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Ecobrick: A Creative Solution for Plastic Waste Management in Karang Umpu Village

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Abstract

Indonesia ranks as the second-largest producer of plastic waste in the world, with plastic taking around 1,000 years to decompose, leading to environmental pollution. One effective solution is the implementation of the 3R concept (Reduce, Reuse, Recycle) and the production of ecobricks, which can be easily done using available materials and tools. This community service project aims to raise public awareness, particularly in Karang Umpu Village, about using ecobricks to maintain environmental cleanliness and health. The method used is educational outreach, enabling the community to understand how to manage and repurpose plastic waste. The results showed an increase in public knowledge regarding the types, utilization, and management of plastic waste by 85%, compared to 53% before the outreach. With this outreach, the community is expected to be able to manage and repurpose plastic waste through the ecobrick method, preventing waste accumulation and reducing environmental pollution, thereby creating a clean and healthy environment.

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INTRODUCTION

Cleanliness reflects the character of an individual and the image of a nation. A clean environment indicates awareness and responsibility, while a dirty environment reflects negligence that can tarnish the nation's image. One of the biggest threats is waste, particularly plastic waste, which harms both the aesthetics and health of the environment. In 2022, Indonesia generated 35.83 million tons of waste, an increase from 29.45 million tons the previous year, with 17.9% of it being plastic (Ratnawati et al., 2022). he majority of this waste originates from households. Waste management must be conducted in an integrated manner, involving both the community and the government in maintaining cleanliness and providing facilities that support effective waste management (Nurhayati & Nurhayati, 2023).

According to the Ministry of Public Works Regulation No. 21 of 2006 on national waste management policy and strategy, the vision to be achieved is the creation of healthy settlements free from waste. To realize this vision, several missions must be undertaken, including reducing waste accumulation for sustainable management, improving the reach and quality of waste management services, empowering the community and involving the private sector, enhancing management and institutional capacity in waste management, mobilizing funds from various sources, and enforcing laws and completing regulations that support an effective waste management system.

One approach that can be adopted to support this mission is the 3R concept (Reduce, Reuse, Recycle) (Herlinawati et al., 2022; Junaidi & Utama, 2023; Mahartin, 2023; Paundanan et al., 2023).

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Reduce means reducing consumption patterns and preferring environmentally friendly products while preventing waste generation. Reuse refers to the reuse of materials that are still usable without further processing, either for the same function or a different one. Recycle means recycling waste that has left the household environment through local sorting and processing into new, useful products (Kementerian Pekerjaan Umum, 2010).

One concrete application of the 3R concept is through ecobricks, a method of filling plastic bottles with non-biological waste, such as plastics, to be used as "eco-friendly bricks" in construction (Fitriana et al., 2023; Widiyasari et al., 2021). Ecobricks not only creatively manage plastic waste into useful objects but are also effective in reducing pollution and extending the lifespan of plastics (El Fajri et al., 2022). This technology offers a low-cost solution that can be implemented in households, schools, and communities. With ecobricks, plastic waste is safely stored in bottles, thus avoiding burning, accumulation, and pollution (Fauzi et al., 2020; Ikhsan & Tonra, 2021). Moreover, this technology helps keep plastics out of industrial recycling systems, reducing the negative impact on the biosphere and conserving energy.

However, the condition in Karang Umpu Village, on Jl. Lintas Sumatera, Blambangan Umpu District, Way Kanan Regency, Lampung, shows that the application of this solution has not been optimal. Although the majority of the community works as private employees, housewives, and farmers with a pre-prosperous economic status, plastic waste is still scattered and piling up around the environment. This occurs because the local Waste Bank is not operational due to a lack of funds from the village authorities, causing the community to continue burning waste around their homes. If this problem is not addressed promptly, the situation will worsen every year and threaten the health of the community in Karang Umpu Village.

