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Community Empowerment Through Socialization of Eco-Friendly Paving Block Production from Plastic Waste in 26 Ilir Sub-district, Palembang City

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ABSTRACT

Plastic waste remains a serious challenge in urban areas, including in 26 Ilir Sub-district, Palembang City, with significant impacts on both the environment and public health. Innovative efforts are therefore required to reduce waste volume while simultaneously providing economic benefits for residents. This community service program aimed to provide education and skills to the local community through socialization and hands-on practice in producing paving blocks from plastic waste using simple steel molds. The program was implemented in several stages: preparation, socialization, demonstration and practice, mentoring, and evaluation with feedback. The results showed high community participation with cross-generational involvement. Public understanding of the impacts of plastic waste increased significantly, from 52% before the program to 87% after. Participants were also able to independently practice paving block production, including the fabrication of simple steel molds. The paving blocks produced were dense and suitable for use in neighborhood roads. Community feedback indicated that 72% of participants were interested in continuing the program and forming small business groups focused on plastic recycling. Thus, the program successfully enhanced awareness, knowledge, and practical skills in plastic waste management. Beyond improving environmental cleanliness, it also opened new entrepreneurial opportunities that support the concept of a circular economy at the community level.

INTRODUCTION

Plastic waste remains a serious issue in many cities across Indonesia, including Palembang. According to data from the Ministry of Environment and Forestry, national plastic waste production reaches millions of tons annually, with most ending up in landfills, rivers, or polluting urban environments. This situation has negative impacts on public health, ecosystems, and environmental aesthetics. In densely populated areas such as 26 Ilir Sub-district, piles of plastic waste are a common sight, particularly around residential neighborhoods and drainage channels. If not properly managed, plastic waste can clog drainage systems, cause flooding, and reduce the overall quality of life.

On the other hand, the development of community infrastructure such as neighborhood roads, alleys, and residential yards still requires affordable yet high-quality construction materials. One commonly used material is paving blocks, which offer advantages in terms of water permeability, aesthetics, and ease of maintenance. However, conventional paving blocks can be costly, and the use of cement as a raw material contributes significantly to carbon emissions. This highlights the need for innovative alternatives that are both environmentally friendly and economically viable (Imam Akbar *et al.*, 2024).

In this context, the use of plastic waste as an additive in paving block production presents an innovative solution (Dewi Rawani *et al.*, 2024). Plastic waste often considered valueless, can be recycled into useful construction material. Through processes of shredding and mixing with cement, sand, and aggregates, plastic can enhance the bonding strength of paving blocks while reducing reliance on conventional raw materials. Moreover, this method directly helps reduce the volume of plastic waste in the environment, offering dual benefits: minimizing pollution and providing an alternative construction material with market value. 26 Ilir Sub-district in Palembang was selected as the location for this community service program due to its dense population and proximity to river streams. The plastic waste problem in this area is complex, ranging from low public awareness of waste separation, limited waste management facilities, to the habit of indiscriminate disposal. These challenges call for educational and outreach activities to provide both awareness and practical skills in managing plastic waste. One effective approach is the socialization of paving block production using plastic waste as part of the mix.

This initiative focuses not only on the transfer of knowledge regarding paving block production techniques but also emphasizes community empowerment (Aziz *et al.*, 2023). Local residents are directly involved in every stage of the process, from collecting and sorting plastic waste, shredding, mixing materials, molding, to quality testing. In this way, participants not only gain theoretical understanding but also acquire practical skills they can further develop. Ideally, after the program, residents will be able to independently produce paving blocks and potentially turn it into a small-scale, environmentally based

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business. Beyond environmental and economic aspects, the program also carries important social dimensions. Through socialization, the community of 26 Ilir is expected to become more aware of proper waste management and their active role in maintaining environmental cleanliness. This initiative can serve as a starting point for the formation of community-based waste management groups, particularly in plastic recycling. Thus, the activity not only addresses waste problems but also strengthens social cohesion and fosters a spirit of collaboration in tackling shared environmental challenges.

From an academic perspective, this community service program also serves as a medium for applying knowledge and technology generated by universities (Ulfah, 2022). The concept of using plastic waste in paving block production has been widely studied from both technical and material quality perspectives, but real-world implementation remains limited. Through this initiative, research outcomes can be grounded and directly benefit the community. This creates synergy between academia, the community, and local government in building sustainable solutions. With this background, the program "Socialization of Paving Block Production Using Plastic Waste in 26 Ilir Sub-district, Palembang City" is highly relevant and important to be carried out (Mustakim *et al.*, 2023). The activity stems from the urgency of plastic waste management, the need for affordable and eco-friendly construction materials, and the importance of empowering communities to manage their own environment. This initiative is expected to create a practical model that not only addresses waste problems but also generates economic and social added value for the local community. Hence, this community service program stands as a tangible example of how simple innovations can bring broad positive impacts to both the environment and community well-being.

