



## **UTILIZATION OF PLASTIC WASTE THROUGH ECOBRICK AS A GREEN INNOVATION TO REDUCE WASTE AND CREATE A CLEAN ENVIRONMENT**

**Salsabila**, Management Study Program, University of Riau Kepulauan, Indonesia  
**Maria Magdalena Ba'un**, Accounting Study Program, University of Riau Kepulauan, Indonesia  
**Nur Halizah Bahar**, Management Study Program, University of Riau Kepulauan, Indonesia  
**Dedet Riski Kurniawan**, Electrical Study Program, University of Riau Kepulauan, Indonesia  
**Delianti Pulungan**, Civil Study Program, University of Riau Kepulauan, Indonesia  
**Hermansah**, Field Supervising Lecturer, University of Riau Kepulauan, Indonesia

*Corresponding Author:* [salsabila@unrika.ac.id](mailto:salsabila@unrika.ac.id)

**Abstract:** This community service activity was carried out by students of Universitas Riau Kepulauan in Setokok Village, Bulang District, Batam City, from September 6 to 14, 2025. The program focused on the utilization of plastic waste through the Ecobrick innovation as a practical and environmentally friendly solution to reduce waste and promote environmental awareness. The main problems faced by the community included the accumulation of plastic waste and the lack of knowledge regarding its proper management. The methods used involved socialization, direct training, and mentoring in the production and utilization of Ecobricks. The results showed increased community.

**Keyword:** Ecobrick, Plastic Waste Management, Green Innovation, Community Participation, Clean Environment

### **INTRODUCTION**

Setokok Village, located in Bulang District, Batam City, is one of the developing regions that still faces environmental problems, particularly in plastic waste management. The increasing volume of plastic waste not only disrupts the aesthetics of the environment but also pollutes surrounding ecosystems and waterways (Nasution & Rahmawati, 2018; Siregar & Kurniawan, 2019).

Through this community service program, university students aimed to provide a real contribution to solving these environmental issues by introducing the Ecobrick innovation. Ecobrick is a simple and creative method of processing non- biodegradable plastic waste into reusable construction materials by compacting plastics into bottles, which can later be used as eco-friendly building blocks (Afriani & Rahman, 2020; Astuti & Wibowo, 2019).

This program was designed not only to reduce the amount of plastic waste but also to educate residents about environmental preservation and the potential economic value of waste recycling. The implementation encourages community participation and fosters an environmentally conscious mindset (Utami & Santosa, 2020; Pranata & Widodo, 2023).

### **METHODOLOGY**

#### **Approach and Implementation Techniques**

This community service activity applied a participatory and educational approach that



emphasizes community empowerment and behavioral change. The program was designed not only to transfer technical skills but also to foster long-term environmental awareness and a sense of shared responsibility for waste management (Arifin & Sulastrri, 2022).

The participatory model allowed community members to take an active role in every stage of the activity, from problem identification to evaluation. This involvement encouraged collaborative learning between students and residents, ensuring that the knowledge and practices gained could be sustained even after the program ended (Lestari & Nugraha, 2022).

Implementation techniques consisted of three main components: (1) Socialization and Education, where students introduced the concept and benefits of Ecobricks; (2) Hands-on Training, which focused on developing the technical skills of Ecobrick production; and (3) Mentoring and Evaluation, aimed at ensuring that residents could independently continue the practice (Saputra & Sari, 2021).

In addition, the approach adopted the principles of environmental education by combining discussion, demonstration, and direct practice methods. This strategy was selected to make learning more interactive and to strengthen community motivation to reduce plastic waste (Afriani & Rahman, 2020; Utami & Santosa, 2020).

### **Preparation Stage**

The activity began with a preliminary observation of environmental conditions in Setokok Village to identify the major sources of plastic waste and the level of community awareness regarding waste management. The team coordinated with the local RW and RT leaders to schedule the activities and prepared all necessary materials, such as bottles, scissors, and clean plastic waste (Arifin & Sulastrri, 2022).

### **Socialization Stage**

In this stage, educational sessions were conducted to introduce the Ecobrick concept and its benefits as an eco-friendly innovation. Residents were informed about the environmental hazards of unmanaged plastic waste and the 3R concept (Reduce, Reuse, Recycle) as a sustainable framework for waste reduction (Siregar & Kurniawan, 2019). Visual aids, posters, and short videos were used to make the session more engaging and easier to understand (Lestari & Nugraha, 2022).

