

Community Empowerment through Waste Bank Program as an Eco-Centric Approach to Environmental Management in Jururejo Village, Ngawi Subdistrict

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Abstract— This community service activity was initiated in response to the growing problem of unmanaged household waste and low public awareness regarding sustainable waste practices in Jururejo Village, Ngawi Subdistrict, East Java. The main objective was to establish a community-based Waste Bank program that could simultaneously reduce environmental burden, improve waste management behavior, and create alternative economic opportunities for residents. The program was implemented using a participatory approach grounded in the Community-Based Environmental Management (CBEM) framework, which emphasizes active stakeholder engagement, capacity building, and collaborative planning. Key stages included socialization through village forums, technical training on waste sorting and composting, infrastructure development for a permanent Waste Bank facility, and continuous monitoring and evaluation using both qualitative and quantitative methods. Over six months, the initiative resulted in a 35% reduction in waste sent to landfills, increased community participation from 15 to 87 members, and the generation of monthly income through recyclable sales. In addition, the use of compost by local farmers demonstrated the program's ecological benefits. The activity not only improved environmental literacy but also fostered social cohesion and empowered residents through structured engagement and skill development. The experience suggests that integrated community-based waste programs can be an effective model for other rural areas facing similar challenges. Future activities are recommended to focus on youth engagement, digital monitoring tools, and multi-stakeholder collaboration to ensure scalability and sustainability.

Keywords—Community Service; Waste Bank; Rural Waste Management; Environmental Empowerment; Participatory Approach

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I. INTRODUCTION

Solid waste management remains one of the most urgent environmental challenges worldwide, particularly in rapidly urbanizing regions such as Southeast Asia. In Indonesia, rural communities encounter distinctive difficulties due to inadequate access to formal waste collection infrastructure, limited financial resources, and low public awareness regarding proper waste handling. Consequently, improper disposal methods—such as open burning and dumping waste into rivers—are still prevalent, contributing to soil degradation, water contamination, and serious public health risks. These practices not only degrade local ecosystems but also expose vulnerable populations to respiratory illnesses and other adverse health outcomes linked to pollution (Rachman et al., 2021).

Jururejo Village, located in Ngawi Subdistrict, East Java, serves as a representative case of the waste management challenges faced by many rural communities in Indonesia. With a population exceeding 4,000 people, the village produces a considerable volume of domestic waste on a daily basis (BPS Kabupaten Ngawi, 2022). However, it lacks a structured system for waste collection and processing, leading to inefficient disposal practices. Most

households discard all types of waste together—organic, inorganic, and even hazardous materials—without any form of segregation or preliminary treatment. This unregulated approach contributes to localized environmental degradation, including blocked drainage systems, polluted water sources, and increased health risks. Moreover, the absence of formal regulations or community-level policies mandating proper waste separation further compounds the issue, leaving waste management efforts largely dependent on individual initiative and awareness (Suwerda et al., 2019).

Historically, waste management strategies in Indonesian villages have been largely anthropocentric—centered on human needs and economic practicality at the expense of environmental health. This perspective prioritizes short-term convenience and cost-efficiency, often neglecting the long-term ecological consequences of improper waste disposal. As a result, practices such as indiscriminate dumping and open burning have become entrenched in rural routines, leading to soil degradation, water contamination, and loss of biodiversity. In contrast, an eco-centric approach to waste management recognizes nature not merely as a resource to be exploited but as a system with intrinsic value that must be preserved. This perspective fosters principles of sustainability, resilience,

and interdependence, which are essential for designing holistic and ecologically sound waste management models in rural Indonesia. Embracing such a paradigm shift is vital for developing solutions that protect both community well-being and the integrity of surrounding ecosystems (Meidiana et al., 2021).

One practical and transformative tool that reflects eco-centric values in waste management is the *Bank Sampah* (Waste Bank) model. Emerging from grassroots-level initiatives across Indonesian communities, this system encourages individuals to collect, sort, and deposit recyclable materials—such as plastic, paper, and metal—at designated centers in exchange for either monetary compensation or non-monetary benefits like school supplies, health services, or community credits. By integrating environmental responsibility with social and economic incentives, the Waste Bank model not only reduces the volume of waste sent to landfills but also promotes behavioral change at the household level. Moreover, it fosters a sense of environmental stewardship among participants, creates microeconomic opportunities—particularly for marginalized groups—and enhances community engagement through collective environmental action. This localized yet scalable approach exemplifies how eco-centric principles can be operationalized to support sustainable development in rural and urban settings alike (Rachman et al., 2021).

