

From Disposal To Circularity: Institutional And Socio-Economic Dimensions Of Urban Waste Management In Makassar City, Indonesia

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Abstract

Municipal solid waste management remains a pressing challenge in rapidly urbanizing cities in the Global South, where institutional capacity, environmental risks, and socioeconomic vulnerabilities intersect. This study examines urban waste governance and community-based circular economy practices in Makassar City, Indonesia, a coastal metropolitan area experiencing a steady increase in municipal solid waste production. Using a mixed qualitative-descriptive approach, the study integrates field observations, policy and institutional analysis, and community-based data collected in areas surrounding municipal landfills. Findings reveal persistent gaps between regulatory frameworks and operational practices, particularly in waste segregation, landfill management, and inter-agency coordination. Although national and local policies promote sustainable waste management and circular economy principles, implementation remains largely disposal-oriented, with reliance on landfills continuing to dominate the system. The study also identifies the crucial role of informal waste actors, waste banks, and community-driven recycling initiatives in reducing waste volumes and generating local economic benefits. However, these initiatives face structural obstacles, including limited legal recognition, inadequate institutional integration, and limited access to financial and technical support. This study argues that strengthening urban waste management in Makassar requires a transition from a landfill-centric approach to an integrated, community-based circular economy model. By highlighting institutional challenges and grassroots innovations, this study provides empirical insights into the literature on sustainable urban environmental governance and offers policy-relevant lessons for rapidly growing coastal cities in developing countries.

Keywords: urban waste management; circular economy; environmental governance; community-based initiatives; coastal cities; Indonesia.

Introduction

Urban waste management is one of the most crucial environmental and governance challenges in the era of global urbanization. Population growth, urban expansion, and changing consumption patterns have driven a significant increase in waste generation, particularly in developing cities. In many developing countries, waste management systems have not been able to keep pace with the increasing rate of waste production, giving rise to various environmental, health, and socioeconomic problems. Ineffective waste management not only impacts environmental degradation but also reflects limited institutional capacity and weak urban governance.

Globally, the waste management paradigm has shifted from conventional approaches focused on final disposal to sustainable approaches emphasizing source reduction, sorting, recycling, and reuse through circular economy principles. This approach views waste as a resource with economic, social, and ecological value when managed properly. However, implementing this paradigm in developing countries faces structural challenges, such as limited infrastructure, low public awareness, and the complex relationship between the formal and informal sectors in the waste management system.

Makassar City, a metropolitan city in eastern Indonesia, faces increasingly complex waste management issues in line with population growth and economic activity. The high volume of daily waste generation places significant pressure on existing management systems, particularly on Final Disposal Sites (TPA), the primary focus of the city's waste management. This heavy reliance on TPA indicates that Makassar City's waste management system remains oriented toward a downstream approach, while efforts to reduce and utilize waste at the upstream level have not been implemented optimally and equitably.

The existence of TPA in Makassar City not only serves as a technical waste disposal facility but also serves as a complex social and economic space. Various waste-based economic activities, involving local communities, such as scavengers, collectors, micro-recycling businesses, and waste banks, thrive around the TPA. These activities demonstrate the significant economic potential of waste management, particularly for vulnerable socioeconomic groups. However, this potential is often overlooked in formal policy planning and has not been systematically integrated into the urban waste management system.

Furthermore, waste management activities at TPA also have various negative impacts on the environment and public health. Air, water, and soil pollution, the risk of disease, and a degraded quality of life are issues that must be addressed by communities surrounding the TPA. This situation reflects the unequal distribution of environmental risks, where certain community groups bear a greater environmental burden without adequate compensation or protection. Therefore, waste management cannot be separated from issues of social justice and community protection.

Normatively, Indonesia already has a fairly comprehensive regulatory framework for waste management, emphasizing sustainable waste reduction and management, as well as community involvement. National and regional policies encourage the implementation of circular economy principles, strengthening the role of local governments, and increasing public participation in waste management. However, in practice, the implementation of these policies often faces various obstacles, such as limited resources, weak inter-agency coordination, and a lack of mechanisms for integrating the informal sector into the formal system.

The gap between policy and field practice is a key issue in waste management in Makassar City. Although various programs and initiatives aim to improve community-based waste management, their impact remains partial and has not been able to comprehensively transform the system's structure. This situation highlights the need for a more comprehensive and contextual approach, focusing not only on technical aspects but also on institutional, social, and economic dimensions.

