IJSSCS
International Journal of Social Science and Community Service
https://ijsscs.com/index.php/journal
Online ISSN 3047-5406

Socialization of Organic Waste Processing Using Composter Drum at SMAN 67 Jakarta

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ARTICLE INFO

Article History
Received : 29.12.2024
Revised : 31.01.2025
Accepted : 06.02.2025
Article Type: Research Article

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ABSTRACT

Waste is a form of problem that needs to be managed and carried out in an integrated manner from upstream to downstream so as not to cause environmental pollution. As part of the AdiwiyataSchool, SMAN 67 Jakarta has several working groups (pokja) including the Wast e Pokja, CompostPokja, and Hydroponic Pokja. However, the available solid compost fertilizer production facilities have not been optimally utilized and the working groups that are run have not run according totheir goals. The aim of this PKM activity is to educate students on the significance of converting waste into useful products, enhance the skills of teachers and students in making compost fertilizers, and support the Adiwiyata School program at SMAN 67 Jakarta. The target of thisactivity is the teachers and students of SMAN 67 Jakarta, especially those who are members of theCompost Pokja. The PKM implementation method consists of four stages: (1) Survey and analysis of partner needs, (2) Lecture-based material delivery, (3) Hands-on practice in processing organic waste into solid and liquid compost fertilizers, and (4) Evaluation based on participants' understanding of the material. The results of this PKM activity are as follows: (1) Participants' knowledge of waste processing into higher-value derivative products improved, as evidenced by an increase in pre-test and post-test scores from 79.45 to 85.04; (2) Participants developed skills in producing solid and liquid compost fertilizer for integration into the work program; (3) A composter drum was donated to SMAN 67 Jakarta to support its Adiwiyata School program.

Keywords: Waste Processing, Organic Waste, Compost

1. Introduction

Processing waste properly without any problems is the dream of every community, especially in urban areas such as East Jakarta. Waste is one problem that must be managed so that it will not cause environmental pollution. Currently, household waste is one of the problems that needs to be solved from the smallest level. The increase of population density is directly proportional to waste production, and cause an increase volume in the final disposal site (Sinaga et al., 2023).

Waste management must be carried out in an integrated manner from upstream to downstream. This aims to provide economic benefits, public health, and especially environmental safety. Waste management patterns can be implemented in terms of knowledge, attitudes, and skills (Widiyanto, 2023). Waste management from knowledge perspective is a waste management step by providing a foundation of knowledge to children from an early age, especially in the school environment. An increase the role of educational institutions is needed to provide knowledge and shaped the character of students regarding the importance of waste processing (Purnami, 2020).

School is a place that plays a very important role in implementing character education, one of which is a caring attitude towards the environment (Mpuangnan et al., 2023). SMAN 67 Jakarta is one of the favorite schools in Makasar District which has a vision of creating a quality school, superior in achievement, environmentally aware, and competitive in the global era. Based on observations in the field, SMAN 67 Jakarta has carried out good waste management activities such as separating organic and inorganic waste.

Based on Law No. 18 of 2008 concerning waste management, there needs to be maximum waste processing. Organic waste is often considered as items that are no longer needed and thrown away by previous users, but can used again if managed by correct procedures. Organic waste can undergo decomposition and break down into smaller, odorless materials or what is commonly called compost (Ningrum et al., 2022). Based on Riskesdas data on 2018, only 34.9% of household waste is managed by the government with transporting it by cleaning staff, while the rest is managed by the community itself by burning, throwing it into the gutter, throwing it carelessly, and burying it. Only 0.4% of the community manages household waste into compost.

Compost is organic material that has undergone a decomposition process due to the interaction between microorganisms working in it. These microorganisms utilize organic materials as a food source. In making compost process, natural process are required to be regulated and controlled so that the compost can form faster. In the end, compost can be applied directly to plants, both fruit and vegetable ceops, and also plantation crops such as oil palm, and others because it can increase soil fertility (Pratama et al., 2019).

