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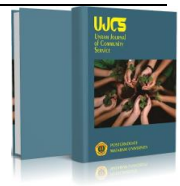

Effectiveness of Using Wood Powder and Litter Fertiliser on Rice Paddy Farming (Implementation in Tanjung Harapan Farmer Group, Setiris Village, Maro Sebo District, Muaro Jambi Regency)

Riri Oktari Ulma[1*], Yusma Damayanti[1], Dewi Sri Nurchaini[1], Yulismi[1], Mukhlis[2]

[1] Program Studi Agribisnis Fakultas Pertanian, Universitas Jambi, Jambi, Indonesia
[2] Department of Agriculture Business, Politeknik Pertanian Negeri Payakumbuh, Payakumbuh, Indonesia

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Corresponding Author:
Riri Oktari Ulma
riri_oktari@unja.ac.id

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Abstract: The use of wood powder and leaf litter fertilizer in wetland rice farming has proven to be effective in improving agricultural productivity sustainably. The research was conducted in Setiris Village, particularly in the Tanjung Harapan Farmer Group, in Jambi Province. This organic fertilizer, besides reducing the environmental damage caused by wood powder waste, has also brought about positive changes in farming practices. Training and counseling have been conducted to enhance farmers' understanding of using organic fertilizer. Wood powder and leaf litter fertilizers enhance crop productivity and quality, improve soil structure, and reduce production costs. Thus, the use of these fertilizers supports sustainable and environmentally friendly farming in Setiris Village.

Keywords: Organic fertilizer; Wood powder; Leaf litter; Productivity; Counseling; Training.

Introduction

Sawdust is wood particles that result from the process of cutting wood with a saw. The source of sawdust can come from various sources, including agricultural waste and processed wood. Indonesia's sawn timber production reaches 2.6 million m3 per year, with about 54.24% of this amount becoming waste. Sawmill waste reaches about 1.4 million m3 per year, almost half of the total sawnwood production. The average yield of a sawmill is 45%, while the remaining 55% is waste, of which about 10% is sawdust. The handling of wood sawdust waste often causes environmental problems because it is often disposed of in an inappropriate way such as letting it rot, piling up, or burning (Afief et al., 2015).

Reducing sawdust waste that can damage the environment can be overcome by processing sawdust into environmentally friendly organic fertiliser, in accordance with the concept of implementing LEISA (Low External Input Sustainable Agriculture). The effectiveness of using sawdust and litter fertiliser is highly dependent on the willingness of farmers to apply organic fertiliser. Low application of organic fertiliser can lead to inefficiency in rice production. Therefore, by using organic fertiliser in the form of sawdust and litter, farmers can improve soil quality and rice production in a sustainable manner, in accordance with the LEISA principle.

Setiris Village, located in Jambi Province, is one of the areas where the majority of the population work as farmers. The dominant agricultural sector in this village is wet-rice farming, which covers a land area of 200

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hectares. The village is organised into 12 farmer groups that are actively involved in various agricultural activities, from planting to harvesting. As such, agricultural activities, particularly wet-rice production, form the economic backbone and main source of livelihood for the people of Setiris Village. In addition, Setiris Village also faces constraints in terms of capital costs, especially in relation to the cost of fertilisers. In particular, the high cost of chemical fertilisers is a burden for farmers in this village. Therefore, to increase production yields and reduce the cost burden, the adoption of the latest innovations in agriculture is required (Aqidah et al., 2022).

The strategy of using organic fertilisers based on sawdust and litter aims to improve soil fertility by utilising local microorganisms contained in these fertilisers. Organic fertilisers such as sawdust and litter contain a variety of microorganisms, such as bacteria and fungi, which have an important role in the decomposition of organic matter and humus formation. When these organic fertilisers are applied to the soil, these local microorganisms will actively work to decompose organic matter into nutrients that are more easily absorbed by plants, and increase the availability of soil nutrients such as nitrogen, phosphorus and potassium. Thus, the use of organic sawdust and litter fertilisers not only helps in naturally fertilising the soil, but also improves the overall soil quality, as well as improving soil structure and water retention (Ulma & TIM MBKM, 2023).

Several studies have shown that sawdust and litter fertiliser can help improve soil nutrients to increase yields. These organic fertilisers have the potential to improve soil fertility by providing nutrients needed by plants naturally. Thus, the use of sawdust and litter fertiliser can be an effective solution in increasing agricultural productivity in a sustainable manner.

Method

Materials

Wood chips, litter, EM4, brown sugar, water, and buckets, tarpaulins, sacks, shovels.

Methods

The research method was carried out in the Tanjung Harapan farmer group, which is one of the farmer groups in Setiris Village. To make organic fertiliser from sawdust and litter, the steps begin by preparing materials such as 9 kg of wood sawdust and 1 kg of litter, then spilling it onto a tarp or a large enough container Next, in a bucket, dissolve 5 litres of water with 5 caps of EM 4 liquid and stir until evenly distributed. Mix 3 ounces of brown sugar into the EM 4 solution and stir until fully incorporated. Leave the solution for 20 minutes to wake up the microorganisms. After that, mix the solution with sawdust until it feels slightly moist. Next, put the mixture of sawdust and solution into a sack and tie it tightly. Let it sit for 14-20 days so that the basic sawdust fertiliser ferments well. Thus, this organic fertiliser is ready to be used to increase soil fertility and agricultural production naturally.

