



# Participatory Strategies for Fostering Environmental Awareness and Domestic Waste Management through Waste Segregation among Primary School

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Received: April 28, 2025

Revised: May 26, 2025

Accepted: June 30, 2025

Published: June 30, 2025

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DOI: [10.29303/ujcs.v6i2.989](https://doi.org/10.29303/ujcs.v6i2.989)

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**Abstract:** This community service project aimed to promote environmental awareness and sustainable waste management practices among primary school students at SDN Kuin Cerucuk V Banjarmasin. The program targeted students aged 8–12, a critical developmental stage for instilling environmentally responsible behaviour. Using a participatory approach, the activities included educational sessions, practical waste sorting exercises, and the installation of visual learning aids. Pre- and post-intervention assessments were conducted through direct observation and questionnaires to evaluate knowledge acquisition and behavioural changes. The results indicated a substantial improvement in students' understanding of waste types and segregation practices. Prior to the intervention, 71.4% of students demonstrated limited knowledge, which shifted significantly post-intervention, with 71.4% achieving the highest knowledge category. Observable behavioural changes included consistent use of segregated waste bins and increased attentiveness to school cleanliness. The active involvement of teachers and school management contributed to the program's success. However, sustainability challenges remain, including limited time for long-term mentoring, resource constraints among staff, and the absence of community-level waste infrastructure. Despite these obstacles, the project demonstrates that early environmental education, supported by collaboration and practical engagement, can effectively foster long-term behavioural change and lay the foundation for an environmentally conscious.

**Keywords:** Environmental Education, Participatory Approach, Waste Segregation, Primary School, Behavioural Change, Sustainability.

## Introduction

The issue of waste management in primary schools constitutes a multifaceted ecological challenge in urban environments, as exemplified by conditions at SDN Kuin Cerucuk V, Banjarmasin. Daily school activities undertaken by students and staff generate substantial amounts of both organic and inorganic waste. Plastic waste is non-biodegradable and most contributes (Baroah & Qonita, 2020; Huda et al., 2002).

However, the absence of proper segregation practices results in the accumulation of mixed waste, contributing to unpleasant odor and disrupting the

quality of the learning environment. Some study reported that student more anxious if they studied in a school with poor social climate than good social climate (Finell et al., 2024)

Preliminary assessments indicated low levels of student engagement in waste separation practices. This is evident from the presence of unsegregated waste in designated areas, which is largely attributable to inadequate waste management infrastructure within the school (Cahayani & Utami, 2025). The lack of routine waste separation further suggests a limited of environmental literacy among primary school students. In this context, targeted educational and practical

## How to Cite:

Hidayati Utami, N., Kaspul, Prahatama Putra, A., Ajizah, A., Amintarti, S., & Nurtamara, L. (2025). Participatory Strategies for Fostering Environmental Awareness and Domestic Waste Management through Waste Segregation among Primary School. *Unram Journal of Community Service*, 6(2), 378–383. <https://doi.org/10.29303/ujcs.v6i2.989>

interventions are necessary to foster a sustainable waste management system that can be extended beyond the school setting. The maintenance of school cleanliness is intrinsically linked to the objectives of Sustainable Development Goal 11 (SDG 11), which emphasizes inclusive, safe, resilient, and sustainable cities and communities (Nurfatimah et al., 2022; Vohland et al., 2021). Ineffective waste management not only poses a threat to environmental quality but also has the potential to negatively impact the health and wellbeing of the surrounding community. To address this, an educational intervention was implemented, encompassing training on organic and inorganic waste sorting, the provision of segregated waste bins, and the installation of educational posters. (Kaspul & Utami, 2024; Nasucha et al., 2020). This participatory approach aims to translate environmental knowledge into habitual behavior through consistent reinforcement and institutional support.

The observed conditions underscore systemic weaknesses in waste management practices and reflect insufficient levels of environmental awareness among students. The absence of ecological consciousness and supportive infrastructure (Husin et al., 2025) such as clearly labelled bins and engaging educational materials, exacerbates the issue. Accordingly, interventions must adopt an integrated, participatory, and practical approach to develop a sustainable, character-based waste management culture across the school community.