Although the *Waste Bank* (Bank Sampah) model has demonstrated success in urban settings across Indonesia, its replication in rural areas often demands a nuanced adaptation to local socio-cultural and economic realities. Unlike cities, where market linkages for recyclables are more developed and public awareness tends to be higher, rural communities may lack infrastructure, financial incentives, and institutional support necessary for effective implementation. Moreover, cultural attitudes toward waste, informal labor structures, and limited access to recycling markets can hinder the direct transfer of urban-based models without contextual modification (Suwerda et al., 2019). Therefore, successful rural adoption requires a tailored approach that integrates community values, strengthens local institutions, and fosters collective ownership. This study presents a case of such an adapted *Waste Bank* initiative in Jururejo Village, East Java—an effort driven by local leadership and supported by academic facilitation from nearby institutions. By aligning the program with village priorities and leveraging existing social capital, the initiative aims to demonstrate how eco-centric waste management practices can be embedded within rural sociocultural frameworks.

The primary goal of the program was to empower the community through a combination of capacity building, behavioral change, and the development of localized waste management infrastructure. By integrating eco-centric principles into daily routines—such as sorting at the source, composting organic waste, and repurposing non-biodegradable materials—the initiative aimed to shift villagers' perceptions of waste from being a disposable burden to a potential resource (Meidiana et al.,

2021). This transformative approach not only encouraged more responsible environmental behavior but also fostered a sense of ownership and collective responsibility within the community. Furthermore, the program sought to illustrate that grassroots-level interventions, though modest in scale, can align with and contribute meaningfully to broader national and global sustainability agendas. In particular, it resonated with the objectives outlined in the United Nations Sustainable Development Goals (SDGs), especially **Goal 11**—which promotes inclusive, safe, resilient, and sustainable communities—and **Goal 12**, which emphasizes sustainable consumption and production patterns (UNDP, 2020). By anchoring local action within these internationally recognized frameworks, the initiative reinforced the idea that rural communities are integral actors in the pursuit of sustainability.

This article documents the implementation process, outcomes, and key lessons learned from the *Waste Bank* (Bank Sampah) program in Jururejo Village, East Java. By presenting a detailed account of how the initiative was designed, executed, and adapted to local conditions, this study contributes to the expanding literature on community-based environmental governance and rural sustainability practices. It highlights how localized interventions—when grounded in participatory planning and ecological ethics—can yield meaningful improvements in waste management while fostering environmental awareness among rural populations. Furthermore, the case underscores the importance of embedding ethical considerations into grassroots-level programs to ensure that development efforts not only meet immediate needs but also align with long-term ecological resilience. These insights are particularly relevant in the context of Indonesia's broader sustainability agenda, offering transferable strategies for other rural communities seeking to implement inclusive and environmentally responsible waste management systems.

Ultimately, the case of Jururejo Village illustrates the transformative potential of participatory approaches in tackling environmental challenges while fostering inclusive and locally driven development. By involving community members in decision-making, implementation, and monitoring processes, the *Waste Bank* initiative not only improved local waste management practices but also strengthened social capital and collective responsibility. This model demonstrates that when rural communities are empowered to design and manage their own environmental programs—within a framework of eco-centric values—they are more likely to achieve sustainable outcomes that reflect their socio-cultural and economic realities. As such, Jururejo serves as an instructive example for other villages aiming to adopt similar, context-sensitive strategies. Its experience underscores the importance of flexibility, community ownership, and adaptive learning in scaling up grassroots environmental initiatives across diverse rural landscapes.

