



Enhancing Community Knowledge in Managing Waste into Economically Valuable Organic Fertilizer in Manjung Village, Wonogiri

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Abstract

Manjung Village, Wonogiri, has been facing serious challenges in waste management with increasing levels of environmental pollution due to a lack of knowledge of effective waste management. Existing organic waste has not been managed properly, resulting in negative impacts on public health and the environment and has no economic value. This activity aims to provide training to partners in managing organic waste in Manjung Village, Wonogiri District, into economically valuable organic fertilizer products. The partner of this activity is the "Manjung Berkah Waste Bank Group" in Manjung Village, Wonogiri District, Wonogiri Regency. Manjung Berkah Waste Bank was used as an activity partner because: (1) it already has waste management management, (2) existing human resources have not been able to manage organic waste optimally, and (3) the partner is one of the Waste Bank pilot institutions that is still active in Wonogiri Regency. The methods used include socialization, mentoring, and training activities. The results of this activity showed a significant increase in participants' knowledge and skills, as evidenced by the comparison of pre-test and post-test results. The increase showed that the training was effective. In addition, the partners also managed to produce organic fertilizer from previously unutilized waste. This activity not only increases environmental awareness but also opens up new economic opportunities for the community.

1. Introduction

Manjung Village in Wonogiri Regency is one of the villages facing classic problems in waste management, especially organic waste from households, farms, and livestock. This problem has a direct impact on environmental quality, public health, and the sustainability of the agricultural sector, which is the main livelihood of residents. Most of the population relies on

chemical fertilizers, which exacerbate environmental degradation (Rif'ah, 2020). Low levels of education and a strong traditional mindset lead to a lack of awareness of the importance of sustainable waste management.

Based on interviews with partners, waste production in Manjung Village reaches around 5 tons per month, consisting of 3 tons of non-organic waste and 2 tons of organic waste, which can be seen visually in Figure 1. Unfortunately, management is still limited to non-organic waste that has a selling value, while organic waste has not been utilized and is directly disposed of to landfill. This waste is often burned or thrown to the side of the road or ditch without an adequate collection system. As a result, the village environment suffers from air (Purnomo & Surnarsih, 2023; Dewi et al, 2023; Febriyanti et al, 2023), soil (Arifiansyah et al, 2023; Borut et al, 2024; Gao et al, 2023), and water (Utari et al, 2023) pollution, as well as various health problems (Wahyudi et al, 2023), especially in children and the elderly, and increased social conflicts due to littering (Sari et al, 2023).



Figure 1. (a) and (b) The condition of Non-Organic and Organic Waste in Manjung Village.

Following this, on December 30, 2023, the village government established the TPS3R and Waste Bank “Manjung Berkah” Self-Help Group (KSM) through Village Head Decree Number 17 of 2023. The group consists of 26 active members and is tasked with improving waste management at the local level. However, field observations show that the group still faces various obstacles, such as limitations in management, low technical skills, and minimal community participation in sorting and depositing waste, especially organic waste.

Manjung Village actually has great potential to develop a community-based waste management system. The main partner of this activity, the Manjung Berkah Waste Bank, still

needs support in terms of education and training. The majority of residents do not understand the basic techniques of processing organic waste into fertilizer, and are still accustomed to conventional methods such as burning waste (Rahmi & Lutfhia, 2018; Wiyarno & Widyastuti, 2022; Sumarna et al, 2023). In addition, the increasing price of chemical fertilizers is also an opportunity to encourage the development of organic fertilizers as an alternative that is more environmentally friendly and economical. Therefore, strengthening community capacity in organic waste management is considered very important to support the environmental and economic sustainability of the village.

