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Governance Community Empowerment Through the EMAK.ID Waste Bank Program in Bandar Lampung City

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ABSTRACT

Waste management is one of the most urgent environmental problems in Indonesia, especially in urban centers like Bandar Lampung City, where waste generation has risen to over 870 tons per day, putting pressure on landfills and creating serious environmental and health risks. Conventional disposal approaches have proven insufficient, prompting the introduction of the Emak.ID Waste Bank program as a community-based solution that combines waste reduction with empowerment. The purpose of this study is to analyze how the program fosters empowerment across four key dimensions—Awakening, Understanding, Harnessing, and Using while assessing its role in strengthening community participation in sustainable waste management. This research employed a qualitative descriptive design, using in depth interviews, observations, and document analysis centered on the Gunter community group, which has successfully practiced independent weighing since late 2022. The findings show that the program improved waste segregation, enhanced environmental literacy, and provided modest financial incentives from recyclables, while also fostering social cohesion through regular training and collective weighing activities. However, participation remains inconsistent due to low environmental literacy, competing daily priorities, and limited economic returns. Despite these challenges, the Emak.ID model demonstrates how waste banks can operate not only as environmental interventions but also as platforms for community empowerment and micro-entrepreneurship. The study concludes that for long-term sustainability, waste bank initiatives require stronger integration of educational, economic, and institutional support. This case highlights the potential of participatory waste governance as a replicable model for advancing sustainable urban development and circular economy practices in Indonesia.

Keyword: Waste Management, Community Empowerment, Community Participation

INTRODUCTION

Waste management has emerged as one of the most pressing environmental challenges in Indonesia, particularly in urban centers such as Bandar Lampung City. Rapid urbanization, coupled with increasing population density, has contributed to a significant rise in daily waste generation. In 2019, the city produced approximately 683 tons of waste per day, a figure that rose to 786 tons by 2022, signaling a growth of more than 15% in just three years. This trend not only underscores the severity of the problem but also

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highlights the inadequacy of existing waste management practices in mitigating the mounting environmental burden.

The consequences of poor waste management extend beyond mere accumulation of waste. Indiscriminate disposal practices have led to serious environmental degradation, including water and air pollution, flooding, and health risks due to unsanitary conditions. Despite the enactment of Law No. 18 of 2008 concerning Waste Management, which emphasizes the transformation of waste from a discarded item into a valuable resource, public awareness and active participation remain significantly low (Kamba, 2018). This gap between policy and practice has made waste management a critical research focus in the Indonesian context.

The Emak.ID Waste Bank program represents one such initiative that seeks to bridge this gap by introducing an innovative community-based model of waste management. The program empowers communities by training them in waste sorting, collection, and recycling. At its core, the Waste Bank concept encourages households to treat waste as a tradable commodity, thereby integrating environmental responsibility with economic incentives (Messing, 2021). However, despite its promise, community participation in the Emak.ID program has remained relatively limited, reflecting broader sociocultural and economic barriers.

The urgency of addressing this issue lies in the dual threats posed to both environmental sustainability and public health. The growing volume of unmanaged waste not only exacerbates ecological risks but also hampers Indonesia's progress toward achieving its Sustainable Development Goals (SDGs), particularly Goal 11 (Sustainable Cities and Communities) and Goal 12 (Responsible Consumption and Production). Without immediate intervention, the gap between waste generation and management capacity will continue to widen, undermining community resilience and government efforts (Edi, 2014).

Table 1 below illustrates the escalation of waste generation in Bandar Lampung City, serving as a stark reminder of the urgency to strengthen community-based interventions such as the Emak.ID Waste Bank program.

