

Original Paper

Green Innovation in Jatibening: Utilizing Organic Waste to Make Compost through the Masdarling Community Service Program

Yuaniko Paramitra^{1*}, Dhianti Mei R², Mishelei Loen³, Partogi Saoloan S⁴, Rosdiana⁵, Diajeng Reztrianti⁶

^{1,2,3,4,5,6} Faculty of Economics, Krisnadwipayana University

Corresponding author: Yuaniko Paramitra (nicoyp@unkris.ac.id)

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Abstract

The increasing population, the growing number of products, and changes in people's consumption patterns have led to a significant rise in waste volume. This situation poses environmental challenges that require sustainable solutions. One effective way to address the increasing volume of waste is to process organic waste into compost a natural fertilizer produced by the decomposition of materials such as leaves, food scraps, and kitchen waste. Composting is environmentally friendly and beneficial for plants as it enhances soil fertility without relying on chemical substances that may harm the ecosystem. The main objective of this community service activity is to provide knowledge, guidance, and hands-on experience to residents of Jatibening, enabling them to develop awareness and practical composting skills. The program employs the Masdarling (waste-conscious community) socialization method, which focuses on education combined with direct compost production practice. This approach ensures that participants not only understand the theoretical aspects but also gain practical experience in making compost. The activity was carried out in collaboration with KKN students from Krisnadwipayana University. It involved Jatibening residents, particularly the PKK women's group, as the prominent participants in promoting sustainable waste management at the community level.

Keywords: Fertilizer, Compost, Organic Waste

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1. Introduction

The Community Service Program (Kuliah Kerja Nyata or KKN) is one of the Tri Dharma of Higher Education, specifically in the field of community service. Through KKN activities, students are expected not only to apply the knowledge and skills they have acquired during their studies but also to take an active role in helping communities identify, formulate, and address problems in their environments. In this way, KKN serves as a contextual learning tool that allows students to make a tangible contribution to improving community welfare and quality of life.

At Krisnadwipayana University, the Community Service Program is conducted through Thematic KKN, organized by the Institute for Research, Community Service, and Student Development (LP3M). Thematic KKN refers to a type of community service activity centered on a specific theme relevant to current social and environmental issues. Themes are selected based on field needs and the socio-cultural conditions of the target community, ensuring that KKN activities are not merely ceremonial but have a sustainable and positive impact. For the current year, the university has adopted the theme "KKN Sosialisasi Masdarling" (Environmentally Aware Students), which focuses on enhancing public awareness and participation in environmental cleanliness, waste management, and sustainable living practices.

One of the key locations for implementing the Masdarling program is Jatibening Village, located in the Pondokgede District of Bekasi Regency. This area was chosen because it is densely populated and generates a relatively high volume of household waste. Based on initial observations conducted by the student participants, it was found that Jatibening residents face several challenges in managing both organic and inorganic waste. Most household waste is mixed and disposed of directly at the final disposal site (TPA) without prior sorting. This leads to waste accumulation, unpleasant odors, and potential environmental pollution in residential areas. Furthermore, the lack of supporting infrastructure, such as segregated waste bins and composting facilities, hinders the development of an effective household waste management system.

To address these issues, the KKN team from Krisnadwipayana University carried out outreach and training activities focused on processing organic waste into compost. The primary objective of this initiative was to raise public awareness particularly among members of the PKK (Family Welfare Movement) women's group about the importance of proper waste management while equipping them with the practical skills needed to turn organic waste into compost. Participants learned to process household waste such as food scraps, dry leaves, and fruit peels into compost that can be used to enrich soil for agriculture, gardening, and community greening initiatives.

Composting offers both environmental and economic benefits. Ecologically, compost improves soil fertility, enhances soil structure, and reduces dependence on chemical fertilizers that may harm the environment. Economically, compost can be utilized by residents for household farming or sold to generate additional income. Through this activity, the program not only addresses waste management challenges but also contributes to local economic empowerment and environmental sustainability.

Beyond technical training, the Masdarling program emphasizes education and participation. The KKN students serve as facilitators and partners in learning, fostering an egalitarian relationship between students and residents. This participatory approach encourages the development of an environmentally conscious, self-reliant, and sustainable community. The activities include awareness sessions, hands-on composting demonstrations, and continued mentoring for residents interested in replicating similar projects in their neighborhoods.

Furthermore, this program aligns with Indonesia's environmental policies, particularly Regulation No. P.75 of 2019 on household and similar waste management, which underscores the importance of waste reduction and treatment at the source. By directly involving the local community, this initiative serves as a model for implementing environmental policy at the grassroots level and has the potential to be replicated in other regions.