II. METHOD

This community service is guided by the Community-Based Environmental Management (CBEM) framework, which emphasizes active participation of local communities, stakeholder collaboration, and capacity building as basic elements of sustainable environmental governance. This collaborative structure ensured that the initiative was not only technically sound but also socially embedded within existing community networks (Prasetya et al., 2023). The CBEM approach has gained empirical support for enhancing local environmental resilience, especially in the context of decentralized governance in Indonesia (Abdillah et al., 2024). The program was implemented between January and June 2024 in Jururejo Village, Ngawi Subdistrict, East Java, with strategic engagement from multiple local stakeholders, including the village government, *Karang Taruna* (youth organization), *PKK* (village women's empowerment group), and academic facilitators from Institut Agama Islam Ngawi. This collaborative structure ensured that the initiative was not only technically sound but also socially embedded within existing community networks (Rahman, 2025; Suryawan & Lee, 2025).



Fig.1 Consolidate with Village Government of Jururejo, the Karang Taruna (Youth Organization), the PKK (Women's Empowerment Group)

The implementation process consisted of four core components:

1. **Socialization.**

The initial phase focused on **building trust and awareness** among residents. Socialization activities were conducted via *musyawarah desa* (village forums), door-to-door campaigns, and informal community gatherings. This participatory outreach helped align the initiative with local values and ensured that residents perceived the Waste Bank not as an external imposition but as a **community-owned solution**. Sundari & Suryandari (2024) affirm that early-stage socialization—particularly when led by respected local figures—significantly increases program legitimacy and participation rates.

2. **Capacity Building and Training.**

This phase involved technical workshops and hands-on sessions that focused on **solid waste classification, organic composting, and recyclable material handling**. The training was

designed to be accessible to a broad demographic, including housewives, youth groups, and the elderly. (Budhijanto et al., 2024) highlight that capacity-building initiatives that are continuous and localized contribute to deeper knowledge retention and foster a sense of environmental responsibility.

3. **Infrastructure Development.**

A permanent Waste Bank facility was constructed, serving as the physical and symbolic hub of the program. It was equipped with **waste-sorting bins, composting units, weighing tools, and an integrated ledger system** to track contributions and earnings transparently. According to (Zahrah et al., 2024), providing adequate infrastructure is a critical determinant of operational efficiency and public participation in community-based waste programs. The physical presence of such a facility also reinforces behavioral cues related to daily waste segregation.

4. **Monitoring and Evaluation**

The program employed a mixed-methods M&E framework, including **baseline and endline surveys, structured interviews, and participant observation**. These tools were used to assess changes in household waste practices, knowledge acquisition, and financial returns. (Yusuf & Fajri, 2022) demonstrate that continuous monitoring not only tracks impact but also provides real-time feedback for program improvement. This approach enabled adaptive governance and ensured that the Waste Bank remained responsive to emerging community needs and challenges.

To ensure methodological rigor, data were collected through a convergent mixed-methods approach—merging quantitative survey results with qualitative insights from Focus Group Discussions (FGDs) and ethnographic field notes (Creswell, J. W., & Creswell, 2018). Pre- and post-intervention assessments were conducted to evaluate changes in waste-handling behaviors, household waste sorting consistency, and local recycling rates.

Further, the program adopted a **participatory planning model**, wherein community members were directly involved in co-designing the standard operating procedures (SOPs), incentive schemes, and financial sustainability plans for the Waste Bank (Arshy Prodyanatasari et al., 2024; Latanna, 2022). This inclusive approach fostered a strong sense of collective ownership, strengthened social accountability, and allowed for adaptive governance responsive to contextual feedback and ecological constraints (Prabawati et al., 2023).

III. RESULT AND DISCUSSION

A. **Social Impact**

The Waste Bank (*Bank Sampah*) initiative in Jururejo Village demonstrated substantial improvements in both environmental awareness and social dynamics at the community level. Prior to the intervention, waste

management practices were largely informal, with most households engaging in unsorted disposal, indicating limited awareness and participation in sustainable waste behaviors. After six months of program implementation, quantitative survey data revealed that **78% of respondents reported regularly separating waste at the household level**, marking a significant increase from the baseline figure of less than 10%. This behavioral transformation underscores the effectiveness of **community-specific educational outreach** and participatory capacity-building mechanisms, such as peer-led workshops and *musyawarah desa* (village deliberation forums). These findings are consistent with prior studies which emphasize that **contextualized environmental education** significantly influences pro-environmental behavior in rural Indonesian settings (Herdiansyah et al., 2021; Latanna, 2022).

