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INNOVATION OF SAMBAK VILLAGE WASTE BANK: COMMUNITY EMPOWERMENT THROUGH CIRCULAR ECONOMY AND PAVING BLOCK PRODUCTION USING INCINERATOR TECHNOLOGY

Jihad Lukis Panjawa[1], Arif Rahman Saleh[2], Dinar Melani Hutajulu[3], Maulia Siti Mukharohmah[4], Yesinta Nanda Kurnia[5], Katarina Putri Maharani[6]

[1-6]Faculty of Economic, Universitas Tidar, Indonesia

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ABSTRACT

Sambak Village, recognized as a Proklim Lestari awardee, continues to face challenges in managing non-recyclable plastic waste with low market value, which often ends up in open burning practices that harm the environment. This community service program introduces an innovative solution through the development of the Sambak Village Waste Bank by integrating circular economy principles with the application of low-emission incinerator technology for paving block production. The activities were implemented through capacity building, tutorials, and mentoring sessions involving local residents, waste bank managers, and micro-entrepreneurs. Plastic waste was processed using an incinerator fueled by waste cooking oil and used lubricants, producing semi-processed by-products that were then utilized in paving block manufacturing. Program implementation encouraged community participation in waste segregation, technical training, and collaborative production, while monitoring and evaluation highlighted significant improvements in institutional governance and reduced environmental impacts compared to traditional burning. Beyond technical outcomes, the initiative enhanced community awareness, fostered behavioral change toward sustainable waste management, and opened economic opportunities through the commercialization of paving blocks. This program illustrates an effective model of community empowerment that transforms plastic waste into value-added products, reinforcing Sambak Village as a pioneer of environmentally friendly and climate-resilient practices.

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* Corresponding Author
mauliasm@untidar.ac.id
(Maulia Siti Mukharohmah)

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INTRODUCTION

In 2017, Sambak Village was conferred the Proklim Utama Award, and in 2021 it achieved the Proklim Lestari Award, making it the sole village in Magelang Regency to obtain such recognition (Sari, 2024). As part of its climate change mitigation and environmental stewardship efforts, the community established a waste bank system as a strategy for community-based solid waste management. However, according to interviews with waste bank managers, the accumulation of unsold plastic waste remains a critical challenge. This category of waste is characterized by its low market value and limited recyclability, often resulting in unsustainable practices such as open dumping or uncontrolled burning within residential areas, which exacerbate local environmental pollution. From a circular economy perspective, such hard-to-recycle materials represent a potential resource stream that could be redirected toward resource valorization processes, thereby supporting local entrepreneurship and enhancing the sustainability of community-based economic activities (Panjawa et al., 2024). As a designated *Proklim* village, Sambak still faces unresolved challenges related to plastic waste management. Based on 2019 data, the village consisted of 632 households, each generating an estimated average of 1 kg of waste per day, resulting in a total daily accumulation of approximately 632 kg of waste. Figure 1. illustrates the piles of waste generated from the daily activities of Sambak's residents.

Figure 1. Waste Disposal Sites and Open Burning Activities in Sambak Village

In supporting the Proklim initiative, efficient waste management based on community empowerment through the circular economy approach is a key strategy to improve environmental quality. The circular economy represents a resource utilization system that emphasizes reduction, reuse, and recycling processes (Darmastuti et al., 2021). In line with

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Presidential Regulation (Perpres) No. 97 of 2017, which sets the target of achieving 70% proper waste handling and 30% waste reduction by 2025, the circular economy can be operationalized through community-based waste management. One potential strategy involves the utilization of waste-to-energy technologies, particularly combustion devices designed to generate value-added products.

In light of the unresolved plastic waste problem in Sambak Village, a program has been initiated under the concept of *"Innovation of the Sambak Village Waste Bank: Community Empowerment through Circular Economy and Paving Block Production Using Incinerator Technology."* This initiative is consistent with Magelang Regency's efforts on environmental protection and management, as stipulated in Regional Regulation (Perda) No. 4 of 2016. By utilizing non-marketable plastic waste, the program is expected to contribute to a reduction in the overall waste volume in Sambak Village.