This activity was designed based on the implementation team's experience in various previous service and research programs. Some of them include the development of a community-based waste bank model that encourages residents to save waste as a form of economic incentive (Anna, 2017), empowering Muhammadiyah 7 Colomadu Junior High School students through the 3P movement (select, sort, recover) to produce ecobrick products (Santhyami et al, 2022), developing web-based waste management applications (Anna, 2021), and environmental health literacy in Tawang Village, Sukoharjo (Kusumawati et al, 2024). Based on these experiences, this activity aims to provide training to partners in managing organic waste into economically valuable products and building a waste management system that is adaptive, sustainable, and in accordance with the local conditions of Manjung Village..

2. Methods of Implementation

2.1. Methods

The method used in the activity of managing waste into economically valuable organic fertilizer is through socialization, mentoring, and training. Socialization was conducted to partners and community representatives of each hamlet with a total of 2 participants. Socialization is intended to educate the community in managing organic waste. Training activities were carried out directly at the partner location by involving all 22 partner members. This training activity is intended to make organic fertilizer products that have economic value. Meanwhile, mentoring activities are intended to assist partners in efforts to market their products.

2.2. Stages of activity implementation

The stages of implementing this activity include: (1) situation analysis, (2) socialization to partners and the community, (3) training in waste management into organic fertilizer, (4) product marketing assistance, (5) monitoring and evaluation of waste management activities, (6) reporting and publication.

2.3. Partner Participation

Partner participation in this activity is actively participating in every stage of the activity. The participation of partners is involved in activities starting from the program socialization stage, waste management into economically valuable organic fertilizer, product marketing assistance, and monitoring and evaluation activities.

2.4. Program Evaluation and Sustainability

Program evaluation is conducted periodically to assess the effectiveness and efficiency of waste management activities and organic fertilizer production. Daily monitoring is conducted to observe the operational process and the quality of fertilizer produced, while monthly or quarterly evaluations are conducted to measure achievements against predetermined targets. Data from the evaluation results are used to identify emerging problems and develop improvement solutions. Active community participation is also assessed to ensure their involvement and support for the program. For the sustainability of the program, important measures include strengthening the capacity of the community through continuous training, so that they have the necessary skills to run and develop the waste management system independently.

3. Results and Discussion

3.1. Geographical and Socio-Economic Conditions of Manjung Village

Manjung Village is one of the villages in Wonogiri Subdistrict, Wonogiri Regency, Central Java Province. The village is located in a hilly area with the majority of the population earning a living as farmers, ranchers, and farm laborers. The village area is approximately 300

hectares with a population of approximately 1,800 people. The education level of the majority of the community is elementary and junior high school graduates. Community awareness of environmental issues is still relatively low, although there has been an increase in recent years. This is an important background in understanding the challenges and opportunities in implementing the waste-to-organic-fertilizer program.

3.2. Activity Implementation

Community service activities with the title “Waste Management into Economically Valuable Organic Fertilizer in Manjung Village, Wonogiri” have been carried out in four meetings. This series of activities took place on February 26, 2025, March 8, 2025, March 15, 2025, and March 22, 2025, at the Manjung Berkah Waste Bank Secretariat. This activity involved 22 participants from the local community, most of whom were farmers, laborers, and small business actors. The service implementation team consisted of 8 people, consisting of lecturers and students as field implementers, facilitators, and documentators. The entire series of activities began at 09.00 WIB until completion.

The first meeting on 26 February 2025 began with socialization, which aimed to give the community an initial understanding of the importance of organic waste management and the economic potential of compost. In this session, participants were given basic information on the types of waste, environmental impacts, and a brief introduction to the composting process. The next three meetings (March 8, 15, and 22, 2025) focused on technical training. The training was conducted in a practical and step-by-step manner, starting from the selection and separation of organic materials, compost making techniques, to the maturation and packaging process. Each training session was organized in an interactive manner with direct demonstration and discussion methods, so that participants not only understood theoretically, but were also able to practice it independently.

Through a systematic and participatory approach, this service activity is expected to have a real impact on the people of Manjung Village, both in terms of increasing environmental awareness and strengthening the economy based on the utilization of household waste. Visually, the course of socialization activities and training on household waste management into organic can be seen in Figure 2.