This situation highlights the urgent need for a new approach to waste management in the area. The use of ecobricks as a solution for managing plastic waste has been implemented in other areas such as Samarinda (Apriyani et al., 2020), Luwuk Kanan Village (Nirmalasari et al., 2021), Bunga Raya District (Fauzi et al., 2020), Baron Hamlet, Muntilan, Magelang (Leria et al., 2020), Ranjok Village, Gunungsari District, West Lombok Regency (Suliartini et al., 2022), and Pulosaren Village (Sari et al., 2023). However, its implementation in Karang Umpu Village has not yet been optimal. Therefore, this community service research aims to present a more integrated approach, where outreach and training in making ecobricks not only emphasize technical aspects but also highlight the importance of behavioral change and increasing community awareness of the impact of plastic waste.

There is a need for outreach related to plastic recycling so that the community can understand the importance of ecobricks in supporting cleanliness and environmental health, and this activity serves as a form of community service program. Based on this, this research focuses on the goal of implementing a community service program through outreach on the utilization of plastic waste using the ecobrick method on Jl. Lintas Sumatera, Karang Umpu, Blambangan Umpu District, Way Kanan Regency, Lampung.

METHOD

The method used in this community service activity is education through outreach. The community service activity, involving KKN students, was carried out on Jl. Lintas Sumatera, Karang Umpu, Blambangan Umpu District, Way Kanan Regency, Lampung. The community service activity was conducted on 2023. This outreach was attended by PKK members and residents of Karang Umpu Village. The approach aims to provide practical knowledge and skills in plastic waste management, particularly through the use of the ecobrick method. This outreach is expected to increase awareness and active participation of the community in maintaining environmental cleanliness. The stages of this method include several key steps that are systematically organized and presented in Figure 1.

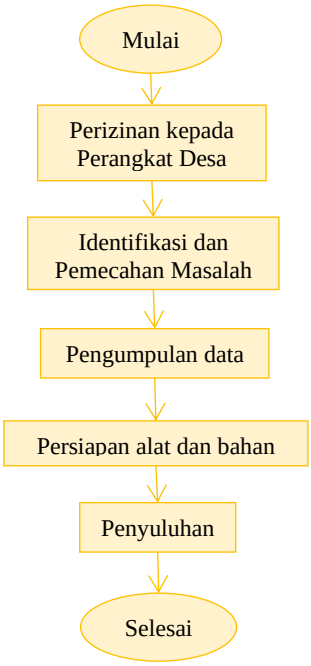

Figure 1. Research Flow Diagram for Community Service

Permitting

Permitting is the initial stage in this community service activity, aimed at informing the local government or community groups about the planned community service activities. This step involves direct discussions with the head of Dusun 04 and the leader of the Karang Umpu PKK.

Problem Identification and Resolution

Identification is the second stage after obtaining permission for the community service activity. In this stage, the problems within the social scope of the area are identified, leading to conclusions and the formulation of solutions for the identified issues.

Data Collection

Data collection is conducted through interviews and observations. In interviews, researchers meet with the village head and the Karang Umpu PKK members, focusing on indicators such as knowledge about types of waste, the utilization of plastic waste, and its management. The purpose of these interviews is to gain a deeper understanding of how the Karang Umpu community manages plastic waste. Additionally, observations are carried out to directly observe community activities as a source of research data.

Preparation of Tools and Materials

The tools and materials required for the outreach activity include scissors, wooden sticks, plastic waste, and used bottles, as shown in Figure 2.

Figure 2. Tools and Materials for Making Ecobricks

Ecobrick Outreach

The community service activity was attended by 20 residents from Dusun 04 and members of the Karang Umpu PKK. The outreach was conducted using lecture and demonstration methods to

explain the process of making Ecobrick materials for products like chairs, emphasizing the importance of maintaining a clean environment and sorting waste properly to create a clean, healthy, comfortable, and prosperous environment. The outreach also provided instructions on the steps or methods for making Ecobrick materials.

Theory and Practice of Making Ecobricks

It is important to note that, according to Indonesian Law No. 18 of 2008 on Waste Management, waste is the residue from daily human activities and/or natural processes that is solid. If waste issues are not managed properly, they will lead to a decline in environmental quality. The use of plastic waste in daily life is inevitable, as most daily products are packaged in plastic or bottles. As a solution to plastic waste utilization, making Ecobricks also has the benefit of reducing disaster risks and contributing to river conservation as a lifeline (Nuruzzaman et al., 2021).