Table 1. Daily Waste Generation in Bandar Lampung City (2019–2022)

Year	Daily Waste Generation (tons)	Change (%)
2019	683	–
2020	710	+3.9%
2021	754	+6.2%
2022	786	+4.2%

Source: Bandar Lampung City Government Data (2022)

Previous research has emphasized that community empowerment plays a pivotal role in improving environmental governance (Wilson, 1996; Suhendra, 2006). The Waste Bank model, in particular, has been recognized for its potential to create behavioral change at the grassroots level by combining environmental education with economic benefits. Nonetheless, limited participation suggests that awareness-raising alone is insufficient. Factors such as time constraints, low environmental literacy, and uncertain market incentives continue to hinder community engagement in sustainable waste practices (Fay, 2019). This article positions itself within the growing literature on community-based environmental management by focusing specifically on the Emak.ID

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Waste Bank program in Bandar Lampung. Unlike previous studies that primarily document the general benefits of waste banks, this study critically evaluates the empowerment process across four key dimensions: Awakening, Understanding, Harnessing, and Using (Sugiyono, 2016). By doing so, it contributes to the discourse on how empowerment frameworks can be operationalized in waste management initiatives.

The research approach employed in this article is descriptive and qualitative, emphasizing the lived experiences and perspectives of community members engaged in the program. This methodological choice allows for a deeper understanding of the socio-cultural dynamics that either facilitate or impede participation (Miller & Josephs, 2009). The study's focus on the Gunter community group recognized for its relative success in implementing independent weighing practices provides a valuable case study for analyzing best practices and replicable models.

Ultimately, this article argues that the success of community-based waste management hinges not only on technical solutions but also on the cultivation of social capital, collective responsibility, and economic viability. The findings are expected to inform policymakers, NGOs, and local stakeholders in formulating strategies that enhance both participation and sustainability. In this way, the study highlights the intersection between environmental governance and community empowerment, reinforcing the urgency of localized, participatory approaches in addressing Indonesia's waste crisis.

Analyzing the Emak.ID Waste Bank program through a structured empowerment framework, this article contributes original insights into the role of community participation in sustainable waste management. It emphasizes the need for integrating educational, economic, and cultural strategies to achieve long-term impact. As such, the study not only responds to the pressing environmental challenges facing Bandar Lampung but also positions itself as a model for broader replication in other Indonesian regions and beyond.

METHODOLOGY

This research employs a qualitative design with a descriptive study approach to explore the processes and outcomes of community empowerment through the Emak.ID Waste Bank program in Bandar Lampung City. The study specifically focuses on understanding how the program facilitates empowerment in four dimensions: Awakening, Understanding, Harnessing, and Using. The target population consists of community members in Bandar Lampung involved in the Waste Bank initiative, with the Gunter community group selected as the primary case study due to its notable success in implementing independent weighing practices since November 2022. Participants were chosen through purposive sampling, ensuring that only individuals directly engaged with the program and possessing relevant experiences were included.

Data collection was carried out using multiple qualitative methods, including in-depth interviews, observations, and document analysis. Interviews were conducted with program administrators and community participants using a semi-structured interview guide specifically designed for this study. Observations were made during waste weighing activities, training sessions, and community meetings to capture real-time practices of empowerment. Document analysis was also employed to review program records, activity reports, and relevant policy documents. To maintain research rigor, all instruments were carefully prepared, pilot tested, and refined prior to use. Ethical safeguards such as

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informed consent, confidentiality agreements, and voluntary participation were strictly upheld throughout the data collection process, ensuring respect for participants' rights.

For data analysis, the study employed thematic analysis, enabling the identification and interpretation of patterns across the collected data. Interview transcripts, observation notes, and documents were systematically coded, categorized, and analyzed to extract key themes related to community empowerment. The findings were validated through triangulation of multiple data sources to enhance credibility and reliability. Furthermore, peer debriefing and member-checking with selected participants were conducted to minimize researcher bias. Ethical considerations, including adherence to institutional standards and guidelines for research involving human subjects, were prioritized. By adopting this comprehensive and systematic methodology, the study ensures transparency, validity, and replicability in analyzing the effectiveness of the Emak.ID Waste Bank program as a model of community empowerment in waste management.