In terms of community participation, the program experienced an **almost sixfold increase** in membership—from just 15 individuals (mostly PKK and youth from Karang Taruna) to 87 active participants across various demographic segments. This surge in engagement reflects the efficacy of **inclusive mobilization strategies** that promote social equity and shared benefit, rather than individual reward. The inclusion of village leaders in the later stages of the program also provided critical legitimacy and served as a catalyst for broader participation, aligning with findings that **leadership endorsement is pivotal** in fostering collective action (Prabawati et al., 2023)

Moreover, the program had a profound impact on **strengthening social capital** and communal bonds. Regular activities such as joint composting sessions, waste collection drives, and informal training gatherings fostered cross-generational knowledge exchange. Elderly women, for example, took on the role of trainers for younger members in composting techniques, while the youth helped transport recyclables for elderly or immobile residents. These **interpersonal interactions cultivated mutual respect and social reciprocity**, establishing a network of interdependence that transcended age and social status. This phenomenon resonates with the broader literature on community-based environmental governance, which identifies such programs as effective **platforms for social integration and empowerment** (Yusuf & Fajri, 2022; Zahrah et al., 2024). The Waste Bank not only contributed to improved waste management behaviors but also served as a **mechanism for civic engagement**, offering marginalized groups—particularly women and youth—meaningful roles in shaping local sustainability efforts.



Fig. 2 socialization and survey to village communities

B. Ecological Impact

From an ecological standpoint, the *Bank Sampah* (Waste Bank) initiative in Jururejo Village demonstrated measurable positive outcomes in reducing environmental burden, particularly by minimizing the volume of waste delivered to the regional landfill. According to the Ngawi District Environmental Office (2024), the monthly average of transported waste declined by **35%** compared to the same period in the previous year. This reduction is directly linked to enhanced waste segregation behaviors and the establishment of a structured system for collecting recyclables and compostables.

This finding aligns with broader evidence showing that community-based waste programs significantly reduce landfill dependency and improve local environmental quality (Budhijanto et al., 2024; Herdiansyah et al., 2021). Waste minimization at the source is especially critical for rural areas where landfill capacities are limited and poorly managed, often resulting in environmental contamination and health hazards.

A major ecological gain of the program was the **diversion and repurposing of organic waste**. Approximately 40% of total collected waste comprised biodegradable matter, which was systematically processed into compost through a community-operated composting unit. This compost was subsequently distributed to local farmers, many of whom **substituted synthetic fertilizers with organic compost** on rice paddies and vegetable plots. Field interviews revealed that this shift not only decreased production costs by up to 25%, but also contributed to **enhanced soil fertility**, improved moisture retention, and increased microbial biodiversity—core indicators of sustainable agroecological systems (Cahya Alam et al., 2025; Zahrah et al., 2024).

Beyond soil health, the use of compost has ripple effects across the local ecosystem. By eliminating dependence on chemical fertilizers and reducing nutrient leaching, the program effectively mitigated risks of **eutrophication in nearby water bodies**, particularly during the rainy season. These practices reflect a local embodiment of the **circular economy model**, where organic waste is treated not as refuse but as a regenerative input for agricultural productivity and ecological balance (Sundari, S., & Suryandari, 2024). Moreover, the initiative promoted environmental stewardship and **ecological literacy** within the village community. Through regular training on composting, waste valorization, and sustainable farming, residents gained a better understanding of ecosystem interdependencies. These knowledge gains are essential for long-term sustainability and can catalyze further innovation in local environmental governance.

C. Economic Benefits

From an economic perspective, the Waste Bank initiative in Jururejo Village functioned not only as an environmental intervention but also as a **microeconomic support system** for participating households. Through structured collection and resale of recyclable materials—namely plastics, paper, aluminum, and iron—the initiative successfully generated approximately **IDR 3 million per month** in collective revenue. These proceeds were managed transparently, with allocations covering operational costs such as facility maintenance, weighing equipment calibration, and transportation logistics, while the remainder was redistributed to active members as **financial incentives**.