LITERATURE REVIEW

Definition of Waste

Waste refers to anything that is no longer used, unwanted, or discarded as a result of human activities. According to the Republic of Indonesia Law No. 18 of 2008, waste is defined as the residue of human activities and/or natural processes in solid form. Sucipto (2012) classifies waste into three categories: (1) organic waste derived from living organisms such as humans, animals, and plants; (2) inorganic waste, which does not originate from living organisms; and (3) hazardous and toxic waste (B3), which contains materials harmful and dangerous to humans. Three primary sources of waste: (1) household waste, consisting of organic and inorganic waste generated from domestic activities; (2) commercial waste, produced by shops, restaurants, markets, offices, hotels, and similar establishments; and (3) industrial waste, originating from production processes ranging from raw material processing to the final product. Waste management is generally divided into two approaches: (1) waste reduction, which includes limiting waste generation, reuse, and recycling; and (2) waste handling, which covers segregation (classification and separation based on type, quantity, and characteristics), collection (transfer from the source to temporary storage or integrated processing facilities), transportation (delivery from the source or temporary facilities to final disposal sites), processing (modifying the characteristics, composition, and volume of waste), and final treatment, which involves the safe return of waste and/or residues to the environment (Republic of Indonesia Law No. 18 of 2008).

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Community-Based Waste Management and Waste Banks

Raising public awareness to engage in waste management activities through the 3R concept (reduce, reuse, and recycle) is one of the alternative strategies for addressing waste problems (Wulandari et al., 2017). The community-based application of the 3R concept has been realized through community initiatives to establish waste banks as a solution for waste challenges (Selomo et al., 2016). According to the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia No. 14 of 2021 concerning waste management in waste banks, a waste bank is defined as a facility that manages waste based on the principles of 3R (reduce, reuse, and recycle). It also functions as a medium for education, behavioral change in waste management, and the implementation of a circular economy, established and managed by communities, enterprises, and/or local governments. Waste banks represent a concrete form of effective and environmentally friendly waste management. Furthermore, one of the key functions or benefits of waste banks is the reduction of waste generation, thereby decreasing the volume of waste disposed of at final disposal sites (Syafrudin et al., 2019).

Circular Economy

The circular economy is an economic system that shifts from a material-based concept (raw materials) toward recycling and increasing the efficiency of raw material use in production, distribution, and consumption processes. Its goal is to achieve sustainable development, thereby preserving environmental quality while enhancing the socio-economic well-being of society (Kirchherr et al., 2017). The circular economy represents both a transition and an advancement from the linear economy, which overly emphasizes human activities without considering the environment as a resource that must be preserved and maintained continuously. This transition aims to achieve sustainable development oriented toward the synergy between economic growth and environmental protection, moving toward a greener economy (Kristianto & Nadapdap, 2021). The principles of the circular economy, based on the 3R concept, seek to optimize production efficiency by maximizing the use of natural resources while minimizing exploitation, reducing environmental pollution, and lowering emissions and waste levels through the implementation of a sustainable economic system (Kristianto & Nadapdap, 2021).

Waste Incinerator

An incinerator is a device designed to burn solid waste using combustion technology at controlled temperatures. It is considered one of the alternatives for reducing waste accumulation (Pratama et al., 2025). The incineration process converts residual materials or

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waste into heat, which can be further utilized to generate energy such as electricity. As a waste treatment technology, incineration through the use of incinerators primarily aims to significantly reduce the volume of waste. In addition, it ensures that the processed waste becomes less hazardous to the environment and chemically stable (Lasmana et al., 2021).