This community engagement initiative was carried out at SDN Kuin Cerucuk V, involving a total of 64 participants, including 56 students and 8 teachers. The program aimed to: (1) enhance participants' knowledge of waste segregation as a foundational component of school-based waste management, and (2) support the long-term cultivation of environmental responsibility and care among the school population.

Intervention strategies included the installation of educational posters in classrooms to facilitate environmental messages (Amintarti et al., 2019; Utami et al., 2017). Interactive training sessions were designed not only to impart technical skills in waste management but also to ensure their application in everyday school activities. Teachers were positioned as role models to promote consistent behavioral reinforcement among students. This approach was intended to establish a culture of independent waste segregation, reduce the volume of mixed waste generated, and position the school as a model for sustainable practices (Husin et al., 2025).

The distinctive strength of this program lies in its holistic design, integrating environmental education, infrastructure development, and character formation (Yusuf & Fajri, 2022). Post-intervention evaluations

revealed that student participation had improved significantly, with the majority demonstrating good to excellent knowledge in waste management practices. In addition to reducing the accumulation of mixed waste within the school environment, the program offers a replicable model for similar educational institutions seeking to enhance their ecological practices.

## Method

The target community of this community engagement program comprised students from Years 4, 5, and 6 at SDN Kuin Cerucuk 5 Banjarmasin, which consist 56 primary participants. They were supported by 8 teachers and school staff. This particular school was selected due to its significant and unresolved issue of domestic waste accumulation—both organic and inorganic—which had not yet been addressed through a systematic management approach. Students aged between 8 and 12 years were chosen as the primary focus of the intervention, as this developmental stage is critical for the formation of character and behavioral habits. It is therefore considered an opportune period to introduce and practice domestic waste segregation.

The primary institutional partner in this activity was the school itself, represented by the headteacher and teaching staff. Their involvement was essential in several capacities: (a) granting access and official permission for the implementation program; (b) providing classrooms and school facilities as designated spaces for activities; and (c) serving as internal facilitators during the training sessions and ongoing monitoring activities. Such collaboration was fundamental to ensuring that the program would not be a temporary initiative, but rather one that could be sustainably integrated into the school's routine activities.

The instruments employed in this program included: (a) direct observation of students' behaviour before and after the intervention, and (b) a structured questionnaire to assess the improvement in students' understanding of waste management. The success indicators for the program were: (a) students' knowledge of waste categories and appropriate segregation methods falling within the 'good' and 'excellent' levels, and (b) students demonstrating consistent behaviour in using the segregated waste bins in accordance with the categories indicated on the educational posters.

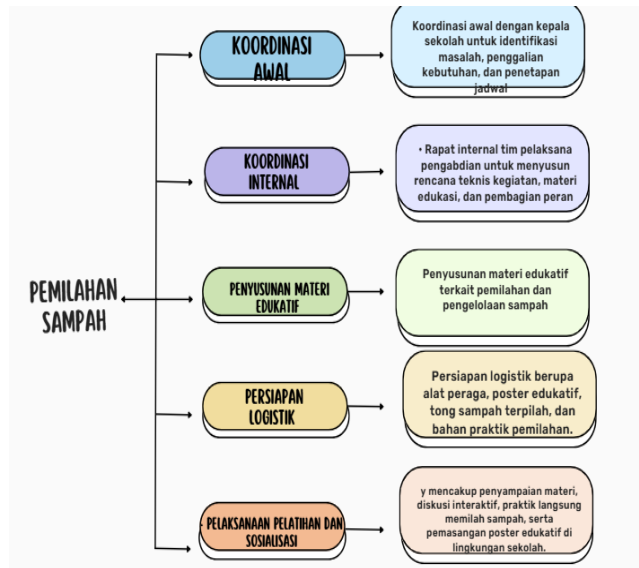


Figure 1. Stages in community service

Evaluation procedures began with a pre-test assessing students’ baseline knowledge of waste management, followed by a post-test to measure changes in their understanding. The formula used to calculate average scores was

$$X=\frac{B}{n}$$

which  $\bar{X}$  represents the mean score,  $B$  is the number of correct responses per participant, and  $n$  is the total number of respondents. The classification of student knowledge levels and corresponding quality categories is summarised in Table 1.