The process of making Ecobrick chairs can be done in a simple manner. This Ecobrick product can be made by all groups, including adults like fathers and mothers, as well as teenagers and children. The production of an Ecobrick chair can also utilize available materials such as plastic bottles and packaging. This product can be used personally or turned into a business opportunity by the community. The practical activity of making Ecobricks commenced after a brief theory session and the distribution of pocket books detailing the required tools and materials, as well as the steps for making the product. The steps for making Ecobricks are presented in Figure 3.

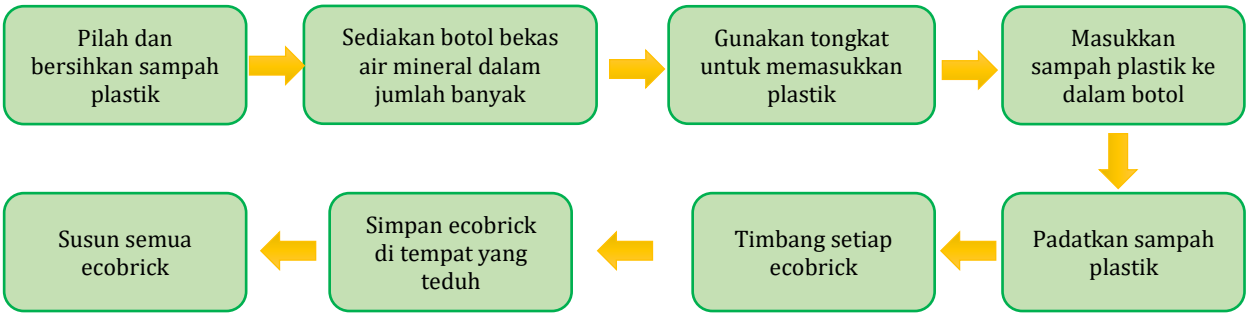

Figure 3. Steps for Making Ecobricks

RESULTS AND DISCUSSION

The community service activity began with obtaining permission from the head of Dusun 04. This step involved informing the head about the objectives and plans for the community service, which aimed to raise awareness about the importance of maintaining and caring for the environment to create a clean and healthy living space. The discussion with the head of Dusun 04 revealed that the residents of Jl. Lintas Sumatera, Karang Umpu, Kec. Blambangan Umpu, Kabupaten Way Kanan, Lampung, have limited knowledge regarding waste management. The head expressed hope that the community would participate in the outreach activities on organic and inorganic waste management and the production of ecobricks, which are planned to be developed in the area.

Following the permission process with the head of Dusun 04 and the PKK leader of Karang Umpu, the next step was data collection through interviews and observations involving 20 community members, including residents of Dusun 04 and PKK members of Karang Umpu. The results of these interviews are presented in Table 1.

Table 1. Pre-Outreach Knowledge on Waste Management

No	Indicator	Answer (%)	
		Knowledge	Lack of knowledge
1	Knowledge of Waste Types	60%	40%
2	Utilization of Plastic Waste	65%	45%
3	Management of Plastic Waste	35%	65%

After collecting data from the interviews, the next phase was to conduct the planned outreach activities. The outreach was carried out through lectures and initial socialization with part of the community in Jl. Lintas Sumatera, Karang Umpu, to provide information about the schedule and plans for the community service activities. This was done to ensure that the community could allocate time to participate in the plastic waste utilization outreach using the ecobrick method in Desa Karang Umpu, Kec. Blambangan Umpu, Kab. Way Kanan, Lampung.

Ecobrick Outreach Implementation

The outreach on the utilization of plastic waste using the ecobrick method was attended by 20 residents and PKK members of Karang Umpu. The event began with approval from the head of Dusun 04 Karang Umpu, Blambangan Umpu, followed by an agreement on the collaboration for the implementation of the community service and the selection of a strategic location accessible to the community. The location chosen was the yard of Mrs. Trisitu, a resident of Dusun 04 Karang Umpu. The implementation of the outreach activity is shown in Figure 4.