MATERIAL AND METHOD

The community service activities were implemented through capacity building programs involving tutorials and mentoring to strengthen the *Proklim* initiative in Sambak Village, with a particular focus on waste bank managers. The tutorials emphasized technology transfer related to the operation of an incinerator as a device for plastic waste treatment and the subsequent waste-to-resource application in the form of molded paving block production. The process employed semi-processed by-products generated from the incinerator, thereby demonstrating a practical approach to plastic waste valorization and the promotion of sustainable construction materials within a community-based circular economy framework. This community service activity was conducted on August 23, 2025, at the Sambak Village Waste Bank, with the primary objective of transforming plastic waste into value-added paving blocks. The activity was carried out following a structured five-stage process, which included:

1. **Identification**: Team conducted a systematic identification and site verification at the Sambak Village Waste Bank to analyze challenges associated with plastic waste management. The intervention strategy emphasized institutional capacity strengthening of the Waste Bank and community empowerment through the development of an integrated system combining low-emission incineration technology with paving block production. The incinerator, designed to operate with alternative fuels such as waste cooking oil or used lubricants, functions as a plastic waste treatment unit while simultaneously supplying semi-processed by-products for use in sustainable construction materials (Lasmana et al., 2021). This program aims to promote sustainable waste valorization pathways, enabling the community to convert non-recyclable plastic waste into value-added products. In doing so, it addresses long-term plastic waste challenges while reinforcing Sambak Village's role as a *Proklim Lestari* model for climate-resilient communities.
2. **Waste Management Solutions in Sambak Village**: The primary challenge currently faced is the development of a community-based system that enables independent and sustainable management of plastic waste in Sambak Village. The initial intervention

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strategy focuses on institutional strengthening of the Village Waste Bank through the establishment of AD/ART (Anggaran Dasar/Anggaran Rumah Tangga) to enhance operational efficiency and governance mechanisms. In addition, community empowerment is operationalized through the design and implementation of low-emission incineration technology, which complements the institutional reforms by providing a practical pathway for plastic waste valorization and integration into a circular economy framework.

Figure 2. Incinerator Tool

The incinerator is a low-smoke waste combustion device fueled by waste cooking oil and used lubricants, which is integrated with the production of paving blocks utilizing a mixture of plastic waste residues from the combustion process. The incinerator operates through a relatively complex mechanism, in which plastic waste is melted inside the combustion chamber (Rizkillah & Indrawan, 2024). A blower functions as an air supply system for the chamber containing the waste oil and lubricant. The resulting combustion gases are directed into a containment drum and subsequently passed through a pipeline equipped with a sprayer system. The sprayer plays a critical role in pollution mitigation by injecting water from a storage tank, thereby facilitating the absorption and reduction of pollutants as the exhaust gases mix with water within the

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containment unit.