### **Training Stage**

This stage involved practical activities where participants learned to make Ecobricks by cutting plastic waste into smaller pieces and compacting them into clean bottles. Participants also learned about the ideal density of Ecobricks to ensure durability and potential reusability as construction



material (Prasetyo & Lestari, 2022). The training was conducted in groups to enhance teamwork and foster mutual cooperation (gotong royong) (Iskandar, 2021).

### **Utilization Stage**

After the Ecobricks were completed, they were collected and used to create useful products such as flower pots, garden seats, and decorative structures. This stage demonstrated to the community how waste materials can be transformed into valuable objects with both functional and aesthetic benefits (Wijayanti & Handayani, 2023; Rahman & Dewi, 2021).

### **Evaluation and Follow-up Stage**

The final stage involved evaluating the success of the activity through observation and discussion. The evaluation criteria included participation level, skill improvement, and visible environmental changes. Feedback from residents was collected to identify strengths and areas for improvement for future sustainability programs. The positive response and enthusiasm shown by the community indicated that the Ecobrick initiative had successfully built environmental awareness and collective action (Astuti & Wibowo, 2019; Lestari & Nugraha, 2022).

## **RESULTS AND DISCUSSION**

The Ecobrick program was successfully implemented with the active participation of residents from RW 01 and RW 02, Setokok Village. The socialization sessions increased awareness of the dangers of plastic waste, while the training sessions provided practical skills for transforming waste into useful materials (Saputra & Sari, 2021).

*Table 1. Participant Diagram in the Well Maintenance Program*

<b>Type</b>	<b>Number</b>	<b>Persentase</b>
Mahasiswa	10	66,7%
Warga RW 1 dan RW 2	5	33,3%
<b>Total</b>	<b>15</b>	<b>100%</b>

The Ecobricks produced were used to create simple furniture and decorations, showing that plastic waste can be turned into valuable products while simultaneously reducing litter in the area (Prasetyo & Lestari, 2022; Wijayanti & Handayani, 2023).

Community participation became a key success factor, as residents especially housewives, youth, and children were actively involved in every stage. This involvement fostered a sense of ownership and collective responsibility toward environmental preservation (Iskandar, 2021; Arifin & Sulastri, 2022).



The activity also increased environmental awareness and promoted sustainable behavior among residents. The implementation of Ecobrick has proven effective as a community-based approach for managing plastic waste (Lestari & Nugraha, 2022; Astuti & Wibowo, 2019).

## CONCLUSION AND RECOMMENDATION

### Conclusion

The community service program titled “Utilization of Plastic Waste through Ecobrick: A Green Innovation to Reduce Waste and Create a Clean Environment” has been successfully implemented in Setokok Village, Bulang District, Batam City. This activity was designed to reduce the accumulation of plastic waste while increasing environmental awareness among local residents. Through a participatory and educational approach, the program succeeded in mobilizing community involvement, particularly from housewives, youth, and children, to take part in the entire process—from waste collection to Ecobrick production (Afriani & Rahman, 2020; Lestari & Nugraha, 2022).

The results indicated that the Ecobrick initiative significantly contributed to improving environmental cleanliness and reducing the amount of unmanaged plastic waste. Residents not only gained new technical skills in making Ecobricks but also learned about waste segregation, recycling principles, and creative reuse techniques (Prasetyo & Lestari, 2022). The process of turning plastic waste into functional objects, such as plant pots and chairs, proved that waste materials could have both economic and aesthetic value (Wijayanti & Handayani, 2023; Rahman & Dewi, 2021).

Another important outcome was the enhancement of community awareness regarding sustainable waste management. The project fostered a collective sense of responsibility and encouraged environmental stewardship that can be maintained even after the program concluded (Arifin & Sulastris, 2022). The success of this activity demonstrates that small-scale, community-based innovations can be powerful tools for promoting sustainability when supported by education and collaboration between universities and residents (Utami & Santosa, 2020; Astuti & Wibowo, 2019).

Overall, the Ecobrick program not only achieved tangible environmental improvements but also empowered the community to become agents of change in managing household waste responsibly. This aligns with national efforts to promote circular economy practices and supports the Sustainable Development Goals (SDGs), particularly Goal 12 on responsible consumption and production (Nasution & Rahmawati, 2018).



## **Recommendation**

### **1. For the Community:**

Residents are encouraged to continue producing Ecobricks independently and to establish local waste management groups to maintain environmental cleanliness. Regular workshops or competitions could be organized to motivate participation and innovation in reusing plastic waste (Lestari & Nugraha, 2022). It is also recommended that residents explore the economic potential of selling Ecobricks or using them in community construction projects, which can help generate additional income while maintaining environmental balance (Rahman & Dewi, 2021).

