



Original Article

Rethinking Community-Based Waste Governance in Informal Urban Settlements

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Abstract:

Waste management in informal settlement areas in Indonesia is still a complex environmental issue. Limited government services, population density, and minimal infrastructure conditions make waste a major source of pollution and health risks. In the last ten years, the community-based waste governance (CBWG) approach has been widely encouraged by local governments and civil society organizations. However, the effectiveness of this approach varies, depending on local capacity, policy support, and sustainability of citizen participation. This study aims to review the CBWG approach in Indonesia's informal settlements by examining the factors that strengthen or weaken the initiative. The study was conducted in three major cities through a qualitative method that included in-depth interviews with residents, community leaders, NGOs, and environmental officials, as well as participatory observation at the RT/RW level. The results showed that the success of the CBWG was greatly influenced by strong community leadership, economic incentives from recycling activities, and synergy between residents and local government support. On the contrary, fragmentation of responsibilities and lack of long-term planning are the main obstacles. These findings emphasize the importance of building a hybrid governance model that combines local wisdom, institutional support, and social innovation to realize an inclusive, sustainable, and contextual waste management system for informal areas in Indonesia.

Keywords: Community-Based Waste Management, Informal Settlements, Co-Production, Urban Resilience, Environmental Justice

Introduction

The problem of waste management in informal settlements is one of the biggest environmental challenges faced by major cities in Indonesia. Based on data from the Ministry of Environment and Forestry (KLHK), around 60–70% of waste in urban areas is still not effectively managed, and most of it comes from densely populated areas that are not covered by official waste services ([BrotoSusilo et al., 2022](#); [KLHK et al., 2020](#)). Informal settlements, which often grow sporadically and without spatial permissions, lack adequate access to basic services, including waste collection and disposal systems. This inequality of access contributes to environmental pollution, the spread of disease,



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and the degradation of the quality of life of the urban poor ([Adelodun et al., 2021](#); [Whiteman et al., 2025](#)).

In recent years, Community-Based Waste Governance (CBWG) has begun to be promoted as an alternative approach to addressing these challenges. CBWG relies on the active participation of residents in the waste management process, from sorting, collection, to small-scale processing such as composting and waste banks ([Loewenson, n.d.](#)). This approach is considered to be able to strengthen social ownership of environmental issues and foster collective awareness in maintaining environmental cleanliness ([Furlong et al., 2017](#); [Walker, 2009](#); [Fox et al., 2023](#)).

However, the implementation of CBWG in the field has not always been successful. Many community initiatives have stagnated or even failed to operate in the long term. Limited capacity of local organizations, lack of funding, and lack of support from local governments are the main obstacles that are often found ([Nurmandi, 2022](#)). In addition, most CBWG programs are still pilot projects that are not integrated with the city's governance system as a whole, making it difficult to be adopted on a broader scale ([Ulum & Ngindana, 2017](#)).

The problem of waste management in informal settlements is not only technical, but also involves social, political, and institutional dimensions. CBWGs, which are essentially based on the principles of participation and decentralization, are often run in unsupportive social contexts: low social capital, gender inequality, and reliance on informal leaders who are not always accountable. Previous studies have highlighted that the success of CBWGs is highly dependent on local contexts—both in terms of community structure, inter-stakeholder relationships, and power dynamics at the micro level ([Massud & Aktar, 2020](#); [Sholanke & Gutberlet, 2022](#)).

In addition, waste management in the context of informal settlements also faces the issue of legitimacy. Many community-based initiatives are not formally recognized by municipal governments or are not aligned with local regulations. On the other hand, national waste policies such as Presidential Regulation No. 97 of 2017 concerning National Policies and Strategies for Household Waste Management have not fully reached the complex realities of informal settlements. This creates an institutional vacuum that makes it difficult for communities to obtain legal, technical, and ongoing funding support ([Perpres, 2017](#); [Fathurrohman et al., 2018](#)).

This study aims to critically examine the implementation of Community-Based Waste Governance (CBWG) in informal settlement areas in Indonesia. The main focus of this study is to identify the factors that support as well as hinder the success of CBWGs in social, economic, and institutional contexts at the local level. This research also aims to explain how forms of collaboration between communities, local governments, and non-state actors can form a more inclusive and sustainable waste management system. In addition, this study is directed to formulate an adaptive and contextual governance model that is able to answer the long-term needs of environmental management in informal settlement areas that have complex socio-ecological dynamics.

