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# ENHANCING PKK'S SKILLS IN SUKA MAKMUR VILLAGE FOR ORGANIC WASTE MANAGEMENT USING THE COMPOSTING BAG METHOD

**Winni R. E. Tumanggor *, Indra Chahaya, Nursa'adah**
Universitas Sumatera Utara
Jl. Dr. T. Mansur No.9, Padang Bulan, Kec. Medan Baru, Kota Medan, Sumatera Utara 20222, Indonesia
Email: winni.tumanggor@usu.ac.id

**Abstract**

Household waste is Indonesia's largest waste source, while food waste is the most significant composition. Waste remains unresolved in Suka Makmur Village due to poor management practices such as burning waste, littering, and a lack of public awareness, which can negatively impact community health and the environment. Compost fertilizer production using composting bags is one of the strategies that can be implemented to manage organic waste. This service aims to enhance the knowledge and skills of the PKK (Family Empowerment and Welfare) regarding composting using composting bags made from the kitchen and organic waste to create a clean kitchen. The methods used in this service include presenting material related to clean kitchen training, practical composting exercises, assessing participants' knowledge through pre-tests and post-tests, question-and-answer discussions, and monitoring and evaluating the processing of organic and inorganic waste. The post-test results on the knowledge and skills from applying composting bags showed an increase of 115.38%. Based on the monitoring and evaluation results, it was found that the participants displayed high enthusiasm for managing kitchen waste and were able to manage organic waste.

**Keywords:** Composting Bag, Household Waste, Organic Waste

## INTRODUCTION

The survival of living beings, especially humans, depends on their environment. Waste is one of the environmental issues that remains a serious concern. The issue of waste is complex and challenging to resolve because every person generates waste daily. The amount of waste accumulation worldwide has increased rapidly. According to the World Bank Group, if the waste problem is not resolved, solid waste-related emissions are predicted to reach 2.6 billion tons of CO2 equivalent by 2050 (Kaza et al., 2018). Around the world, some developing countries that are part of the Organization for Economic Co-operation and Development (OECD) are among the largest contributors to waste. Their waste production reaches 572 million tons per year, with the amount of waste per person ranging from 1.1 to 3.7 kilograms per day (Fitri et al., 2022).

Nationally, waste in Indonesia reached 35,654,121.69 tons in 2023. Household waste is


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the largest source of waste in Indonesia, contributing 50.86% of the total waste, while food waste makes up the most significant composition at 39.77% of the total waste, which is the greatest than the others (National Waste Management Information System, 2023). The North Sumatra region has a waste accumulation of 4,945.42 tons per day and 1,805,078.51 tons per year in 2023. Meanwhile, Deli Serdang Regency has a waste accumulation of 1,126.61 tons per day and 411,210.01 tons per year (National Waste Management Information System, 2023). SIPSN data shows that only 62.82% of the total waste has been managed, while approximately 37.18% cannot be processed. The waste accumulation data in Deli Tua District is 0.12 kg/person/day or 2.34 L/person/day, with the most significant composition of waste being organic waste at 66.68% (Sitorus, 2021).

Organic waste remains a significant challenge as it constitutes the largest proportion of total waste generated. Organic waste can be managed so that it does not become a pile of garbage. One way is to apply the compost method using a composting bag. Compost fertilizer is made from dry household organic waste, such as vegetables (Maulitia et al., 2022). A composting bag is a new way to manage organic waste using a compost bag container. The advantage of this method is that the container is made from a flexible material that can withstand sunlight, making it easy to carry anywhere, durable, and capable of lasting up to five years. Composting runs smoothly in a space with ventilation available for air exchange, ensuring that the decomposition process occurs without emitting foul odors. The top cover features a side zipper for mixing and is secure from disturbances, with a dedicated gap specifically designed to facilitate the compost harvesting process (Bahraini, 2020).

In the process of sorting and separating waste at home, housewives play an essential role. Household waste that is not managed correctly can harm the environment. Therefore, sustainable management is necessary in its administration. Waste should be sorted before being disposed of to make the process easier. The success of this program depends on community participation, especially from urban communities, in the waste-sorting process (Siswati et al., 2022).

Based on the data above, Deli Tua District still needs to solve waste issues, particularly in Suka Makmur Village. This is due to the community's low knowledge and awareness in managing waste, such as burning waste, disposing of garbage in random places, and a general lack of understanding, which can impact public health and the environment (Bete'e, 2022). In response to the existing problems, community empowerment needs to be carried out in Suka Makmur Village regarding waste management, especially organic waste management, using compost bag technology.

