



Empowerment of Rice Farmers Group Through Training on The Utilization of Rice Straw Waste into Organic Fertilizer

Kustiawati Ningsih, Halimatus Sakdiyah, Moh. Da'i Bachtiar

Universitas Islam Madura

E-mail: kustiawatin@gmail.com

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Abstract: *The purpose of this program is to increase the knowledge and skills of members of the Harapan Jaya Rice Farmers Group regarding the utilization of rice straw waste into organic fertilizer. The program are in the form of participatory socialization or counseling and training on making organic fertilizer from rice straw waste. The results of the program showed that from a total of 20 participants, 60% considered it very important for socialization and counseling activities and as many as 40% considered it important. The practical activity has an influence on the level of understanding of the participants, which is a significant increase to 3.57 (66,93%). This community service activity is one of the implementations of SDGs, namely climate change mitigation, decent work and economic growth, as well as quality education, so that it can provide business opportunities in the agricultural sector and increase the independence and economy of farmer groups.*



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Introduction

Indonesia, a top global producer of agricultural commodities, faces the critical task of maintaining domestic food security. Rice, the dominant staple crop, is cultivated extensively due to its role as the primary dietary staple surpassed only by corn, soybeans, cassava, eggs, dairy, and vegetables in national consumption. FAO reports a 47.2% rise in Indonesia's rice output over 12 years, albeit with significant annual volatility¹. The increase in rice production has led to an increase in the volume of rice straw waste between 8-11%². With the increase in the amount of rice straw, there will be an impact on the increase in agricultural waste and environmental pollution due to the burning of rice straw. So far, rice straw waste has only been burned in the farmland and has had limited utilization, this is due to its scattered nature in various places, resulting in high

¹ FAO. *Produksi Padi Indonesia Tahun 2006 - 2017*, 2017.

² Rhofita, E. I. and L. Chana AW. "Pemanfaatan Limbah Jerami Padi Di Desa Garon Kecamatan Balerejo, Kabupaten Madiun," *JIPEMAS: Jurnal Inovasi Hasil Pengabdian Masyarakat*, 2019, 120, 10.33474/jipemas.v2i2.2915.

collection and transportation costs³. Burning rice straw in farmland can decrease essential soil nutrient including nitrogen (N), phosphorus (P), potassium (K), and sulfur (S) by 21% to 80%^{4, 5, 6}. Burning rice straw not only causes air pollution but also affects public health and climate change^{7, 8}.

The main activity of the Harapan Jaya Farmers Group so far has only relied on agricultural activities, which incidentally are programs from the government through the Department of Agriculture and Field Extension Officers. Cultivation is limited to rice as their staple crop. The average area of land owned by members of the Harapan Jaya Farmers Group is 0.25 Ha. So the total area of land owned by the Harapan Jaya Farmers Group is one hectare. From the area of one hectare that was processed, a total harvest of 5000 kg (5 tons) was obtained. Al. K⁹ stated that the straw/harvest ratio was 1.4 (based on mass dry weight). This means that every 1 tonne production will produce 1.4 tons of straw. So that from the total harvest of 5 tons, the rice straw waste produced is 7 tons. Because the knowledge of farmers who are members of farmer groups is still very minimal about the use of straw into organic fertilizer, no one has yet used the rice straw to become something more valuable, such as organic fertilizer or as environmentally friendly fuel. The benefits of straw compost are not only seen in terms of nutrient content. Compost also has a high organic C content. The addition of straw compost will increase the organic matter content of the soil. The consistent use of straw compost in the long term will increase the organic matter content of the soil and restore soil fertility.

Based on conditions in the field, rice straw waste is still not optimally utilized by rice farmers, even just burned and without further processing. This is a challenge for farmers caused by the weak adoption of technology among rice farmers. The factors that

³ Rhofita, E. I. "Kajian Pemanfaatan Limbah Jerami Padi di Bagian Hulu," *Al-Ard: Jurnal Teknik Lingkungan*, 2016, 74–79, 10.29080/alard.v1i2.118.

