MOVE: Journal of Community Service and Engagement
Vol. 5, No.3, January 2026
Page : 135 - 143
DOI : 10.54408/move.v5i3.583
E-ISSN: 2808-2990
P-ISSN: 2828-4941

Household Waste Management with The Utilization of Incinerator Technology

Didik Aribowo[1*], Endi Permata[1], Arum Wahyuni Purbohastuti[2]

[1*] Vocational Education in Electrical Engineering, Sultan Ageng Tirtayasa University
[2] D3 Marketing, Sultan Ageng Tirtayasa University

D_aribowo@untirta.ac.id[1*)] (corresponding author)

Abstrak

Abstrak: Masalah sampah rumah tangga di wilayah Serang, khususnya di Desa Priyayi, telah mencapai tingkat yang mengkhawatirkan dan berdampak pada pencemaran sungai. Pengabdian masyarakat ini bertujuan untuk mengimplementasikan tata kelola sampah berbasis pemilahan dan pemanfaatan teknologi incinerator ramah lingkungan sebagai solusi penanganan sampah residu. Metode yang digunakan meliputi sosialisasi pemilahan sampah menjadi empat kategori (organik, anorganik, B3, dan residu) serta demonstrasi penggunaan unit incinerator skala rumah tangga dengan sistem filtrasi asap. Hasil kegiatan menunjukkan bahwa integrasi antara Bank Sampah dan teknologi incinerator mampu mereduksi volume sampah residu hingga 90% di tingkat sumber. Selain itu, pemanfaatan maggot BSF berhasil mengurai 77 ton sampah organik sejak 2019. Kesimpulannya, kombinasi edukasi pemilahan dan inovasi teknologi tepat guna efektif mewujudkan lingkungan yang bersih serta mengurangi ketergantungan pada TPA.

Kata kunci: *Bank Sampah, Incinerator, Pemilahan Sampah, Residu, Tata Kelola Sampah.*

Abstract

The problem of household waste in the Serang region, particularly in Priyayi Village, has reached alarming levels and has impacted river pollution. This community service project aims to implement sorting-based waste management and utilize environmentally friendly incinerator technology as a solution for handling residual waste. The methods used included socialization of waste sorting into four categories (organic, inorganic, hazardous and toxic, and residue) and a demonstration of the use of a household-scale incinerator unit with a smoke filtration system. The results of the activity showed that the integration of the Waste Bank and incinerator technology can reduce the volume of residual waste by up to 90% at the source level. Furthermore, the use of BSF maggots has successfully decomposed 77 tons of organic waste since 2019. In conclusion, the combination of sorting education and appropriate technological innovation is effective in creating a clean environment and reducing dependence on landfills.

Keywords: *Waste Bank, Incinerator, Waste Sorting, Residue, Waste Management.*

Introduction

The current waste problem has reached an alarming point because of its impact which directly damages the environmental ecosystem. Based on data from the Ministry of Environment and Forestry (KLHK, 2025), total national waste generation has exceeded 20 million tons per year, with the largest contribution coming from household waste. At the national level, the government is facing enormous pressure to take immediate emergency action. However, a social dilemma has emerged: the public wants quick solutions but is reluctant to accept the operational risks of waste processing facilities near them. The limited capacity of Final Disposal Sites (TPA) and the difficulty of finding new land make this issue a 'time bomb' that threatens environmental stability in the near future (Mochamad Syamsiro et al., 2024). "The waste problem seems never-ending because its impact has severely disrupted our environment. Currently, the public is urging the government to immediately address this waste emergency. However, a dilemma arises: residents want waste managed quickly, but they don't want to be directly impacted by the processing process.

So far, the focus of attention on waste management has tended to be on urban areas, even though rural areas face far more complex and risky challenges. In many villages in Indonesia, limited infrastructure and the absence of an integrated processing system force people to engage in dangerous conventional practices, such as open burning of waste or dumping it into water bodies (Edtri et al., 2025). This unorganized management pattern not only reduces the quality of sanitation, but also triggers greenhouse gas emissions and smoke pollution which harms the health of residents (Gucella et al., 2025). Therefore, a paradigm shift in governance is needed from open dumping to independent processing at the local level.

The reality of weak waste management is clearly visible in Priyayi Village, Kasemen District, Serang City. Despite being within the city's jurisdiction, the reach of waste collection services has not yet reached all levels of residents, so the majority of residents still manage domestic waste by burning yards or throwing garbage on empty land. This situation is exacerbated by the lack of literacy regarding environmentally friendly waste processing technology. Without an appropriate governance system, Priyayi Village is at risk of experiencing a significant decline in environmental quality due to the accumulation of household waste that is not managed sustainably.