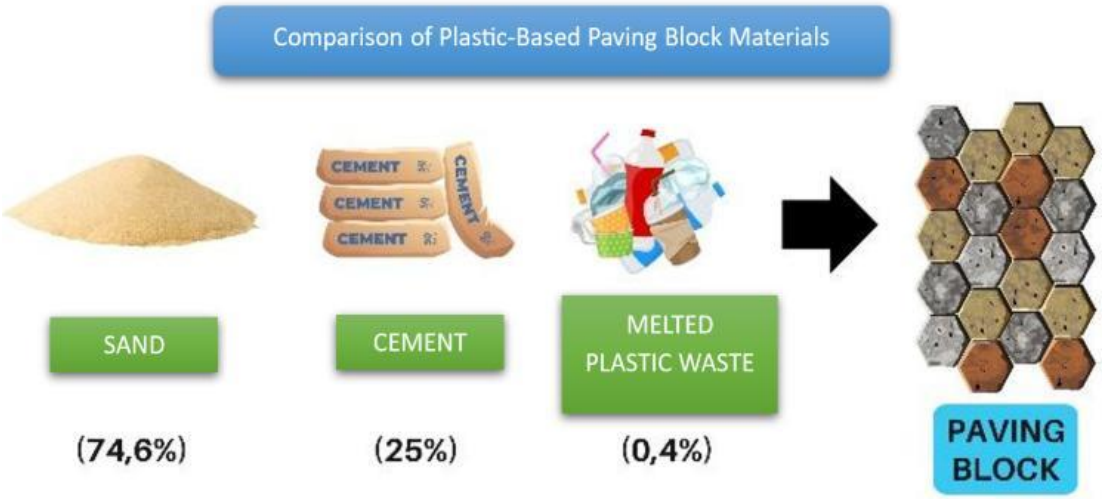

Figure 3. Composition of Plastic Paving Blocks

The paving blocks were produced using a mixture consisting of 74.6% sand, 25% cement, and 0.4% molten plastic waste derived from the incineration process. These paving blocks demonstrated a compressive strength of 17.5 MPa and a water absorption capacity of 6.5%. The proportion of plastic utilized amounted to 0.4%, equivalent to 0.22 kg per square meter (Muslimah, 2024). This solution is expected to provide a sustainable approach for addressing plastic waste management challenges while delivering tangible benefits to the village community.

3. **Program Implementation Participation**: The implementation of this innovative program requires active participation from multiple stakeholders, including local communities, micro-entrepreneurs, and other relevant actors. Village residents are expected to actively engage in waste segregation and collection by separating organic from non-organic waste. Micro-entrepreneurs can contribute to the production process of paving blocks, ranging from waste handling to manufacturing using incinerator technology, thereby enabling the development of this initiative into an environmentally friendly and sustainable business opportunity. In addition, educational institutions—specifically Universitas Tidar—are involved in conducting research and technological development related to the incinerator utilized in this program.
4. **Program Monitoring and Evaluation**: Monitoring and evaluation activities were conducted to assess the progress of institutional improvements in the Sambak Village Waste Bank through the empowerment of both its managers and the local community.

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Monitoring was carried out during each mentoring session on the operation of the incinerator and the production of paving blocks. Final evaluations were performed at the conclusion of the program to identify potential challenges in the operation of the incinerator integrated with paving block production. This was examined by comparing air quality levels between traditional open burning practices and the incinerator-based combustion process. The evaluation also assessed the extent to which the community was able to independently operate the incinerator. Furthermore, this stage evaluated the volume of plastic waste successfully managed and the quantity of paving blocks produced by the village community.

5. **Program Sustainability**: As part of this initiative, an institutional framework will be established to ensure the long-term sustainability of the program. The organizational structure will be managed by the Waste Bank committee, supported by active participation from the Sambak Village community. Residents will be encouraged to engage in weekly collective activities (*gotong royong*) for paving block production. Evaluation processes will involve the Waste Bank management, community members, and other stakeholders. During the final monitoring stage, a documentation report entitled *"The Compilation of Proklim Activities in Sambak Village"* will be handed over to the Waste Bank committee and the Sambak Village government. Following the completion of this community service program, the Sambak Village Waste Bank is expected to manage plastic waste independently and serve as a pioneer for other villages in implementing low-pollution, environmentally friendly, value-added, and sustainable plastic waste management practices.

RESULT AND DISCUSSION

Situation Analysis of Sambak Village

The daily activities of Sambak Village residents inadvertently generate a significant amount of waste, averaging 623 kg per day. This waste primarily consists of food packaging, used paper, and plastic bottles. The accumulation of non-biodegradable waste creates environmental problems, including soil, water, and air pollution. To address this issue, the Sambak Village government established a waste bank as an innovative and participatory solution that encourages the community to sort and collect waste with economic value, such as plastics, paper, and metals. The sorted recyclable waste is deposited at the waste bank on a weekly basis and later sold to collectors. Meanwhile, residual waste that cannot be sold is

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typically burned near residential areas, contributing to environmental pollution. However, this type of waste can actually be transformed into useful products by utilizing an incinerator, which processes the waste into value-added materials such as paving blocks.