This service involves the community in the form of a group of PKK. The reason for choosing the PKK group is that the issue of waste is closely related to the daily activities of these mothers, such as waste from cooking in the kitchen. The involvement of these PKK can also strive to empower the community and improve family welfare. This community service activity aims to address the waste problem, particularly kitchen waste (organic waste), in Suka Makmur Village by enhancing the knowledge and skills of the community in managing kitchen waste using composting bags.

## IMPLEMENTATION METHOD

This community service activity was conducted in Suka Makmur Village, Deli Tua District, Deli Serdang Regency, North Sumatra. The target of this community service activity was the PKK (Family Empowerment and Welfare) of Suka Makmur Village, which came from 8 hamlets with 24 people who were formed and named Nucleus (Nutritious, Clean, and Useful) Guard. Representatives of 1 hamlet were three PKK members. The stages of this community service activity include planning and preparation, socialization, implementation of activities (training and application of technology), mentoring, and evaluation.

The planning and preparation stage includes analyzing the partner's problem situation (collecting data and information about location problems), coordinating time with partners, planning targets, preparing a series of activities, preparing materials, preparing tools and materials, preparing facilities and infrastructure, and technical field planning. The FGD Socialization Stage is a discussion stage with partners; this stage discusses the resolution of problems in Suka Makmur Village.

Education composting bag was implemented at the Suka Makmur Village Hall on Thursday, August 1, 2024. This activity includes several stages of implementation, namely the provision of materials, practical training on compost-making using the Composting Bag method, and skills assessment. The assessment of this skill is evaluated through the completion of pre-tests and post-tests by the service team to assess the participants' skills related to compost making. The pre-test and post-test consist of 9 questions; each question will receive a highest score of 4 (four) and a lowest score of 1 (one). This activity requires tools and materials such as composting bags, humus soil, shovels, gloves, EM4 solution, and molasses.

This community service activity is also accompanied by monitoring and evaluation activities carried out through WhatsApp groups and monitoring of the homes of each community service participant, which is carried out once a month. The monitoring and evaluation aims to monitor and evaluate inorganic waste that has been sorted and collected and the compost that each community service participant has made.

## RESULTS AND DISCUSSION

This Community Service activity collaborates with the partner, the TP PKK of Suka Makmur Village. It is aimed at addressing the issue of kitchen waste management in the Suka Makmur Village area. The event took place at the Suka Makmur Village Hall. It was attended by 24 members of the PKK, the Head of Suka Makmur Village, the Secretary of Suka Makmur Village, the Chairperson of the PKK of Suka Makmur Village, and the staff of Suka Makmur Village. The purpose of this community service initiative is to create a clean and healthy environment in Suka Makmur Village by forming a Nucleus Guard Team consisting of PKK, aimed at enhancing knowledge and skills in the processing of inorganic waste and the utilization of organic waste in compost production through the composting bag method.

### Preparation Stage of Activities

In this stage, the service team prepares tools, materials, training content, and refreshments and coordinates transportation and equipment for applying composting technology, such as

composting bags, shovels, gloves, humus soil, EM4 solution, and molasses.


**Figure 1. Preparation for activities**

In preparation for implementing composting using the composting bag method, the service team conducted a composting practice at FKM USU on July 30, 2024. This was done to train the service team's skills for direct application to the PKK.

**Figure 2. Composting practice preparation**

**Implementation and Assessment Stage**

This activity was implemented at the Suka Makmur Village Hall in Deli Tua District. It was held on August 1, 2024, and attended by 24 participants representing eight hamlets in Suka Makmur Village, the village Secretary, and the Chairperson of the Village PKK.


**Figure 3. Asset handover to partners**

**Figure 4. A photo together with the Results of the composting bag practice**

How to make compost using the composting bag method is as follows: Prepare the tools and materials in a composting bag, a stirrer or shovel, gloves, and organic waste, consisting of brown waste or dry leaves, and green waste or kitchen scraps (vegetable waste, fruit, others.), and soil. The composting process adds humus soil to the composting bag as the base layer. Next, add brown waste on top of the first layer. Add green waste and layer it again with humus soil. Repeat the previous steps until the composting bag is full (remember that the brown waste should cover the green waste underneath). During the observation stage, stir the compost every 3 to 7 days, and if it feels too dry, add a little water or EM4/MOL liquid. Then mix until well combined.

This activity aims to train participants in processing kitchen waste to prevent the accumulation of garbage before it is processed. Therefore, this activity using the composting bag method is expected to address the waste issue. There was a high level of enthusiasm from all participants in the activity, as evidenced by their participation in bringing the necessary materials for this compost-making practice, such as dry waste (dry leaves) and wet waste (vegetable scraps, fruit, food waste, and others). The participants were also very enthusiastic in following the practice from the beginning to the end of the activity, and the interaction between the service team and the participants was outstanding in carrying out the compost-making practice using this composting bag method.