⁴ Trivedi, A., A. R. Verma, S. Kaur, B. Jha, V. Vijay, R. Chandra, V. K. Vijay, P. M. V. Subbarao, R. Tiwari, P. Hariprasad and R. Prasad. "Sustainable bio-energy production models for eradicating open field burning of paddy straw in Punjab, India," *Energy*, Elsevier Ltd, 2017, 310–317, 10.1016/j.energy.2017.03.138, <http://dx.doi.org/10.1016/j.energy.2017.03.138>.

⁵ HUANG, W., J. fu WU, X. hua PAN, X. ming TAN, Y. jun ZENG, Q. hua SHI, T. ju LIU and Yan hua ZENG. "Effects of long-term straw return on soil organic carbon fractions and enzyme activities in a double-cropped rice paddy in South China," *Journal of Integrative Agriculture*, CAAS. Publishing services by Elsevier B.V, 2021, 236–247, 10.1016/S2095-3119(20)63347-0, [http://dx.doi.org/10.1016/S2095-3119\(20\)63347-0](http://dx.doi.org/10.1016/S2095-3119(20)63347-0).

⁶ Singh, R., B. Sinha, H. Hakkim and V. Sinha. "Source apportionment of volatile organic compounds during paddy-residue burning season in north-west India reveals large pool of photochemically formed air toxics," *Environmental Pollution*, Elsevier Ltd, 2023, 122656, 10.1016/j.envpol.2023.122656, <https://doi.org/10.1016/j.envpol.2023.122656>.

⁷ Nengah Muliarta, I. "Knowledge and Perception of Farmers Towards Composting Rice Straw Waste," *Agriseip*, 2021, 81–94, 10.31186/jagriseip.20.1.81-94.

⁸ Goyal, P., S. Gulia and S. K. Goyal. "Critical review of air pollution contribution in Delhi due to paddy stubble burning in North Indian States," *Atmospheric Environment*, Elsevier Ltd, 2025, 121058, 10.1016/j.atmosenv.2025.121058, <https://doi.org/10.1016/j.atmosenv.2025.121058>.

⁹ Al, K. et. "Indirect Land Use Change for Biofuels : Testing Predictions and Improving Analytical Methodologies," *Biomass and Bioenergy*, 2011, 4488–4491.

influence this are the farmers' education level ¹⁰ and the size of the farmers' families ¹¹. Therefore, service activities are needed in the form of utilizing rice straw waste into compost organic fertilizer. Technology-based agribusiness transformation holds significant potential for improving farmer welfare. However, its success is largely determined by the ability to overcome various existing challenges, such as limited access, lack of training, inadequate infrastructure, and suboptimal supporting policies. Therefore, synergy between the government, the private sector, and educational institutions is needed to build an ecosystem that encourages inclusive technology adoption ^{12,13}.

According to Bachtiar et.al ¹⁴ the benefits of organic fertilizer/compost from rice straw waste can improve the physical, chemical and biological properties of the soil, are environmentally friendly, do not require a lot of money, and the manufacturing process is easy. In addition, fertilizer made from rice straw waste is one of the implementations of the Sustainable Development Goals (SDGs), namely climate change mitigation, decent work and economic growth, as well as quality education ^{15,16,17}.

¹⁰ Abera, A., E. Bojago, M. Masha and T. Lidatu. "Agroforestry practices, adoption factors, and livelihood contributions among smallholder farmers in Didu district, southwestern Ethiopia," *Journal of Agriculture and Food Research*, Elsevier B.V., 2025, 102052, 10.1016/j.jafr.2025.102052, <https://doi.org/10.1016/j.jafr.2025.102052>.