METHOD

The implementation of the community service program "Socialization of Paving Block Production Using Plastic Waste in 26 Ilir Sub-district, Palembang City" was carried out through several interrelated stages. Each stage was designed to ensure that the community not only gained theoretical knowledge but also acquired practical skills that could be directly applied in daily life. The overall workflow of this method is illustrated in the schematic diagram in Figure 1.

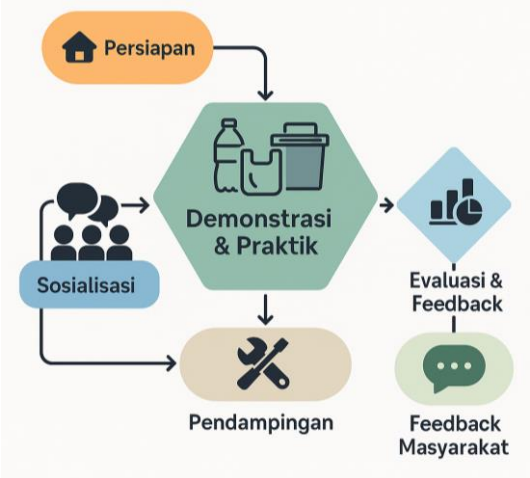

Figure 1. Schematic Diagram of Community Service Implementation Method

Preparation Stage

he initial stage was preparation, which included coordination with the local government of 26 Ilir Sub-district, a site survey, and the collection of necessary materials and equipment. At this stage, the community service team also developed a socialization module containing materials on the impacts of plastic waste, the 3R concept (reduce, reuse, recycle), and technical procedures for paving block production. Careful preparation ensured that the program could run effectively and in line with the needs of the local community.

Socialization Stage

This stage focused on delivering materials related to the importance of plastic waste management, its environmental impacts, and its potential for recycling into eco-friendly construction products. The sessions were conducted interactively, with open discussions that allowed residents to share their experiences and challenges in daily waste management.

Demonstrasion and Practice

This was the core stage of the activity, where residents were directly involved in the practical process of paving block production. The steps included:

- Collecting and sorting household plastic waste.
- Shredding plastic into small flakes using simple machinery.
- Mixing shredded plastic with sand, cement, and a small amount of water in specified proportions.

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- Producing steel molds: residents were introduced to the process of making molds from 3–5 mm steel plates, cut to standard sizes, and assembled by welding. Used oil was applied to the inner surface of the molds to prevent sticking.
- Casting paving blocks using the prepared molds.
- Drying and curing the paving blocks until they hardened.

hrough this stage, the community not only learned how to produce paving blocks but also gained the skills to independently manufacture production tools (steel molds), ensuring the sustainability of the activity.

Mentoring Stage

Following the socialization and practice, mentoring was provided for residents interested in continuing the activity. The mentoring focused on:

- Continuous production of steel molds, including hexagonal shapes.
- Improving technical skills in paving block production.
- Entrepreneurial consultation regarding small business opportunities and paving block marketing strategies.
- Establishing community-based groups focused on plastic waste recycling.2.5. Tahap Evaluasi dan Feedback

Evaluation and Feedback Stage

The final stage involved evaluation and the collection of feedback from participants. The evaluation assessed community participation, improvements in knowledge and practical skills, as well as the quality of the paving blocks produced. Feedback was obtained through interviews, group discussions, and simple questionnaires to assess program sustainability. These inputs provided valuable material for the community service team to refine and further develop the program in the future, see Figure 2.