Incinerator Innovation as a Solution for Independent Governance Responding to the need for an applicable and space-saving governance system, the application of simple incinerator technology is a very relevant solution for rural communities. As the core of this innovation in household waste management, incinerators are designed to significantly reduce waste volume through a closed combustion process. This technology overcomes the drawbacks of open combustion by minimizing smoke and hazardous exhaust emissions (Gucella et al., 2025). With the implementation of an incinerator that is easy to understand and manage independently, the people of Priyayi Village now have an appropriate technological alternative to create a clean and healthy environment without relying entirely on the increasingly limited capacity of the landfill.

Implementation Method

This mentoring activity aims to encourage residents to become entrepreneurs in Kilasah Village using a participatory approach, in accordance with the participation-based community empowerment model (Sugiyono, 2021). The methods used include:

Table 1. Implementation Method to be used

No.	Target	Implementation Methodology
1.	Identifying Village Potential and Problems	Delivery of material by resource persons from Universitas Sultan Ageng Tirtayasa
2.	Socialization and outreach on household waste management	counseling and outreach on a comprehensive understanding of the concept and practice of household waste management and the use of incinerator technology in the context of rural and community-based environments.
3.	Training and Mentoring	The community is provided with information about the types and characteristics of household waste, principles of waste management, the role of households, waste sorting systems, management of organic and inorganic waste, the role of waste banks, and the use of incinerator technology.
4.	Monitoring and Evaluation	Monitoring is carried out to monitor the development of integrated and applicable household waste management, while evaluation is carried out to determine the success and obstacles of the program.

Source: KKMReguler, 2026

Result and Discussion

Through training and mentoring activities on the implementation of household-scale incinerator technology in Priyayi Village, Kasemen District, residents began to understand the importance of managing residual waste that can no longer be recycled or composted. These results are in line with research by Gucella et al., 2025, where this technology is able to overcome the weaknesses of open burning by minimizing smoke emissions and hazardous exhaust gases. The training and mentoring materials are shown in Table 2.

Table 2. Topic Discussions

No.	Target	Implementation Methodology
1.	Building Mentality and Motivation for Household Waste Management	• Changing the public's mindset regarding household waste management. • Building confidence and consistency through the use of incinerator technology in rural and community-based settings.
2.	Implementation of household-scale incinerator technology in handling residual waste that can no longer be recycled	• This technology is designed to destroy waste through a controlled combustion process at high temperatures. • The proposed incinerator features a simple filtration system to minimize black smoke emissions for environmentally friendly, densely populated residential areas.
3.	Household Waste Management Flow Practice	• The waste management flow is designed systematically from the source (household) to the final processing stage.

4.	Household Waste Sorting System	• This flow emphasizes the separation of materials based on their characteristics so that they can be processed optimally. • Organic: Food scraps and leaves are processed into compost/animal feed (Maggot Saung). • norganic: Plastic bottles, paper, and metal are directed to the Waste Bank. • B3: Used batteries and lamps are separated separately. • Residue: Leftover waste is then fed into the incinerator.

The first presentation, on the topic of "Changing Community Mindsets Regarding Household Waste Management," aimed to encourage the Priyayi Village community to build trust and consistency through the use of incinerator technology in rural and community-based settings.

This material seeks to involve the community by touching on the psychological aspects and real experiences of Priyayi Village residents, not just theory. This situation is exacerbated by the lack of literacy regarding environmentally friendly waste processing technology. Without an appropriate governance system, Priyayi Village is at risk of experiencing a significant decline in environmental quality due to the accumulation of household waste that is not managed sustainably. Several points were emphasized in this training, namely that household waste management does not require large capital; the important thing is to start early, and small businesses in the village can contribute to improving environmental quality. The presentation of this material can be seen in Figure 1.

Figure 1. Presentation Changing Community Mindsets Regarding Household Waste Management

After the presentation on Changing the Community's Mindset Regarding Household Waste Management, the presentation continued with material on the Implementation of household-scale incinerator technology in Priyayi Village, Kasemen District. The material presented focused on handling residual waste that can no longer be recycled or composted. The existence of this incinerator technology is designed to destroy waste through a controlled combustion process at high temperatures. Unlike open burning, the proposed incinerator has a simple filtration system to minimize black smoke emissions, making it more environmentally friendly for densely populated

residential areas. The process of presenting incinerator technology material and the physical form and working mechanism of this technology can be seen in Figure 2.