The main goal of this community service program is to enhance the independence, knowledge, and skills of Jatibening residents in sorting and processing household waste particularly organic waste into beneficial compost. Through outreach and hands-on training facilitated by Krisnadwipayana University students, it is expected that the community will adopt sustainable waste management practices and foster collective environmental responsibility. However, while the program succeeded in promoting awareness and skill development, it still lacks a detailed evaluation framework and measurable indicators to assess participants' learning outcomes and behavioral change an important consideration for future program improvement and sustainability.

2. Method

Implementation Method

The implementation method for the Community Service Program (KKN) of the Masdarling Socialization program at Krisnadwipayana University uses a socialization and hands-on practice (demonstration) approach. This method is widely recognized as effective because providing both theoretical explanations and practical demonstrations significantly increases community understanding and skill adoption (Sari & Prasetyo, 2023). Socialization is conducted through counseling on the Importance of household waste management and the benefits of compost use, which aligns with recent findings showing that educational interventions can improve household waste-sorting behavior by up to 40% (UNEP, 2024).

Meanwhile, direct practice is carried out to involve the community particularly the PKK women's group in the compost-making process, from preparation to packaging. Hands-on learning is proven to enhance the community's ability to replicate environmentally friendly practices independently, especially in organic waste processing programs (Rahmawati & Putra, 2023). This participatory approach is consistent with community-based environmental management principles, which emphasize joint involvement between facilitators and residents to foster sustainable behavioral change (Syafira & Widodo, 2022). Therefore, the combined method of counseling and practical demonstration is expected to strengthen community awareness and support long-term sustainable waste management.

Place and Time

The activity was carried out in Jatibening Village, Pondokgede District, Bekasi City, on 6 February 2025. The series of activities included preparation, implementation, monitoring, and evaluation. During the preparation stage, KKN students coordinated with the village and local community groups to determine the location, schedule, and equipment and material requirements. The implementation stage included the delivery of socialization materials on the basic concepts of organic waste management, the benefits of compost, and its environmental impact. Furthermore, a live demonstration of compost making was conducted using readily available household materials. After the practical activities, a monitoring stage was conducted to ensure the community could repeat the process independently and understand the stages of organic decomposition to produce mature compost.

Tools and materials

The tools and materials used in this activity are pretty simple and easily obtained by the public, including used buckets as composting containers, hoes or trowels for stirring, gloves and masks to maintain cleanliness and safety during the process, and plastic as a cover or container for the final compost. The primary materials used include household organic waste such as food scraps and fruit peels, dry leaves, pieces of cardboard, soil, water, molasses (liquid sugar), and EM4 liquid, a bioactivator that accelerates the decomposition of organic materials. This combination of materials was chosen because it produces high-quality, environmentally friendly compost.

Peaksanaan Stages

The composting process begins with preparing a composting container, a cleaned, used paint or ice cream bucket. Next, participants collect organic waste such as dry leaves, food scraps, fruit peels, and cardboard to serve as the compost base. The composting process is carried out in layers: add soil to one-third of the container, then a layer of mixed organic waste to the subsequent third, and finally cover the container with soil until it is full. A molasses solution is then prepared by mixing liquid sugar and water, along with an EM4 solution, also mixed with water in specific proportions. These two solutions are then poured into the compost container to provide the organic material with a supply of microorganisms that aid fermentation. All ingredients are thoroughly mixed with a trowel or hoe, then the container is tightly closed and stored in a shady place away from direct sunlight. This fermentation process takes approximately 2 to 3 weeks for the material to decompose into dark brown, odorless compost completely.

Throughout the process, the KKN students played an active role in providing guidance and scientific explanations of the decomposition process, as well as how to maintain the compost container to prevent odor and maintain hygiene. In addition, the students also assisted the community in periodically monitoring the compost results to ensure the quality and success of the decomposition process. This activity concluded with a discussion and evaluation session to assess community understanding and formulate a follow-up plan to ensure organic waste management activities continue after the KKN program ends. Through this systematic, participatory implementation method, it is hoped that the Jatibening Village community can independently and sustainably apply composting techniques, thereby creating a cleaner, healthier, and more productive environment.

3. Results

The Process of Making Compost from Organic Waste

Based on the results of socialization and practice in Jatibening Village, making compost using a simple method can be done in several stages as follows:

Material Collection



Figure 1. Collection of Organic Waste Materials

In the composting process, organic household waste, such as vegetable and fruit scraps and dried leaves, is collected as the main ingredients. Cardboard scraps or sawdust are added as a carbon source to balance nutrient levels, while soil and an EM4 solution or molasses are used as composting activators. This combination of materials accelerates decomposition, producing nutritious, environmentally friendly compost.