This model reflects the growing evidence that **Waste Banks can act as informal economic buffers** in low-income and rural settings, particularly where formal employment is scarce (Prabawati et al., 2023). The circular nature of this microeconomy—where waste becomes a tradable commodity—helps households supplement income while internalizing the value of environmental stewardship (Sunarti et al., 2023; Zahrah et al., 2024)

Despite these benefits, the program encountered several economic and operational challenges that could hinder its **scalability and resilience**. Notably, participation among younger demographics—especially school-aged youth and *Karang Taruna* members—remained limited. This generational disengagement contrasts with the higher participation rates observed among housewives and older residents, a trend also noted in broader studies of rural waste programs in Indonesia (Prabawati et al., 2023; Yusria et al., 2025).

Another critical challenge was the **price volatility in the recyclable material market**. Sudden drops in the value of plastic or paper significantly reduced monthly revenues, causing participant disillusionment and intermittent withdrawal from the program. Such economic inconsistency is a known weakness of informal recycling markets, which are highly sensitive to global commodity fluctuations and local demand dynamics (Rahman, 2025).

To overcome these limitations, **strategic innovations are essential**. For instance, youth engagement can be amplified through integration with **eco-literacy school programs**, gamified mobile applications, or community competitions that link recycling actions with digital rewards. Additionally, the formation of **cooperatives or regional waste management consortia** could mitigate market instability by enabling bulk sales, negotiating better rates, and accessing more formalized recycling channels (Budhijanto et al., 2024).

The long-term viability of Waste Bank models thus depends not only on environmental motivation but also on their ability to **build economic resilience** through diversified revenue streams and multi-stakeholder partnerships. Embedding waste economies into broader regional development frameworks—such as Village-Owned Enterprises (BUMDes)—can further institutionalize their function as rural green enterprises.

D. Comparison with Existing Literature

The outcomes of the Waste Bank initiative in Jururejo Village demonstrate strong alignment with existing literature that emphasizes the efficacy of **participatory and community-embedded approaches** in solid waste management. Numerous studies conducted in Indonesia—especially in Yogyakarta, Bandung, and other urbanizing rural areas—highlight that **community ownership**, reinforced by local norms and incentives, is a critical factor in ensuring program longevity and success (Herdiansyah et al., 2021; Zahrah et al., 2024).

In these contexts, Waste Banks have thrived not merely through infrastructure provision or awareness campaigns, but by **embedding recycling routines into household behavior**, aligning with local cultural practices, and fostering social accountability. For example, the work of (Prabawati et al., 2023) in West Java emphasizes how structured incentive mechanisms and institutional support from village authorities significantly influence participation rates. Similarly, (Sundari, S., & Suryandari, 2024) argue that integrating waste programs into *PKK, Karang Taruna*, and *Bumdes* agendas enhances legitimacy and operational continuity.

Moreover, the Jururejo initiative resonates with **multi-dimensional sustainability frameworks** that consider not only technical efficacy but also **social, economic, and ethical dimensions** of waste governance. This broader lens is particularly evident in the program's adoption of eco-centric values—promoting a respectful and harmonious relationship between humans and their ecosystems. Such values align with the shift advocated by sustainability scholars from anthropocentric models, which prioritize human benefit, toward **eco-centric paradigms** that emphasize ecological integrity and long-term balance (Budhijanto et al., 2024; Rahman, 2025).

This ethical grounding finds theoretical support in **environmental virtue ethics** and **deep ecology**, where sustainable behavior is fostered not solely by regulation or incentives, but through the cultivation of intrinsic motivation and a sense of place-based responsibility. In rural settings like Jururejo, where livelihoods are intimately tied to land and water systems, instilling these values can enhance **community resilience**, encourage conservation, and reduce ecological degradation (Cahya Alam et al., 2025).

Furthermore, the participatory structure of the Waste Bank reflects **Deliberative Environmental Governance** theories, wherein citizens actively shape environmental agendas and co-produce solutions. Such governance fosters **democratic legitimacy and adaptive capacity**, both of which are crucial for navigating complex socio-environmental challenges in decentralized settings like Indonesia (Yusria et al., 2025)

IV. CONCLUSION

The Waste Bank program in Jururejo Village exemplifies a successful model of community-driven

environmental governance that harmonizes ecological protection with grassroots socioeconomic advancement. By operationalizing an **eco-centric approach**, the initiative fostered sustainable behavioral change, reduced the volume of waste transported to landfills, and promoted resource circularity through composting and recycling activities.