Figure 4. Outreach with Lecture Method

During the outreach, PowerPoint presentations were used to showcase examples of products made using the ecobrick method, as depicted in Figure 5.

(a)

(b)

Figure 5. (a) Example of Ecobrick Products (b) Ecobrick Bottle

Observations during the outreach revealed that the residents and PKK members in Karang Umpu had a basic understanding of waste but lacked knowledge on how to utilize both organic and inorganic waste, particularly plastic waste. This aligns with previous studies showing that many communities are unaware of the importance of waste sorting and management, resulting in poorly managed waste (Lifatinanda et al., 2022; Munthe et al., 2023). This lack of awareness is also reflected in the fact that the term "ecobrick" was still very new and unfamiliar to the residents of Karang Umpu.

One of the goals of the ecobrick initiative is to change community habits towards greater environmental cleanliness. Additionally, ecobricks present an opportunity and an alternative solution for the residents of Desa Karang Umpu to expand their knowledge of plastic waste management. The creation of ecobricks can help reduce plastic waste in the area, leading to a cleaner and healthier environment. Through training and outreach, the community was taught how to make ecobricks and understand their benefits, raising awareness of the negative impacts of plastic waste and ways to mitigate them(Setiawati et al., 2020; Utomo et al., 2023).

During the outreach, many questions were raised by the participants, one of the most frequent being whether only plastic waste could be used to make ecobrick products. This question opened a broader discussion on the various types of waste, both organic and inorganic, and how they could be effectively utilized. This challenge provided an opportunity for the facilitators to deepen their knowledge and deliver more comprehensive information to the community. As a result, the outreach not only focused on plastic waste utilization but also included education on organic waste management, such as composting (Andayani et al., 2022), and the utilization of other inorganic waste that can be processed into useful products. This approach is expected to enhance the community's awareness and capability in managing all types of waste, contributing to a cleaner and healthier environment. After the outreach, data was collected again through post-outreach interviews, and the results are shown in Table 2.

Table 2. Post-Outreach Knowledge on Waste Management

No	Indicator	Answer (%)	
		Knowledge	Tidak Mengetahui
1	Knowledge of Waste Types	90%	10%
2	Utilization of Plastic Waste	85%	15%
3	Management of Plastic Waste	80%	20%

Based on Table 2, some residents still do not fully grasp the material presented due to a lack of focus during the outreach. Nevertheless, after the outreach, there was a significant improvement in the environmental conditions in Kampung Karang Umpu, especially in plastic waste management. This research contributes by providing a structured and sustainable approach to environmental education, which not only increases community awareness of the importance of waste management but also encourages real behavioral change towards environmental cleanliness. These results suggest that with appropriate interventions, positive changes can be achieved even in communities that were initially less focused or engaged.

CONCLUSION

The community service program in Karang Umpu Village, Blambangan Umpu, successfully increased community awareness and knowledge about the importance of plastic waste management using the ecobrick method. The results of the activities showed a significant increase in the community's understanding of different types of waste, the utilization of plastic waste, and its management, with the basic knowledge initially at 53% rising to 85% after the outreach. Additionally, this program encouraged the community to adopt better waste management practices, particularly by utilizing plastic as material for ecobricks, which not only helps prevent waste accumulation but also creates new opportunities for environmental preservation. This success, although just the first step, highlights the importance of continued efforts such as intensive training and ongoing outreach focused on technical aspects, motivation, and community empowerment. This program not only provided direct benefits to the community but also offered valuable learning experiences for the students involved, enhancing their skills in analysis, communication, and decision-making. Therefore, it is hoped that this program can serve as a model for future community service activities, both on a local and national scale.