Tabel 1. knowledge levels

No	Score range	Categorize
1	85 < x ≤ 100,00	Excellent
2	70,00 < x ≤ 85,00	Good
3	50,00 < x ≤ 70,00	Fair
4	01,00 < x ≤ 50,00	Poor

Result and Discussion

This community engagement initiative focused on fostering and cultivating environmental awareness among students at SDN Kuin Cerucuk V through the implementation of sustainable waste management practices using a participatory approach. The program was specifically designed to bridge the gap between theoretical knowledge and practical application. The strategies employed included the delivery of educational content through visual media, hands-on practice in waste segregation, and ongoing supervision and monitoring. For instance, students were trained to

identify different types of waste and to understand the environmental consequences of improper waste management.

A. Students’ Knowledge of Waste Management

Based on the findings, students’ knowledge before and after the intervention is presented as follows in Table 2.

Table 2. Distribution of Students Knowledge Levels Before and After Intervention

No	Categori	Frequency		Percentage	
		Pretest	Posttest	Pretest	Posttest
1	Poor	40	0	71,7	0
2	Fair	6	6	10,7	10,7
3	Good	0	10	0	17,9
4	Excelent	10	40	17,9	71,7

The results of the pre-test and post-test demonstrate a marked improvement in participants knowledge following the educational intervention. Prior to the intervention, the majority of students (71.4%) were classified within the “poor” category, indicating limited initial understanding of the subject matter. Only 17.9% of participants were categorised as having “excellent” knowledge, while 10.7% fell into the “fair” category. Notably, no students achieved a “good” rating at the pre-test stage, underscoring the generally low baseline level of knowledge among participants.

Following the participatory learning activities focused on waste management, a substantial shift in knowledge distribution was observed. A total of 71.4% of participants reached the “excellent” category, indicating a remarkable improvement compared to the pre-intervention results. Furthermore, the “good” category rose from 0% to 17.9%, while the “fair” category remained constant at 10.7%. Importantly, no participants remained in the “poor” category, suggesting that all experienced an improvement in knowledge acquisition, albeit to varying degrees.

These findings suggest that the participatory strategies employed during the intervention were effective in enhancing participants’ mastery of the subject (Carvalho et al., 2021; Savery, 2019). The notable increase in the number of participants advancing from the “poor” to “excellent” category demonstrates the intervention’s success in bridging the substantial initial knowledge gap. Additionally, the emergence of participants in the “good” category reflects gradual improvements among



those who had not yet achieved the highest level of mastery.

However, the unchanged proportion of participants within the “fair” category merits further consideration. The persistence of this group suggests the presence of learners who may require more individualised or differentiated instructional methods to enhance their comprehension. This observation underscores the importance of designing adaptive and learner-responsive educational strategies that can accommodate diverse cognitive profiles and learning needs.

Overall, the findings affirm the effectiveness of the intervention in improving knowledge acquisition and offer important implications for the design of future community engagement initiatives (Gaghunting & Bermuli, 2023; Sariah S, 2020). Replicating similar interventions in different educational contexts holds promise, provided that these efforts integrate varied, inclusive, and tailored pedagogical approaches to ensure that all participants can attain optimal knowledge outcomes. Documentation of activities is presented in Figures 2 and 3.



**Figure 2.** Participatory Activities in Domestic Waste Management



**Figure 3.** Participatory Activities in Domestic Waste Management

The utilisation of participatory strategies elicited a positive response from the students, particularly during the hands-on practice sessions. Students demonstrated enthusiasm in segregating organic and inorganic waste and exhibited a

heightened understanding of the importance of maintaining a clean school environment. Within a relatively short period, observable behavioural changes emerged: students began to consistently dispose of waste in appropriate bins, sort waste according to type, and take greater care in maintaining the cleanliness of their classrooms and school grounds. These behavioural shifts indicate that educational activities incorporating direct practice can effectively foster ecological awareness within the local school context.

