

WASTE MANAGEMENT AND WASTE BANK OUTLINE AS AN ENVIRONMENTAL EDUCATION EFFORT FOR GREEN GENERATION 2025 PARTICIPANTS AT BUDI LUHUR UNIVERSITY

Julian BONGSOIKRAMA¹, Debi RUSMIATI², Nexen Alexandre PINONTOAN^{3*},

Doddy WIHARDI⁴, Devit SETIONO⁵

^{1,2,3,4,5}Universitas Budi Luhur, Jakarta, INDONESIA

**n xenalexandre.pinontoan@budiluhur.ac.id*

ABSTRACT

This community service activity aims to increase awareness and knowledge of high school (SMA) and vocational high school (SMK) students from various cities in Indonesia regarding the importance of sustainable waste management and the concept of waste banks as a practical solution to reduce waste generation. The outreach was held at Budi Luhur University during the 2025 Green Generation event, involving 110 participants from 34 provinces. The implementation method included interactive material presentations, waste sorting simulations, and field visits to the Budi Luhur Waste Bank. Evaluation results showed a 72% increase in participant understanding based on pre- and post-test results. This activity proves that practice-based education is effective in building environmental awareness among the younger generation and encourages program replication in their respective schools.

Keywords: Environmental Education, Green Generation, Sustainable Education, Waste Management, Waste Bank.

1. INTRODUCTION

The waste problem is an increasingly complex environmental issue in Indonesia and is one of the main challenges in achieving the Sustainable Development Goals (SDGs), especially Sustainable Cities and Communities goals and Responsible Consumption and Production goals (Mangindaan, 2021). Based on data from the Ministry of Environment and Forestry (KLHK, 2023), Country waste production reaches approximately 68.5 million tons per year, with the largest composition coming from household waste (approximately 37.3%). Unfortunately, approximately 40% of this has not been properly managed, resulting in water, air, and soil pollution problems in various regions (KLHK, 2023). This condition requires systematic efforts through a community-based waste management approach and strengthening public capacity in implementing the 3R principle (Reduce, Reuse, Recycle). National policies such as Presidential Regulation Number 97 of 2017 concerning the National Policy and Strategy for Waste Management serve as an important reference, with a target of 30% waste reduction and 70% waste management by 2025. Environmental education has been proven to be an effective strategy in forming environmentally conscious behaviour from an early age (Arif Saputra et al., 2025).

Educational programs instill ecological awareness, practical skills, and values of social responsibility in the younger generation. According UNESCO (2021) Environmental literacy encompasses not only theoretical knowledge but also critical skills, active participation, and the ability to make decisions that support sustainability. Education that emphasizes experiential learning has been shown to increase community participation in waste sorting, encourage the implementation of a circular economy, and foster habits of reducing waste at the source.

This is in line with research Alfiquroam Kumar et al (2025) which showed that students involved in the waste bank program experienced significant increases in pro-environmental behaviours, such as reducing the use of single-use plastics, engaging in recycling activities, and taking the initiative to educate their peers. Programs such as waste banks in school's function not only as a technical means of waste management but also as a social learning medium that encourages collective behavioural change at the community level. Therefore, integrating environmental education into school and community activities is a key strategy for creating long-term changes in more responsible consumption and production patterns.

Budi Luhur University, as an environmentally conscious campus, has developed the Budi Luhur Waste Bank program as a concrete manifestation of the green campus concept and its commitment to sustainable development. This program not only serves as a means of waste management on campus but also serves as an experiential learning medium for students, pupils, and the surrounding community. Through this program, participants not only learn waste management theory but also directly participate in the process of sorting, weighing, recording, and utilizing waste for economic value. This aligns with the principle of service learning, which integrates academic learning with community service, resulting in more meaningful learning (Alfiquroam Kumar et al., 2025). This outreach activity was designed in a participatory manner to raise awareness among young people about the importance of integrated waste management. Participants were introduced to the 3R concept (Reduce, Reuse, Recycle), the circular economy mechanism, and the socio-economic impacts of waste banks, such as the potential

for additional income from the sale of sorted waste. By visiting the Budi Luhur Waste Bank, participants gained first-hand experience that fostered a sense of ownership of environmental issues and increased their likelihood of implementing new habits in their respective schools.