This research is built on a number of key questions that are the basis for conceptual and empirical exploration. First, this study aims to understand how social and institutional dynamics affect the effectiveness of CBWG implementation in informal settlements. Second, this study aims to uncover the main factors that determine the success and failure of community-based waste management in the context of major cities in Indonesia. Third, this study also examines the extent to which collaboration between communities and formal institutions is able to create a resilient and sustainable

environmental governance system.

This research has important significance both practically and theoretically. From a practical perspective, this research is expected to make a real contribution to the development of waste management policies in marginalized urban areas by emphasizing an approach based on community participation. The empirical findings from this study have the potential to be the basis for the formulation of policy strategies that are more inclusive, contextual, and long-term oriented. Theoretically, this research also aims to expand the discourse on urban environmental governance through political ecology approaches and co-production theories that emphasize the importance of interaction and synergy between state and non-state actors in building socio-ecological resilience. In the context of growing urbanization and increasingly real environmental inequalities, this research offers an alternative framework of thinking in understanding and addressing waste management issues in informal settlements in a more comprehensive and transformative manner.

Methods

This study uses a qualitative approach with a multi-site case study design to deeply understand the dynamics of community-based waste management in informal settlement areas. This approach was chosen because it allows contextual exploration of local practices, challenges, and strategies that are not always seen in quantitative studies. This study was conducted in three major cities in Indonesia, namely Jakarta, Surabaya, and Makassar, which represent social and institutional complexity in the context of urbanization and the growth of informal settlements in Indonesia ([Burgess et al., 2002](#); [Jenkins et al., 2018](#)).

The selection of the study site was based on three main criteria, namely the density of informal settlements, the existence of community-based waste management initiatives, and the active involvement of local agencies or non-governmental organizations in environmental programs. Each location is analyzed as a separate case that reflects a unique socio-ecological and local governance context.

Data collection was carried out through three main techniques, namely in-depth interviews, participatory observation, and document analysis. Interviews were conducted with various key actors, including community leaders, waste bank managers, environmental cadres, local government officials, and representatives of civil society organizations. A total of 30 key informants were interviewed in a semi-structured manner to explore their experiences, views, and practices related to community-based waste management ([Romero et al., 2019](#)).

Participatory observation was carried out by participating in community activities such as community service, waste sorting, and environmental coordination meetings. This technique is used to understand the dynamics of social interactions, local leadership patterns, and forms of collaboration between actors directly in the context of daily life. Meanwhile, document analysis was carried out on local regulations, community activity reports, and archives of environmental management programs available at the local level.

The data obtained were analyzed thematically with an inductive approach. The analysis process is carried out through the stages of open coding, thematic categorization, and narrative interpretation to identify common patterns and peculiarities in each location. The validity of the data was strengthened through triangulation techniques of sources and methods, discussion of provisional results with

informants, and reflective recording during the field process. With this strategy, the research is expected to be able to fully describe how community-based waste management develops in the midst of structural limitations and social dynamics in urban informal settlements.

Results

Based on data analysis from three study locations—Jakarta, Surabaya, and Makassar—six main themes were obtained that reflect the dynamics of community-based waste management in informal settlements. These findings build on the results of in-depth interviews, participatory observations, and analysis of local documents obtained during fieldwork between January to March 2024.

1. Social Capital and Community Leadership

The existence of local actors who have social and historical legitimacy in the community has proven to play an important role in driving the success of community-based waste governance (CBWG). This research found that actors such as RW Chairs, environmental cadres, and waste bank managers function as strategic links between residents, policies, and waste management practices at the site level.

In Jakarta, for example, the Chairman of RW 05 in Manggarai Village succeeded in becoming the main catalyst in building collective awareness among residents about the importance of household waste management. The role of the Chairman of the RW is not only administrative, but also symbolic and inspiring. He used his social status to initiate waste bank programs, coordinate segregated waste collection schedules, and bridge relationships between residents and environmental agencies. One of the residents said that:

"We participated because Mr. RW has been proven to care about the environment for a long time. He was diligent in cleaning the village even before there was a waste bank program" (W1, Jakarta, March 3, 2024).

This statement confirms that moral legitimacy and a positive leadership track record form a high level of trust in local actors. This trust is the main foundation in building voluntary participation of citizens in the CBWG program.

In Surabaya, a similar practice can be seen through the role of environmental cadres who operate collectively under the coordination of the village. These cadres not only carry out socialization functions, but also conduct education from house to house, develop a simple sorting system, and become facilitators when management conflicts occur between citizens. One of the cadres explained:

"Every week we hold training and home visits, residents become accustomed and do not feel unfamiliar with waste sorting activities. If someone doesn't understand, we will help them directly at home" (W2, Surabaya, February 12, 2024).