A community-based circular economy approach offers a strategic alternative to address these challenges. By integrating local communities and the informal sector into the waste management system, this approach has the potential to create dual benefits: reducing environmental burdens while improving economic well-being. However, the success of this approach depends heavily on inclusive governance, strengthening institutional capacity, and policies that bridge the gap. Based on the above background, this study addresses the following research questions:

1. What are the dynamics of urban solid waste management in Makassar City, particularly with regard to the role of landfills, local government policies, and the involvement of communities and the informal sector?
2. What are the potentials and challenges associated with the development of circular economy-based waste management and community empowerment in supporting sustainable urban waste management in Makassar City?

This study aims to comprehensively analyze urban waste management in Makassar City, emphasizing the dynamics of governance, institutional roles, and community and informal sector involvement in the waste management system. This study seeks to identify how waste management policies at the national and regional levels are implemented in urban waste management practices, particularly those that are still oriented towards Final Disposal Sites (TPA). Furthermore, this study aims to examine the role of communities and waste-based economic activities in supporting environmental reduction while improving socio-economic well-being. This study also aims to analyze the potential and challenges of developing a circular economy approach based on community empowerment as an alternative strategy for more sustainable waste management. Through this analysis, this study is expected to formulate relevant and applicable policy recommendations to strengthen inclusive, sustainable, and socially just urban waste management governance in Makassar City.

This research contributes to the scientific field by enriching studies on urban waste management and environmental governance by providing empirical evidence from Makassar City, a developing coastal city in the Global South. By integrating circular economy and community empowerment perspectives, this research positions local communities and the informal sector as key actors in the waste management system, thus going beyond the dominant technocratic approach in waste management studies. Furthermore, this research provides a conceptual understanding of the gap between policy and implementation in waste management at the local level, particularly related to limited institutional capacity and coordination among stakeholders. Practically, this research is expected to serve as a policy reference for local governments in designing more adaptive and inclusive waste management strategies, while simultaneously encouraging the integration of the informal sector and community-based initiatives into the formal system. Thus, the findings of this research are not only relevant to the local context of Makassar City but also offer lessons that can be transferred to other developing cities facing similar challenges in urban waste management.

Methods

This study adopted a descriptive mixed-methods approach to examine municipal solid waste management in Makassar City, Indonesia. This approach integrates qualitative and quantitative data to capture the institutional, social, and economic dimensions of waste governance, particularly those related to landfill-based management and community-based initiatives.

The study area focuses on Makassar City, with particular attention to the communities surrounding the Tamangapa Landfill, which serves as the city's primary waste disposal site. The landfill is analyzed not only as a technical facility but also as a socio-economic space where formal waste management systems intersect with informal recycling activities.

Primary data were collected through field observations and semi-structured interviews. Observations were conducted to document landfill conditions, waste management practices, and community activities related to waste recovery. Semi-structured interviews were conducted with purposively selected informants, including local residents, informal waste workers (such as scavengers and small-scale recyclers), community leaders, and representatives from relevant local government agencies.

Secondary data were obtained from official reports, policy documents, and municipal waste statistics to contextualize the field findings and support the descriptive analysis. Quantitative data were analyzed using descriptive statistics to describe waste production patterns and management capacity, while qualitative data were analyzed thematically to identify key governance challenges, institutional gaps, and community-based circular

economy practices. By triangulating multiple data sources, this study provides an integrated understanding of policy implementation, community participation, and the potential of a circular economy in urban waste management. The methodological design allows for the identification of transferable insights relevant to sustainable waste governance in rapidly growing cities in developing countries.

Result And Discussion

Dynamics of Urban Solid Waste Management in Makassar City

Findings indicate that municipal solid waste management in Makassar City remains largely centered on landfills (TPA), with the Tamangapa landfill serving as the core node of the city's waste management system. Municipal waste collection and transportation are largely designed to ensure the daily transfer of mixed waste streams from residential, commercial, and public areas directly to the landfill. This configuration reflects a conventional end of process approach, where waste reduction, separation, and recovery at source remain limited and unevenly implemented.

Field observations indicate that landfills continue to operate under significant capacity pressure, driven by increased waste production associated with population growth and urban expansion. Although policy frameworks at the national and local levels emphasize waste reduction and recycling, operational realities demonstrate a structural dependence on landfills. Similar patterns have been documented in many rapidly growing cities in developing countries, where landfills serve as the dominant waste management solution due to institutional inertia and infrastructure constraints (Wilson et al., 2012a).