This practice-based education has a multiplier effect: participants have the potential to become agents of change, inspiring their peers, teachers, and communities to implement similar programs. This is crucial considering that the national waste reduction target of 30% by 2025 can only be achieved through multi-stakeholder collaboration, including contributions from the education sector (KLHK, 2023). Therefore, the outreach and hands-on practice at the Budi Luhur Waste Bank are not merely knowledge transfer but also a strategy for empowering young people to build a culture of sustainable waste management.

2. METHOD

This outreach activity was held face-to-face at the Green Generation 2025 event at Budi Luhur University, involving 110 high school and vocational high school students from 34 provinces as the main participants. A participatory approach was used, encouraging participants to actively interact, discuss, and practice the skills taught. The series of activities began with presentations by speakers from Budi Luhur University and the Environmental Agency, covering basic waste management concepts, the 3R principle (Reduce, Reuse, Recycle), and an introduction to the waste bank mechanism. The presentation was supported by visual presentations, educational videos, and case studies to help participants understand the context of waste issues more comprehensively.

Following the presentation, the activity continued with a live waste sorting simulation. Participants were grouped into small teams and given samples of organic, inorganic, and residual waste. They were asked to practice proper sorting methods according to the Indonesian National Standard (SNI) for household waste management. The facilitator then provided feedback and explained the impact of sorting errors on the quality of recycled materials. The next stage was a field visit to the Budi Luhur Waste Bank, where participants observed the process of collecting, weighing, recording, and managing economically valuable waste until it was ready to be sold to collectors. This visit provided real-world experience of how waste can be transformed into an economic resource through an organized system.

The activity continued with an interactive discussion and question-and-answer session, aimed at identifying challenges faced by participating schools, such as a lack of waste sorting facilities, limited support from the school administration, or low awareness among school residents. This discussion generated ideas for solutions that participants could implement in their schools, including plans to establish a school waste bank and a campaign to reduce single-use plastics.

Finally, an evaluation of the activity was conducted through pre- and post-tests to measure the increase in participants' knowledge regarding waste management and the concept of a waste bank. The evaluation results were analysed quantitatively to assess the effectiveness of the outreach and to inform the planning of follow-up activities. The approach used ensured that this activity not only served as a transfer of knowledge but also fostered attitudes and practical skills that could be replicated in their respective schools, creating a sustainable impact.

3. RESULT AND DISCUSSION



Figure 1. Waste Management Workshop at Budi Luhur University, 2025

The pre-test results showed that only 30% of participants correctly understood the concept of waste banks, the categories of organic–inorganic waste, and the standardized waste-sorting procedures. The average pre-test score

was 42.3 ± 8.7 (SD), indicating a fairly high variation in participants' understanding. This reflects the low level of waste management literacy among high school/vocational school students, in line with the findings of Rezeki et al. (2024), which state that environmental education in schools has not been fully integrated into the curriculum. After counselling sessions, simulations, and field visits, the post-test results showed an increase in the average score to 78.5 ± 6.2 (SD), more than doubling compared to the initial results. Statistical analysis using a paired t-test indicated a significant difference between pre-test and post-test scores ($t(109) = 14.87$; $p < 0.001$), meaning that the program was effective in improving participants' understanding.

The greatest improvement was observed in the ability to recognize waste categories (from 38% to 93%, an increase of 55%) and understanding the mechanism of waste banks (from 32% to 80%, an increase of 48%). Meanwhile, practical waste-sorting skills improved from 40% to 85%. These results demonstrate that practice-based learning methods (simulations and field visits) have a greater impact compared to theoretical material delivery alone.

Participants also provided feedback that the simulation and field visit sessions were the most engaging and impactful, as they offered hands-on experiences that made it easier to internalize the concepts taught. Based on the satisfaction questionnaire, 87% of participants rated the simulation activities as "very helpful" in understanding waste-sorting practices, while 82% stated that the visit to Budi Luhur Waste Bank motivated them to initiate similar programs at their schools. Some participants even shared specific comments, such as: *"seeing the waste recording process made me realize that waste can generate economic value"* and *"we want to create a similar program at our school."*

This findings align with Aribowo et al (2025) experiential learning, which emphasizes the importance of direct experience as an effective learning medium for changing behavior. This learning model allows participants to experience a learning cycle ranging from concrete experience, reflection, conceptualization, to active experimentation. In the context of this activity, the practical experience of sorting and observing the waste bank process creates a stronger emotional impact than simply receiving theoretical material.

