



## Socialization and Implementation of Compost Bin Technology as an Environmentally Friendly Solution in Elementary Schools

<sup>1</sup>Wayan Sri Maitri\*, <sup>2</sup>Komang Widhya Sedana Putra P, <sup>3</sup>Ni Wayan Lasmi

<sup>1,2,3</sup>Universitas Pendidikan Nasional, Denpasar, Bali

Email: srimaitri@undiknas.ac.id<sup>1</sup>, widhyasedana@undiknas.ac.id<sup>2</sup>, wayanlasmi@undiknas.ac.id<sup>3</sup>.

\*Corresponding author: Wayan Sri Maitri<sup>1</sup>

### ABSTRAK

Permasalahan lingkungan yang berkaitan dengan pengelolaan sampah organik masih menjadi tantangan utama di banyak sekolah dasar. Keterbatasan pengetahuan, kurangnya sarana pendukung, serta minimnya pembelajaran lingkungan yang bersifat praktis sering menyebabkan pengelolaan sampah belum dilakukan secara optimal. Kondisi ini berdampak pada rendahnya kesadaran siswa terhadap pentingnya keberlanjutan lingkungan dan terbatasnya keterlibatan mereka dalam kegiatan pengelolaan sampah. Oleh karena itu, diperlukan solusi yang efektif dan mudah diterapkan untuk memperkuat pendidikan lingkungan sejak usia dini. Program pengabdian kepada masyarakat ini bertujuan untuk meningkatkan literasi lingkungan dan keterampilan praktis siswa melalui kegiatan sosialisasi dan implementasi teknologi tong komposter di SD Desa Padangsambian Klod, Denpasar. Kegiatan dilaksanakan pada tanggal 6 Februari 2026 dengan menggunakan pendekatan partisipatif yang menggabungkan penyuluhan, demonstrasi praktik, pendampingan langsung, serta pembinaan berkelanjutan. Tahap persiapan meliputi observasi awal, koordinasi dengan pihak sekolah, serta penyusunan materi pembelajaran. Pada tahap pelaksanaan, siswa diperkenalkan pada konsep pemilahan sampah dan dilatih untuk mengolah sampah organik menggunakan tong komposter. Tahap refleksi dan evaluasi dilakukan melalui observasi, diskusi, dan umpan balik dari peserta kegiatan. Hasil kegiatan menunjukkan adanya peningkatan yang signifikan pada pemahaman dan perilaku siswa dalam pengelolaan sampah organik. Setelah mengikuti program, siswa mampu membedakan jenis sampah, memanfaatkan tong komposter secara aktif, serta menunjukkan tanggung jawab yang lebih tinggi dalam menjaga kebersihan lingkungan sekolah. Partisipasi siswa meningkat secara nyata, dan keterlibatan guru dalam mendampingi serta mengintegrasikan kegiatan komposting ke dalam aktivitas pembelajaran juga semakin optimal. Temuan ini menunjukkan bahwa pembelajaran berbasis praktik yang didukung oleh teknologi sederhana mampu meningkatkan kesadaran lingkungan dan membentuk perilaku berkelanjutan pada siswa. Secara keseluruhan, penerapan teknologi tong komposter terbukti efektif sebagai media edukasi dalam menumbuhkan perilaku peduli lingkungan di sekolah dasar. Program ini berhasil mencapai tujuannya dalam meningkatkan literasi lingkungan, memperkuat keterampilan praktis, serta membentuk kebiasaan yang berorientasi pada keberlanjutan. Program pengabdian selanjutnya diharapkan dapat memperluas cakupan pendidikan lingkungan guna mendukung keberlanjutan jangka panjang.

**Kata Kunci: Pengabdian Masyarakat, Tong Komposter, Pendidikan Lingkungan, Pengelolaan Sampah, Sekolah Dasar, Praktik Berkelanjutan**

### ABSTRACT

*Environmental problems related to organic waste management remain a major challenge in many elementary schools. Limited knowledge, inadequate facilities, and the lack of practical environmental education often result in improper waste disposal practices. This condition reduces students' awareness of environmental sustainability and limits their involvement in waste management activities. Therefore, effective and applicable solutions are required to strengthen environmental education at an early age. This community service program aimed to improve students' environmental literacy and practical skills through the socialization and implementation of compost bin technology at SD Desa Padangsambian Klod, Denpasar. The program was conducted on February 6, 2026, using a participatory approach that combined socialization sessions, practical demonstrations, guided practice, and continuous mentoring. The preparation stage included preliminary observation, coordination with school authorities, and the development of learning materials. During the implementation stage, students were introduced to waste sorting concepts and trained to process organic waste using compost bins. The reflection and evaluation stage was carried out through*