Layer Arrangement



Figure 2. Arrangement of Compost Container Layers

The composting process begins with preparing a compost container, such as an old bucket or composter. Next, a five cm-thick layer of soil is created as a base. A second layer of organic waste and cardboard pieces is added to this layer. Afterward, the compost is covered with another layer of soil approximately 5 cm thick to maintain moisture and accelerate decomposition of the organic material into compost.

Addition of Activator



Figure 3. Activator for Compost

An EM4 solution mixed with molasses and water is then poured into the compost pile to speed up the decomposition of organic matter. Adding this solution helps increase the activity of decomposing microorganisms, making the fermentation process faster and more efficient. However, without EM4, the composting process will take approximately 4 to 6 weeks until the compost is mature and ready to use.

Stirring and Fermentation



Figure 4. The compost is ready to use.

During composting, the compost mixture needs to be stirred every 3 to 5 days to provide sufficient aeration and allow oxygen to spread evenly throughout the material. This stirring process is essential to keep the decomposing microorganisms active and working optimally. During this stage, the compost temperature will typically rise, indicating that microbial activity is intensifying. After approximately two to three weeks of decomposition, the compost will mature and be ready to be used as a natural fertilizer to enrich the soil and support plant growth.

The Effect of EM4 Use on Composting Speed

In this composting experiment, two methods were compared: one with EM4 and one without. The EM4 method resulted in a faster composting process, taking approximately two to three weeks, because the effective microorganisms in EM4 accelerate the decomposition of organic matter. However, this method sometimes produces maggots, which actually help accelerate the decomposition of organic matter.

To reduce the presence of maggots, you can add natural ingredients such as papaya leaves or tobacco solution, which act as insect repellents (Sutanto, 2002). Meanwhile, the method without EM4 takes longer to decompose around 4 to 6 weeks because it relies solely on the activity of natural microbes in the soil and organic matter. Although slower, this method can still produce good-quality compost with regular stirring and aeration.

To reduce the presence of maggots, natural repellents such as papaya leaves or tobacco extract can be used, as botanical insecticides have been proven to reduce larval populations without disrupting the composting process (Lestari & Widyaningrum, 2021). Meanwhile, the method without EM4 takes longer to decompose around 4 to 6 weeks because it relies solely on the activity of natural microbes in the soil and organic matter. Despite the longer time, recent findings indicate that compost produced naturally can still achieve good maturity levels if aeration and stirring are done regularly (Hidayat et al., 2023).

Method	Composting Time	Ripe Characteristics	Excess	Lack
With EM4	2-3 weeks	Blackish brown color The smell of earth	Fast More even results	Sometimes maggots appear
Without EM4	4-6 weeks	Sepia Rough texture	More natural Cheap	Longer process

Obstacles and Solutions in Composting

During composting, several challenges often arise and must be addressed to achieve optimal compost results. One major challenge is an unpleasant vinegar-like odor. This is usually caused by a lack of aeration or excessively moist compost. To address this, the compost needs to be stirred regularly to maintain good air circulation and moisture levels. Another challenge is the presence of excessive maggots, which, while aiding decomposition, can be uncomfortable for some people. A natural solution to reduce maggot infestation is to add papaya leaves or tobacco solution to the compost pile, as both have insect-repellent properties. Furthermore, an imbalance in moisture content is also common; if the compost is too wet, dry materials such as sawdust or cardboard pieces can be added. If the compost is too dry, it needs a light spray of water to maintain the ideal moisture level for the decomposing microbes.

4. Discussion and Benefits

Results of Socialization Activities

The socialization activity was conducted in Jatibening Village, Pondokgede District, Bekasi, involving residents, particularly members of the PKK (Family Welfare Movement) women's group. During this session, students from Krisnadwipayana University provided education on the importance of organic waste management and the environmental and economic benefits of

processing household waste into compost. The use of community-based education methods has been shown to significantly improve public understanding of waste reduction practices, especially when delivered through local social groups such as PKK (Sundari & Lestari, 2021). The socialization was delivered through interactive presentations supported by posters and practical demonstrations, which aligns with recent findings that visual and experiential learning tools enhance comprehension for participants with varying educational backgrounds (Sari & Prasetyo, 2023).

The activity results indicated a high level of community enthusiasm and engagement. Participants actively asked questions and shared their experiences related to waste handling at home. Such interactive participation is consistent with studies showing that community dialogues increase confidence and willingness to adopt environmentally friendly practices (Syafira & Widodo, 2022). Many participants expressed positive feedback about the idea of utilizing organic waste as compost to support household gardening and reduce environmental pollution, which is supported by national data showing that composting can reduce household waste by up to 30% (KLHK, 2022). This activity successfully increased community awareness of sustainable waste management and encouraged behavioral change, as residents began to recognize that organic waste has economic value when appropriately processed an outcome also emphasized in recent research on the household-level circular economy (Setiawan & Pratiwi, 2024).