The potential for organic waste produced by SMAN 67 is quite high, originated from leaves and food scraps. Students at school generally know and implement how to put waste in the trash bins provided by the school, according to the type of organic or non-organic. However, only a few students aware the journey of waste after leaving the school yard (Mpuangnan et al., 2023).

In 2023 SMAN 67 Jakarta was designated as one of the Adiwiyata Schools of DKI Jakarta Province (DKI Jakarta Governor Decree Number 803 of 2023). As part of the Adiwiyata School, SMAN 67 Jakarta has several working groups (Pokja), which include the Waste Pokja, Compost Pokja, and Hydroponic Pokja. SMAN 67 Jakarta has the facilities that support achieving and maintaining Adiwiyata School statuses, which is the school gardens and green open spaces, simple gardens, greenhouses, and waste management and recycling. Based on the initial survey and discussions, the available waste recycling and composting facilities have not been optimally utilized and the working groups have not run according to their goals.

Based on situation analysis, it is necessary to make an effort to provide alternative solutions that can increase knowledge and shape the character of students' concern for the environment. Team of Community Service (PKM) Industrial Engineering Study Program FTDI Usurya, coordinated with partners to prepare a schedule for implementing socialiszation and training activities for teachers and students of SMAN 67 Jakarta regarding the management of organic waste into compost products that can be used for schools and the community environment. This PKM activity is a follow-up to the commitment and actions of Universitas Dirgantara Marsekal Suryadarma in greening and environmental sustainability through the UI Green Metric program. The purpose of this PKM activity is to provide knowledge and shape the character of students regarding the importance of implementing waste processing into greater utility value products, improve the skills of teachers and students in making solid and liquid compost, and support the SMAN 67 Jakarta working group program as an Adiwiyata School.

2. Methodology

2.1. Research Design

Based on the partner problems encountered, the solution offered to solve the problems is by providing organic waste processing socialiszation and training, as well as evaluating the results of activities. The PKM implementation method consist of stages as shown in figure 1.

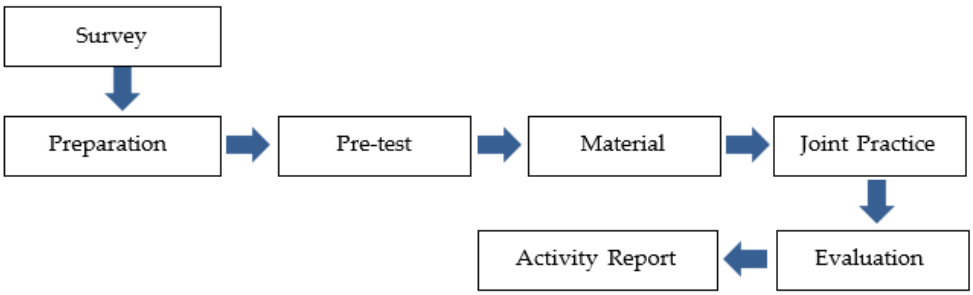

Figure 1. PKM Implementation Method

Based on Figure 1, the PKM activities of the Industrial Engineering Study Program FTDI Usurya started with survey to determine and analyze the needs of partners and the steps to overcome these problems. The preparation stage to fulfill the needs required for PKM activities. At the stage of PKM activities, participants will be given a presentation of the material and the practice together in joint practice session. At the end of the activity, an evaluation of PKM activities that have been carried out, through indicators of participant understanding of the material presented. Activity reports have been carried out to properly monitoring.

3. Results and Discussion

3.1. Results

3.1.1. Implementation of Activity Preparation Survey PKM

The Industrial Engineering Study Program PKM Team conducted a field survey on 20 November 2024. The survey was immediately received by the Deputy Head of SMAN 67 Jakarta for Student Affairs and Public Relations, Iman Fathurohman, M.Pd. as partner coordinator in implementing PKM activities. During the survey, the PKM Team also had the opportunity to have further discussions with the Head of SMAN 67 Jakarta to discuss the role and participation that could be provide by partners.

