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Socialization and Assistance Program for Plastic Waste Recycling using Ecobrick Method at SDN Kawungsari, Bandung Regency, Indonesia

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ABSTRACT

Plastic waste is a significant environmental issue, particularly due to its slow decomposition and incresing accumulation. One solution to mitigate plastic waste is the Ecobrick method., where non-organic plastic is compacted into plastic bottles to create durable building materials. This study focuses on the socialization and assistance program for plastic waste recycling using Ecobrick method at SDN Kawungsari, Bandung Regency. The program aims to raise awareness among students and the community about the importance of waste separation and the potential of Ecobricks, along with follow-up assistance to ensure continuous practice. Surveys and observations were conducted before and after the program to measure changes in knowledge, attitudes, and participation levels regarding plastic waste recycling. The result showed a significant increase in awareness and active involvement from students and teachers in the creation of Ecobrick. This initiative demonstrates the potential of educational interventions to foster sustainable waste management practices in local communities.

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1. INTRODUCTION

Waste management and education are important factors in achieving sustainable urban development within the framework of the SDGs (Sustainable Development Goals)(Ariyani et al., 024). Plastic waste poses a serious environmental challenge due to its nonbiodegradable nature and increasing volume in landfills and oceans. In Indonesia, the rapid growth of plastic consumption has intensified the need for effective waste management solutions. One promising approach is the Ecobrick method, which involves compacting plastic waste into used plastic bottles to create reusable building materials. This method not only offers a creative solution to reducing plastic waste but also promotes sustainability through community engagement (Sufiyanto et al., 2022; Purwati et al., 2023).

Ecobrick are effective method for recycling plastic waste due to simple and low-cost solution. Ecobricks are easy to make and don't require expensive or sophisticated machinery. Individuals can create them using readily available materials, making it a practical and accessible recyclingsolution for

communities around the world. By stuffing non-recyclable plastic into bottles, ecobrick help divert plastic waste from landfills, waterways, and the environment. This process reduces pollution and the harmful effects of plastic on wildlife and ecosystems. Ecobricks also are high durable and can be used in constructions projects, such as building homes, furniture, or garden structures (Yusuf et al., 2020). This provide a long-term, sustainable use for plastics that would otherwise remain waste for centuries. Making ecobricks encourages people to be more mindful of their plastic consumptions. It raises awareness of how much non-biodegradable waste is generated and promoted a shift towards reducing, reusing, and recycling. Ecobrick projects often involve communities in environmental education and a shared commitment to reducing plastic waste. Unlike industrial recycling processes, which can require significant energy and resources, ecobriking is a low-energy method of managing plastic waste. It doesn't involve melting or chemically processing plastics, which often produce harmful emissions. Ecobricks are versatile and can be used to create a variety of structure, including benches, walls, planters, and even entire buildings. This not on;y repurpose plastic but also provides affrodable and eco-friendly construction materials.

Schools play a crucial role in solid waste management campaign for several reasons. First, school are ideal platforms for teaching students about the importance of waste management from a young age (Elvianasti et al., 2021). Educating children on the principles of reduce, reuse, and recycle can help instill lifelong environmentally-friendly habits. Then, students often bring lessons learned at school onto management campaigns. This ripple effect helps awareness among families and neighborhoods about proper waste disposal. School can foster behavioral change by incorporating waste management into daily routines (Hapsari & Wahyuni, 2020). Through hand-on activities like recycling programs, waste segregation, and composting projects, students learn practical waste reduction techniques. Schools also can nurture future environmental leaders. Encouraging students to participate in solid waste management initiative can inspire the to advocate for sustainable practices throughout their lives, influencing broader societal change (Shahen, 2024). Furthermore, students are often encouraged to think creatively and innovatively. In the context of solid waste management, this can lead to new ideas for recycling, waste reduction, and community-level initiatives that may have a larger impact. Last but not least, school contribute to national and international sustainability goals, such as SDGs, by fostering knowledge and responsible actions regarding solid waste management. This support is critical in achieving long-term sustainability targets (Suhendri, 2022; Bermuli et al., 2023).

The socialization and assistance program for plastic waste recycling using the Ecobrick method at SDN Kawungsari, Bandung Regency, was initiated to address this environmental issue at the grassroots level. The program aims to educate students and the surrounding community on the importance of plastic waste management and to provide practical training in creating Ecobricks. By involving the school community, the initiative seeks to foster a culture of environmental responsibility and sustainable practices from an early age. The benefits of this program include reducing plastic waste in the local environment, raising awareness about the long-term impacts of plastic pollution, and empowering students to take active roles in environmental conservation. Moreover, the Ecobrick method provides a practical, hands-on approach to waste management that can be easily adopted and replicated in other communities. This reaserach show some stages Ecobrick projects from socialization until recycling plastic waste into Ecobrick product at SDN Kawungsari, Bandung Regency.

2. METHODS

This research followed a structured approach designed to educate and engage students, teachers, and the local community. The method involved four key phases:

1) Preliminary Assessment : A baseline survey was conducted to assess the current knowledge, attitudes, and practices related to plastic waste management among students and staff. This helped identify the specific needs of the school and informed the design of the program.
2) Socialization and Education : A series workshop and presentations were held to introduce the concept of plastic waste recycling and the Ecobrick method. These sessions included interactive

discussions on the environmental impact of plastic waste and the benefits of Ecobricks. Educational materials, such as posters, videos, and handouts, were provided to ensure comprehensive understanding. The program targeted both students and teachers to promote a school-wide adoption of the initiative.