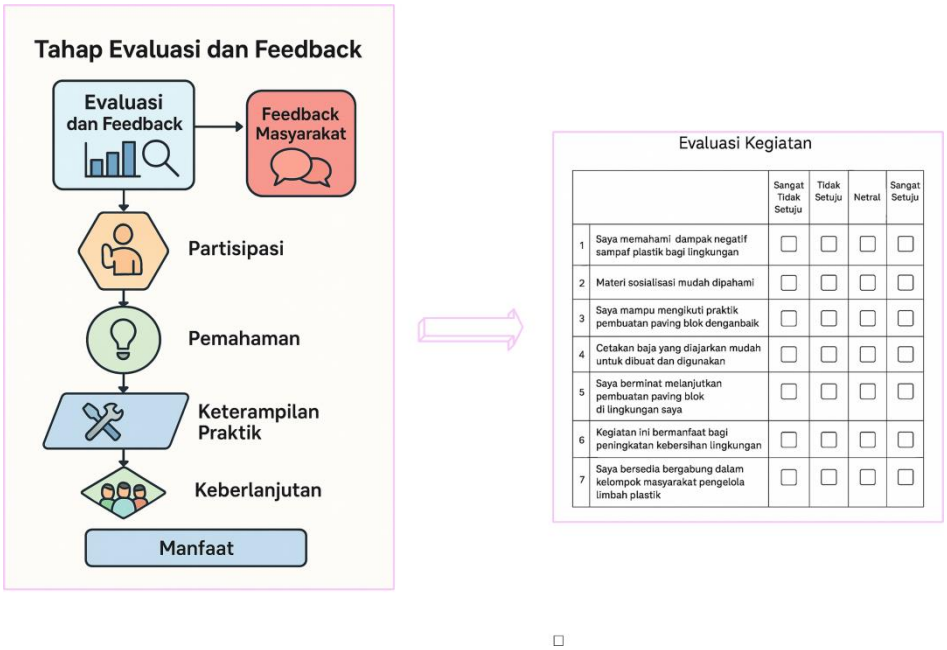

Figure 2. Community Feedback Questionnaire

RESULTS AND DISCUSSION

The socialization and practical training on producing paving blocks from plastic waste conducted in 26 Ilir Sub-district, Palembang City, yielded very positive results. Community participation was notably high, with more than fifty residents attending, including community leaders, housewives, and local youth groups. This enthusiasm was clearly reflected in their active involvement during both discussion sessions and hands-on practice. As shown in Figure 3, participants came from various age groups, allowing the activity to reach across generations and foster a sense of togetherness in addressing plastic waste issues in their neighborhood.

Figure 3. Community Participation

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Significant improvements in community understanding were also observed after the program. Based on distributed questionnaires, 85% of participants stated that the material was easy to understand, especially regarding the negative impacts of plastic waste on the environment and the 3R (reduce, reuse, recycle) concept. A comparison of comprehension levels before and after the program revealed a substantial increase, from an average of 52% to 87%. This demonstrates that the interactive socialization method effectively raised awareness while enriching participants' knowledge about proper waste management.

In terms of technical skills, residents showed encouraging progress in paving block production. During the practice session, participants were able to successfully complete all stages, from shredding plastic waste, mixing it with cement and sand, to molding using the simple steel molds introduced by the team. As documented in Figure 4, the community actively engaged in the casting process. The paving blocks produced appeared dense and durable, although further laboratory testing is required to ensure compliance with quality standards. These results confirm that the transfer of practical skills was effective and well-received by participants.

Gambar 4. Residents Engaged in Paving Block Casting

Feedback from the community further reinforced the program's success. Through questionnaires and group discussions, most residents stated that the activity provided tangible benefits, not only environmentally but also by opening opportunities for small-scale community-based enterprises. As many as 72% of respondents expressed their willingness to continue paving block production independently and join a plastic waste management group. This provides strong evidence that the community service activity did not stop at the educational level but also fostered social entrepreneurship.

A comprehensive overview of the program evaluation is presented in Figure 5, which highlights achievements across five key aspects: participation, understanding, skills, benefits, and sustainability. The diagram shows that the “benefits” aspect received the highest score (90%), reflecting residents’ perception that the program significantly improved environmental cleanliness and quality of life. Understanding and participation were also rated highly at 87% and 85%, respectively, indicating that the chosen approach successfully built collective awareness. Practical skills reached 82%, suggesting that residents were able to master the appropriate technology, particularly in making steel molds and casting paving blocks. However, sustainability scored relatively lower at 72%, indicating that while residents were interested in continuing the program, further support such as the formation of small business groups and facilitation from local government is needed to ensure long-term continuation.

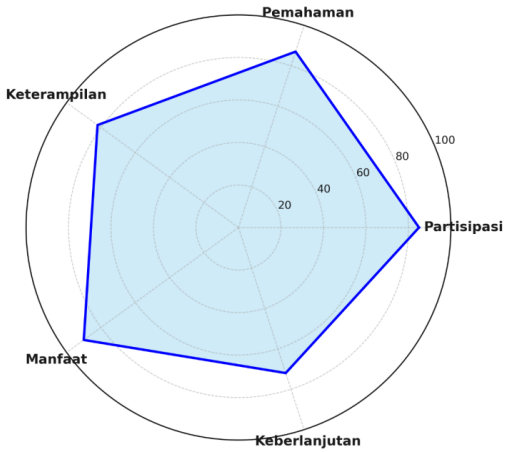

Figure 5. Program Evaluation

Overall, the results of this community service activity demonstrate that the applied approach was effective in enhancing participation, knowledge, and technical skills. The program not only addressed the plastic waste problem but also opened new opportunities for environmentally based community empowerment. Discussions with residents revealed their hope for the program to be expanded on a larger scale with broader institutional support. Thus, the socialization of paving block production using plastic waste can serve as a sustainable and practical model of community service, as well as a concrete contribution to promoting circular economy practices at the community level

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CONCLUSION

The community service program on "Socialization of Paving Block Production Using Plastic Waste in 26 Ilir Sub-district, Palembang City" was successfully implemented and produced encouraging outcomes. The program effectively increased cross-generational community participation, broadened awareness of the negative impacts of plastic waste, and enhanced residents' technical skills in paving block production using simple steel molds. The evaluation results indicated that the "benefits" aspect received the highest rating, followed by understanding, participation, and practical skills all of which showed positive achievements. Nevertheless, sustainability remains a challenge, as residents require further support in establishing business groups and obtaining facilities from local government and related stakeholders. In conclusion, this program has made a tangible contribution to reducing plastic waste while providing an innovative solution through paving block products that are both environmentally beneficial and economically valuable. It may serve as a model of community service based on appropriate technology, one that not only addresses environmental problems but also fosters community independence and economic empowerment

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