Program Socialization Activities for Sambak Village Community

The socialization activity aimed to educate the residents of Sambak Village in order to raise awareness of household waste management and to introduce a low-smoke waste combustion device, namely the incinerator. The activity was conducted on August 23, 2025, and was attended by more than 20 participants, including Sambak Village residents, the management of the Mekar Sari Waste Bank, members of the Kelompok Wanita Tani (KWT) of Sambak Village, PKK cadres, and village officials. During the event, participants actively engaged in the collection and segregation of waste, which was later tested using the incinerator. They also received education on plastic waste sorting, the benefits of using the incinerator, and technical training on its operation.

Figure 4. Socialization of Activity Programs in Sambak Village

Demonstration of Incinerator Operation and Plastic Paving Block Production

The demonstration of incinerator operation and paving block production was carried out in Sambak Village. Initially, the waste from the community in Sambak Village was still mixed, so it had to be sorted. The segregation process supports the implementation of the circular economy by distinguishing between waste with economic value and waste without economic value. Non-marketable waste is further processed into paving blocks. Training participants were provided with knowledge on how to prepare materials, calculate the proper composition of cement and sand, and apply the correct procedures for molding. During the demonstration, participants showed great enthusiasm by attentively observing and actively engaging in igniting and operating the incinerator. This high level of enthusiasm emphasized

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that the incinerator, aimed at producing paving blocks, is not merely a technical tool but also