¹¹ Chanie Haile, D., Y. Kebede Bizuneh, M. Debele Bedhane and A. Gelaw Mekonnen. "Determinants of land management technology adoptions by rural households in the Goyrie watershed of southern Ethiopia: Multivariate probit modeling estimation," *Heliyon*, Elsevier Ltd, 2024, e31894, 10.1016/j.heliyon.2024.e31894, <https://doi.org/10.1016/j.heliyon.2024.e31894>.

¹² Noviar, H., A. Saputra, S. Syahril, F. Fitriadi and S. Badli. "Tantangan Pengembangan Pertanian Wilayah Pedesaan (Studi Kasus Desa Leuken)," *Jurnal Pengabdian Agro and Marine Industry*, 2023, 16, 10.35308/jpami.v3i1.7614.

¹³ Wanda, T., T. W. Mado and Y. J. Mado. "Transformasi Agribisnis Melalui Teknologi: Peluang Dan Tantangan Untuk Petani Indonesia," *HOAQ (High Education of Organization Archive Quality) : Jurnal Teknologi Informasi*, 2024, 146–150, 10.52972/hoaq.vol15no2.p146-150.

¹⁴ Bachtiar, B., D. Andi and H. Ahmad. "Analisis Kandungan Hara Kompos Johar Cassia siamea dengan Penambahan Aktivator Promi," *Bioma: Jurnal Biologi Makassar*, 2019, 68–76.

¹⁵ Malihah, L. "Tantangan Dalam Upaya Mengatasi Dampak Perubahan Iklim Dan Mendukung Pembangunan Ekonomi Berkelanjutan: Sebuah Tinjauan," *Jurnal Kebijakan Pembangunan*, 2022, 219–232, 10.47441/jkp.v17i2.272.

¹⁶ Lathifa Putri Wiedhya Syahrani, Luthfia, Prabang Setyono and R. Muhammad Amin Sunarhadi. "Meningkatkan Resiliensi Perkampungan terhadap Perubahan Iklim: Kasus Implementasi Program Kampung Iklim Pucangsawit, Surakarta," *Jurnal Lingkungan Binaan Indonesia*, 2024, 1–10, 10.32315/jlbi.v13i1.265.

¹⁷ Adji, R., A. Sayekti and A. Khamdi. "Empowering Women Farmers : Training in Organic Fertilizer Production for Sustainable Horticulture and Economic Growth," *ENGAGEMENT: Jurnal Pengabdian kepada Masyarakat*, 2025, 43–62.



Figure 1. Profile of Harapan Jaya Farmers Group and Rice Straw Burning Activities

The long-term effect of using organic fertilizers is that it can improve the physical, chemical and biological properties of the soil and the resulting organic products are safe for health. The government's support for organic farming is manifested in the "Go Organic" program which started in 2010 and continues to this day. Plant cultivation with an organic system is an effort to support sustainable agriculture and realize food security. Organic fertilizer/compost from rice straw waste can later be used by farmers in the fertilization process in plant cultivation. The program aims to increase the knowledge and skills of rice farmer groups about processing rice straw into organic fertilizer/compost.

Method

The service activity was carried out at the Harapan Jaya Farmers Group in Panaguan Village, Larangan District, Pameasan Regency. The participants were members of the Harapan Jaya Farmers Group. The number of participants is 20 people.

Service activities are in the form of participatory socialization or counseling, training on making organic fertilizer from rice straw waste and monitoring and evaluating service activities. The counseling was carried out at the home of Mr. H. Hadi Suwono as the Chair of the Harapan Jaya Farmers Group by providing an understanding of processing rice straw waste into organic fertilizer through the fermentation/composting stage and the benefits of organic fertilizer/compost.

