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Transforming Plastic Waste into Ecobricks : Case Study at MAS Al Hidayah, Serang Regency

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Abstract: *This community service activity aims to increase students' awareness of plastic waste management by utilizing the bottle ecobrick method. The community service was carried out on April 28, 2025 at the Al Hidayah Private Islamic High School (MAS), Sukaratu Village, Cikeusal District, Serang Regency. This activity was attended by 112 students from classes 11A, 11B, 11C, and 11D. The implementation of the activity was carried out by Lecturers Deni Sunaryo and Yoga Adiyanto from Serang Raya University (UNSERA), with the assistance of KKM students group 50-2025. The methods used include socialization, ecobrick making training, and student participation evaluation. The results of the activity showed that students were able to understand the concept of ecobricks and produce bottle ecobricks that can be used for various purposes. This activity is expected to be the first step in managing plastic waste in the school environment.*

1. INTRODUCTION

Background of the problem

Plastic waste has become one of the biggest environmental problems facing Indonesia in recent decades. Data from the Ministry of Environment and Forestry (KLHK) shows that Indonesia produces around 68.5 million tons of waste annually, with 15% of it being plastic waste (Mappasere et al., 2024; Oktavilia et al., 2024; Rosanti, 2025). This plastic waste is often difficult to decompose naturally and takes up to hundreds of years to completely decompose (Indrawan et al., 2024). This condition is exacerbated by the lack of public awareness in managing plastic waste, so that much plastic waste ends up polluting the environment, both on land and in water (Awaluddin et al., 2024).

Sukaratu Village, Cikeusal District, Serang Regency, is not free from this problem. Plastic waste is often found scattered in the surrounding environment, such as on the streets, yards, school areas, and water channels. Ineffective waste management is caused by minimal public education and the lack of supporting facilities, such as waste processing facilities or organized recycling programs. As a result, plastic waste piles up and becomes a threat to environmental cleanliness, public health, and the sustainability of local ecosystems.

One simple solution that can be done to overcome this problem is to process plastic waste into ecobricks**.** Ecobricks are plastic bottles filled with plastic waste until solid, so that they can be used as alternative building materials or other functional objects, such as simple furniture (Ramadhan et al., 2024; Wanti et al., 2025). In addition to being a creative solution to reduce the amount of plastic waste, ecobricks also provide educational benefits by teaching the community, especially the younger generation, about the importance of protecting the environment (NZPB Putri & Fitriani, 2025; SAD Putri et al., 2025; Rahayu, 2024).

The Al Hidayah Private Islamic High School (MAS) in Sukaratu Village was chosen as the target of this community service activity because it has great potential to increase students' awareness of waste management, especially plastic waste. As an educational institution that educates the younger generation, MAS Al Hidayah has a strategic role in instilling environmental values from an early age. In addition, student involvement in hands-on activities, such as making ecobricks, can be an effective learning tool to introduce the concept of recycling and creative waste management.

This community service aims to provide students with an understanding of the negative impacts of plastic waste on the environment and how to use plastic waste creatively and productively. By involving students in the ecobrick making process, it is hoped that they will not only understand the theory, but also have practical skills that can be applied in everyday life. In addition, this activity provides an opportunity for students to become agents of change in their surroundings, both at school and at home, by practicing and disseminating the ecobrick concept to the wider community (Amalia Nur Milla et al., 2025).

With this program, it is hoped that students' awareness of the importance of maintaining environmental cleanliness can increase, and Sukaratu Village can be an example for other areas in managing plastic waste creatively and sustainably.

Purpose of Service

a. Improve students' understanding of the negative impacts of plastic waste on the environment.
b. Train students in making bottle ecobricks as a solution for plastic waste management.
c. Encourage students to apply training results in school and home environments.

2. IMPLEMENTATION METHOD

Location and Time of Implementation

This activity was carried out on April 28, 2025 at the Al Hidayah Private Islamic High School, Sukaratu Village, Cikeusal District, Serang Regency.