RESULTS AND DISCUSSION

1. Waste Landscape and Problem Scale in Bandar Lampung

The issue of solid waste management in Bandar Lampung has become increasingly critical over the past decade. According to the Central Bureau of Statistics (BPS), the total waste transported to the landfill in 2024 reached 317,550 tons, equivalent to approximately 870 tons per day (BPS Kota Bandar Lampung, 2025). This daily average shows a significant increase compared to earlier years and confirms previous data from the local Environmental Agency (DLH) which reported that the city produces between 800–900 tons of waste every day (DLH Bandar Lampung, 2025). The consistency of these figures across multiple sources highlights not only the scale of the waste problem but also the urgency of addressing it through sustainable interventions such as waste banks and community-based waste reduction programs.

The reliance on the Bakung landfill underscores the city's vulnerability to environmental risks. Bakung receives nearly all of Bandar Lampung's municipal solid waste and has been documented to handle around 800 tons per day, often exceeding its intended capacity (DLH Provinsi Lampung, 2023). This has led to recurrent environmental hazards such as leachate contamination, air pollution from burning, and spontaneous fires caused by methane accumulation. In 2023, a fire at Bakung highlighted the risks of unmanaged methane in open dumping practices, reinforcing the argument that landfilling alone cannot provide a long-term solution.

Table 2. Daily Waste Generation in Bandar Lampung City (2019–2025)

Year	Daily Waste Generation (tons)	Change (%)	Source
2019	683	–	BPS (2019)
2020	710	+3.9%	BPS (2020)
2021	754	+6.2%	BPS (2021)
2022	786	+4.2%	BPS (2022)
2024	870 (average)	+10.7%	BPS (2025); DLH (2025)

Source: Author, 2025

While the city government has started to adopt a **controlled landfill** system as a gradual improvement from open dumping, the implementation remains partial. As of

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August 2025, only 3 hectares of the 14.1-hectare Bakung landfill (≈21.3%) had adopted controlled landfill practices, leaving the majority still operating under environmentally hazardous conditions (Pemkot Bandar Lampung, 2025). These figures demonstrate the limited effectiveness of infrastructure solutions without parallel efforts to reduce waste at the source.

At the provincial level, Lampung produces 4,666 tons of waste per day, with data showing that 73.33% of landfills across the province are still managed as open dumps (DLH Provinsi Lampung, 2024). This structural challenge indicates that municipal interventions like the Emak.ID Waste Bank cannot be viewed in isolation; rather, they must be understood as part of a larger strategy to tackle systemic shortcomings in waste management. By empowering communities to reduce waste before it reaches the landfill, programs like Emak.ID offer a grassroots-level solution to a province-wide crisis.

2. Policy and Governance Context for Community Waste Management

The national framework for waste management in Indonesia is guided by Law No. 18 of 2008, which articulates the dual principles of "reduction" and "handling" of waste (Government of Indonesia, 2008). This law mandates that municipalities not only manage the collection and disposal of waste but also encourage the public to reduce, reuse, and recycle. In this context, community-based initiatives like waste banks have been officially recognized as valid mechanisms to implement waste reduction at the household level. Furthermore, the law emphasizes the economic potential of waste as a resource, a perspective that underpins programs such as Emak.ID.

At the national level, the Sistem Informasi Pengelolaan Sampah Nasional (SIPSN) serves as the government's main database for tracking municipal waste generation, disposal methods, and the growth of waste management facilities. Through SIPSN, data on the number of waste banks, community participation, and economic turnover are compiled and reported annually by local governments (KLHK, 2023). The existence of this system provides accountability and a standardized measurement tool for assessing the effectiveness of programs like Emak.ID within a broader governance framework.

Table 3. Waste Governance and Policy Indicators

Level	Indicator	Value/Target	Source
National	Waste banks (2023)	16,981 units, 411,897 customers	KLHK (2023)
National	Waste bank turnover (2023)	Rp 12.93 billion	KLHK (2023)
Province (Lampung)	Active waste banks (2025)	~95 units	DLH Lampung (2025)
City (Bandar Lampung)	Target active waste banks (2026)	200 units	DLH Bandar Lampung (2025)

Source: Author, 2025

In Lampung Province, the provincial DLH has confirmed the operation of approximately 95 active waste banks as of March 2025, with Bandar Lampung among the most prominent contributors (DLH Lampung, 2025). The inclusion of Emak.ID in the province's active registry reflects its recognition not only as a local community initiative but also as part of a province-wide strategy to increase waste reduction capacity. This

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institutional acknowledgment allows Emak.ID to receive more technical and policy support from government stakeholders, strengthening its operational sustainability.