The results of the activities align with the goals of the community service, as there has been an increase in the participants' skills in creating and processing kitchen waste. The results can be seen in Figure 7, where the blue graph represents the pre-test results of the service participants, and the red graph represents the post-test results of the service participants. The average pre-test score of the service participants is 15.6, and the average post-test score is 33.6, resulting in a percentage increase in the skills and knowledge of the service participants of 115.38%.

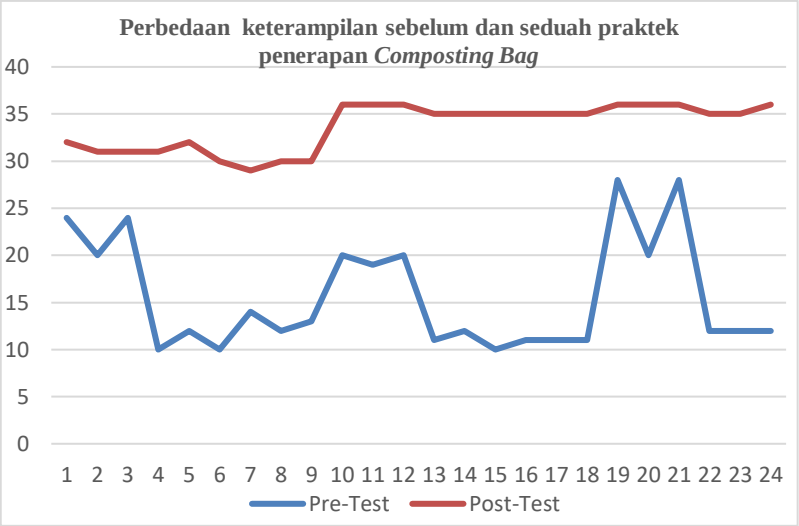


**Figure 5. The Difference in Skills Before and After the Practice of Applying Composting Bags**

**Monitoring and evaluation stage**

At this stage, the service team is conducting monitoring and evaluation, which is carried out through several methods, first through the WhatsApp group called the Nucleus Guard Team of Suka Makmur Village, which consists of 24 PKK, the PKK Chairperson, the Secretary of Suka Makmur Village, village staff, and the service team. Through this WhatsApp group, the participants of the community service are sending the results of the sorting of inorganic and organic waste, as well as reporting on each process of compost making.

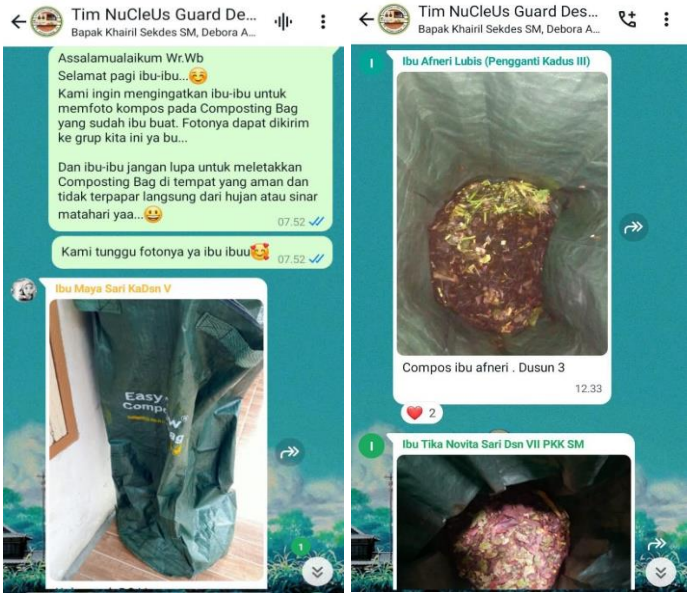


**Figure 6. Screenshot of the WhatsApp group**

Both monitoring visits were to the participants' homes. This stage was carried out on August 15, 2024, and September 7, 2024, with the service team divided into three groups visiting each participant's home. This monitoring stage is conducted to observe the condition of the compost made directly.

**Figure 7. Direct monitoring**

The monitoring and evaluation activities results indicate that participants have successfully sorted organic waste and processed it using composting bags. Each time kitchen waste was produced, participants placed it into the composting bag, stirred the contents, and sealed it. This process was repeated consistently with every new batch of waste. As a result, participants became increasingly enthusiastic about managing organic waste, significantly reducing the volume of waste sent to public dumps.

Waste poses a significant challenge for society, as it is often overlooked and contributes to environmental pollution. Therefore, the paradigm of society regarding waste must be changed by involving the community in waste management, starting with the processing of household waste, which is the most significant source of waste. This service is also in line with the community service of Lesmana & Faizah (2024), which highlights that effective organic waste management can significantly reduce household waste and promote a clean, healthy environment.