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REFERENCES

Andayani, N., Mulatsari, E., Moordiani, M., Khairani, S., & F Swandiny, G. (2022). Edukasi dan Aplikasi Pengelolaan Sampah Berbasis Pemilahan Sampah di Lingkungan Fakultas Farmasi Universitas Pancasila. *Jurnal Abdimas BSI: Jurnal Pengabdian Kepada Masyarakat*, *5*(1), 23–35. https://doi.org/10.31294/jabdimas.v5i1.11028

Apriyani, A., Putri, M. M., & Wibowo, S. Y. (2020). Pemanfaatan sampah plastik menjadi ecobrick. *Masyarakat Berdaya Dan Inovasi*, *1*(1), 48–50. https://doi.org/10.33292/mayadani.v1i1.11

El Fajri, N., Muhajirin, M. R., Prendi, R., Putri, A., Clarisa, C., Ramadhani, A. D., Ulfa, N. F., Salina, A., Nurhidayat, R., & Santika, S. B. (2022). ECOBRICK SEBAGAI SOLUSI PENANGGULANGAN SAMPAH PLASTIK DI DESA TAMBAK. *J-ABDI: Jurnal Pengabdian Kepada Masyarakat*, *2*(5), 5005–5012.

Fauzi, M., Sumiarsih, E., Adriman, A., Rusliadi, R., & Hasibuan, I. F. (2020). Pemberdayaan masyarakat melalui pelatihan pembuatan ecobrick sebagai upaya mengurangi sampah plastik di Kecamatan Bunga Raya. *Riau Journal of Empowerment*, *3*(2), 87–96. https://doi.org/10.31258/raje.3.2.87-96

Fitriana, N., Putri, A. A. S., Nur, Y. W., & Tampubolon, O. F. (2023). Pemberdayaan warga Bencah Lesung melalui pelatihan pengolahan sampah anorganik menjadi Ecobrick: Empowering Bencah Lesung Residents through Training on Processing Inorganic Waste into Ecobricks. *ABSYARA: Jurnal Pengabdian Pada Masayarakat*, *5*(1).

Herlinawati, H., Marwa, M., & Zaputra, R. (2022). Sosialisasi Penerapan Prinsip 3R (Reduce, Reuse, Recycle) Sebagai Usaha Peduli Lingkungan. *COMSEP: Jurnal Pengabdian Kepada Masyarakat*, *3*(2), 209–215.

Ikhsan, M., & Tonra, W. S. (2021). Pengenalan ecobrick di sekolah sebagai upaya penanggulangan masalah sampah. *Jurnal Pengabdian Kepada Masyarakat Patikala*, *1*(1), 32–38.

Junaidi, J., & Utama, A. A. (2023). Analisis Pengelolaan Sampah dengan Prinsip 3R (Reduce, Reuse, Recycle)(Studi Kasus Di Desa Mamak Kabupaten Sumbawa). *JISIP (Jurnal Ilmu Sosial Dan Pendidikan)*, *7*(1), 714–723.

Leria, P. S. P., Febrianto, M. W., Astari, S. A., Fitriasari, E. T., & Syarifuddin, A. (2020). Pengolahan Sampah Plastik Melalui Kreativitas Produk Ecobrick di Dusun Baron, Muntilan, Magelang. *Community Empowerment*, *5*(1), 11–15. https://doi.org/10.31603/ce.v5i1.3130

Lifatinanda, N. K. A., Putra, K. A. D., Purnama Putra, I. G. A. S., Damayanti, I. G. A. R., & Haes, P. E. (2022). Edukasi Pengelolaan Sampah Bagi Anak SDN Di Desa Cau Belayu Tabanan. *Jurnal Pengabdian Masyarakat Progresif Humanis Brainstorming*, *5*(4), 655–661. https://doi.org/10.30591/japhb.v5i4.3380

Mahartin, T. L. (2023). Waste management plan with reduce, reuse, recycle (3r) method. *Journal of Sustainability, Society, and Eco-Welfare*, *1*(1).