Beyond environmental benefits, the program facilitated **skill development**, encouraged micro-entrepreneurial initiatives, and fostered stronger social cohesion by involving diverse community members. Its success was primarily attributed to a synergistic combination of **education, infrastructure investment, participatory planning**, and adaptive governance structures. This confirms findings from regional studies that community empowerment, when coupled with tangible benefits and local institutional backing, can lead to **sustainable transformation in waste management practices** (Prabawati, A., & Frimawaty, 2023)

To ensure the **long-term continuity, scalability, and institutionalization** of the program, the following strategic recommendations are proposed:

1. **Strengthen Community Capacity**

Sustained and adaptive capacity building is fundamental to the success of community-based environmental programs. Training should evolve beyond basic waste sorting to include **waste valorization techniques**, eco-product innovation, compost quality improvement, and entrepreneurial competencies. These efforts not only increase community competence but also promote **local innovation ecosystems** around waste utilization (Prabawati, A., & Frimawaty, 2023). Integration with vocational training institutions can improve the technical rigor of modules and facilitate **certification programs** to incentivize continued learning (Budhijanto et al., 2024).

2. **Engage Youth and Schools**

Youth participation remains a cornerstone for intergenerational continuity of environmental stewardship. Embedding **waste literacy in school curricula**, coupled with active collaboration with Karang Taruna, Scouts, and youth-led digital platforms, creates early ecological awareness and civic responsibility. (Yusria et al., 2025) highlight that students exposed to structured environmental education programs are more likely to demonstrate **sustainable waste behaviors into adulthood**. Gamified learning modules and waste-to-creativity competitions can further enhance engagement.

3. **Establish Formal Regulations**

Legal institutionalization through **desa-level regulations (Perdes)** on waste segregation and mandatory household waste separation can embed environmental practices into local governance structures. (Budhijanto et al., 2024) found that local bylaws improve compliance,

create **incentive/disincentive systems**, and foster a culture of environmental accountability. Regulatory support also formalizes the authority of the Waste Bank in managing village waste systems, which is crucial for long-term institutional legitimacy.

4. **Develop Market Linkages**

Economic viability of Waste Banks depends heavily on **stable and predictable demand** for recyclable materials. Developing **forward linkages** with regional recycling hubs, SMEs, and cooperatives ensures better price security. (Rahman, 2025) emphasizes the role of cooperative models in providing **collective bargaining power**, diversifying income sources (e.g., compost, eco-bricks, upcycled products), and absorbing market volatility. Value chain mapping can identify local industry gaps and opportunities for integration.

5. **Secure Sustainable Financing**

Financial sustainability requires diversified funding sources. Accessing **Corporate Social Responsibility (CSR)** funds from local businesses, applying for **environmental innovation grants**, and mobilizing **community crowdfunding** (e.g., via KitaBisa or Greeneration platforms) can buffer against budget shortfalls. (Prabawati et al., 2023) show that financial resilience is closely tied to multi-source income streams and the professionalization of financial management within Waste Bank units.

6. **Enhance Monitoring Systems**

Implementing digital tools for monitoring waste inputs, financial flows, and participant contributions can increase transparency, operational efficiency, and data integrity. **Mobile apps**, barcode systems for user tracking, and real-time dashboards allow for adaptive decision-making and facilitate reporting to external partners or funders. According to (Yusuf & Fajri, 2022), digitized M&E systems also improve participant motivation by visualizing impact in accessible formats.

7. **Promote Digital Awareness Campaigns.**

Expanding environmental campaigns through **social media, video storytelling, and WhatsApp groups** can reach a wider audience and stimulate behavioral replication beyond pilot communities. Highlighting success stories from Jururejo through **short films, digital posters, and testimonials** can inspire other villages. (Zahrah et al., 2024) note that digital environmental narratives contribute significantly to the **scaling of grassroots sustainability models** when coupled with locally trusted messengers.

By integrating these strategic measures, the Jururejo Waste Bank model offers a **scalable and adaptable blueprint** for environmentally responsible and socially

inclusive solid waste management in rural Indonesia and potentially other similar global contexts.

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