The effectiveness of the role of environmental cadres is inseparable from the structural support of the Surabaya city government which provides periodic training, educational tools, and coordination rooms between villages. In other words, the success of citizen mobilization in Surabaya occurred because of the synergy between the social forces of the community and the formal institutional system that supports it.

In contrast to Jakarta and Surabaya, in Makassar the participation of residents in the CBWG program shows a more volatile pattern. This is largely due to the weak coordination structure at the RT/RW level, the absence of official environmental cadres,

and the change of management of residents which tends to be fast and unsustainable. An informant from RW 03 Tamalanrea Village stated:

"If no one reminds them, residents often forget to deposit garbage. Especially if the schedule changes or if the new RW management doesn't care, the program will just stop" (W3, Makassar, January 18, 2024).

From this narrative, it can be seen that the sustainability of citizen participation is highly dependent on the existence of a consistent and trustworthy informal leader figure. When there is no such figure, or when there is no institutional structure that supports its systemic replacement, the CBWG program tends to lose its momentum.

These findings reinforce the view that the success of CBWGs is not only determined by the existence of technical programs or facilities, but by complex social dynamics—including local leadership, social networks, and cultural legitimacy. In the context of informal settlements that often suffer from structural limitations, local actors are the main pillars in filling governance gaps and building collective capacity from the bottom up

2. Economic Incentives as a Driver of Participation

Economic motivation is the main driving factor for the sustainability of the CBWG program, especially through the waste bank scheme. In Surabaya, the point system that can be exchanged for basic necessities has proven to be effective:

"Residents are excited because they can exchange waste for rice or cooking oil" (W4, Surabaya, February 20, 2024).

However, in Jakarta and Makassar, fluctuations in the price of recycled materials are a challenge. Several informants said that the uncertainty of the exchange rate caused citizen participation to decrease:

"When the price of plastic drops, residents are lazy to deposit because there are no results" (W5, Jakarta, March 5, 2024).

3. Formal–Informal Collaboration in Governance



Figure 1. Waste Utilization Strategy Based on Type (Reduce, Sort, Utilize)

The results show that collaboration between communities, local governments,

and NGOs strengthens the technical capacity and legitimacy of the CBWG. In Jakarta, training from the Environment Agency and household composter assistance helped increase the effectiveness of the program:

"We are given training and tools, so we are better prepared to run a waste bank" (W6, Jakarta, March 7, 2024).

Surabaya implements an institutional incentive model in the form of periodic operational funds for active RTs:

"We used the funds to buy sacks and scales" (W7, Surabaya, February 16, 2024).

In contrast, in Makassar, the lack of formal support makes it difficult for communities to access basic facilities:

"We have difficulty finding land for a garbage collection place, there is no official permit" (W8, Makassar, February 1, 2024).

4. Contextual Adaptation and Local Innovation

In conditions of limited resources, lack of formal infrastructure support, and institutional uncertainty, communities in the three study sites developed various forms of local innovation that were adaptive and contextual. These innovations are not always in the form of advanced technology, but creative solutions based on the needs and daily experiences of citizens.

In Surabaya, one of the prominent forms of innovation is the use of bags made from cassava starch-based organic materials as a substitute for conventional plastic. This initiative arose from a collaboration between environmental cadres and housewife groups involved in organic waste management training. In addition to being environmentally friendly, the bags can be composted directly without the need to separate them from the contents of organic waste. An informant explained:

"We make plastic from cassava, it can go directly into the compost. So residents don't bother sorting their pockets anymore" (W11, Surabaya, February 28, 2024).

This solution demonstrates how a local approach can simplify technical processes and improve the convenience and efficiency of citizen participation.

In Makassar, limited access to garbage transport vehicles is a major problem, especially in narrow and congested alleyways. To overcome this obstacle, the RW 03 community in Tamalanrea Village developed a "mobile waste bank" system by utilizing motorcycles. The motorcycle is equipped with a simple but effective designed transport box, allowing community environmental officers to collect garbage from house to house at regular intervals. An executor said:

"We go around every afternoon to pick up residents' garbage using motorbikes. So residents don't need to leave their homes" (W12, Makassar, March 4, 2024).

This innovation has succeeded in increasing the coverage of citizen participation which was previously low due to transportation constraints and distance to the collection point. Meanwhile, in Jakarta, the challenges of compost management that require discipline and work rotation are overcome with a scheme based on collective responsibility between RWs. Each RW is given a turn to manage the composter for one month, with a simple documentation system based on notebooks and inspections by environmental cadres. This system not only divides the workload, but also creates a sense of collective responsibility and pride between regions. One of the informants stated:

"RW will replace the composter so that everything is active and does not depend on

one RW only" (W13, Jakarta, March 6, 2024).

