Asian Journal of Community Services (AJCS)
Vol. 4, No. 12 2025: 1087-1096

Transforming Waste Management Towards Green Entrepreneurship through Plastic Paving Block Production by the Demen Hamlet Youth Organization

Elanjati Worldailmi[1]*, Ratih Dianingtyas Kurnia[2], Tri Lestari Wahyuning Utami[3], Dwi Adi Purnama[4], Rajab Bullah Anggara Nasution[5], Muhamad Abdil Gani[6]
Universitas Islam Indonesia
Corresponding Author: Elanjati Worldailmi elanjati.worldailmi@uii.ac.id

A R T I C L E I N F O

Keywords: Plastic Waste, Community-Based Empowerment, Eco Paving Block, Green Entrepreneurship, Circular Economy

Received : 18, October
Revised : 20, November
Accepted: 22, December

A B S T R A C T

Plastic waste is a major environmental problem in Indonesia due to rising plastic consumption and suboptimal community-level waste management. This community service program aimed to empower the youth organization of Demen Hamlet to develop a community-based waste management system. This program focus on utilizing recycled plastic as raw material for eco paving blocks. The stages of this program are a combination of needs assessment, training, implementation, mentoring, and evaluation, including waste-bank training, organizational structuring, SOP development, branding and digital marketing workshops. These activities improved youths' skills in waste sorting, operational recording, and producing more consistent paving blocks. Furthermore, youth members can establish a green product brand and online promotion channels, such as eco-friendly campaigns. It strengthen community-based circular-economy entrepreneurship.

DOI prefik: https://doi.org/10.55927/ajcs.v4i12.486
ISSN-E: 2962-1496
https://srhformosapublisher.org/index.php/ajcs

INTRODUCTION

Plastic waste is a serious issue in Indonesia. The Ministry of Environment and Forestry records that plastic waste accounts for 17% of total national waste generation and tends to increase every year (KLHK, 2023). The problem is particularly evident in urban areas, where rapid population growth and expanding economic activities intensify pressure on local waste management systems, and Yogyakarta is no exception. Reports from the Yogyakarta Environmental Agency show that the city produces 90,000–110,000 tons of solid waste annually (Cantya & Rahmawati, 2024). This growing volume highlights the urgent need for more effective and sustainable waste management approaches. Of particular concern is organic waste, which constitutes a significant share of municipal waste and demands targeted strategies to reduce environmental and operational burdens on the city's waste infrastructure. Mismanaged plastic causes soil and water pollution because it is difficult to degrade (Jambeck et al., 2015). Therefore, a waste management approach oriented toward the circular economy is needed to maintain environmental sustainability (Geissdoerfer et al., 2017). The value of circular economy can be assessed from total waste that transform to be new product (Alifa et al., 2024).

Waste banks are one of the effective strategies in community-based waste management because they can increase community participation in waste sorting while also providing economic benefits (Damanhuri & Padmi, 2019; BPS, 2022). Waste bank programs also contribute to institutional strengthening and youth empowerment through the improvement of technical and managerial capacities (Putra et al., 2021). Youth communities have increasingly been recognized as central actors in sustainability transitions (Gajović et al., 2023; Kumar, 2023). At the community level, youth groups play direct roles in advancing sustainable development through activities such as waste reduction programs, renewable energy projects, urban agriculture, and circular economy innovations (Kumar, 2023). Participation in such initiatives also cultivates leadership, resilience, and agency among young individuals, strengthening their long-term capacity to shape environmental decision-making (Gajović et al., 2023). These developments affirm that youth are not peripheral participants but indispensable partners in building a more sustainable and equitable future. Strengthening youth development can encourage young people to form sustainable behaviors that persist into environmentally responsible adulthood (Damon, 2004; Benson & C. Scales, 2009; Lerner et al., 2019; Barnason et al., 2022).

Building on this foundation of youth engagement and institutional capacity, communities are increasingly able to adopt innovative plastic recycling approaches such as eco-paving block production. The innovation of processing plastic waste into value-added products such as eco-paving blocks has developed as an alternative for reducing waste as well as a green entrepreneurship opportunity at the community level (Sorum et al., 2020; Hidayat et al., 2022). Paving block products made from plastic waste have been proven to have good compressive strength and higher water resistance, making them potentially marketable (Rathore et al., 2021; Mahmoud et al., 2023).