From a governance perspective, landfills play a dual role. Technically, they are municipal waste disposal sites; Socially and economically, this site has evolved into an informal production space where recyclable materials are extracted and traded. This duality highlights the contradiction in the existing system: while reliance on landfills is environmentally unsustainable, it simultaneously supports informal livelihoods that fill the void left by formal waste management institutions.

Local Government Policies and Institutional Implementation Gaps

Analysis of policy implementation reveals a significant gap between regulatory intent and operational practice. Local government policies in Makassar are formally aligned with national waste management regulations, which encourage waste reduction, recycling, and community participation. However, empirical findings indicate that these policies are only partially translated into effective local action.

Institutional fragmentation emerges as a major challenge. Responsibilities for waste management are distributed across multiple agencies, often without effective coordination mechanisms. This fragmentation limits the capacity of local governments to implement integrated waste management strategies and weakens consistency in policy enforcement. As a result, waste reduction initiatives, such as waste separation at source and community-based recycling programs, tend to operate in isolation rather than as part of a coherent system.

Furthermore, limited financial and technical resources constrain policy implementation. Fixed investment is heavily oriented towards waste collection and transportation, while upstream interventions such as public education, incentive mechanisms, and support for recycling infrastructure receive relatively less attention. This imbalance reinforces reliance on landfills and delays the transition to more sustainable waste management models, a phenomenon widely observed in urban waste governance in global South countries (Guerrero et al., 2013).

These findings also indicate that monitoring and evaluation mechanisms are weak, resulting in limited feedback between policy objectives and outcomes on the ground. Without robust performance indicators and data integration, policy learning remains limited, reducing the adaptability of waste management systems to changing urban dynamics.

Community Participation and Informal Sector Involvement

One of the most significant findings of this study is the central role played by communities and the informal sector in waste recovery and recycling activities. Around the Tamangapa landfill, informal waste workers including scavengers, small scale recyclers, and middlemen actively extract valuable materials such as plastic, metal, and paper. These activities contribute significantly to waste diversion, despite operating outside of formal institutional arrangements.

Community based initiatives, such as neighborhood-level waste sorting and informal recycling networks, demonstrate local innovation and resilience. However, their effectiveness relies heavily on individual motivation and informal social networks, rather than on structured institutional support. This reliance on informality reflects both the adaptability of local communities and the limitations of formal governance structures in accommodating diverse actors.

Despite their contributions, informal waste collectors remain largely excluded from formal policy frameworks. The lack of legal recognition and social protection makes them vulnerable to occupational health risks, income instability, and social marginalization. This exclusion reflects a broader pattern identified in urban waste management systems globally, where informal actors provide essential environmental services but remain institutionally invisible (Medina, 2007).

This study finds that the lack of integration between formal and informal systems represents a missed opportunity to advance circular economy principles. If supported through inclusive governance arrangements, informal recycling networks can improve resource recovery efficiency, reduce pressure on landfills, and generate social benefits. Previous studies have shown that inclusive waste governance models can significantly improve system performance while promoting social equity (Gutberlet et al., 2017).

The Interplay Between Landfills, Policy, and the Informal Sector

The interplay between reliance on landfills, policy implementation, and informal sector activities creates a complex governance landscape in Makassar City. On the one hand, the landfill centric system reflects institutional limitations and reliance on outdated patterns of urban waste management. On the other hand, informal sector activities partially compensate for these limitations by recovering recyclable materials that would otherwise contribute to environmental degradation.

However, this compensation is unsystematic and insufficient to address the long-term sustainability challenges facing the city. The absence of formal integration mechanisms results in inefficiencies, such as overlapping roles, uncoordinated waste flows, and missed opportunities for value creation. Furthermore, reliance on informal recovery at the landfill stage undermines upstream waste reduction efforts, as recyclable materials are only handled after disposal.

These findings suggest that the transition to sustainable urban waste management in Makassar requires a reconfiguration of governance priorities. This includes reducing structural dependence on landfills, strengthening institutional coordination, and formally recognizing the role of communities and informal actors within an inclusive circular economy framework. Without such integration, policy ambitions are likely to remain aspirational rather than transformative.

Implications for Urban Waste Governance in Developing Cities

The dynamics observed in Makassar reflect the broader challenges faced by rapidly urbanizing cities in developing countries. The coexistence of a formal landfill system and an informal recycling economy underscores the need for governance models that go beyond purely technical solutions. Instead, waste management must be approached as a socio-technical system shaped by policies, institutions, and everyday practices.