Activity Participants

Participants consisted of 112 students from classes 11A, 11B, 11C, and 11D with details of 28 students in each class.

Activity Implementer

This activity was carried out by Lecturers Deni Sunaryo and Yoga Adiyanto from Serang Raya University (UNSERA), and assisted by KKM students group 50-2025.

Activity Stages

The stages of activity include (Fitriana et al., 2024; Wanti et al., 2025):

a. Socialization: Explanation of the dangers of plastic waste and the benefits of ecobricks.
b. Ecobrick Making Training: Direct practice in making ecobricks using used plastic bottles and non-organic plastic waste.
c. Participation Evaluation: Assessment of the results of ecobricks made by students.

3. RESULTS AND DISCUSSION

Results Achieved

This community service activity was successfully implemented with high enthusiasm from the students of Madrasah Aliyah Swasta (MAS) Al Hidayah. During the training, students showed active involvement in every stage of the activity, from socialization to the practice of making ecobricks. Of the total 112 students who participated in the activity, 90% (101 students) succeeded in producing bottle ecobricks that met the standards, namely plastic bottles filled with plastic waste until solid and have a good level of compactness.

Ecobrick Production

Each student was given one used plastic bottle and non-organic plastic waste that had been collected previously. In a limited training time, students were able to produce ecobricks with an average weight of 300-500 grams per bottle. The total ecobricks produced during the activity reached 101 bottles, which will later be used for various purposes in the school environment, such as making simple chairs, small tables, or decorating the school garden. These results show that students not only understand the concept of ecobricks, but

are also able to practice them well and in accordance with the results of the community service from (Hukubun et al., 2025). .

Figure 1. Ecobrick Training Participants

Improving Student Understanding

In addition to the physical results in the form of ecobricks, this activity also succeeded in increasing students' understanding of the importance of plastic waste management. Based on the evaluation carried out through group discussions and questions and answers, around 85% of students were able to re-explain the concept of ecobricks, their benefits, and the steps for making them. This shows that this activity is not only practical, but also educational, so that it has a positive impact on students' awareness of the importance of protecting the environment in accordance with the results of community service from (Jaya et al., 2025).

Further Initiatives and Impacts

This activity also gave rise to an initiative from students to continue the ecobrick program independently. Several students suggested that the school hold a regular plastic waste collection program, which could then be used to make ecobricks sustainably. In addition, students also expressed a desire to teach the ecobrick concept to their families and the community around their homes. This shows that this activity not only has an impact on individual students, but also has the potential to have a wider positive impact on the community (Jaya et al., 2025).

Figure 2. Students learn the stages of Ecobrick

Obstacles Faced

Even though this activity went well, there were several obstacles faced during implementation, such as:

a. Material Limitations: Not all students have sufficient access to used plastic bottles and plastic waste suitable for making ecobricks. Some students have to share materials with their classmates.
b. Limited Implementation Time: With only one day of training, students have not had time to complete more ecobricks. However, this can be overcome by continuing the activities independently at home or at school.

Benefits Felt

This activity provides direct benefits for students and schools, including:

a. For Students: Students gain new skills in managing plastic waste creatively and productively. They also become more aware of the importance of maintaining environmental cleanliness.
b. For Schools: The ecobricks produced can be used to beautify the school environment, such as making garden chairs or other decorations. In addition, this activity can also be an inspiration for sustainable environmental programs in schools.

Figure 3. Students' Ecobrick Results

Overall, this activity successfully achieved its main objective, which was to increase students' awareness and skills in managing plastic waste through making ecobricks. With continued initiatives from students and support from the school, it is hoped that this program can continue and provide a greater positive impact in the future.