## **B. Sustainability of the Domestic Waste Management Program**

The impact of this community engagement initiative extended beyond individual behavioural changes among students, positively influencing the broader school community. The school environment became noticeably cleaner and more organised, and typically accumulated waste was significantly reduced. Efforts to sustain the program have been initiated through several approaches such as (1) the provision of segregated waste bins and the establishment of regular “cleanliness day” initiatives that actively engage students in waste segregation; (2) collaborative actions embedded into the school’s routine activities, such as the “Clean Friday” program and thematic local content integrated; and (3) using educational posters as continuous reminders to reinforce appropriate waste management behaviour.

These initiatives are intended to embed cleanliness as a core component of the school’s culture, ensuring that waste management practices become habitual and are reinforced through both adequate infrastructure and value-based education. Students actively engage in hands-on waste segregation activities as part of a participatory educational in Figure 4 and 5.



**Figure 4.** Promoting sustainable domestic waste



**Figure 5.** Educational program aimed at promoting sustainable domestic waste management practices

The sustainability of the program is not without its challenges. Firstly, the limited duration of the intervention posed a constraint on the ability to provide long-term guidance and mentorship. Behavioural change requires continuous reinforcement and repetition, whereas community engagement projects are often time-bound. Secondly, not all teachers have sufficient time or resources to continuously oversee the program, particularly amidst a demanding academic schedule. Thirdly, prevailing community habits—where waste segregation is not yet a norm—can influence the consistency of student behaviour, potentially impeding the formation of lasting environmental practices. Furthermore, the lack of extended infrastructure, such as access to waste banks or recycling systems, remains a critical challenge in managing separated inorganic waste effectively.

Despite these obstacles, the success of this program demonstrates that cultivating environmentally responsible behaviour is possible from an early age, provided it is supported by appropriate pedagogical approaches and a robust support system. By adopting a sustainability model grounded in education, participation, and collaboration, school-based waste management programs can generate not only immediate impact but also serve as a foundation for nurturing a generation that is environmentally conscious and committed to safeguarding the planet's future

## Conclusion

Based on the implementation of the community engagement activities at SDN Kuin Cerucuk V Banjarmasin, it can be concluded that the educational and training program on waste management successfully achieved its primary objective: fostering environmental awareness among students through a combination of educational content and hands-on practice. This achievement was evident in the students' increased awareness of waste segregation, the adoption

of appropriate waste disposal habits, and their active participation in environmentally focused activities. The involvement of teachers and the support of the school administration further strengthened the program's effectiveness. These outcomes suggest that the program holds significant potential for further development and long-term integration, contributing to the cultivation of a sustainable, environmentally conscious school culture.

## Acknowledgments

The authors would like to express their sincere gratitude to the Institute for Research and Community Service (LPPM) of Universitas Lambung Mangkurat (ULM) for providing financial support through the PNBP funding scheme, which enabled the successful implementation of this program. The authors are especially grateful to the dedicated team of student volunteers whose active participation greatly contributed to the educational and practical aspects of the program. Their commitment and collaboration in the successful delivery of the activities in the school.