The training is carried out by direct demonstration or direct practice of the process of making organic fertilizer/compost from rice straw waste to service participants. According to Sulmiyati and Said¹⁸ stated that direct practical training aims for service participants to directly practice so that it is easier for them to understand the training material that has been delivered. Evaluation activities for the implementation of service are carried out through Focus Group Discussions (FGD) with service participants about the results of service activities that have been carried out. The training

¹⁸ Sulmiyati, S. and N. S. Said. "Pengolahan Briket Bio-Arang Berbahan Dasar Kotoran Kambing dan Cangkang Kemiri di Desa Galung Lombok Kecamatan Tinambung, Polewali Mandar," *Jurnal Pengabdian kepada Masyarakat (Indonesian Journal of Community Engagement)*, 2017, 108-118, 10.22146/jpkm.25529.

implementation method is presented in the figure 2.



Figure 2. The implementation Method of Training on Organic Fertilizer Production From Rice Straw

Result

Compost is organic material derived from leaves, straw, reeds, rice bran, grasses, corn stalks, tendrils, branches and animal waste that have undergone a decomposition process by decomposing microorganisms. Factory-made chemical fertilizers such as Urea, SP-36, Phonska, KCL have a negative impact on soil fertility. So, to improve the texture/physical, chemical and biological properties of the soil and improve soil fertility, it is necessary to use compost from rice straw waste. According to Widiastuti¹⁹, compost can provide benefits, namely improving soil properties because it contains mineral nutrients that are important for plants. Making organic fertilizer/compost is part of environmental management using effective microorganisms (EM). According to Majlessi²⁰, plant residues and composted waste are effective in producing biofertilizers.

Socialization and Counseling on the Utilization of Rice Straw Waste for Organic Fertilizer

The lack of partner knowledge about the use of rice straw waste into organic fertilizer is one of the reasons for the need for community service activities in the form of

¹⁹ Widiastuti et al. "Evaluasi Perubahan Pengetahuan dan Keterampilan Petani dalam Pembuatan Kompos Jerami Padi Di Kelompok Karya Bersama Pampangan Kab. Ogan Komering Ilir," *Jurnal Triton*, 2018, 51-58.

²⁰ Majlessi, M., A. Eslami, H. N. Saleh, S. Mirshafieean and S. Babaii. "Vermicomposting of food waste: Assessing the stability and maturity," *Journal of Environmental Health Science and Engineering*, 2012, 1-6.

socialization and counseling on the use of rice straw waste into organic fertilizer.

Socialization and counseling activities were carried out by providing material about the benefits of organic fertilizer/compost from rice straw to the Harapan Jaya rice farmer group. Rice straw is one of the organic materials that can be used as organic fertilizer. The existence of rice straw waste which is abundant and has not been used optimally, in this case it is only burned or left alone is a great potential to be used as raw material for organic fertilizer. With the use of organic fertilizers, it is expected to increase farmers' income. With the socialization and counseling about the utilization of rice straw waste into organic fertilizer/compost, there was an increase in knowledge and insight to members of the Harapan Jaya Farmers Group.



Figure 3. Presentation of Socialization and Counseling Materials on Utilization of Rice Straw Waste into Organic Fertilizer/Compost

The results of the socialization and counseling activities to participants were an increase in partners' knowledge about the benefits of rice straw and the stages of making organic fertilizer/compost. The participants of the socialization/extension were very enthusiastic and this was shown during the socialization/examination the participants had a lot of discussions with the presenters/resources. Some participants even shared their experiences when farming rice and when post-harvest rice straw waste was just left in the fields, then watered with water without composting and sometimes just burned on the ground. The feedback from the participants of the socialization and counseling on the material of socialization and counseling about the utilization of rice straw waste into organic fertilizer/compost fertilizer is presented in Figure 4. Based on Figure 4, it can be seen that out of a total of 20 participants, 12 people or 60% rated the socialization and counseling activities as very important, and 8 people or 40% rated them as important.

