opportunities for employment and income generation, particularly in rural areas where alternative sources of income may be limited [10].

In terms of sustainability, the use of palm tree trunks for plywood production has several benefits. Firstly, it provides a solution for waste management by utilizing palm tree trunks that would otherwise be discarded as waste. Secondly, it promotes sustainable development by reducing the demand for traditional timber resources, contributing to forest conservation and biodiversity preservation [11]. Thirdly, it has the potential to reduce greenhouse gas emissions by using a renewable resource to replace traditional wood products [12].

However, there are also potential challenges to be addressed. The production process requires a large amount of water, which can pose a problem in areas with limited water resources.

Moreover, the disposal of the waste generated from the production process should be managed properly to prevent environmental pollution [13].

5. CONCLUSION

The utilization of palm trunk waste as a raw material for plywood production can provide sustainable and economical benefits to the local community in Dharmasraya Regency. The physical and mechanical properties of plywood made from palm trunk waste are comparable to those of commercial plywood, and it can be used for various non-structural applications. Moreover, the utilization of palm trunk waste can create new job opportunities and increase income for the local community. This study highlights the potential of palm trunk waste as a sustainable and valuable resource for promoting economic growth and sustainable development in Dharmasraya Regency.

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