Figure 2. Survey of Partner Location

Based on the survey results, SMAN 67 Jakarta has several working groups (Pokja), include the Waste Pokja, Compost Pokja, and Hydroponics Pokja, and supported by a number of facilities to support the status as an Adiwiyata School achievement and maintenance. These facilities are designed to facilitate the implementation of sustainability and environmentally friendly principles in teaching and learning activities, as well as support good environmental management. Some of the facilities in SMAN 67 Jakarta has to complete its status as an Adiwiyata school include school gardens and green open spaces, simple gardens, greenhouses, waste management and recycling.

3.1.2. Implementation of Socialization and Training on Compost Making

The implementation of PKM activities with the theme "Socialization of Organic Waste Processing Efforts at SMAN 67 Jakarta" has been carried out smoothly and accordance with the schedule plan and agreed together. The implementation of the PKM activity was carried out on Wednesday, 11 December 2024, 09.00 WIB in SMAN 67 Jakarta. The evaluation was carried out until January 2025. The number of participants in this PKM activity was 30 students and 8 teachers of SMAN 67 Jakarta.

The PKM activity was opened with welcomming remarks from the Head of SMAN 67 Jakarta and the Head of the Industrial Engineering Study Program FTDI Unsurya. The introduction of the Unsurya profile and presentation of the material were carried out by the Lecturer of the Industrial Engineering Study Program FTDI Unsurya, who is also the Rector of Unsurya, Marsda TNI (Purn) Dr. Sungkono, S.E., M.Si. Before the presentation, participants were given a pre-test sheet as a measure of participants understanding before participating in the training. The time given is 10 minutes, with a total of 15 questions.

The material presented is focused on the importance of increasing students' concern for the environment, providing solutions to overcome waste management problems, providing knowledge and shaping students' characters regarding the importance of processing waste into products that have greater utility value, improving the skills of teachers and students in making solid and liquid compost, and supporting the work program of SMAN 67 Jakarta as an Adiwiyata School.

The presentation of the material for teachers and students at SMAN 67 Jakarta included socialization of the importance of maintaining the surrounding environment through organic waste processing, the dangers of waste to the environment, and the process of making solid and liquid compost. Participants were given technical directions the processing of solid and liquid compost using the composter and emulator provided. Participants were also given anticipation techniques to consider in the process of making compost, so that the container is not contaminated and not exposed to direct sunlight.

Figure 3. Socialization Process

The practice purpose is to provide direct participants experience regarding the organic waste processing to becomes derivative products that have greater utility value. Participants are provided with skills in processing and utilizing organic waste into solid and liquid organic compost. Organic waste processing consists of several stages, which is preparing equipment, breaking down the waste to be processed, and the mixing process in the composter drum.

The waste processing method used is the aerobic method. The aerobic method refers to the composting process that utilizes microorganisms that require oxygen to decompose organic materials into humus that is useful for the soil. This process takes place in oxygen-rich conditions. This process lasts for several weeks to several months, depending on environmental conditions and material composition (Sayara et al., 2020).

Before the processing of organic compost training activity, the main materials needed in making organic compost such as organic waste and dry leaf waste have been prepared first. The equipment used in PKM has

been arranged in an open space. This is to facilitate the movement of resource persons and participants in carrying out activities.

Figure 4. Joint Practice in PKM Activity

From the joint practice in PKM activity, it can be seen that the teachers and students are very enthusiastic to participate. In this joint practice activity, teachers and students of SMAN 67 Jakarta can directly observe and carry out procedures in the solid and liquid compost processing. This aims to ensure that students and teachers can gain knowledge and skills in compost processing through direct involvement. This opportunity is a valuable practical to improve the skills of teachers and students of SMAN 67 Jakarta who are mentors and members of the working group in the Adiwiyata School program.

3.1.3. Activity Evaluation

The evaluation of the activity was carried out by providing a post-test sheet containing questions related to the training material, which was distributed to the participants of the Industrial Engineering Study Program PKM activity. The questions given on the post-test sheet were given to measure participants' understanding in absorbing the material given, and the same questions as the pre-test questions. The results of the scores obtained by the participants before and after the training are shown in Figure 5.