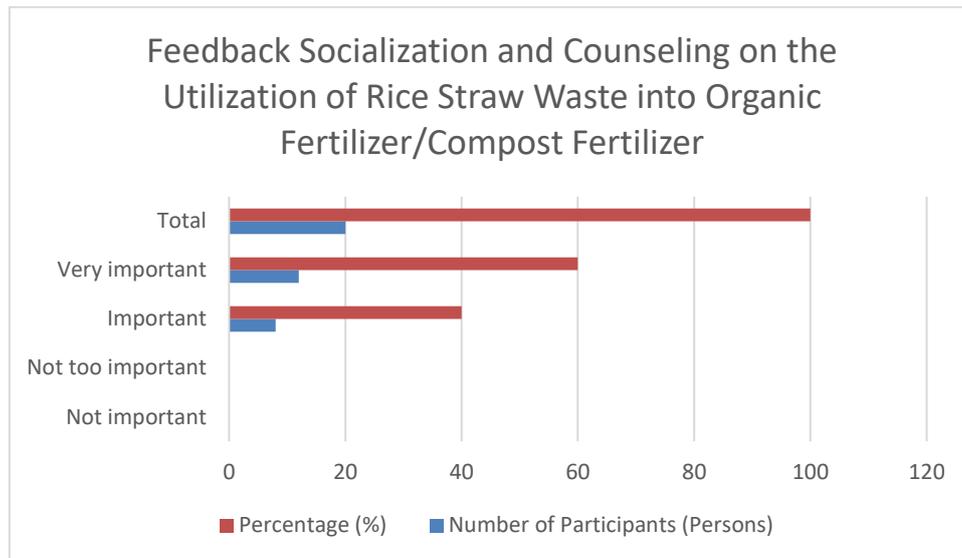


Figure 4. Feedback on Socialization and Counseling on the Utilization of Rice Straw Waste into Organic Fertilizer/Compost Fertilizer

- a. Making a fermentation tub from bamboo. The size of the fermentation tub is adjusted to the needs, namely how much material will be processed.



Figure 5. Fermentation tub made of bamboo

- b. Cutting rice straw into small sizes. The cutting of rice straw is done manually using a sickle/sickle. Cutting rice straw serves to speed up the weathering/decomposition process.
- c. Mix water, activator, and sugar water. The composition is:
 - Activator : 10-20cc
 - Sugar water / molasses : 5-10 cc
 - Water : 10 liters
- d. The material is put into a bucket/gembor then stirred until evenly mixed, then sprinkled on the material.



Figure 6. Mixing water with activator and molasses

- e. Watering the fermentation tub
- f. Before the material is arranged in the fermentation bath, it should be watered first with water that has been mixed with activator and molasses. This watering serves so that at the bottom of the fermentation place there are already microbial decomposers.
- g. Put the ingredients into the fermentation bath. When entering the material into the fermentation tank, it should be arranged in layers with the following arrangement:
 1. Enter the manure at the bottom with a thickness of 3cm, then flush with water that has been mixed with the activator.
 2. Enter the straw in the second layer with a thickness of 10 cm, then flush with water that has been mixed with the activator.
 3. Enter the manure on the 3rd layer with a thickness of 5 cm, then flush with water that has been mixed with the activator.
 4. Repeat point b) until the stack height reaches 0.5 – 1 m. After the pile reaches 1 meter, then store the husk charcoal at the top of the pile, then flush it with water that has been mixed with the activator.



Figure 7. Watering the material with water that has been mixed with activator

f. Take off the fermentation tub

g. Cover the material with a tarp



Figure 8. Covering Material with tarpaulin

The practice of making organic fertilizer from rice straw waste received a good response from the participants so that the implementation of the practice went well. The level of participants' understanding of the practice of making organic fertilizer from rice straw waste is presented in Figure 10. In Figure 10 it can be seen that prior to the implementation of the practice of making organic fertilizer from rice straw waste, the average score of participants' understanding level of the practice of making organic fertilizer was 1,18. However, after the implementation of the practice of making organic fertilizer from rice straw waste, the average score of the participants' understanding of the practice of making organic fertilizer experienced a significant increase, namely to 3,57 or a significant increase of 66,93%. This shows that community service activities have succeeded in increasing the knowledge and skills of participants in processing straw into organic fertilizer. This also shows that the participants in participating in the counseling and practice are very enthusiastic about wanting to increase their knowledge about how to make organic fertilizer from rice straw waste in a practical way.