The three examples above show that local innovation is not only a technical solution, but also a reflection of the community's adaptive capacity to respond to structural constraints. This kind of innovation emerges from direct experience and is reinforced by social solidarity, making it relevant and effective in the local context.

Discussion and Theoretical Implications

The results of this study reveal that the effectiveness of community-based waste governance (CBWG) in informal settlements is strongly influenced by the dynamic linkages between community social power, microeconomic incentives, local innovation, and flexible and adaptive institutional support. There is no single variable that can guarantee the success of CBWG. Instead, the success of the program depends on the integration of actively and equally involved multiactors in contextual governance systems. In this case, the governance model that is formed is hybrid—blending grassroots initiatives with the structures and resources of formal actors.

Conceptually, these findings confirm the relevance of co-production theory Bandola-Gill et al. which states that public services are not only produced by the state, but also through the active contribution of citizens in the form of energy, time, local knowledge, and social ownership. In the three study locations, residents not only played the role of beneficiaries, but also as service producers through waste bank management activities, composter rotation systems, and motorcycle-based collection innovations ([Aparcana, 2017](#)). The involvement of these citizens is not symbolic, but functional, as they take over the functions of services that are absent or inadequate from the state. In the context of informal settlements that are often outside the scope of formal services, CBWG is the only rational approach to building an operational and socially relevant waste management system ([Bandola-Gill et al., 2023](#)).

Furthermore, through the lens of urban political ecology (UPE), this study shows that waste management in informal areas cannot be understood solely as a technical issue, but as part of the power structure and distribution of access to urban space and resources. The absence of formal regulation, limited public services, and institutional marginalization suggest that informal settlements operate in a municipal system that does not fully acknowledge their existence. However, local innovations such as mobile waste banks and basic food exchange point systems show that residents are not just passive in accepting these conditions. Instead, they reworked the exclusive structure by creating an alternative governance logic that is more contextual, participatory, and socially meaningful. In this case, citizens are not only "beneficiaries" of the formal system, but also political subjects who reclaim their rights to the management of space and a healthy environment.

These findings also enrich the discourse of hybrid governance, especially in the context of developing countries such as Indonesia. The governance model formed in the CBWG practice in the three study cities shows that the success of environmental governance does not depend on the dominance of a single state or society, but rather on complex interactions between actors that carry different institutional logics—formal, informal, traditional, and contemporary ([Aparcana, 2017](#)). In Surabaya, for example, synergy between communities, environmental cadres, and city governments creates a stable incentive mechanism. In Jakarta, the involvement of NGOs and local governments strengthens the technical capacity of citizens. Meanwhile, in Makassar,

despite structural limitations, residents created adaptation through a motorcycle-based garbage pick-up system. These three cases show that effective governance is formed from the results of negotiation, collaboration, and innovation between actors with different positions, resources, and interests ([Ragolane & Khoza, 2024](#)).

The conceptual model developed in this study shows that the success of CBWGs depends on the co-production process facilitated by a hybrid governance system. The system relies on the internal power of the community, but still relies on external support in the form of regulation, training, and access to funding. In the context of Indonesia, which is characterized by uneven bureaucracy and limited public service capacity in marginalized areas, this hybrid governance model is a realistic, applicative, and potentially replicated approach. This also shows that CBWG is not just a reactive local initiative, but a form of alternative governance that is able to offer systemic solutions to environmental problems in marginalized urban areas.

Conclusion

This study shows that the success of community-based waste governance (CBWG) in informal settlements in Indonesia is highly dependent on the integration of local social forces, formal institutional support, and the ability of communities to innovate contextually. The CBWG program will not be sustainable if it only relies on community initiatives without regulatory support, funding, and recognition from local governments. Similarly, the technocratic top-down approach has proven to be less responsive to the socio-ecological dynamics on the ground.

Findings from three study cities—Jakarta, Surabaya, and Makassar—suggest that effective community-based waste management emerges from co-production processes that allow communities and formal institutions to work together in a hybrid governance system. This model shows that environmental governance in marginalized urban areas requires a flexible, adaptive, and collaboration-based approach. Local innovations such as mobile waste banks, incentive systems, and composter management rotations show great potential for community capacity, but still require structural strengthening through long-term policies and technical support.

Thus, CBWG in the context of informal settlements should not be understood as a substitute solution to state failure, but rather as a cooperative strategy that breaks the boundaries between the state and society. The hybrid governance model resulting from this research can serve as a conceptual and practical reference in the formulation of more inclusive waste management policies, particularly in developing countries that face similar challenges in urbanization and environmental exclusion

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