Munthe, R. N., Tanjung, I., & Munthe, I. (2023). Penanganan Limbah Sampah Plastik Berbasis Kearifan Lokal Di Kelurahan Sirandorung Kabupaten Labuhanbatu. *Inspiratif Pendidikan*, *11*(2), 424–436. https://doi.org/10.24252/ip.v11i2.24988

Ni Wayan Sri Suliartini, Isnaini, Popi Ulandari, Muhammad Zaki Alhannani, I Gede Esha Adyana Nando, Baiq Martina Safitri, Halimatussakdiah, & Akhsanul Amru. (2022). Pengolahan Sampah Anorganik Melalui Ecobrick Sebagai Upaya Mengurangi Limbah Plastik. *Jurnal Pengabdian Magister Pendidikan IPA*, *5*(2), 209–213. https://doi.org/10.29303/jpmpi.v5i2.1741

Nirmalasari, R., Ari Khomsani, A., Nur'aini Rahayu, D., Lidia, L., Rahayu, M., Anwar, M. R., Syahrudin, M., Jennah, R., Syafiyah, S., Suriadi, S., & Setiawan, Y. (2021). Pemanfaatan Limbah Sampah Plastik Menggunakan Metode Ecobrick di Desa Luwuk Kanan. *Jurnal SOLMA*, *10*(3), 469–477. https://doi.org/10.22236/solma.v10i3.7905

Nurhayati, E., & Nurhayati, S. (2023). COMMUNITY WASTE MANAGEMENT EDUCATION: STRATEGIES AND IMPACTS. *JURNAL DIMENSI*, *12*(3), 677–686.

https://doi.org/10.33373/dms.v12i3.5582

Nuruzzaman, W. P., Marianti, M., Zain, A., Putri, D. R., Amara, M., Sukerta, I. M., Heryanto, V., Prihatini, P. J., Swiswidayati, R. D. D., & Rokhmat, J. (2021). Ecobrick sebagai solusi penanggulangan sampah non-organik rumah tangga di lingkungan Sayo Baru. *Jurnal Pengabdian Magister Pendidikan IPA*, *4*(2).

Paundanan, M., Pelima, R. V, Rikwan, R., Fajrah, S., Fitriani, F., & HR, F. A. (2023). Edukasi Pengelolaan Sampah Dengan Konsep 3r (Reduce, Reuse, Recycle) Di Smp Negeri 30 Sigi. *Batara Wisnu: Indonesian Journal of Community Services*, *3*(1), 204–209.

Ratnawati, B., Yani, M., Suprihatin, S., Hardjomidjojo, H., Cholik, T., & Ardiyani, Q. T. (2022). Comparison of municipal solid waste landfill management in Depok City and Klaten Regency. *IOP Conference Series: Earth and Environmental Science*, *1109*(1), 012040. https://doi.org/10.1088/1755-1315/1109/1/012040

Sari, D. A., Harfia, A. Z., & Heriyanti, A. P. (2023). Penyuluhan dan Pelatihan Pembuatan Ecobrick di Desa Pulosaren Sebagai Upaya Pemanfaatan Sampah Plastik. *Jurnal Bina Desa*, *5*(1), 45–53. https://doi.org/10.15294/jbd.v5i1.41080

Setiawati, D. A., Sumarsono, J., Abdullah, S. H., Priyati, A., & Khalil, F. I. (2020). Sosialisasi Pengelolaan Sampah Plastik menjadi Ecobrick di Desa Peresak Narmada. *Jurnal Gema Ngabdi*, *2*(2), 133–138. https://doi.org/10.29303/jgn.v2i2.83

Utomo, M. A. P., Witjoro, A., Rakhmawati, Y., Lelitawati, M., Lestari, S. R., Maslikah, S. I., Daniarsih, A., Pratiwi, Z. A., Nirbaya, A., & Rudianto, R. (2023). Seni pemanfaatan limbah plastik melalui ecobrick sebagai upaya pengelolaan sampah berkelanjutan di sekolah. *Jurnal Inovasi Hasil Pengabdian Masyarakat (JIPEMAS)*, *6*(3), 453–466. https://doi.org/10.33474/jipemas.v6i3.19418

Widiyasari, R., Zulfitria, Z., & Fakhirah, S. (2021). Pemanfaatan sampah plastik dengan metode ecobrick sebagai upaya mengurangi limbah plastik. *Prosiding Seminar Nasional Pengabdian Masyarakat LPPM UMJ*, *1*(1).