Figure 2. Documentation of Socialization and Training Activities.

3.6. Respondent Characteristics

Based on age, the age category of participants is the productive age group between 28 and 54 years old, with an average age of 43.6 years old. This age group is physically and mentally in an optimal condition to receive new knowledge and is able to follow and apply the waste management training into organic fertilizer in their daily lives. This productive age is also an important asset in creating behavior change and increasing the community's capacity in managing waste, especially because they have the endurance and long-term commitment to apply new knowledge consistently.

In terms of education, the majority of respondents had a secondary education background, with 45.5% graduating from junior high school (SLTP/MTs) and 40.9% graduating from senior high school (SMA/MA/SMK). Only 13.6% of respondents had primary education (SD/MI). This composition indicates that most participants have sufficient literacy skills to understand the training materials. The training that used a

practical and visual approach was able to reach all participants, including those with low education levels. With this approach, the training was not only inclusive but also effective in building community awareness and skills related to organic waste management.

In terms of occupation, most of the participants (68.2%) were farmers, while the rest consisted of traders/entrepreneurs (18.2%), laborers (9.1%), and others (4.5%). This composition strongly supports the success of the training as farmers are the group that directly benefits from the use of organic fertilizer. The participation of traders and entrepreneurs also opens up the potential for marketing organic fertilizer production, thus expanding the economic benefits of this program. Respondents from among the laborers also have the potential to develop small businesses based on waste management, given their flexibility in trying new opportunities.

The income level of the participants showed that 90.9% of the respondents had a monthly income below Rp1,000,000, while only 9.1% were in the range of Rp1,000,000 to Rp2,000,000. This economic condition makes waste management training highly relevant and necessary, as it can provide practical solutions to reduce household expenses and create additional income potential. This training program not only adds value environmentally, but also economically, making it a targeted solution for low-income communities in Manjung Village.

3.7. Activity Evaluation

The evaluation of this activity used pre-test and post-test methods on 22 respondents to assess the effectiveness of the socialization and training provided. The questions covered the understanding of the concept of organic compost fertilizer, its benefits, raw materials used, how microorganisms work, and challenges in the composting process. The results of this evaluation are presented in a table to show the changes in respondents' level of understanding before and after the training. In general, the results show a significant increase in understanding in various aspects of the material.

Table 1. Respondents' Understanding of Organic Compost Fertilizer

Respondent's Answer	Pre Test		Pos Test	
	Total	Percentage (%)	Total	Percentage (%)
Fertilizers made from natural materials such as food waste and dried leaves	18	81,8	20	90,9
Fertilizers derived from animal manure without additives	4	18,2	2	9,1
Total	22	100	22	100

In terms of basic understanding of organic compost, before the training 81.8% of respondents understood that this fertilizer comes from natural materials such as food waste and dry leaves. After the training, this figure increased to 90.9%. Meanwhile, the number of respondents with wrong perceptions decreased from 18.2% to 9.1%. These results reflect that the training was successful in improving participants' basic understanding, although there are still a small number who do not fully grasp the concept.

Table 2. Understanding the Benefits of Organic Compost Fertilizer

Respondent's Answer	Pre Test		Pos Test	
	Total	Percentage (%)	Total	Percentage (%)
Fertilize the soil naturally without harming the environment	12	54,5	5	22,7
Helps plants grow faster without side effects	1	4,6	1	4,5
All the answers are correct	9	40,9	16	72,7
Total	22	100	22	100

The understanding of the benefits of compost fertilizer also increased sharply. Before the training, only 40.9% of respondents were able to thoroughly identify the benefits of compost. After the training, this number jumped to 72.7%. This increase shows that the training succeeded in instilling a more complete insight into the benefits of compost, including its contribution to soil fertility, plant growth, and environmental sustainability. However, there are still about 27% of respondents who do not fully understand, so further reinforcement is needed.