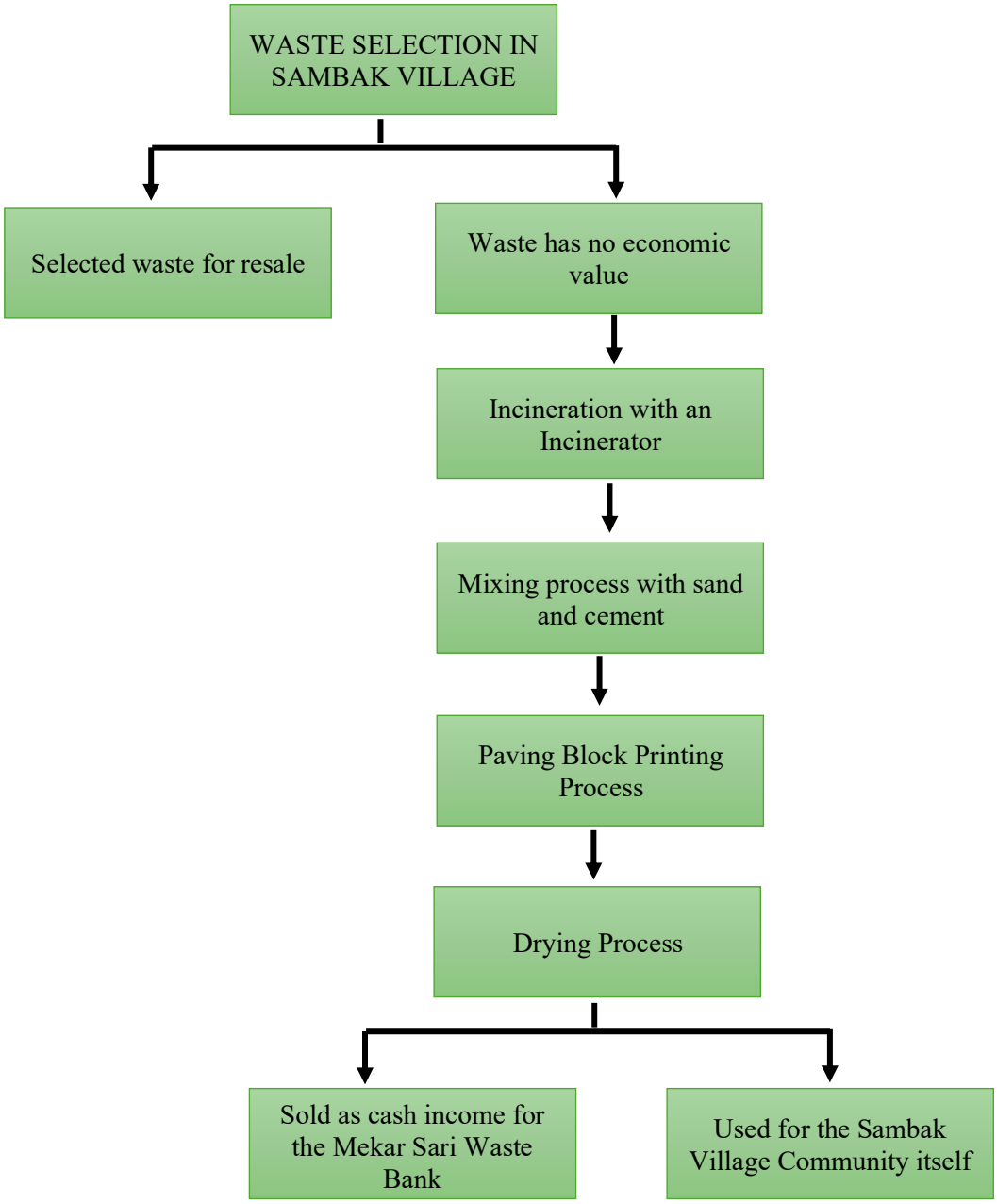

Figure 5. Waste Processing in Sambak Village

a means of fostering behavioral change toward healthier and more sustainable waste management practices. The workflow of the waste treatment process, starting from waste segregation to the production of paving blocks, is illustrated in Figure 5.

Working Principle of the Incinerator

The incinerator operates using an oil drum as the primary combustion chamber. Inside the drum, a used-oil stove serves as the ignition source, and a metal pot placed above it

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functions as the melting container for plastics. The combustion gases from burning oil and melting plastics rise upward into a pipe installed at the top of the drum. This pipe acts not only as a chimney but also as part of the filtration system. Within the pipe, a water sprayer is installed to spray water mist onto the rising gases. As the hazardous gas-laden smoke passes through the water mist, harmful components are reduced, resulting in cleaner emissions released into the atmosphere. In addition, this process helps to lower the temperature of the gases before discharge. In this way, the incinerator minimizes the impact of air pollution.

Plastic Paving Blocks Using an Incinerator

Plastic paving blocks are an environmentally friendly innovation that utilizes plastic waste as the primary material in their production process. These paving blocks are derived from the residues of plastic waste combustion using an incinerator. The material composition consists of 1.3 kg of plastic waste and 750 grams of sand, which are then molded with a press machine and casting mold to produce durable and solid paving blocks. The manufacturing process of plastic paving blocks with an incinerator involves three main stages, namely:

1. **Preparation and Melting of Materials**

   The first step is weighing 1.3 kg of plastic waste and 750 grams of sand as the mixture. Suitable examples of plastic waste include PET bottles, plastic bags, or food containers, while multilayer plastics are not recommended. Subsequently, 1.3 kg of plastic pieces are melted on a furnace or stove fueled by used oil.

Figure 6. Waste Sorting

Figure 7. Molding Tool

2. **Mixing and Molding**

   Once the plastic has completely melted, gradually add 750 grams of dry sand into the molten plastic. Stir the mixture until it is evenly blended. The sand functions as a filler,

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increasing the weight and enhancing the strength of the paving block. It is essential to

Figure 8. Waste Incineration Process

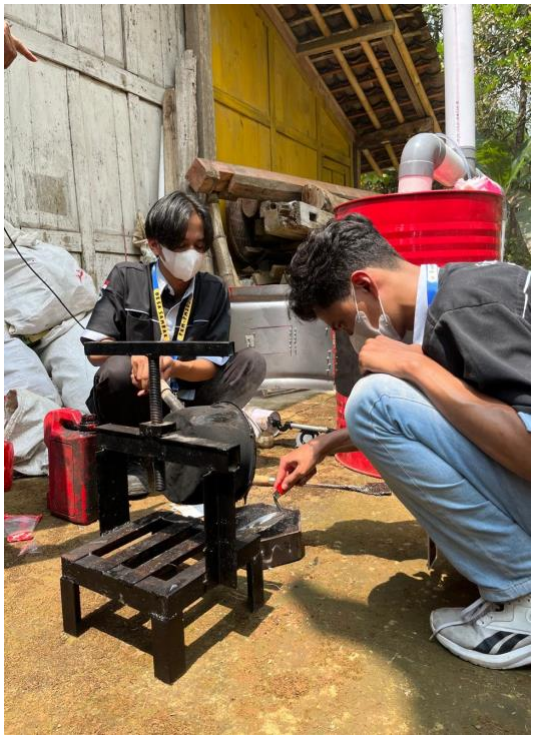

Figure 9. Process of pouring a mixture of plastic waste, cement and sand into the mold