However, the success of recycling-based enterprises does not depend only on technical aspects of production, but also on organizational management and marketing strategies (Kotler & Keller, 2016; Chen, 2020). Green branding can increase market acceptance of environmentally friendly products (Rahmawati & Santoso, 2021; Nguyen et al., 2020). Based on these conditions, assistance is needed for the Karang Taruna youth organization as the driver of the local youth economy, which has the potential to develop an integrated waste management enterprise and the sustainable production of paving blocks made from recycled plastic. Therefore, this community service program focuses on:

1. The establishment of waste bank management.
2. The preparation of sops for plastic paving block production.
3. Branding strategies and marketing of green products.
4. Strengthening youth capacity in environment-based entrepreneurship.

This community service is expected to realize a sustainable business model that provides economic benefits while at the same time reducing the environmental burden in Demen Hamlet.

IMPLEMENTATION AND METHODS

This community service program adopts a community-based empowerment approach that focuses on enhancing the capacity of Karang Taruna youth in waste management and the production of recycled paving blocks. The implementation of this program is based on needs assessment, training, implementation, mentoring, evaluation, and sustainability recommendations, as illustrated in Figure 1.

Figure 1. Foundation of Community Service Implementation

Furthermore, the implementation of the activities is carried out through several main stages, namely: (1) preparation, (2) training, (3) implementation, and (4) evaluation, as illustrated in Figure 2.

Figure 2. Stages of Activity Implementation

A more detailed explanation is as follows:

1. Preparation Stage
   The program began with coordination between the Village Government and the *Karang Taruna* committee to determine the activity participants (waste bank managers and production team). This stage included identifying problems and community needs through observation and short interviews, as well as preparing training materials and drafting Standard Operating Procedures (SOPs).

2. Traning Stage
   The training was conducted through tutorials, discussions, and hands-on practice, divided into five main topics: Waste Bank Scheme Training, Formation of the Waste Bank Organizational Structure, Preparation of SOPs for Plastic-Based Paving Block Production (Green Paving Blocks), Branding Strategy Workshop, and Digital Marketing.
3. Implementation Stage
   Participants carried out waste management activities and paving block production independently, with structured assistance from the lecturer and student team. Activities included routine household waste collection and sorting, production of paving blocks made from shredded plastic waste, and the development of digital marketing content and buyer networks. The mentoring team conducted monitoring throughout each activity to ensure compliance with the SOPs.
4. Evaluation Stage
   Evaluation was carried out through: observation of work practices and SOP alignment, assessment of product quality, and review of digital marketing performance.

RESULTS AND DISCUSSION

The community service program carried out with the *Karang Taruna* youth organization of Demen Hamlet generated various important outcomes, particularly in strengthening youth capacity, improving waste management practices, and developing environmentally based entrepreneurial initiatives. The activities included training on waste bank schemes, organizational structuring, SOP development, branding, and digital marketing.

Training on Waste Bank Schemes

The materials covered the separation of organic and inorganic waste, recording mechanisms for incoming and outgoing waste transactions, management of waste collection, storage, and distribution, and the utilization of organic waste as animal feed. Youth community in *Karang Taruna* learned about the systematic separation of organic and inorganic waste, as well as proper categorization of recyclables. The training also introduced procedures for managing waste collection schedules. In addition, youth members were taught simple knowledge for utilizing organic waste as animal feed, supporting the hamlet to reduce organic and inorganic waste volume.

Figure 3. Community Training Session on Waste Bank Schemes and the Utilization of Waste in Demen Hamlet

Establishment of the Waste Bank Organizational Structure

This training involved identifying roles and preparing job descriptions as well as workflow arrangements. Organizational structuring and role assignment were aimed to build a more accountable and functional waste bank institution. Youth participants collaboratively developed an organizational chart, defined job descriptions, and established internal communication flows to ensure smooth coordination. This step helped the youth organization shift from informal practices to a more structured community-based waste management system.

Figure 4. The Waste Bank Organizational Structure Coordination

Development of SOPs for Plastic-Based Paving Block Production

The program covered technical procedures for plastic selection, shredding, mixing, molding, and curing for eco-paving block production. SOPs for safety, cleanliness, and quality control were also established to guide consistent operational performance. This program equipped the youth with a standardized and replicable set of procedures for producing plastic-based eco-paving blocks.

The training began with the preparation of raw materials, which included the selection and cleaning of shredded plastic, proper measurement of cement and sand ratios, and quality checks to ensure that only suitable materials entered the production line. Participants were introduced to criteria for plastic types and particle size to maintain consistency in the final product. The session then moved to mixing procedures, where youth members learned the correct sequencing of materials, ideal mixing duration, and the importance of achieving uniform distribution of plastic particles within the cement–sand mixture. Demonstrations were conducted using manual and semi-mechanical mixing tools to show the difference in texture and workability.