Table 3. Types of Materials for Making Organic Compost Fertilizer

Respondent's Answer	Pre Test		Pos Test	
	Total	Percentage (%)	Total	Percentage (%)
Dry leaves and grass	12	54,5	6	27,3
Animal feces	6	27,3	3	13,6
Vegetable and fruit scraps	4	18,2	13	59,1
Total	22	100	22	100

A significant change in understanding was also seen in the introduction of compost-making materials. Initially, the majority of respondents (54.5%) only mentioned dry leaves and grass as the main ingredients. But after the training, 59.1% of respondents started to mention vegetable and fruit scraps as potential ingredients. This reflects the success of the training in introducing more accessible household organic materials, and encouraging participants to utilize kitchen waste as a source of compost material.

Table 4. Respondents' Understanding of How Microorganisms Work

Respondent's Answer	Pre Test		Pos Test	
	Total	Percentage (%)	Total	Percentage (%)
Break down organic matter into nutrients that plants need	19	86,4	21	95,5
Helps mix compost materials without changing their structure	3	13,6	1	4,5
Total	22	100	22	100

In the technical aspect, respondents also improved their understanding of how microorganisms work. Before the training, 86.4% knew that microorganisms play a role in breaking down organic matter into nutrients. This figure increased to 95.5% after the training. This shows that although most participants already had a basic understanding, the training was still able to strengthen and deepen their knowledge scientifically. The reduction in the number of respondents with misconceptions from 3 to 1 also shows the success of the educative approach used.

Table 5. Challenges in Making Organic Compost Fertilizer

Respondent's Answer	Pre Test		Pos Test	
	Total	Percentage (%)	Total	Percentage (%)
Requires a long time to prepare	16	72,7	15	68,2
Unpleasant odor if the process is not done properly	2	9,1	4	18,2
Requires sufficient space and maintenance	3	13,6	2	9,1
Can't be made by the general public	2	9,1	1	4,5
Total	22	100	22	100

Regarding the challenges in composting, the pre-test results showed that most respondents (72.7%) perceived the length of the process time as the main challenge. After the training, this perception slightly decreased to 68.2%, but the number of respondents who realized other challenges such as bad odor increased from 9.1% to 18.2%. This shows that the training was successful in increasing the practical knowledge of the participants, especially regarding the technical aspects that are often faced in the composting process, such as the importance of hygiene and proper process management.

It was interesting that there was a decrease in the perception that compost cannot be made by the general public, from 9.1% to only 4.5%. This indicates that the training succeeded in increasing the community's confidence in managing organic waste independently. In addition to enriching knowledge, the training also provided a psychological boost that composting is not something complicated or exclusive to certain circles. This is important to encourage active participation in community-based recycling activities.

Overall, the training on waste management into organic fertilizer had a positive impact on improving the community's environmental literacy. The increase in participants' understanding not only occurred in the conceptual aspect, but also in the technical and practical aspects, which are important provisions for application in everyday life. Although a small number of participants still showed suboptimal understanding, the evaluation results indicated that the training was effective and could be an educational model worthy of wider application in other areas facing organic waste management problems.

4. Conclusion

The conclusions that can be drawn from this activity include the following: (1) The waste-to-organic-fertilizer management program in Manjung Village succeeded in turning previously unmanaged household waste into economically valuable products. The impact not only reduces the volume of waste and improves environmental conditions, but also opens up new economic opportunities for residents. The success of this program is largely determined by the active role of the community, the support of the village government, and a sustainable educational approach, and (2) Organic waste management training activities in Manjung Village, Wonogiri District, have had a positive impact on Partners. This can be seen from the increased understanding and skills of participants in managing organic waste into economically valuable fertilizer. The effectiveness of this training can be seen from the comparison of pre-test and post-test results, which show a significant increase in scores. These results indicate that the material presented can be well understood by participants and the training takes place effectively. In addition to providing environmental insights, this activity also opened up new economic opportunities for the community. The next activity plan is to strengthen compost banks based on education, digitalization, and product innovation in Manjung Village.

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