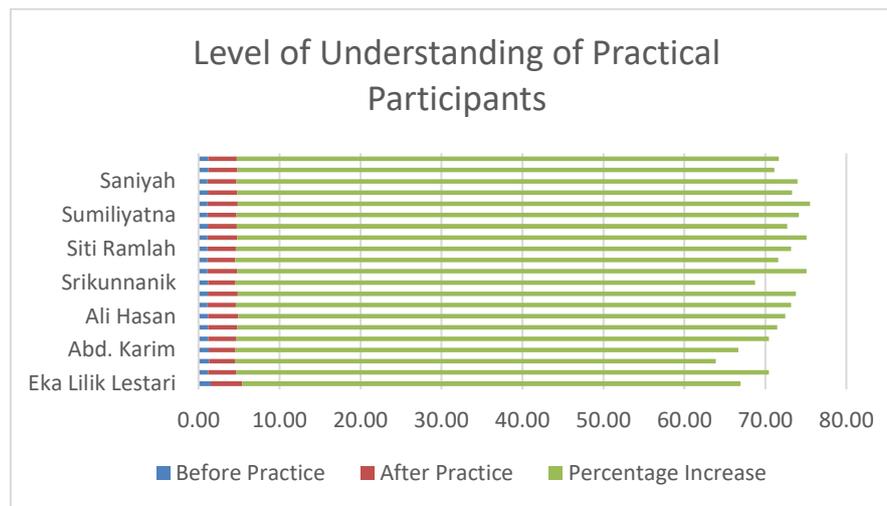


Figure 9. Level of Participants' Understanding of the Practice of Making Organic Fertilizer from Rice Straw Waste

Information :

Score 4 = very understanding

Score 3 = understand

Score 2 = little understanding

Score 1 = don't understand

The community service program in the form of training on the utilization of rice straw waste into organic fertilizer that we carried out for the rice farmer group in Panaguan Village received a very positive response. Enthusiasm was evident from the participants' active questioning and full participation during the activities. This training successfully provided tangible benefits by increasing the understanding and skills of group members in making organic fertilizer from rice straw waste, as well as creating business opportunities that can enhance the independence and economy of the group. Table 1 shows a summary of the development results before and after the training in the community service activities.

Table 1. Development Results Between Before and After Training

| No | Component | Before Training | After Training | Information |
|----|---|--|---|--|
| 1 | Practice of making organic fertilizer from rice straw waste | The group has not utilized post-harvest rice straw waste and only burns it in the rice fields. | The group started using rice straw waste as organic fertilizer. | Efficiency increased by 100% |
| 2 | Level of participant enthusiasm | The number of participants attending is not yet known | The number of participants who attended was in | 20 participants or 100% of group members |

| | | | | |
|---|---|--|--|---|
| | | | accordance with the planned target. | actively participated and followed the training well. |
| 3 | Understanding the material | Group members do not yet understand the use of rice straw waste as organic fertilizer. | Group members already understand how to make organic fertilizer from rice straw waste. | Participants' level of understanding increased significantly by 66.93% |
| 4 | Training on making organic fertilizer from rice straw waste | Group members do not yet know the materials and tools needed and the manufacturing techniques. | Group members already know the materials and tools needed as well as the manufacturing techniques. | 100% of group members are able to make organic fertilizer from rice straw waste |