Figure 5. Technical Procedures for Plastic Selection, Shredding, Mixing, Molding, and Curing for Eco-Paving Block Production

The program also covered molding and compaction techniques, emphasizing the need for even filling, vibration or manual tamping to reduce air gaps, and the use of standardized molds to achieve consistent dimensions. Participants practiced operating the molds, applying pressure, and inspecting the surface finish as part of quality assurance. Youth members were guided on proper stacking, shading, and moisture control to ensure the paving blocks reached structural stability before use. At the end of the program, the development of SOPs were given. This included detailed occupational health and safety (OHS) procedures, such as safe handling of cement, use of protective equipment (gloves, masks, goggles), proper ventilation, ergonomic lifting techniques, and guidelines for operating shredders and mechanical tools. These safety protocols aimed to minimize work-related risks and establish a culture of safe production practices within the youth group.

Branding Strategy Workshop

To support sustainability and market readiness, the program introduced branding and digital marketing training. This session discussed the importance of naming, brand identity, and formulating a green value proposition. Youth members were guided through the process of naming their product line, designing a logo, establishing a visual identity, and setting up digital platforms such as social media accounts to promote their eco-friendly paving blocks.

Figure 6. Branding Strategy Workshop with Local Youth Participants

Digital Marketing

The materials covered the importance of creating social media accounts (Instagram, Facebook, and WhatsApp Business) and developing a standard customer service SOP. The youth members also were introduced to customer service, content creation, and online promotion strategies to increase visibility and consumer trust. Participants were also provided with marketing strategies for environmentally friendly products, including creating campaign content that emphasizes the importance of environmental protection.

Figure 7. Digital Marketing Session on Creating Social Media Accounts and Standard Customer Service SOP

The training outcomes indicate that the Karang Taruna youth successfully performed household waste sorting into three categories: organic waste, soft plastics for paving block production, and paper/metal/hard plastics for sale. The participants also learned to implement recording mechanisms for waste inflow and outflow and gained an understanding of scheduling duties and logistics management.

The establishment of the waste bank organizational structure facilitated clearer task allocation and communication flows. There was also an observable increase in ecological awareness and active engagement among Karang Taruna members post-training. This aligns with the findings of Istiyani & Handayani (2022), which state that strengthening community institutions enhances the effectiveness of circular economy practices at the village level.

The SOPs that were developed and trained to participants included material composition, shredding and mixing procedures, molding and compaction techniques, and safety protocols. The youth organization demonstrated the ability to independently carry out production after the initial mentoring phase. The paving blocks produced show potential uniformity in shape due to the use of a specialized mold. Rathore et al. (2021) note that using plastic as an aggregate can improve water resistance in paving blocks and provide good economic value for local markets.

Through discussions and brainstorming activities, it was identified that the plastic-based paving block product (ecogreen) required a proper name. The name should reflect environmental friendliness, support the circular economy, and represent youth empowerment. Branding is a key factor in increasing the perceived value of green products (Nguyen et al., 2020), and therefore a logo, digital marketing accounts, and a customer service SOP are required to strengthen competitiveness when entering the market.

Participants are considered participatory when they are actively involved in the series of activities, understand the production and management processes of plastic-based paving blocks, and have the motivation to continue implementation. This program contributes to behavioral transformation and technical competency improvement among youth towards green entrepreneurship. This reinforces the findings of Akbar et al. (2025), who emphasize that youth capacity-building is a major factor in the sustainability of community-based ecopreneurship.

Several initial challenges were identified, including limited production equipment, unstable production capacity, and the market still being in the development stage. However, there are opportunities for improvement through potential collaboration with local construction actors. This aligns with the recommendations of Subekti (2022), which highlight the importance of market ecosystem support for recycled products.

CONCLUSIONS AND RECOMMENDATIONS

The community service program carried out in Demen Hamlet helped develop a concept to improve youth competencies in waste sorting and management through the establishment of a structured waste bank system, enhance their ability to produce eco–paving blocks based on recycled plastic through the application of appropriate SOPs, build brand identity and digital marketing strategies that support business sustainability, and increase youth motivation to engage in green entrepreneurship, thereby contributing to the reduction of plastic waste in the village environment. Thus, this program plays a role in strengthening the circular economy and creating opportunities for sustainable environment-based enterprises.