## References

- Amintarti, S., Ajizah, A., & Utami, N. H. (2019). Pengembangan Media Gambar Alga Mikroskopis Sebagai Penunjang Mata Kuliah Botani Tumbuhan Rendah. *Wahana-Bio: Jurnal Biologi Dan Pembelajarannya*, 11(1), 10. <https://doi.org/10.20527/wb.v11i1.11149>
- Baroah, S., & Qonita, S. M. (2020). Penanaman CiLi (Cinta Lingkungan) Pada Siswa Melalui Program Lingkungan Sekolah Tanpa Sampah Plastik. *Jurnal PANCAR (Pendidik Anak Cerdas Dan Pintar)*, 4(1), 11-16.
- Cahayani, K. P., & Utami, N. H. (2025). Evaluation of Wetland Environmental Awareness Among Biology Students. *JMSCEDU*, 4(2), 136-144.
- Carvalho, M., Cabral, I., Verdasca, J., & Alves, J. (2021). What about us? Teachers' participation in schools' strategic action plans. *Participatory Educational Research*, 8(3), 156-175. <https://doi.org/10.17275/per.21.59.8.3>
- Finell, E., Tolvanen, A., Claeson, A. S., & Helenius, J. (2024). How student perceptions of stuffy air and unpleasant odour are associated with students' well-being: Cross-level interaction effects of school climate. *Journal of Environmental Psychology*, 93(November 2022), 102211. <https://doi.org/10.1016/j.jenvp.2023.102211>
- Gaghunting, M. K., & Bermuli, J. E. (2023). Strategi Partisipatif untuk Meningkatkan Keterlibatan Siswa pada Pembelajaran Biologi. *Biodik*, 9(3), 86-101. <https://doi.org/10.22437/biodik.v9i3.15746>
- Huda, F. N., Feri, N., & Nani, Y. (2002). Pengaruh Bahan Ajar Muatan Lokal Konservasi Pesisir Pantai Bengkulu Terhadap Sikap Peduli Lingkungan

- Siswa Kelas IV Sekolah Dasar. *Jurnal Riset Pendidikan Dasar*, 1(3), 189-198.  
<https://ejournal.unib.ac.id/juridikdasunib/article/view/6501%0Ahttps://ejournal.unib.ac.id/index.php/juridikdasunib/article/download/6501/3106>
- Husin, A., Helmi, H., Nengsih, Y. K., & Rendana, M. (2025). Environmental education in schools: sustainability and hope. *Discover Sustainability*, 6(1). <https://doi.org/10.1007/s43621-025-00837-2>
- Kaspul, K., & Utami, N. hidayati. (2024). School Environmental Education Activities to Enhance Plant Utilization for Students at SDN Kuin Cerucuk V, Banjarmasin City. *Unram Journal of Community Service*, 5(1), 40-44.  
<https://doi.org/10.29303/ujcs.v5i1.577>
- Nasucha, Y., Rahmawati, L. E., Silviana, Y., Udin, R., Atitah, S., Astuti, W., Indriyani, N., Safitri, I., Ayu, F. D., Aji, S., Nirmala, E., & Arfiah, S. (2020). Penguatan Karakter Peduli Lingkungan melalui Program Cinta Lingkungan di MIM Kranggan, Sukoharjo. *Buletin KKN Pendidikan*, 2(2), 95-99.  
<https://doi.org/10.23917/bkknndik.v2i2.11846>
- Nurfatimah, S. A., Hasna, S., & Rostika, D. (2022). Membangun Kualitas Pendidikan di Indonesia dalam Mewujudkan Program Sustainable Development Goals (SDGs). *Jurnal Basicedu*, 6(4), 6145-6154.  
<https://doi.org/10.31004/basicedu.v6i4.3183>
- Sariah S. (2020). Kegiatan Belajar Partisipatif. *Jurnal Pemikiran Islam*, 37(1), 45-51.
- Savery, J. R. (2019). Comparative Pedagogical Models of Problem-Based Learning. In *The Wiley Handbook of Problem-Based Learning*.  
<https://doi.org/10.1002/9781119173243.ch4>
- Utami, N. H., Riefani, M. K., Muchyar, M., & Mirhanudin, M. (2017). The Measurement of Science Process Skills for First Year Students at Biology Education Departement. 100, 382-384.  
<https://doi.org/10.2991/seadric-17.2017.83>
- Vohland, K., Land-Zandstra, A., Ceccaroni, L., Lemmens, R., Perello, J., Ponti, M., Samson, R., & Wagenknecht, K. (2021). The science of citizen science. In *The Science of Citizen Science*.  
<https://doi.org/10.1007/978-3-030-58278-4>
- Yusuf, R., & Fajri, I. (2022). Differences in behavior, engagement and environmental knowledge on waste management for science and social students through the campus program. *Heliyon*, 8(2), e08912.  
<https://doi.org/10.1016/j.heliyon.2022.e0891>