*observation, discussions, and feedback from participants. The results showed significant improvements in students' understanding and behavior regarding organic waste management. After participating in the program, students were able to distinguish between organic and inorganic waste, actively use compost bins, and demonstrate greater responsibility in maintaining a clean school environment. Student participation increased noticeably, and teachers became more involved in supervising and integrating composting activities into daily learning routines. These changes indicate that hands-on learning supported by simple technology can effectively enhance environmental awareness and sustainable practices among students. In conclusion, the implementation of compost bin technology serves as an effective educational tool for promoting environmentally responsible behavior in elementary schools. The program successfully achieved its objectives of increasing environmental literacy, strengthening practical skills, and fostering sustainable habits. Future community service programs are encouraged to expand environmental education initiatives to strengthen long-term environmental sustainability.*

**Keywords: Community Service, Compost Bin, Environmental Education, Waste Management, Elementary School, Sustainable Practices**

## 1. INTRODUCTION

Waste management has become a significant environmental challenge in educational institutions, especially at the elementary school level (Albani et al., 2025). This issue is largely driven by daily school activities that generate substantial amounts of organic waste, such as food scraps from canteens, fallen leaves, and plant residues from school gardens (Pradnya et al., 2024). In many cases, this waste is disposed of without proper sorting or processing and is directly sent to landfills (Gus et al., 2025). Such practices not only contribute to environmental degradation but also indicate the limited integration of environmental education into daily school life (Purnami, 2020). Elementary schools hold a crucial position in shaping students' character, values, and habits from an early age (Ainin & Asafri, 2023). At this formative stage, students are highly receptive to learning experiences that influence their long-term attitudes and behaviors. Therefore, environmental education should not be limited to theoretical discussions in the classroom but should be supported by practical activities that allow students to apply their knowledge in real situations (Hidayatulloh et al., 2025). Through direct involvement, students are more likely to develop a sense of responsibility and awareness toward environmental sustainability.

One practical approach to strengthening environmental education is the introduction of environmentally friendly and easily applicable technologies, such as compost bin systems (Schwarz, n.d.). Compost bins enable the processing of organic waste into compost that can be reused as fertilizer for school gardens and green spaces (Torrijos et al., 2021). This technology is relatively simple, affordable, and suitable for school environments. More importantly, composting activities provide opportunities for students to understand the waste cycle, from disposal to reuse, in a concrete and meaningful manner (Mukesh et al., 2026). Despite its potential benefits, the implementation of compost bin technology in many elementary schools has not been carried out optimally. Several obstacles are commonly encountered, including limited knowledge of composting techniques, lack of systematic guidance, insufficient facilities, and low student participation (Perencanaan et al., 2021). In some cases, compost bins are available but are not used effectively due to the absence of proper training and continuous supervision (Agustina et al., 2025). As a result, the expected educational and environmental benefits cannot be fully achieved.

Teachers and school staff often face challenges in integrating environmental practices into existing learning activities (Kamal, 2021). Without adequate support and assistance, environmental programs tend to be implemented only temporarily and are difficult to sustain (Asiah & Negara, 2024). This condition highlights the importance of community service programs that provide structured socialization, technical assistance, and continuous mentoring in the application of environmentally friendly technologies within school settings (Ediputra et al., 2025). Based on these considerations, this community service program was designed to conduct systematic socialization and practical assistance in the implementation of compost bin technology in elementary schools. The program aims to improve students' understanding of organic waste management, enhance their practical skills in composting, and encourage active participation in environmental conservation activities. Furthermore, the program seeks to strengthen teachers' capacity to integrate environmental education into daily learning processes.

The specific objectives of this program include increasing students' environmental literacy, fostering positive attitudes toward waste management, developing sustainable habits in school life, and creating a supportive environment for green initiatives. Through hands-on training, demonstrations, and continuous mentoring, students are expected to gain direct experience in managing organic waste responsibly. Ultimately, this program is expected to contribute to the development of an environmentally conscious school culture that promotes sustainable practices beyond the classroom. By integrating compost bin technology into daily activities, schools can serve as models for environmental stewardship in the wider community (Mizar et al., 2021). In the long term, this initiative is anticipated to support national efforts in environmental protection and sustainable development through early education and community-based empowerment.