For business sustainability and scaling up, the following actions are recommended: conducting product quality testing; increasing production capacity and improving the quality of paving block molds; developing a long-term business model, including analysis of production costs and competitive selling prices; establishing partnerships with the village government, construction actors, and local markets to expand product distribution; and organizing advanced training on digital marketing, customer relations, and MSME financial management.

ACKNOWLEDGMENT

The Community Service team would like to Demen Hamlet who participated in this program. We also thank to the Directorate of Research, Technology, and Community Service (DRTPM), Directorate General of Research and Development, Ministry of Higher Education, Science, and Technology, for providing a Community Service Grant under the Community-Based Empowerment Scheme, with the scope of Community Partnership Empowerment, packaged within the BIMA Community Service Grant program 2025.

REFERENCES

Alifa, N. P., Adelia, A., & Mufti, A. A. (2024). Material Flow Analysis of Plastic Waste for Circular Economy Potential: A Case Study of Wijaya Kusuma and Sidomakmur Waste Banks in Metro City. Jurnal Indonesia Sosial Teknologi, 5(10).

Barnason, S., Li, C. J., Hall, D. M., Wilhelm Stanis, S. A., & Schulz, J. H. (2022). Environmental action programs using positive youth development may increase civic engagement. Sustainability, 14(11), 6781. https://doi.org/10.3390/su14116781.

Benson, P. L., & C. Scales, P. (2009). The definition and preliminary measurement of thriving in adolescence. The Journal of Positive Psychology, 4(1), 85–104. https://doi.org/10.1080/17439760802399240.

BPS. (2022). Statistik lingkungan hidup Indonesia. Badan Pusat Statistik.

Cantya, N., & Rahmawati, A. (2024). Implementasi kebijakan dalam pengelolaan sampah melalui metode biopori di Kota Yogyakarta. PAMARENDA : Public Administration and Government Journal, 4(2), 383–394. https://doi.org/10.52423/pamarenda.v4i2.54.

Chen, Y. S. (2020). The drivers of green brand equity: Green brand image, green satisfaction, and green trust. Journal of Business Research, 116, 823–831.

Damanhuri, E., & Padmi, T. (2019). Pengelolaan sampah terpadu. ITB Press.

Damon, W. (2004). What is Positive Youth Development? The ANNALS of the American Academy of Political and Social Science, 591(1), 13–24. https://doi.org/10.1177/0002716203260092.

Gajović, A., Bjelica, D., Pavlović, D., & Vukmirović, D. (2023). Educating youth on project sustainability: Project engagement and recognition of the green deal. Applied Ecology and Environmental Research: International Scientific Journal. http://ebooks.ien.bg.ac.rs/1944.

Geissdoerfer, M., et al. (2017). The circular economy – A new sustainability paradigm? Journal of Cleaner Production, 143, 757–768.

Hidayat, R., et al. (2022). Strength analysis of plastic waste-based paving blocks. IOP Conference Series: Earth and Environmental Science, 1063(1), 012039.

Jambeck, J. R., et al. (2015). Plastic waste inputs from land into the ocean. Science, 347(6223), 768–771.

KLHK. (2023). Sistem informasi persampahan nasional. Kementerian Lingkungan Hidup dan Kehutanan.

Kotler, P., & Keller, K. L. (2016). Marketing management (15th ed.). Pearson.

Kumar, A. (2023). Promoting youth involvement in environmental sustainability for a sustainable future. Edumania-An International Multidisciplinary Journal, 1(03), 261–278.

Lerner, R. M., Dowling, E. M., & Anderson, P. M. (2019). Positive youth development: Thriving as the basis of personhood and civil society. In Beyond the self (pp. 172–180). Routledge.

Mahmoud, A. E., et al. (2023). Recycled plastic binder for eco-friendly paving blocks. Construction and Building Materials, 365, 130026.

Nguyen, T. N., et al. (2020). Green marketing strategies and consumer behavior. Sustainability, 12(21), 9063.

Pambudi, N. F., et al. (2025). Enhancing public participation in plastic waste management. Journal of Environmental Management, 369, 100354.

Putra, A., et al. (2021). Community empowerment through waste bank program. Jurnal Pengabdian Kepada Masyarakat, 7(2), 132–140.

Rahmawati, F., & Santoso, A. (2021). The effect of green branding on purchase intention. Jurnal Manajemen dan Bisnis, 18(3), 55–67.

Rathore, A., et al. (2021). Mechanical properties of plastic waste paving blocks. Materials Today: Proceedings, 46, 5771–5777.

Sorum, L., et al. (2020). Plastic recycling for construction materials: A review. Resources, Conservation & Recycling, 158, 104808.