Participant emotional involvement has been shown to be a driver of attitude change, as explained by Paschalidou (2018) Experiential learning not only enriches knowledge but also strengthens long-term memory and triggers the intention to act. This explains why many participants expressed a desire to share their knowledge with their classmates. Thus, simulations and field trips serve as important catalysts in creating environmental change agents among the younger generation.

This activity not only resulted in increased knowledge but also prompted concrete follow-up plans. Based on a post-activity questionnaire, 80% of participants expressed a commitment to establishing or strengthening a waste bank program in their respective schools. The forms of commitment proposed by participants included developing a weekly waste sorting schedule, providing separate waste bins in each classroom, and collaborating with nearby waste collectors or banks to ensure the proper management of collected waste. Some participants even proposed integrating this activity into environmental extracurricular activities or the school's Adiwiyata program, thereby ensuring the program's sustainability.

These findings indicate that outreach activities not only create momentary awareness but also trigger strong behavioral intentions to change waste management practices at the school level. This aligns with the Theory of Planned Behavior (Ajzen, 1991), which states that intention is a key predictor of actual behavior change. With support from the school and community, this commitment has the potential to result in significant improvements in waste reduction in educational settings.

This result is in line with Sarapung et al., (2025) which found that a practice-based educational approach can increase adolescent participation in waste management by up to 60% within three months of the program's implementation. This means that programs like this have the potential to create a multiplier effect, where participants, as agents of change, can influence their peers, teachers, and even the surrounding community to participate in waste management activities. The expected long-term impact is the formation of a greener, more sustainable school ecosystem that supports national waste reduction targets.

This activity significantly contributes to strengthening Budi Luhur University's image as a green campus that consistently implements the principles of sustainability within the Tri Dharma of Higher Education. The university's active participation in initiating outreach and field practice demonstrates the institution's commitment to becoming a center for broad-based environmental education, while also integrating environmental issues into community service activities. This reinforces Budi Luhur University's reputation as a pioneer in environmental programs at the university level, in line with the global trend of sustainable campus initiatives.

This activity also serves as an example of a cross-sector collaboration model involving universities, local governments, and schools. This type of collaboration enables knowledge transfer, policy alignment, and the provision of resources to support program sustainability at the community level. Kholis & Tawakal (2022) emphasized that multi-stakeholder synergy strengthens local institutional capacity and increases the likelihood of long-term success of community-based programs.

Furthermore, follow-up in the form of online mentoring, monitoring the results of implementation in schools, and the possibility of replicating the program to other schools are key to creating long-term effects on changing waste management behavior in the education sector. By adopting this model more widely, it is hoped that the education sector's contribution to reducing waste generation can increase significantly, thereby supporting the achievement of the national target of reducing waste by 30% by 2025 (KLHK, 2023). This model also has the potential to become a best practice that can be replicated in other cities, while strengthening Budi Luhur University's position as a strategic partner in implementing government programs in the environmental sector.

4. CONCLUSION

The waste management outreach and introduction of the Budi Luhur Waste Bank at the 2025 Green Generation event successfully achieved its objectives of increasing participants' knowledge and awareness of the 3R principles, waste sorting, and the circular economy concept. Pre- and post-test results showed a significant increase in understanding, from an average of 30% to 72%, with a statistically significant difference ($p < 0.001$). Participants also responded positively to the practice-based learning methods, particularly the waste sorting simulation and field trips, which were considered to provide the most memorable learning experiences and encourage attitude change. In addition to increasing knowledge, this activity sparked participants' commitment to establishing or strengthening waste bank programs in their respective schools. This demonstrates an intention to replicate the program, which has the potential to create a multiplier effect in fostering a culture of waste management among students. Institutionally, this activity strengthens Budi Luhur University's image as a green campus and serves as a model for effective collaboration between universities, local governments, and schools in realizing sustainable environmental education. Such programs play a significant role in supporting the national target of reducing waste by 30% by 2025, while also developing a younger generation that can act as agents of environmental change in their respective communities.