Figure 2. Household Scale Incinerator Unit with Smoke Filtration System.

The third topic is about waste management at the household level. The aim of this topic is to strengthen the understanding of the residents of Priyayi village and to be the spearhead in minimizing the waste load at the Final Disposal Site (TPA). Based on the implementation, the waste management process is systematically designed, starting from the source (household) to the final processing stage. This flow emphasizes the separation of materials based on their characteristics so that they can be processed optimally. Visually, these management stages are presented in Figure 3.

Figure 3. Household Waste Management Flow Scheme

As seen in the flow chart above, the process begins with residents sorting their waste into three main streams:

1. Organic Stream: Leftover food and leaf waste is directed to compost or animal feed (such as the BSF maggot cultivation method).
2. Inorganic Pathway: Economically valuable waste such as plastic bottles, paper, and metal is collected and deposited at the Waste Bank.
3. Residue Path: Residual waste that cannot be reprocessed is collected for destruction using environmentally friendly incinerator technology.

According to Triajie et al. (2026), the implementation of an integrated governance flow between upstream sorting and downstream technology utilization is very effective in reducing the impact of air pollution due to open burning of waste. The success of this process is highly dependent on household discipline in maintaining the purity of waste sorting from the kitchen, thus facilitating the subsequent processing process (Putri et al., 2024).

The fourth topic focused on the Household Waste Sorting System. The sorting system is the main foundation before incinerator technology is used. Based on the outreach materials, the community is directed to separate waste into four main categories:

- Organic: Food scraps and leaves are processed into compost/animal feed (Saung Maggot).
- Inorganic: Plastic bottles, paper, and metal are directed to the Waste Bank.
- Hazardous and Toxic (B3) waste: Used batteries and lamps are separated separately.
- Residue: Remaining waste is then fed into the incinerator.

This sorting system aims to ensure that only non-organic and non-B3 waste enters the incineration process, ensuring that the resulting emissions do not contain hazardous toxic substances (Putri et al., 2024).

This section also discusses the Waste Bank. The Waste Bank plays a strategic role in creating a circular economy for the residents of Priyayi Village. This governance process integrates all management elements from the household to the processing unit. Collaboration with the PPLG Waste Bank has shown significant results, with 77 tons of organic waste being successfully decomposed using Black Soldier Fly (BSF) maggots from 2019 to 2025. Figure 4 shows community leaders in Kasemen sub-district who are focused on developing the Waste Bank. After thepresentations, the next session, the certificate presentation to the speakers, is shown in Figure 5.

Figure 4. Kasemen community leaders regarding the management of the Waste Bank

Figure 5. Awarding Certificates to speakers

The event continued with a reflection session and discussion with participants following the speaker's presentation. At this point, participants demonstrated enthusiasm and began to understand that without an effective household waste management system, Priyayi Village is at risk of experiencing significant environmental degradation due to the accumulation of unsustainably managed household waste. The material presented provided new insights for the community, particularly regarding simple yet effective ways to develop a simple and environmentally friendly household waste management system. Participants also shared their experiences, challenges, and hopes in implementing household waste management through interactive discussions. This made the event not only one-way, but also a place for sharing and learning together.

Overall, the speaker's presentation can increase individuals' desire and confidence to start or develop a more focused and sustainable household waste management system. Figure 6. Group photo after the event. The event concluded with a warm and friendly atmosphere after the group photo session that marked the end of the program. This group photo demonstrates the collaboration between the speakers, the committee, and the Priyayi Village community, who actively participated in the program. This closing ceremony demonstrated a shared commitment to applying the knowledge and skills gained to develop a household waste management system in the village. Therefore, it is hoped that a sustainable relationship will be established between all parties involved after the program concludes.

Figure 6. Group photo after the activity

Conclusion

Based on the results of the implementation of community service regarding household waste management in Priyayi Village, it can be concluded that the use of a household-scale incinerator unit with a filtration system has proven effective as a solution for quickly destroying residual waste and is able to minimize smoke emissions that disturb the residential environment.

The household waste sorting system as a form of waste sorting education is the key to successful management, where organic waste can be diverted into animal feed through BSF maggot cultivation, and inorganic waste has economic value through the role of the Waste Bank.

Furthermore, the synergy between appropriate technology and active community participation through the Waste Bank has succeeded in reducing the burden of waste dumped into rivers (such as the Cibanten River) and reducing the volume of waste sent to the landfill significantly.