By highlighting the interconnected roles of landfills, local government policies, and informal actors, this study contributes to the growing body of literature supporting inclusive and adaptive waste governance. The Makassar case demonstrates that a sustainable waste management transition depends not only on infrastructure investment but also on institutional reforms that recognize and integrate multiple stakeholders into a shared governance framework.

Potentials and challenges associated with the development of circular economy-based waste management and community empowerment in supporting sustainable urban waste management in Makassar City.

a. Potentials of Circular Economy-Based Waste Management in Makassar City

The findings indicate that Makassar City has significant potential for developing circular economy-based waste management, particularly through community participation and the involvement of the informal sector. Field observations and interviews revealed that waste is no longer simply treated as waste destined for final disposal, but is increasingly viewed by local communities—especially those living around the Tamangapa landfill—as an economic resource. Informal waste collectors, including scavengers and small-scale recyclers, actively collect recyclable materials such as plastic, metal, and paper, contributing to waste volume reduction while generating household income.

This practice aligns with the core principles of the circular economy, which emphasize material recovery, value retention, and extended product life cycles (Kirchherr et al., 2017). In Makassar, the existence of community-based waste initiatives, such as informal recycling networks and waste banks, demonstrates the latent institutional capacity for circular waste flows at the local level. These initiatives serve as entry points for circular economy implementation by promoting waste segregation at source and facilitating the circulation of materials outside the landfill system.

Furthermore, this study found that community involvement in waste management strengthens social capital and collective responsibility for environmental protection. Residents involved in recycling activities demonstrate a higher awareness of waste-related environmental risks and demonstrate adaptive strategies to overcome the limitations of formal waste management services. This confirms previous research highlighting community empowerment as a critical driver of sustainable waste governance in developing cities (Wilson et al., 2012b).

From a governance perspective, Makassar's local policy framework formally recognizes waste reduction and recycling goals, creating regulatory space for a circular economy approach. While implementation remains uneven, the existence of a supportive policy narrative provides an institutional foundation upon which community-based circular practices can be scaled. This policy-practice interface suggests that Makassar is in an intermediate transition stage, where bottom-up initiatives coexist with top-down regulatory intentions, a condition commonly observed in cities in the Global South (Gutberlet, 2016).

b. Socio-Economic Benefits and Community Empowerment

Further research indicates that circular economy-oriented waste management activities generate tangible socio-economic benefits for marginalized communities. Income

generated from recycled materials, even modestly, contributes to livelihood diversification and reduces economic vulnerability among households near landfills. These findings support the argument that inclusive waste management systems can simultaneously function as environmental and poverty reduction strategies (Medina, 2010).

Community empowerment emerges not only through increased income but also through increased participation in local environmental decision-making. Informants reported greater trust in interacting with local authorities when community-based waste management initiatives are recognized or supported. Such empowerment is crucial for sustainable urban waste management, as it fosters long-term behavioral change and shared responsibility between the state and citizens.

However, empowerment remains largely informal and relies on individual or collective initiatives rather than institutionalized support. The lack of formal recognition for informal waste workers limits their access to social protection, stable markets, and capacity-building opportunities. These conditions limit the transformative potential of circular economy practices and reinforce structural inequalities in waste management systems.

c. Challenges in Implementing Circular Economy-Based Waste Management

Despite its potential, this study identified several structural and operational challenges hampering the development of circular economy-based waste management in Makassar City. One of the most significant challenges is the continued dominance of a landfill-centric management model. The Tamangapa Landfill remains the primary endpoint for municipal waste, reflecting a linear “collection–transportation–disposal” paradigm that limits upstream waste reduction efforts.

Institutional fragmentation further complicates implementation. Waste management responsibilities are spread across multiple agencies with limited coordination, resulting in overlapping policies and inconsistent program implementation. This finding is consistent with broader evidence that weak institutional integration undermines sustainable waste management transitions in developing urban areas (United Nations Environment Programme (UNEP), 2019).

Another major challenge relates to limited infrastructure. The lack of adequate waste sorting facilities, recycling centers, and material recovery infrastructure reduces the efficiency of circular economy practices. Consequently, community-based recycling activities remain small-scale and labor-intensive, limiting their ability to absorb larger volumes of waste. Without investment in supporting infrastructure, circular economy initiatives risk stagnation or failure.