## **2. METHODS**

### **2.1 Location of Activity**

This community service program was conducted at SD Desa Padangsambian Klod, located in Denpasar, Bali, Indonesia. The school was selected as the activity site due to its active involvement in environmental education programs and its potential for developing sustainable waste management practices. The program involved approximately 60 students from three classes, particularly those in grades 4 to 6, who participated in a series of hands-on activities. The location provided an appropriate environment for introducing compost bin technology and implementing experiential learning related to organic waste management.

### **2.2 Time of Implementation**

The program was implemented on February 6, 2026. The activity was carried out during regular school hours to ensure maximum participation from students and teachers. The selected date was determined based on coordination with school authorities and the academic schedule, allowing the program to be conducted effectively without disrupting learning activities.

### **2.3 Preparation Stage**

The preparation stage was conducted to ensure the smooth implementation of the program. This stage began with an initial observation to identify existing waste management practices and environmental conditions within the school environment. The team then coordinated with school principals and teachers to discuss the objectives, schedule, and technical aspects of the activity.

In addition, learning materials related to composting, environmental conservation, and waste sorting were prepared in advance. Compost bins, organic waste samples, instructional media, and presentation tools were also arranged. The team developed activity guidelines and demonstration procedures to ensure that the implementation stage could be carried out systematically and effectively.

### **2.4 Implementation Stage**

The implementation stage focused on delivering educational content and practical training to students. The activity began with a socialization session that introduced basic concepts of waste management, the importance of reducing organic waste, and the benefits of composting. This session was delivered through interactive presentations and discussions to encourage active student participation.

Following the socialization session, a practical demonstration was conducted to show the proper use of compost bins. Students were guided step by step in sorting organic waste, placing it into the compost bin, and maintaining appropriate composting conditions. During this process, participants were encouraged to practice directly under the supervision of the service team and teachers.

Furthermore, mentoring and monitoring activities were carried out to ensure that students understood the procedures and could apply them independently. The team provided continuous assistance, answered questions, and offered feedback to improve students' skills and confidence in managing organic waste.

### **2.5 Reflection and Evaluation Stage**

The reflection and evaluation stage was conducted after the completion of the implementation activities. This stage aimed to assess the effectiveness of the program and identify areas for improvement. Evaluation was carried out through observation, informal interviews, and group discussions with students and

teachers. Participants were encouraged to share their experiences, challenges, and suggestions related to the use of compost bins. The team analyzed students' levels of participation, understanding, and behavioral changes toward waste management. Based on the evaluation results, recommendations and follow-up plans were formulated to support the sustainability of the program. This stage also emphasized strengthening collaboration between the school and the community service team to ensure that composting activities could continue as part of the school's environmental education program.



Figure 1. Impementation with Students

As shown in Figure 1, the program was implemented through hands-on activities that actively engaged students in organic waste management practices. To ensure the systematic implementation of the community service program, all activity stages were organized into a structured workflow. This workflow was designed to illustrate the sequence of activities from the initial preparation phase to the final evaluation stage. By arranging the program into clear and interconnected steps, the team was able to maintain consistency, coordination, and effectiveness throughout the implementation process.

The activity flowchart serves as a visual representation of the program's operational framework. It outlines the relationship between each stage, including preparation, implementation, mentoring, and evaluation. Through this flowchart, stakeholders can easily understand the logical progression of activities and the roles of each participant involved in the program. The flowchart also functions as a practical guideline for replication in other schools with similar characteristics and objectives.

Furthermore, the use of a flowchart supports transparency and accountability in the execution of community service activities. It enables the team to monitor progress, identify potential obstacles, and make timely adjustments when necessary. By presenting the workflow in a clear and systematic manner, the program promotes efficiency and sustainability, ensuring that each stage contributes meaningfully to the achievement of the overall objectives.



Fig. 2 Problem Schedule Flowchart

### 3. RESULTS AND DISCUSSION

The community service program on the socialization and implementation of compost bin technology at SD Desa Padangsambian Klod produced several positive outcomes. The activities were conducted through interactive presentations, practical demonstrations, and guided practice sessions, as reflected in the documentation of the program. Students actively participated in both theoretical and practical components, indicating a high level of engagement and interest in environmental learning activities.