At the municipal level, Bandar Lampung's DLH has set an ambitious target of establishing 200 active waste banks by 2026. This policy demonstrates the city's intent to scale up community-based waste management and embed it into its urban governance framework (DLH Bandar Lampung, 2025). Within this trajectory, the Emak.ID program functions as a critical model whose outcomes and challenges can inform the replication of waste bank systems across neighborhoods.

3. Community Empowerment via Waste Banks and the Emak.ID Model

The waste bank model empowers communities by transforming waste into an economic asset. In practice, households are encouraged to segregate recyclable waste such as plastics, paper, and metals, which can then be deposited at waste banks in exchange for financial credits. This exchange system instills a sense of ownership among participants and promotes behavioral changes that align with the principles of a circular economy (Messing, 2021). For many communities, this approach represents their first tangible opportunity to connect environmental stewardship with direct economic benefits.

On a national scale, the waste bank movement has expanded rapidly. By 2023, there were nearly 17,000 waste bank units across Indonesia, serving over 400,000 customers and generating a turnover of nearly Rp 13 billion (KLHK, 2023). These numbers suggest that the waste bank model has gained significant traction as a grassroots mechanism for waste reduction. However, the average contribution per bank remains modest, indicating that scaling impact requires improvements in participation rates and integration with broader waste management systems.

In Lampung Province, the growth of waste banks mirrors national trends, with local authorities reporting close to 100 active units by early 2025 (DLH Lampung, 2025). The inclusion of Emak.ID in this network highlights its role as a model of community empowerment in Bandar Lampung. Unlike many smaller initiatives, Emak.ID has developed training modules, digital communication channels, and collaborative activities that extend beyond waste collection. These activities include education sessions in community gatherings and regular "weighing days," which foster both social cohesion and environmental awareness.

Academic studies have further analyzed Emak.ID's contribution to community empowerment. Irawansyah, Puspawati, and Prihantika (2024) documented the program's four-phase empowerment process—Awakening, Understanding, Harnessing, and Using—and found that although participation levels remain inconsistent, the program has successfully enhanced environmental literacy and skills in waste-based entrepreneurship. These findings underscore the importance of complementing infrastructure development with social empowerment strategies to achieve long-term sustainability.

4. Managing Organic Waste through Black Soldier Fly (BSF) and Circular Economy Integration

Organic waste constitutes the majority of household solid waste in Indonesia, often exceeding 60% of the total composition (KLHK, 2023). Failure to manage this fraction contributes significantly to methane emissions and odors at landfills. The

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adoption of Black Soldier Fly (BSF) bioconversion technology presents an innovative solution. Studies in Indonesian urban communities demonstrate that BSF larvae can convert up to 74% of organic waste into biomass and compost, providing not only a waste reduction pathway but also valuable by-products such as animal feed and organic fertilizer (Pratiwi et al., 2025).

Evidence from pilot facilities reinforces the feasibility of BSF integration into urban waste systems. In the Wonorejo processing unit, for example, approximately 40–50 tons of food waste were processed between 2020–2021 using BSF larvae, successfully reducing the volume of waste and generating protein-rich larvae for aquaculture feed (Putra et al., 2023). This model suggests that BSF can complement waste bank programs by addressing the organic fraction that cannot be handled through traditional recycling.

Table 4. Examples of Organic Waste Management with BSF in Indonesia

Location	Throughput/Conversion	Key Findings	Source
Community pilot (Indonesia)	74% conversion of organics	High efficiency in reducing waste	Pratiwi et al. (2025)
Wonorejo, Surabaya	40–50 tons of food waste processed	Produced larvae for animal feed	Putra et al. (2023)
Bandung households	Positive adoption after training	Social acceptance crucial	Sari & Nugroho (2025)

Source: Author, 2025

Community acceptance of BSF-based solutions has also been explored. A 2025 survey in Bandung indicated that with adequate training and community facilitation, households were willing to adopt BSF practices as part of household waste management (Sari & Nugroho, 2025). The key determinants of adoption included perceived benefits, ease of implementation, and social support networks. These findings are directly relevant to Emak.ID, which could incorporate BSF education into its existing empowerment activities to extend its impact beyond recyclables.