Sociocultural factors also present barriers. While awareness of the waste problem is growing, behavioral change at the household level remains uneven. Many residents continue to mix waste due to convenience, limited incentives, or a lack of consistent educational programs. This behavioral gap underscores the importance of ongoing environmental education and incentive-based policy instruments to strengthen circular economy practices (Organisation for Economic Co-operation and Development (OECD), 2020).

d. Governance Gaps and Policy Implications

This study reveals a clear disconnect between policy aspirations and operational realities. While circular economy principles are increasingly referenced in national and local policy discourse, they have not yet been translated into coherent strategic implementation at the city/district level. The contribution of the informal sector remains underappreciated in official planning, despite its proven role in waste reduction and resource recovery.

This exclusion reflects a broader governance challenge: the failure to integrate informal actors into formal waste management systems. International experience shows that inclusive governance models in which informal workers are recognized as legitimate service providers improve environmental performance and social equity. In Makassar, formalizing partnerships with community-based waste management initiatives can improve system efficiency while protecting livelihoods.

Toward Sustainable Urban Waste Management

Overall, the research findings indicate that circular economy-based waste management in Makassar City has significant potential, but requires systemic transformation to reach its full potential. Community empowerment and informal sector engagement are crucial assets, but must be supported by supportive governance structures, infrastructure investment, and policy coherence.

These findings suggest that sustainable urban waste management in Makassar depends on a shift from a disposal-oriented model to an integrated circular system that prioritizes waste prevention, material recovery, and social inclusion. Such a transition would not only reduce environmental pressures but also contribute to more equitable urban development, strengthening the role of waste governance as a strategic component of sustainability transitions in developing cities.

Conclusion

This study shows that urban waste management in Makassar City remains largely dominated by a landfill-centric and disposal-oriented paradigm, despite a regulatory framework that promotes waste reduction, recycling, and circular economy principles. Continued reliance on the Tamangapa landfill reflects structural constraints in institutional capacity, infrastructure provision, and inter-agency coordination, which collectively hinder the effective translation of policy objectives into operational practices. Consequently, upstream interventions such as waste segregation at source and systematic material recovery remain limited and unevenly implemented.

At the same time, these findings reveal significant potential for developing circular economy-based waste management through community empowerment and informal sector engagement. Informal waste collectors, waste banks, and community-driven recycling initiatives play a crucial role in diverting recyclable materials from landfills while generating socio-economic benefits for marginalized groups. These practices demonstrate that circular economy principles are already emerging organically at the grassroots level, albeit in fragmented and informal forms. Community participation also strengthens environmental awareness, social capital, and shared responsibility for waste management, all of which are essential components of the transition to sustainability.

However, the transformative potential of these initiatives is constrained by limited legal recognition, inadequate institutional integration, and inadequate access to financial, technical, and infrastructure support. The lack of inclusive governance mechanisms results in inefficiency, social vulnerability among informal actors, and missed opportunities to scale up circular economy practices.

Overall, this study concludes that achieving sustainable urban waste management in Makassar requires a systemic shift from a disposal-oriented model to an integrated, community-based circular economy framework. Such a transition requires stronger institutional coordination, investment in waste recovery infrastructure, and inclusive policies that formally recognize and integrate communities and informal actors. These findings offer important insights for urban waste governance in rapidly growing cities in the Global South facing similar sustainability challenges.

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References

1. Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste Management*, 33(1), 220–232.
2. Gutberlet, J. (2016). Ways out of the waste dilemma: transforming communities in the global south. *RCC Perspectives*, (3), 55–68.
3. Gutberlet, J., Kain, J.-H., Nyakinya, B., Oloko, M., Zapata, P., & Zapata Campos, M. J. (2017). Bridging weak links of solid waste management in informal settlements. *The Journal of Environment & Development*, 26(1), 106–131.
4. Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232.
5. Medina, M. (2007). *The world's scavengers: salvaging for sustainable consumption and production*. Bloomsbury Publishing PLC.
6. Medina, M. (2010). Solid wastes, poverty and the environment in developing country cities. World Institute for Development Economic Research (UNUWIDER) Working Papers.
7. Organisation for Economic Co-operation and Development (OECD). (2020). *Circular economy in cities and regions*. OECD Publishing.
8. United Nations Environment Programme (UNEP). (2019). *Waste management outlook for Southeast Asia*. UNEP.
9. Wilson, D. C., Rodic, L., Scheinberg, A., Velis, C. A., & Alabaster, G. (2012a). Comparative analysis of solid waste management in 20 cities. *Waste Management & Research*, 30(3), 237–254.
10. Wilson, D. C., Rodic, L., Scheinberg, A., Velis, C. A., & Alabaster, G. (2012b). Comparative analysis of solid waste management in 20 cities. *Waste Management & Research*, 30(3), 237–254.