Results of Compost Making Practice

Following the socialization, a hands-on composting workshop was held to provide participants with direct experience. Residents were guided step by step in preparing materials such as vegetable scraps, fruit peels, dry leaves, soil, cardboard pieces, and an EM4 (Effective Microorganisms) or molasses solution as a fermentation starter. The composting process was conducted using simple household tools, including reused plastic buckets and makeshift composting containers.

The workshop showed that participants were highly enthusiastic and able to follow the instructions effectively. Observations during the activity revealed that composting using EM4 accelerates the decomposition process, producing mature compost within two to three weeks. In contrast, the natural composting process without EM4 takes around four to six weeks. The final compost product was characterized by a dark brown color, fine texture, and earthy smell indicators of proper decomposition. The success of this practice demonstrated that low-cost, small-scale composting techniques can be independently applied by the community, making it a sustainable and replicable method for household waste management.

Obstacles Faced

Despite the activity's success, several obstacles were encountered during both the socialization and the practical stages. The main challenge during composting was the occurrence of unpleasant odors, which were generally caused by inadequate aeration or excessive moisture. This aligns with findings that poor oxygen flow and excess water lead to anaerobic conditions that produce foul-smelling gases during composting (Hidayat et al., 2023). Some participants also reported discomfort due to the appearance of maggots in the composting containers, although maggots play a natural role in the organic decomposition process. Recent studies confirm that larvae of black soldier flies and similar organisms accelerate breakdown of organic materials and improve compost structure (Setyowati & Amin, 2022).

To address these problems, several practical solutions were introduced, including regularly stirring the compost every three to five days to improve aeration, adding papaya leaves or tobacco solution to repel insects, and adjusting the moisture balance by adding dry materials (such as sawdust or dried leaves) or small amounts of water as needed. After receiving guidance, participants were able to manage these challenges and maintain the quality of their compost effectively. These experiences not only strengthened participants' problem-solving skills but also enhanced their confidence in applying composting techniques independently.

Impact and Community Response

Overall, the Masdarling socialization and composting training had a positive impact on both community knowledge and environmental awareness. Participants demonstrated improved understanding of organic waste utilization, and several households expressed commitment to continuing composting practices after the program's completion. The activity also fostered a stronger sense of environmental responsibility and community cooperation among residents, particularly within the PKK group.

The activity also fostered a stronger sense of environmental responsibility and community cooperation among residents, particularly within the PKK group. Strengthening social cohesion through environmental programs is supported by evidence that collective involvement encourages shared responsibility and collaborative action in maintaining local environmental quality (Setiawan & Pratiwi, 2024). Such community-driven initiatives not only enhance environmental awareness but also help build a culture of sustainability at the grassroots level.

However, while the program provided strong practical insights into sustainable waste management and demonstrated tangible community engagement, it lacked deeper theoretical grounding and comparative analysis with existing studies or community service models. Incorporating relevant frameworks such as community-based environmental management theory or behavior change models would strengthen future evaluations. Similarly, developing measurable indicators to assess learning outcomes, behavioral shifts, and long-term sustainability would enhance the academic rigor and impact assessment of subsequent programs.

5. Conclusion

Based on the results of the socialization activities and composting practices in Jatibening Village, it can be concluded that processing organic waste into compost is an effective way to reduce household waste volume while increasing public awareness of the importance of sustainable environmental management. The EM4 method has proven more efficient, speeding up the composting process and producing more evenly distributed compost, while the method without EM4 has not. However, it takes longer and still provides good results without additional cost. Various obstacles, such as unpleasant odors, excessive maggots, and imbalances in water content, can be overcome with simple steps, such as regular stirring, the use of natural insect repellents, and humidity adjustments.

The implication is that this activity demonstrates that active community participation in waste management has a tangible impact on environmental cleanliness and sustainability. Going forward, ongoing mentoring, adequate composting facilities, and advanced training on compost utilization for urban agriculture and environmental reforestation are needed. Furthermore, developing natural bioactivators from local materials can be an environmentally friendly innovation that strengthens community independence in maintaining their local ecosystems.

Recommendations

It is recommended that the Jatibening Village community form an organic waste management group and utilize the shared composting facility to ensure the program's sustainability. The village government and universities need to provide additional training and ongoing mentoring to ensure the community remains consistent in processing waste. Furthermore, the use of natural bioactivators derived from local materials, such as rice washing water or papaya leaves, can be developed as a more economical and environmentally friendly alternative.

Limitations and avenues for future community services

This community service activity had limitations, including a short implementation timeframe, insufficient supporting facilities, and unsustainable mentoring. For future activities, long-term mentoring is recommended to help the community become more independent in processing organic waste. Furthermore, developing natural bioactivators from local materials and further training on compost utilization could be sustainable steps to strengthen the program's impact.

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