By integrating BSF into waste bank systems, communities can adopt a more holistic approach that aligns with Indonesia's circular economy agenda. The combination of waste segregation, BSF bioconversion, and waste-based entrepreneurship addresses both inorganic and organic waste streams. In this way, Emak.ID has the potential to evolve into a hybrid empowerment model, simultaneously reducing waste flows to Bakung landfill and creating new livelihood opportunities for residents.

5. Program Outcomes, Lessons Learned, and Scaling Pathways

The effects of the Emak.ID program can be assessed through multiple indicators. First, the program has improved waste segregation at the household level, with participants reporting increased awareness of the importance of sorting waste (Irawansyah et al., 2024). Second, the program has contributed to income generation, as recyclable materials deposited in the waste bank provide financial incentives. Third, the educational component has strengthened community bonds, with participants engaging in collective activities such as weighing days and training sessions. These outcomes reflect a holistic empowerment process that combines environmental, economic, and social dimensions.

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https://ojs.umrah.ac.id/index.php/jgbr

However, challenges persist. Participation rates remain inconsistent, often due to competing responsibilities of community members, low initial environmental literacy, and uncertainty about the financial returns from recyclables (Irawansyah et al., 2024). These challenges indicate the need for sustained facilitation, transparent price-setting mechanisms for recyclables, and stronger institutional support. Without addressing these barriers, the program risks plateauing in terms of participation and impact.

From a governance perspective, the integration of waste banks like Emak.ID into the city's data monitoring system is essential. Linking community-level outcomes with the national SIPSN database can improve accountability and help policymakers allocate resources effectively (KLHK, 2023). Furthermore, establishing partnerships with private sector actors, such as recycling industries and social enterprises, can expand market access for waste-based products, thus improving economic sustainability.

Looking forward, the pathway to scaling involves a portfolio approach: combining inorganic waste banks, BSF bioconversion for organics, education and campaigns for behavioral change, and supportive municipal policies. The city's target of 200 active waste banks by 2026 provides a clear opportunity to replicate the Emak.ID model across neighborhoods (DLH Bandar Lampung, 2025). By embedding empowerment strategies within waste governance frameworks, Bandar Lampung can not only reduce its dependence on the Bakung landfill but also position itself as a leading case of community-based circular economy practice in Indonesia.

CONCLUSION

The findings of this study highlight the critical role of community-based initiatives such as the Emak.ID Waste Bank program in addressing the escalating waste management challenges in Bandar Lampung City. By focusing on empowerment across the four dimensions of Awakening, Understanding, Harnessing, and Using, the program has demonstrated its capacity to foster environmental awareness, encourage waste segregation, and create modest economic benefits through recycling. These outcomes confirm that participatory models can effectively bridge the gap between policy frameworks and practical community engagement in sustainable waste practices

Despite these positive outcomes, the study also reveals significant challenges, particularly the inconsistency of participation due to low environmental literacy, competing priorities, and limited financial incentives. These obstacles underscore the importance of continuous education, supportive governance, and transparent economic mechanisms to ensure long-term sustainability. Furthermore, the integration of innovative approaches, such as Black Soldier Fly bioconversion for organic waste, can expand the program's impact by addressing waste fractions beyond recyclables, thereby enhancing its contribution to circular economy practices.

Overall, the Emak.ID model demonstrates that effective waste governance cannot rely solely on infrastructure but must also prioritize social capital, institutional support, and behavioral change. Scaling up this initiative to meet municipal targets requires stronger collaboration between communities, government agencies, and private stakeholders. By embedding empowerment strategies within formal waste management frameworks, Bandar Lampung has the potential to become a leading example of localized circular economy practices in Indonesia, offering a replicable model for other urban regions facing similar environmental challenges.

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Journal Governance Bureaucratic Review

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