Discussion

Fertilizers are external nutrient sources that support plant growth. In agriculture, they are essential for replacing nutrients lost during harvests. However, modern farming demands more than just nutrient restoration. With shrinking farmland and rising global food needs, maximizing crop yields (production per unit area) has become crucial. To meet these demands, intensive fertilizer use is necessary to boost both the quantity and quality of agricultural output goals that cannot be achieved otherwise ²¹. However, the use of chemical fertilizers, especially nitrogen (N) fertilizers, has caused soil quality degradation, soil humus mineralization, and excessive nutrient leaching into the ecosystem ²². Although chemical fertilizers provide short-term yield benefits, their long-term ecological impacts remain severe ²³. Therefore, the use of organic fertilizers is now a crucial part of farming to maintain soil fertility. Organic fertilizers have the potential to synergistically increase the overall nutrient availability for plants, key to increasing productivity, profitability, and sustainability of rice systems ²⁴.

²¹ Priya, E., S. Sarkar and P. K. Maji. "A review on slow-release fertilizer: Nutrient release mechanism and agricultural sustainability," *Journal of Environmental Chemical Engineering*, Elsevier Ltd, 2024, 113211, 10.1016/j.jece.2024.113211, <https://doi.org/10.1016/j.jece.2024.113211>.

²² Duan, Q., Q. Liu, R. Yang, X. Kong, Y. Gao, S. Yue, Y. Shen and M. Xu. "Long-term co-application of nitrogen and organic fertilizers enhances soil quality and wheat growth stability by modulating microbial communities," *Applied Soil Ecology*, Elsevier B.V., 2025, 106309, 10.1016/j.apsoil.2025.106309, <https://doi.org/10.1016/j.apsoil.2025.106309>.

²³ BAI, J. shun, S. qing ZHANG, S. min HUANG, X. peng XU, S. cheng ZHAO, S. jun QIU, P. HE and W. ZHOU. "Effects of the combined application of organic and chemical nitrogen fertilizer on soil aggregate carbon and nitrogen: A 30-year study," *Journal of Integrative Agriculture*, CAAS. Publishing services by Elsevier B.V, 2023, 3517-3534, 10.1016/j.jia.2023.09.012, <http://dx.doi.org/10.1016/j.jia.2023.09.012>.

²⁴ Das, S., A. Kumar, N. C. Giri, S. Pal, H. Banerjee, D. J. Gaikwad, B. Sarkar and V. S. Meena. "Impact of

Several research results on the benefits have been carried out, such as the results of research by Ezward²⁵ which states that rice straw compost alone has a significant effect on the parameters of harvest age and dry grain weight. This is supported by research by ²⁶ which states that the use of biochar and rice straw compost affects the growth and production of rice plants. Other research on the benefits of organic fertilizer from straw waste has also been carried out by M. Pranata²⁷, Maganti²⁸ and Bimasri²⁹. This service activity that we have done is one form of implementation of the results of the research, namely training activities on the use of rice straw waste into organic fertilizer through socialization / counseling and practice activities. The results of the service activities showed that from a total of 20 participants, 12 people or 60% considered it very important for socialization and counseling activities and as many as 8 people or 40% considered it important. Meanwhile, the practical activity of utilizing rice straw waste into organic fertilizer has an influence on the level of understanding of the participants, which is a significant increase to 3,57 or a significant increase of 66,93%. This is also supported by Nurmalasari³⁰ which states that the service activities that have been carried out have increased the understanding and knowledge of service participants. Seeing some of the results of research and service that has been done by researchers and devotees, further assistance is needed, especially for improving the quality of organic fertilizer from rice straw. This community service activity is one implementation of the SDGs, specifically climate change, and can create business opportunities, particularly in the field of agricultural production inputs such as organic fertilizer. Thus, this community service activity can increase the independence and economic well-being of rice farmer groups.