Recommendation

Based on the results of the outreach and evaluation activities, several recommendations can be put forward to ensure the sustainability and long-term impact of the program:

1) Follow-up Mentoring

Provide online mentoring programs for participants to monitor the implementation of waste banks in their respective schools. Mentoring can include technical consultations, guidance in creating sorting schedules, and assistance in connecting schools with local waste collectors or banks.

2) Developing Digital Modules and Educational Media

Develop digital learning modules, waste sorting video tutorials, and educational posters that can be used by participating schools as a means of ongoing outreach to other students, teachers, and parents.

3) Green School Competitions and Appreciation

Hold inter-school competitions, such as waste bank innovation competitions, recycling creativity competitions, or eco-challenges to increase student participation and create a positive competitive culture focused on waste reduction.

4) Strengthening Networks and Collaboration

Encourage the establishment of communication forums between participating schools to share experiences, strategies, and best practices. This forum can collaborate with local governments and environmental communities to organize annual events such as the Waste Bank Festival or the Green Youth Summit.

5) Integration with the National Agenda

Propose strategic collaboration with the Ministry of Environment and Forestry (KLHK) so that this program can serve as a pilot model and be replicated in schools in other regions, supporting the national waste reduction target of 30% by 2025.

REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Alfiqroam Kumar, Suryadimal, Duskiardi, Batahan Harahap, Khudia Qolbi, Alfahrizi, & M Rifdhi Alhadi. (2025). Pendampingan Edukasi Pengelolaan Sampah sebagai Tindak Lanjut Pendirian Bank Sampah. *JURPIKAT (Jurnal Pengabdian Kepada Masyarakat)*, 6(1), 207–217. <https://doi.org/10.37339/jurpikat.v6i1.2061>

- Aribowo, S., Nadiroh, N., & Faesal, M. (2025). Implementation of Experiential Learning Methods in Environmental Education. *International Journal of Business, Law, and Education*, 6(1), 468–476. <https://doi.org/10.56442/ijble.v6i1.1037>
- Arif Saputra, T., Baharudin, & Muchsin Afriyadi, M. (2025). Implementasi Pendidikan Lingkungan Di Sekolah Dasar Dalam Membangun Kesadaran Ekologis Siswa Sejak Dini: Studi Kasus SD Alam Lampung. *Jurnal Kajian Pendidikan Dan Keguruan*, 5(1), 1–21.
- Kholis, N., & Tawakal, A. (2022). Community Service Project: Waste Management Through Waste Bank in Pogung, Sleman Regency. *Proceedings of the 9th International Conference on Education Research, and Innovation (ICERI 2021)*, 463–468. <https://doi.org/10.2991/978-2-494069-67-1>
- KLHK. (2023). Laporan Kinerja KLHK 2023. *Laporan Kinerja Ditjen Tanaman Pangan Tahun 2022*, 229. [https://tanamanpangan.pertanian.go.id/assets/front/uploads/document/LAKIN DJTP 2022_UPDATE ATAP \(2\).pdf](https://tanamanpangan.pertanian.go.id/assets/front/uploads/document/LAKIN_DJTP_2022_UPDATE_ATAP(2).pdf)
- Mangindaan, D. (2021). Community services in Indonesia regarding waste handling and management: Mapping and bibliometric analysis. *International Journal Of Community Service*, 1(3), 344–357. <https://doi.org/10.51601/ijcs.v1i3.54>
- Paschalidou, L. (2018). Exploring gamification’s contribution in engaging pupils to Solid Waste Management in the context of Environmental Education in Greece. *Education and Learning Sciences Group*, 890916642070. <http://edepot.wur.nl/445842>
- Sarapung, R. R., Idrus, S., & Ismail, J. (2025). the Effectiveness of the Apik Method in Improving Waste Management Literacy Among Elementary and Junior High School Students. *Jurnal Pendidikan Glasser*, 9(2), 223–238. <https://doi.org/10.32529/glasser.v9i2.4257>
- UNSECO. (2021). *UNESCO Environmental Sustainability and Management Policy* (Issue May).