3) Hands-on Training and Ecobrick Making : Participants were given step-by-step instructions on how to create Ecobricks by compacting plastic waste into plastic bottles. Hands-on demonstrations were conducted, followed by supervised practice sessions where students actively participated in making Ecobricks. The collected plastic waste was sourced from the school's own waste stream, reinforcing the importance of waste separation at the source.
4) Monitoring and Follow-up Assistance : Regular follow-up visits were conducted to monitor progress and provide additional support. A system was set up to track the number of Ecobricks produced and the reduction in plastic waste at the school. Feedback from participants was gathered through questionnaires and interviews to evaluate the program effectiveness and make improvements where needed.

This phased approach ensured active participation, continuous learning, and sustainable practice of plastic waste management through the Ecobrick method at SDN Kawungsari.This activity involved students from Universitas Kebangsaan Indonesia (UKRI) in the Community Service Program (KKN) Group 10 as facilitators.

3. FINDINGS AND DISCUSSION

To understand the existing waste management conditions at SDN Kawungsari, a field survey and interviews with the principal and teachers were conducted as seen in **Figure 1**. Most of the waste at SDN Kawungsari comes from the activities of students and teachers , especially during break time, with majority of these consisting of food packaging. The waste has been sorted according to its type and has so far been handed over to the Community Empowerment (LPM) for management. SDN Kawungsari has not yet carried out independent waste management.

Figure 1. Interview with Principal and Teachers of SDN Kawungsari

A socialization program explaining the importance of waste management and introducing ecobricks was conducted for the students of SDN Kawungsari as shown in **Figure 2**. The collection of sorted plastic waste at SDN Kawungsari was conducted over the course of one week (five working days). The plastic waste collected was not only form school activity but also brought in from the homes of students, teachers, and school staff. A total of eight jumbo bags, each with a capacity of 200 liters, were collected as shown in **Figure 2**. Subsequently, a workshop was organized to demonstrate the process of making ecobricks. The students were actively involved in the ecobrick production process, with guidance provided by facilitators. The student showed great enthusiasm and eagerness while participating in this workshop as shown in **Figure 3** and **Figure 4**.

Figure 2. Ecobrick Socialization Program at SDN Kawungsari

After all the plastic was converted into ecobricks, a brainstorming session was conducted to generate ideas for transforming the ecobricks into useful products. One of the selected products was the creation of waste bins using the collected ecobricks bottles, as shown in **Figure 5**.

Figure 3. Workshop and Assistance Ecobrick Program at SDN Kawungsari

This research, yielded promising results in terms of both awareness and practical outcomes. The pre- and post survey showed a significant increase in students and teachers knowledge about plastic waste issues and the Ecobrick method. Prior to the program, only 30% of participants were aware of the environmental impacts of plastic waste, but post-program, this figure rise to 85%. Over 80% of the students and teachers participated in the Ecobrick making sessions. This level of participation exceeded expectations, indicating a strong engagement with the project. The school observed a noticeable reduction in plastic waste disposal. An estimated 80% of the school's daily plastic waste diverted from landfills through Ecobrick initiative, demonstrating the practical impact of the program on waste management.

Figure 4. (a) Ecobrick Making Process and (b) Result by Students at SDN Kawungsari

The success of this program highlights the importance of integrating environmental education into the school curriculum. The hands-on nature of the Ecobrick method made the learning experience more tangible and engaging, enabling students to see the immediate effects of their actions in reducing plastic waste. The socialization process played a key role in fostering environmental awareness among students, encouraging them to view plastic waste not as a problem, but as a resource. This shift in mindset is critical for the sustainability of the program, as instills long-term behavioral change in waste management practices.

Additionally, the program demonstrated that the Ecobrick method is not only an effective waste reduction strategy but also a tool for promoting community collaboration. Teachers, students, and local residents worked together to collect plastic waste, strengthening community bonds and environmental stewardship. However, ongoing support is necessary to ensure the continued success of this initiative. Establishing a structured system for monitoring the production and use of Ecobricks, as well as expanding the program to other schools in the regions, would enhance its long-term impact. This program has the potential to serve as a model for other communities looking to implement grassroots solutions to plastic waste management.

Figure 5. Ecobrick Product and Final Session at SDN Kawungsari

4. CONCLUSION

The socialization and assistance program for plastic waste recycling using the Ecobrick method at SDN Kawungsari, Bandung Regency, has proven to be an effective initiative for raising environmental awareness and reducing plastic waste within the school community. The program successfully educated students and teachers on the importance of waste management, and the hands-on Ecobrick-making sessions resulted in high participation and tangible outcomes, including a significant reduction in the school's plastic waste over 8 jumbo bags during one week. The initiative also fostered a shift in mindset, encouraging participants to view plastic waste as a resource rather than a problem, which is crucial for promoting sustainable waste management practices. Furthermore, the program strengthened community involment, with students, teachers, and local residents working collaboratively toward a common environmental goal. To ensure the sustainability and scalability of this program, continued support, monitoring, and expansion to other schools in the region are recommended. The success of this program at SDN Kawungsari demonstrates its potential to serve as a model for other communities, contributing to broader efforts in combating plastic pollution through education and practical, innovative solutions like Ecobricks.

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