During the initial observation, it was found that most students had limited knowledge regarding organic waste management and composting techniques. Waste generated from daily school activities was generally disposed of without proper separation, and composting practices had not been systematically implemented. This condition was consistent with the issues identified in the introduction, particularly regarding the lack of practical environmental education and limited utilization of environmentally friendly technology in schools.

After the implementation stage, noticeable improvements were observed in students' understanding and behavior. Students demonstrated the ability to distinguish between organic and inorganic waste and showed increased awareness of the importance of waste sorting. Through hands-on practice using compost bins, students gained direct experience in managing organic waste and understanding the composting process. The presence of instructors and teachers during practice sessions also contributed to building students' confidence and motivation.

Furthermore, the documentation shows that students were actively involved in demonstrations and group activities. This participatory approach encouraged collaborative learning and strengthened students' sense of responsibility toward maintaining a clean and sustainable school environment. The practical nature of the activity enabled students to relate theoretical concepts to real-life applications, making the learning process more meaningful. To evaluate the effectiveness of the community service program, a comparison was conducted between conditions before and after the implementation. The results are presented in Table 1.

Aspect	Before Program	After Program
<b>Students' Knowledge of Composting</b>	Limited understanding of composting concepts and processes	Improved understanding of composting principles and procedures
<b>Waste Sorting Practice</b>	Waste was disposed of without proper separation	Students actively separated organic and inorganic waste
<b>Utilization of Compost Bins</b>	Compost bins were rarely or not used	Compost bins were used regularly for organic waste processing
<b>Student Participation</b>	Low involvement in environmental activities	High participation in composting and waste management activities
<b>Environmental Awareness</b>	Limited awareness of environmental sustainability	Increased awareness and positive attitudes toward environmental protection
<b>Teacher Involvement</b>	Limited integration into learning activities	Active involvement in supervising and supporting composting practices
<b>School Environment</b>	Waste management was less organized	Cleaner and more organized waste management system

**Table 1. Comparison Before and After Implementation**

The results of this program indicate that the integration of compost bin technology into environmental education activities can effectively enhance students' environmental literacy and practical skills. As stated in the introduction, environmental education at the elementary level should emphasize experiential learning. The findings of this program confirm that direct involvement in composting activities plays a significant role in shaping students' attitudes and behaviors toward waste management. The socialization sessions provided a foundation for understanding the environmental impacts of improper waste disposal and the benefits of composting. Meanwhile, practical demonstrations and guided practice allowed students to apply this knowledge in a structured manner. This combination of theoretical explanation and hands-on experience proved to be effective in improving learning outcomes.

In addition, the mentoring and monitoring process supported continuous learning and prevented misconceptions related to composting procedures. Students were able to ask questions, receive immediate feedback, and correct mistakes during practice. This approach contributed to the sustainability of the program, as students became more confident in continuing composting activities independently. The involvement of teachers also played an important role in reinforcing the program's impact. Teachers assisted in supervising students and integrating composting activities into daily routines. This collaboration increased the likelihood that the program would be maintained beyond the initial implementation period. As a result, the school environment gradually developed a culture that supports environmentally responsible behavior.

From a broader perspective, this program demonstrates that simple and affordable technologies, such as compost bins, can serve as effective learning tools in environmental education. When combined with systematic guidance and community engagement, these technologies can contribute to long-term behavioral change and support sustainable development goals.

#### **4. CONCLUSION**

This study demonstrates that integrating structured environmental socialization with hands-on composting practices constitutes an effective micro-level intervention for strengthening environmental literacy in elementary education. Beyond immediate knowledge gains, the program reveals that experiential exposure to simple compost bin technology can function as a behavioral catalyst, embedding sustainable waste management habits at an early age. The key contribution of this initiative lies in its operational model, which combines low-cost technology, participatory learning, and school-based institutional support. This model not only enhances students' practical competencies but also creates a replicable framework for embedding sustainability into daily educational routines. The findings suggest that environmental education becomes significantly more impactful when translated from abstract concepts into routine, practice-based activities.

From a long-term perspective, early-stage behavioral conditioning through school-based interventions has the potential to generate cumulative environmental benefits, particularly in shaping future community practices related to waste management. Therefore, this program extends beyond a single intervention, positioning elementary schools as strategic entry points for cultivating environmentally responsible behavior at the societal level. Future initiatives should focus on scaling this model across schools, integrating monitoring mechanisms to assess behavioral persistence over time, and strengthening collaboration between educational institutions and local stakeholders to ensure sustained environmental impact.

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