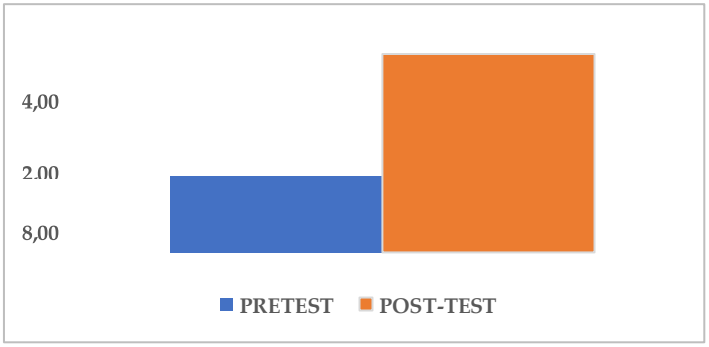

Figure 5. Pre-test and Post-Test Results of PKM Participants

Based on Figure 5, we can see a comparison of the pre-test and post-test results of the PKM participants. There were 30 correspondents. Based on the results, there was an increase in value from 79.45 to 85.04. This shows that there was an increase in insight and understanding of the PKM participants during the activities . The use of pre-tests and post-tests has the same goals and results as the activities carried out by Satmalawati et al. (2024), Banyuriatiga et al. (2023), serta Simbolon et al. (2023).

3.2. Discussion

This PKM activity aims to support SMAN 67 Jakarta in strengthening its status as an Adiwiyata School. Adiwiyata School is a program that aims to create a school that cares and awares to environment, where the school tries to integrate the principles of environmental sustainability into daily activities. By involving students and teachers in activities that focus on organic waste management through the organic compost processing, this activity is expected to support the implementation of better environmental management principles in schools.

The PKM activity is very relevant in the development of the Working Group program related to environmental management at SMAN 67 Jakarta, especially the Compost Working Group. Through the socialization of organic waste management into solid and liquid compost, the Working Group can integrate this knowledge into the programs that have been prepared so that they can run according to their goals, and the waste recycling and composting facilities can be reused. This socialization activity opens up opportunities for the Working Group to innovate in designing and implementing environmental-based programs in schools.

The composter drum equipment used in the PKM implementation was donated with the aim of supporting the sustainability and success of the Adiwiyata School program by SMAN 67 Jakarta. This equipment grant aims to strengthen the school's capacity in managing environmental activities, especially in making organic compost and waste management, thereby providing a long-term impact on better environmental management. The composter drum equipment used in the implementation of the PKM activities at SMAN 67 Jakarta is a simple tool that can be easily reproduced.

Evaluation of the knowledge that has been delivered to the participants can be seen through the question and answer process or discussion during the presentation or joint practice. This PKM activity has a positive impact on the participants as shown by the active role of all PKM activity participants in following the procedure for making solid and liquid organic compost using the composter method. The evaluation of the implementation of PKM activities is also supported by the results of the pre-test and post-test that there was an increase in insight and understanding of the PKM participants during the activity. These results are the basis for achieving activity output, which is increasing the understanding, insight and skills of PKM participants in managing organic waste into solid and liquid organic compost.

4. Conclusion

Based on the results of the Industrial Engineering Study Program PKM activities implemented, the it can be concluded as follows:

a. The achievement of increased skills and knowledge of the participants of the Industrial Engineering Study Program PKM activities at SMAN 67 Jakarta regarding waste processing into derivative products that have greater utility value. This can be proven based on the pre-test and post-test results with an increase in value from 79.45 to 85.04 .
b. Through the socialization of organic waste processing into solid and liquid compost, Teachers and Students of SMAN 67 Jakarta can have more skills in making solid and liquid compost. The Compost Working Group can integrate this knowledge into the programs prepared so they can run according to their goals.
c. This PKM activity is the initial step in implementing the work program at SMAN 67 Jakarta as an Adiwiyata School. The composter drum used was donated to SMAN 67 Jakarta to support the Adiwiyata School work program at SMAN 67 Jakarta, and the waste recycling and composting facilities can be reused.

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