### **2. For the Student:**

University students should continue similar community service activities that integrate academic knowledge with real environmental challenges. Future programs can include training on advanced Ecobrick applications, such as modular furniture or small structures, to enhance creativity and sustainability impact (Pranata & Widodo, 2023). Students can also document the progress and challenges faced by residents to serve as research data for improving future environmental projects (Saputra & Sari, 2021).

### **3. For the University:**

The university and local government should collaborate to support the continuity of Ecobrick-based initiatives through funding, facilities, and policy support. Establishing a partnership with local environmental agencies would ensure that the program aligns with broader regional waste management strategies (Utami & Santosa, 2020). Furthermore, incorporating Ecobrick education into school curricula or community training programs would expand the long-term impact of this initiative (Astuti & Wibowo, 2019).

In conclusion, this Ecobrick community service program has proven that innovation, collaboration, and education can collectively create sustainable change. With continuous support from academic institutions and active participation from residents, Ecobrick can become a model of grassroots environmental empowerment that helps transform waste problems into valuable community assets.

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## REFERENCES

- Afriani, E., & Rahman, A. (2020). Pengolahan Sampah Plastik Menjadi Ecobrick Sebagai Solusi Ramah Lingkungan. *Jurnal Pengabdian Kepada Masyarakat*, 5(2), 123–130.
- Arifin, M., & Sulastri, N. (2022). Pemberdayaan Masyarakat Melalui Pelatihan Ecobrick untuk Meningkatkan Kesadaran Lingkungan. *Jurnal Abdimas Berkelanjutan*, 3(1), 55–63.
- Astuti, P., & Wibowo, H. (2019). *Ecobrick: Inovasi Pengelolaan Sampah Plastik Rumah Tangga*. Jakarta: Prenada Media.
- Hidayat, R., & Yuliana, D. (2020). Implementasi Ecobrick Sebagai Upaya Mengurangi Limbah Plastik di Lingkungan Sekitar. *Jurnal Abdimas Nusantara*, 2(1), 25–33.
- Iskandar, D. (2021). *Strategi Pemberdayaan Masyarakat dalam Pengelolaan Sampah Plastik*. Yogyakarta: Deepublish.
- Lestari, D., & Nugraha, A. (2022). Penerapan Ecobrick Sebagai Solusi Pengelolaan Sampah Plastik di Kawasan Pesisir. *Jurnal Lingkungan dan Pembangunan*, 7(3), 150–158.
- Nasution, F., & Rahmawati, I. (2018). Analisis Dampak Lingkungan dari Sampah Plastik Rumah Tangga di Indonesia. *Jurnal Sains dan Teknologi Lingkungan*, 10(2), 45–53.
- Pranata, Y., & Widodo, T. (2023). Pemanfaatan Ecobrick Sebagai Media Edukasi Lingkungan di Sekolah Dasar. *Jurnal Pendidikan dan Pengabdian Masyarakat*, 5(1), 66–74.
- Prasetyo, B., & Lestari, S. (2022). Pemanfaatan Ecobrick dalam Program Pemberdayaan Lingkungan. *Jurnal Green Community*, 4(1), 45–55.
- Rahman, T., & Dewi, L. (2021). Ecobrick Sebagai Solusi Alternatif Penanganan Sampah Plastik di Desa Wisata. *Jurnal Pemberdayaan Masyarakat Desa*, 4(2), 122–131.
- Saputra, R., & Sari, M. (2021). Edukasi Pengelolaan Sampah Plastik Melalui Ecobrick di Masyarakat. *Jurnal Pengabdian Saintek*, 3(2), 87–94.
- Siregar, A., & Kurniawan, D. (2019). Konsep Reduce, Reuse, Recycle (3R) dalam Manajemen Sampah Berkelanjutan. *Jurnal Ilmu Lingkungan*, 6(1), 12–19.
- Utami, P., & Santosa, H. (2020). Inovasi Kreatif Pemanfaatan Sampah Plastik Menjadi Produk Bernilai Ekonomi. *Jurnal Inovasi dan Kewirausahaan*, 9(1), 33–41.
- Wijayanti, F., & Handayani, R. (2023). Dampak Program Ecobrick terhadap Pengurangan Sampah Plastik di Lingkungan Perumahan. *Jurnal Green Action*, 5(2), 78–86.