ensure that all sand particles are thoroughly mixed with the plastic. The hot mixture is then poured into the prepared paving block mold. The mixture is compacted using a press machine to eliminate air voids that could otherwise reduce the mechanical strength of the paving block.

3. Cooling and Demolding Process

The pressed paving block is immersed in a container filled with water. After being soaked for 15 minutes, the paving block is removed from the mold. It is then placed back into the

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water container until it is completely cooled.

Figure 10. Results

Figure 11. Participant Participation in the Demonstration Process

Program Achievements in the Sambak Village Community

The incinerator has successfully provided a solution for plastic waste combustion with minimal smoke emissions. Properly processed combustion residues help reduce environmental pollution in Sambak Hamlet. The residues from plastic waste combustion using the incinerator have been effectively converted into plastic paving blocks, which can be utilized by the local community. Furthermore, the total amount of waste processed during the program has reached 37.5 kg to date and is expected to continue increasing over time.

Impact of the Program on the Sambak Village Community

The implementation of the program had a noticeable impact on raising the awareness of Sambak Village residents regarding more environmentally friendly household waste management. Previously, most residents practiced open burning of waste; however, following the program, they began to understand the dangers of such practices and shifted toward using simple incinerators. From a social perspective, the community gained new skills in operating and maintaining the equipment, thereby reducing dependence on external parties. From an economic perspective, the application of incinerators presents potential business opportunities through the production of paving blocks. Overall, the program has provided sustainable benefits, not only in terms of environmental improvement but also in enhancing the social and economic well-being of the local community.

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CONCLUSION AND RECOMMENDATION

Waste management in Sambak Village, which previously posed environmental challenges, is now being addressed through the establishment of a waste bank and the utilization of an incinerator to process plastic waste into paving blocks. The socialization and demonstration programs successfully raised community awareness of the importance of waste segregation and environmentally friendly processing methods. The community not only acquired technical knowledge on operating the incinerator and producing paving blocks but also demonstrated enthusiasm and active participation throughout the activities. The impact of this initiative is evident in the behavioral shift of residents, who formerly practiced open burning of waste and are now transitioning toward more sustainable waste management methods. Furthermore, the program provides dual benefits: reducing environmental pollution while creating new economic opportunities through the production of plastic paving blocks, thereby contributing to the development of a cleaner, healthier, and more self-reliant village.

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REFERENCES

Darmastuti, S., Cahyani, I. P., Afrimadona, A., & Ali, S. (2021). Pendekatan Circular Economy Dalam Pengelolaan Sampah Plastik di Karang Taruna Desa Baros, Kecamatan Baros, Kabupaten Serang. *Indonesian Journal of Society Engagement*, *1*(2), 1–18. https://doi.org/10.33753/ijse.v1i2.13

Dinas Lingkungan Hidup. (2016). *Peraturan Daerah (Perda) Kabupaten Magelang Nomor 4 Tahun 2016 Tentang Perlindungan Dan Pengelolaan Lingkungan Hidup*.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, *127*, 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005

Kristianto, A. H., & Nadapdap, J. P. (2021). Dinamika Sistem Ekonomi Sirkular Berbasis

Panjawa, J.L., Saleh, A.R., Hutajulu, D.M., Mukharohmah, M.S., Kurnia, Y.N., & Maharani, K.P. (2025). Innovation of Sambak Village Waste Bank: Community Empowerment through Circular Economy and Paving Block Production Using Incinerator Technology. *Jurnal Pemberdayaan Masyarakat Madani* (JPMM). 1-15.