Result and Discussion

Counselling and Training

Counselling and training on the use of sawdust and litter-based fertiliser is an important step in implementing the new agricultural technology in Setiris Village, especially in the Tanjung Harapan Farmer Group. Through this activity, villagers, especially farmers in the farmer group, were given an in-depth understanding of the benefits, usage, and application techniques of sawdust and litter organic fertiliser in paddy rice farming.

The extension was conducted as an effort to disseminate information about the advantages of these organic fertilisers, including in terms of increasing soil fertility, improving soil structure, and increasing production yields in a sustainable manner. In the extension session, farmers are invited to understand the process of fermentation and decomposition of organic matter in fertilisers, as well as how the microorganisms involved in the process can improve soil health and plant growth (Nugroho et al., 2024).

Figure 1. Documentation of Extension Implementation

Furthermore, training was conducted to provide farmers with practical skills in using sawdust and litter organic fertiliser effectively. Farmers were taught about the application techniques of these fertilisers, including the preparation of the solution, compaction of the fertiliser in sacks, and the appropriate timing of fertiliser application during the crop growth cycle.

Figure 2: Documentation of the Training on Making Basic Wood Powder and Litter Fertiliser

Through this training, farmers can master the process of using organic fertiliser properly and apply it independently in their farms. Continuous counselling and training is also a platform to facilitate knowledge exchange between farmers and experts or researchers. This enables better technology adoption, collaborative problem-solving, and increased awareness of sustainable agricultural practices in the Setiris Village farming community, particularly in the Tanjung Harapan Farmer Group (Hardiwinoto et al., 2010). Thus, extension and training are important steps in encouraging the application of sawdust and litter organic fertiliser as part of efforts to sustainably increase agricultural productivity and reduce negative impacts on the environment.

Figure 3. Making Wood Powder and Litter Base Fertiliser

Effectiveness of Wood Powder and Litter

In Setiris Village's Tanjung Harapan Farmer Group, the use of sawdust and litter fertiliser has brought about significant changes in the practice of wet rice farming. Along with applying this technique, farmers in the group have witnessed a marked improvement in the productivity and quality of their crops. These organic fertilisers have had a positive impact, not only in terms of increased yields, but also in the health and fertility of the soil and the environment.

Figure 4. Wood Powder and Litter Base Fertiliser

Figure 5. Wood Powder and Litter Base Fertiliser after Packaging

By improving the soil structure woody debris and litter improves water retention and soil drainage, and enhances the growth of the plant root system, all these factors provide a solid foundation for better plant growth and development. In addition, these organic fertilisers also increase the activity of beneficial soil microbes (Sari & Darmadi, 2016). By introducing microorganisms that improve the circulation of nutrients in the soil over the long term, it brings sustainable benefits to soil health and agricultural productivity. These changes are not only seen in production yields, but also in more sustainable farming practices (Afirdaningrum & Mizwar, 2022).

Figure 6. Rice Paddies Using Wood Powder and Litter Base Fertiliser

Figure 7. Paddy fields not using sawdust-based fertiliser

Rice paddies that use sawdust-based fertiliser have a noticeable difference compared to those that do not. The soil in which the rice grows becomes more fertile due to the microorganisms in the fertiliser, which positively affect nutrient availability and soil structure. As a result, plant growth is faster and more lush, with stronger growing roots and leaves. In addition, yields tend to be higher as plants treated with organic fertiliser have better access to nutrients. This also makes the plants more resistant to diseases and pests, as their natural defence system is better (Suniantara et al., 2019).

Meanwhile, paddy rice plants that do not use wood dust base fertiliser tend to show some striking differences. The soil in which the rice grows becomes less fertile due to the lack of microorganisms brought in by the wood fertilizer (Laksono et al., 2021). As a result, plant growth is slower and the plants tend to look skinny. The leaves also tend to be less green, even when close to harvest time. Plants that are not treated with sawdust fertiliser also tend to have weaker roots and poorer defence systems, making them more susceptible to diseases and pests. Yields are usually lower due to inadequate nutrient availability. Thus, differences in the use of sawdust base fertiliser greatly affect the overall productivity, health and growth of paddy rice (Mulyadi & Dahlan, 2012).

Farmers in Tanjung Harapan feel the positive impacts of using these organic fertilisers, which include reduced long-term production costs due to less reliance on chemical fertilisers and reduced negative impacts on the environment. Thus, the use of sawdust and litter fertiliser has brought meaningful changes to Tanjung Harapan farmers, strengthened local food security, and promoted more sustainable and environmentally-friendly agriculture in Setiris Village.

Conclusion

The use of sawdust and litter fertiliser has brought positive changes in wetland rice farming practices, especially in Tanjung Harapan Farmer Group, Setiris Village, Jambi. This research shows that these organic fertilisers are effective in increasing agricultural productivity in a sustainable manner. Through extension and training, farmers were provided with an in-depth understanding of the use of these organic fertilisers, which resulted in increased quality and quantity of crop yields, improved soil structure, as well as reduced production costs. Thus, the use of sawdust and litter fertiliser supports environmentally friendly and sustainable agriculture in Setiris Village.

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