Discussion

This community service activity has a significant positive impact on students' understanding and skills in managing plastic waste through the ecobrick method. Based on the evaluation results, the increase in students' understanding can be seen from their ability to re-explain the concept of ecobrick, its benefits, and the steps to make it. Most students also expressed that this activity opened their insights on how to utilize plastic waste that was previously considered useless waste. This shows that this activity is not only practical, but also educational, thus providing a long-term impact on students' environmental awareness. (Jaya et al., 2025; NZPB Putri & Fitriani, 2025; SAD Putri et al., 2025; Rahayu, 2024).

Increasing Environmental Awareness

Before this activity was carried out, most students did not understand the negative impacts of plastic waste on the environment. Through socialization carried out at the beginning of the activity, students were invited to understand that plastic waste takes hundreds of years to decompose and can pollute the soil, water, and air if not managed properly. By introducing the ecobrick method, students not only learn about waste management, but also understand that plastic waste can be utilized into something of value. This provides a new perspective to students that they can contribute directly to protecting the environment (Fitriana et al., 2024; Hukubun et al., 2025).

Active Student Involvement

During the training, students showed high enthusiasm in the ecobrick making process. They actively collected plastic waste, cut it into small sizes, and filled plastic bottles until solid. This process not only trained students' technical skills, but also taught them about the importance of cooperation and responsibility in maintaining environmental cleanliness. Of the total 112 students who participated in the activity, 90% succeeded in producing ecobricks that met the standards, with an average weight of 300-500 grams per bottle. These results indicate that students are able to apply the theory given in real practice (Jaya et al., 2025; Rahayu, 2024).

Obstacles Faced

Although this activity went well, there were several obstacles encountered during implementation, including:

a. Material Limitations: Not all students have sufficient access to used plastic bottles and plastic waste suitable for making ecobricks. Some students have to share materials with their classmates, making the ecobrick making process less than optimal.
b. Limited Implementation Time: With only one day of training, students have not had time to complete more ecobricks. However, this can be overcome by continuing the activities independently at home or at school.

Positive Impacts and Further Initiatives

One of the most prominent positive impacts of this activity is the emergence of student initiatives to continue the ecobrick program independently. Several students suggested that the school hold a routine plastic waste collection program, which can then be used to make ecobricks sustainably. In addition, students also expressed a desire to teach the ecobrick concept to their families and the community around their homes. This shows a change in students' attitudes towards the importance of protecting the environment, which is not only limited to the school environment, but also extends to the home and community environment (Arya & Mahadewi, 2025; Ferdiansyah et al., 2024; Saraswati & Mahyuni, 2025, 2025).

Long Term Benefits

This activity provides long-term benefits for students and schools. With the ecobricks produced, schools can use them to make simple chairs, small tables, or school garden decorations. In addition, this activity can also be an inspiration for sustainable environmental programs in schools, such as inter-class ecobrick making competitions or extracurricular programs that focus on waste management. At the individual level, students

are expected to continue practicing ecobrick making at home and become agents of change who inspire others to care about the environment (Amalia Nur Milla et al., 2025; Hildegardis et al., 2024; Wulandari et al., 2024).

Relevance to the Purpose of Community Service

This activity successfully achieved its main objective, which was to improve students' understanding and skills in managing plastic waste through the ecobrick method. In addition, this activity also provided a positive social impact by encouraging students to be more concerned about the environment and contribute to reducing plastic waste pollution in Sukaratu Village. With the support of the school and the community, it is hoped that this program can continue and have a wider impact in the future.

This discussion shows that this community service activity not only provides direct benefits, but also has the potential to create sustainable changes in plastic waste management in school and community environments.

4. CONCLUSION

This community service activity has succeeded in increasing the understanding of MAS Al Hidayah students about plastic waste management through the creation of bottle ecobricks. In addition to producing ecobricks that can be utilized, this activity also encourages students to care more about the environment. For the sustainability of the program, it is recommended that schools implement a policy of collecting plastic waste periodically and continue making ecobricks as part of extracurricular activities.

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