To date, organic waste generated by the community has typically been discarded into the surrounding environment  Implementing effective organic waste management strategies is a viable alternative to mitigate the environmental pollution caused by organic waste (Jumiarni et al., 2023). One technique for treating organic waste is composting bags (Hutagalung et al., 2023). The implementation of community service activities through the use of composting bags has resulted in an increase in skills among the participants by 115.38%. This aligns with the community service conducted by (Nurkhasanah et al., 2023), which states that managing compost from waste can enhance knowledge and awareness, particularly regarding the need to reduce the use of environmentally unfriendly inorganic fertilizers. Compost fertilizer is a type of fertilizer made by microorganisms that break down or decompose organic matter. Organic compost has numerous benefits, especially for plants. It is an environmentally friendly fertilizer that offers many advantages, including enhancing soil fertility, acting as a stabilizer for soil aggregates, providing nutrients for the soil and plants, and potentially increasing land productivity in the long term (Azmin et al., 2022). Thus, in addition to reducing excessive waste accumulation at landfills, managing waste into compost can also reduce environmental pollution and, of course, benefit the environment. The compost fertilizer that has been made can enrich the soil, provide nutrients for plants, and serve as a solution to address the

accumulation of dry leaf waste. This can also enhance community efforts to process waste into more practical, cost-effective, and environmentally friendly products.

Compost production in this activity uses environmental health technology, namely the composting bag. The composting bag method is a new approach to processing organic waste. Through the use of the composting bag method, the benefits gained by the community will be increasingly evident in terms of its advantages. Through the implementation of this service, it is expected that the participants will be able to cultivate awareness and willingness to manage kitchen waste, which they will inevitably encounter daily. In addition, the participants in the community service are encouraged to share their knowledge and skills with the surrounding community so that behavioral changes can also occur within the community.

Environmental education is necessary to build awareness and concern in society regarding environmental impacts and the issues they cause. Environmental education requires skills, attitudes and behaviors, motivation, commitment, and cooperation to solve environmental problems and prevent new issues from arising (Rosdiana & Wibowo, 2021). The implementation of this service aims to address the waste problem in Suka Makmur Village. This community service activity is linked to one of the health behavior theories, namely L. Green's theory (1980). According to L. Green's theory (1980), the determinants of an individual's health prevention behavior are influenced by three factors: predisposing factors such as knowledge, attitudes, beliefs, values, and traditions; enabling factors such as health facilities and infrastructure; and reinforcing factors such as support from health workers and spousal support (Notoadmodjo, 2012). According to this theory, a person's behavior is influenced by predisposing factors such as their level of knowledge.

The first factor is the predisposing factor; the values of enthusiasm that already exist in society are increasingly growing, leading to a noticeable community participation in activities. In this activity, the service team provided education or lectures on the topic of compost as an effort to enhance knowledge. The second factor is the enabling factor, which includes the facilities and infrastructure to support the implementation of this activity. In this activity, the service team distributed facilities and infrastructure that support compost production, such as composting bags, shovels, humus soil, used bottles for mixing solutions, gloves, and EM4 solution and molasses. The service team also provided a module to each participant as a resource to support the knowledge gained. The module contains all the material that will be presented to the participants, and a WhatsApp group was created for participants to share knowledge beyond what was provided during the clean kitchen training activity. The provision of modules and the creation of a WhatsApp group are forms of developing enabling factors. This has proven to boost the spirit and enthusiasm of the participants in the compost-making practice, both at the activity site and at each participant's home. The last factor is based on L. Green's theory is the reinforcing factor, which is the support from the village head and the Suka Makmur village officials who encourage participants to engage in and continue the clean kitchen activities. The support from the village head can influence participants and other community members to behave in a way that properly manages waste.

## CONCLUSION

The community service activity of making compost fertilizer using the Composting Bag method in Suka Makmur Village, Deli Tua District, Deli Serdang, as a solution to the kitchen waste problem in this village, was successfully carried out smoothly. This success can be seen from increased knowledge and skills through pre-tests and post-tests and monitoring and evaluation results. Based on the assessment of the technology implementation activities through composting bags, it was found that the average pre-test score of the participants was 15.6, and the average post-test score was 33.6, indicating that the participant's skills and knowledge improved by 115.38%. The results of this community service activity show increased knowledge and skills among the participants in managing kitchen waste and making compost. Based on the monitoring and evaluation results, it was found that the participants showed high enthusiasm for managing kitchen waste. For the participants in the community service, they can sort inorganic and organic waste. Sorted organic waste is processed into compost using the composting bag method. It is hoped that the community service activities involving this group of participants can address the waste issues closely related to the participants' activities.

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