ISSN 2580-4332 (online)
DOI: https://doi.org/10.21009/JPMM.010.1.1

Masyarakat Metode Causal Loop Diagram Kota Bengkayang. *Sebatik*, *25*(1), 59–67. https://doi.org/10.46984/sebatik.v25i1.1279

Lasmana, A., Junaidi, Kurniawan, Eddy, & Nawawi, H. H. (2021). *Rancang Bangun Alat Pembakar Sampah (Incinerator) Dengan Burner Oli Bekas (1)* (Vol. 2, Issue 1).

Muslimah, N. I. (2024). Mengenal Lebih Dekat: Implementasi SDG 12. *Https://Sdgscenter.Unair.Ac.Id/Mengenal-Lebih-Dekat-Implementasi-Sdg-12/*.

Panjawa, J. L., Ratnasari, E. D., Hutajulu, D. M., Samsudin, M., Lestari, P., Ernawati, D., & Purna, F. P. (2024). Investigating the Key Drivers of Career Selection in the Creative Economy Sector. *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi Dan Pembangunan*, 315–338. https://doi.org/10.23917/jep.v25i2.24066

Peraturan Presiden (Perpres) Nomor 97 Tahun 2017 Tentang Kebijakan Dan Strategi Nasional Pengelolaan Sampah Rumah Tangga Dan Sampah Sejenis Sampah Rumah Tangga (2017).

Pratama, D., Hasanah, R., Citra Dewi, Y., Muliastri, D., Eka Septiyani Arifin, D., Rizki Zuhri, M., Ayu Milanti, A., Widarti, S., Teknik Elektro, J., Negeri Bandung, P., Teknik Mesin, J., & Teknik Konversi Energi, J. (2025). Penerapan Insinerator Sampah Sederhana dalam Mengatasi Masalah Penumpukan Sampah di Desa Sariwangi Implementation of a Simple Waste Incinerator to Address Waste Accumulation in Sariwangi Village. *Jurnal Pengabdian Kepada Masyarakat Terapan*, *1*. https://doi.org/10.59061/abdimasterapan.v3i1.998

Rizkillah, A. A., & Indrawan, D. (2024). *Sosialisasi Dan Pembuatan Alat Pembakaran Sampah Minim Asap Menggunakan Drum Oli Bekas Di Desa Purwodadi Kec. Sidayu Kab. Gresik*.

Sari, N. M. (2024). Mengunjungi Desa Sambak Magelang, Peraih Predikat Proklim hingga Jadi Desa BRIlian. *Https://Www.Merdeka.Com/Jateng/Mengunjungi-Desa-Sambak-Magelang-Peraih-Predikat-Proklim-Hingga-Jadi-Desa-Brilian-100601-Mvk.Html?Page=4*.

Selomo, M., Sampah, B., Salah, S., Solusi, S., Sampah, P., Makassar, K., Bintara Birawida, A., Mallongi, A., Bagian, M., Lingkungan, K., Kesehatan, F., & Unhas, M. (n.d.). *The Waste Bank is One of Good Solusion for Handling Waste in Makassar City*.

Sucipto, C. D. (2012). *Teknologi Pengolahan Daur Ulang Sampah*. Gosyen Publishing.

Wulandari, D., Hadi Utomo, S., & Narmaditya, B. S. (2017). International Journal of Energy Economics and Policy Waste Bank: Waste Management Model in Improving Local Economy. *International Journal of Energy Economics and Policy* |, *7*(3), 36–41.

Panjawa, J.L., Saleh, A.R., Hutajulu, D.M., Mukharohmah, M.S., Kurnia, Y.N., & Maharani, K.P. (2025). Innovation of Sambak Village Waste Bank: Community Empowerment through Circular Economy and Paving Block Production Using Incinerator Technology. *Jurnal Pemberdayaan Masyarakat Madani* (JPMM). 1-15.

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