Acknowledments

The author would like to thank the LPPM of Sultan Ageng Tirtayasa University for providing the opportunity to serve as a Field Supervisor, the KKM students of group 42 in Priyayi Village for facilitating the implementation of the mentoring activities, the Priyayi Village government, the Priyayi Village community, and all those who have helped and supported this activity. Furthermore, the academic institutions that have assisted in mentoring and scientific development are also appreciated.

References

Badan Perencanaan Pembangunan Nasional. (2022). Pembangunan ekonomi desa dan kawasan perdesaan.

Edtri, D. P., Nurfarinah, M. A., Utomo, E. C., Atmaja, M. D. T., Pari, H. A., Azaliyah, S. H., Safitri, I., Ningtyas, N. H., & Hafizah, I. (2025). BASMI BASMI: Inovasi Pengelolaan Sampah Berbasis Insinerator Sederhana dan Ember Maggot untuk Desa Babakan Sadeng, Bogor. Jurnal Pusat Inovasi Masyarakat, 7(2), 233–240. https://doi.org/10.29244/jpim.7.2.233-240.

Fadillah, N. A., Muslim, M. I., Rosadi, A. H., & Ramadhani, Y. K. I. (2025). Pengelolaan Sampah Berbasis Teknologi Tepat Guna: Inovasi Incinerator di Desa Tajau Landung, Kalimantan Selatan. Jurnal Inovasi Pengabdian Dan Pemberdayaan Masyarakat, 5(1), 91–100. https://doi.org/10.54082/jippm.783

Gucella, A. Q., Nurrahmat, H., Rohmahardewi, A. M., Tusyurur, W., Aliya, S. R., Prayogi, I., Yayang, S., Jidan, M., Fadillah, N. N., Najma, N., Agustina, R., Firmansah, N. N. A. R., Fathin, H. A., Fadila, F. M., & Wahyuni, S. (2025). Inovasi Pengelolaan Sampah Ramah Lingkungan Melalui Teknologi Incinerator di Desa Kedokan Bunder: Program Pengabdian Masyarakat. Jurnal Pengabdian Masyarakat Bhinneka, 4(1), 727–733. https://doi.org/10.58266/jpmb.v4i1.513

KLHK. (2025). Portal Sistem Informasi Pengelolaan Sampah Nasional (SIPSN). https://portal-sipsn.kemenlh.go.id/

Putri, euis A. P., suryadi, N. F. N., cameel, ,Muhammad Thorieq Al, & fitri, , Susanti Ainul. (2024). Optimalisasi Pengelolaan Sampah Dengan Alat Pembakaran Minim Asap Di RW 007 Desa Waluya. 5(2). https://proceedings.uinsgd.ac.id/index.php/Proceedings

Soleha, erin, setyawan, prada, elmawati, nurazizah, nalisa fazrin, & farhan, muhamad farhan. (2025). Pembentukan Kelompok Masyarakat dan Inovasi Alat

Pembakaran Sampah Minim Asap di Desa Karangbahagia. Jurnal Pengabdian Kepada Masyarakat, 1, 1009–1015.

Sugiyono. (2021). Metode penelitian kuantitatif, kualitatif, dan R&D. Alfabeta.

Syamsiro, Mochamad, Setyono, P., Hariyanti, K., & Sutanto, G. (2024). Kajian Teknologi Alternatif Pengolahan Sampah Padat Perkotaan menjadi Energi Terbarukan Ramah Lingkungan. J-Proteksion: Jurnal Kajian Ilmiah Dan Teknologi Teknik Mesin, 9(1), 19–30. https://doi.org/10.32528/jp.v9i1.1757

Syamsiro, Mochammad, widodo, T., bashir, nur azmi ainul, slamet, & romadhon, M. ajhi. (2024). PENERAPAN TEKNOLOGI INSINERATOR RAMAH LINGKUNGAN UNTUK PEMUSNAHAN SAMPAH DI TPS3R BISMA KABUPATEN SLEMAN. Jurnal Pengabdian Kepada Masyarakat, 4, 869–882.

Triajie, H., Chilmy, K., Az Zahra, S., Mandalahi, L., Raya Telang, J., Kamal, K., Bangkalan, K., & Timur, J. (2026). PEMBUATATAN INCENERATOR DALAM MENGURANGI DAMPAK SAMPAH PLASTIK DAN ASAP PEMBAKARAN DI TPS3R DESA BULUHARJO. JMA), 4(1), 3031–5220. https://doi.org/10.62281