Conclusion

Straw, as the largest by-product of rice cultivation, has not been utilized optimally due to technical and economic constraints. The habit of burning straw by farmers can

coated fertilizers and organic manure on soil health and productivity indicators in rice-based cropping systems of the Eastern Indo-Gangetic Plains of India," *Field Crops Research*, Elsevier B.V., 2025, 109966, 10.1016/j.fcr.2025.109966, <https://doi.org/10.1016/j.fcr.2025.109966>.

²⁵ Al, E. et. "Peningkatan Produktivitas Tanaman Padi Melalui Teknik Budidaya dan Pupuk kompos Jerami," *Jurnal Agrosains dan Teknologi*, 2017, 51-67.

²⁶ Herman, W. and E. Resigia. "Pemanfaatan Biochar Sekam dan Kompos Jerami Padi Terhadap Pertumbuhan dan Produksi Padi (*Oryza sativa*) pada Tanah Ordo Ultisol," *Jurnal Ilmiah Pertanian*, 2018, 42-50.

²⁷ Pranata, M. and B. Kurniasih. "Pengaruh Pemberian Pupuk Kompos Jerami Padi terhadap Pertumbuhan dan Hasil Padi (*Oryza sativa* L.) pada Kondisi Salin," *Vegetalika*, 2019, 95-107.

²⁸ Maganti et al. "Peningkatan Produktivitas Padi di Lahan Pasang Surut dengan Pupuk P dan Kompos Jerami Padi," *Jurnal Tanah dan Iklim*, 2017, 17-24.

²⁹ Bimasri et al. "Manfaat Biosilika dari Kompos jerami Padi Terhadap produksi Tanaman Sorgum," *Agroland : Jurnal Ilmu-ilmu pertanian*, 2020, 214-222.

³⁰ Nurmalasari, A. I., S. Supriyono, M. T. Sri Budiastuti, T. D. Sulistyono and S. Nyoto. "Pemanfaatan Jerami Padi dan Arang Sekam sebagai Pupuk Organik dan Media Tanam dalam Budidaya Kedelai," *PRIMA: Journal of Community Empowering and Services*, 2021, 102, 10.20961/prima.v5i2.44766.

drastically alter paddy field conditions, including a 0.5 increase in pH, a 189 ppm rise in ambient CO₂ levels, a 21.9°C increase in soil temperature, a 4.9°C rise in air temperature, and a 15.9% decrease in soil moisture. Converting rice straw into organic fertilizer offers a solution for rice farmer groups in Panaguan Village, Larangan Subdistrict, Pamekasan Regency, as it can increase soil phosphorus content. Furthermore, farmers with a neutral attitude towards organic fertilizers often show a high willingness to adopt them. A similar condition was observed among the farmer groups in Panaguan Village, which was confirmed through our community service activities. These activities involved training farmers to convert rice straw into organic fertilizer and successfully demonstrated the method's practicality and acceptance.

From the service activities on counseling and the practice of using rice straw waste into organic fertilizer that we did to the Harapan Jaya Rice Farmers Group, it can be concluded that the extension of the use of rice straw waste into organic fertilizer, that from a total of 20 participants, as many as 12 people or 60% rated it very important to socialization and counseling activities and as many as 8 people or 40% considered it important. Meanwhile, the practical activity of utilizing rice straw waste into organic fertilizer has an influence on the level of understanding of the participants, which is a significant increase to 3.57 or a significant increase of 66,93%.

As an implication of the results of the community service activities we have carried out, we can provide the recommendation that the skills of rice farmers in utilizing rice straw waste into organic fertilizer can be improved through continuous mentoring, so that organic fertilizer can be produced continuously in terms of both quantity and quality. Beside that it also needed for ongoing mentoring activities for the results of community service activities, especially in digital marketing activities for organic fertilizer products that have been produced as an effort to improve the economy of farmer groups and the optimal role of field extension workers is very much needed so that in addition to community service activities that have been carried out by teachers, waste utilization extension activities by field extension workers can improve the knowledge and skills of farmer groups. This can realize the independence of farmer groups in entrepreneurship and create creative ideas..

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