

Differences in the Effectiveness of City and Regency Governance in Waste Management in Urban Areas: Challenges and Sustainable Strategies

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Abstract

Waste management in urban areas poses a major challenge for city and regency governments due to population growth, increased economic activity, and changes in public consumption patterns. This study aims to analyze differences in the effectiveness of waste management governance between city and regency governments by reviewing various literature on the implementation of collaborative governance, the 3R principles, the effectiveness of waste banks, the use of technologies such as spatial data and digitization, and emission reduction strategies through modern waste processing. The findings indicate that city governments tend to be more innovative and responsive in developing waste management systems due to social pressure and higher public service demands, enabling them to adopt approaches based on community participation, information technology, and data-driven planning. Meanwhile, regency governments still face challenges in funding, institutional coordination, and infrastructure limitations; consequently, their waste management systems tend to rely on landfills and are not yet fully sustainability-oriented. This study concludes that successful waste management requires policy consistency, multistakeholder synergy, community capacity building, and the use of technology to support the planning and operations of waste management systems..

Kata Kunci: Waste management, public administration, cities, counties, 3Rs, collaboration, environmental technology.

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I. Introduction

Waste management in urban areas poses a major challenge for city and regency governments in Indonesia, primarily due to rapidly increasing urban population growth, expanding economic activities, modern consumption patterns, and a lack of public awareness regarding waste sorting at the source. The larger the population, the greater the amount of waste generated daily; consequently, a waste management system that is not updated or improved will lead to serious consequences such as soil, air, and water pollution, as well as a decline in

the quality of life for the community. This problem is particularly acute in urban areas where population growth outpaces the government's ability to provide waste management facilities and infrastructure. Therefore, waste management is no longer merely a technical issue of transportation and disposal, but an integral part of complex challenges involving land use planning, development planning, social behavior, and public policy.

City and regency governments face different challenges when dealing with waste management issues. Cities generally face high population density, limited landfill space, and very large volumes of waste, necessitating innovations in both technology and policy to manage waste efficiently. On the other hand, regency governments often face budget constraints, inadequate waste processing facilities, and a lack of basic infrastructure support. This means that a one-size-fits-all approach to waste management cannot be applied to both cities and regencies. A collaborative approach is becoming increasingly important because the capacity of local governments is no longer sufficient to address waste issues independently. As stated in the literature review, waste management must be understood as a multidimensional process that integrates the interrelated aspects of technology, public behavior, and institutional governance. Therefore, this study aims to conduct an in-depth analysis of the differences in the effectiveness of waste management governance between city and regency governments, as well as the strategies that can be developed to achieve sustainable waste management in urban areas.

II. Literatur Review

Modern waste management requires a paradigm shift from a simple "dispose-transport-dispose" approach to a system that prioritizes prevention, sorting, reuse, and processing to reduce waste generation starting at the household level. In the context of Bogor Regency, research shows that the complexity of waste issues resulting from urbanization and population growth requires collaborative governance involving multiple stakeholders.

This collaboration is realized through the penta-helix approach, which integrates the roles of government, the public, academia, the business sector, and the media into a single, integrated system. However, the study also found that collaboration is often hindered by weak coordination, inconsistent commitment among institutions, and a lack of readiness in waste processing infrastructure on the ground. This demonstrates that collaborative governance requires not only regulations but also consistent implementation, transparency, and collective awareness.

A literature review on the global application of the 3R (Reduce, Reuse, Recycle) concept reveals a distinct difference between developed and developing countries. Developed countries have successfully implemented strict waste sorting starting at the household level, possess modern processing technologies, and enforce strong regulations, thereby reducing the amount of waste sent to landfills to less than one percent. Meanwhile, developing countries still tend to rely on landfills as the sole solution. The dominant barriers are low public awareness, minimal investment, and a weak environmental law enforcement system.

It is important to recognize that the 3R principle is not merely a matter of technology, but rather a transformation of behavior and public policy that affects the entire system of consumption and production in society.

Other studies related to cities show that different strategies are often implemented to encourage public participation. A study on waste banks in Surabaya demonstrates that an incentive-based approach through waste savings can improve household waste sorting behavior and provide tangible economic, social, and environmental benefits. This underscores that programs tailored to community needs and offering direct benefits tend to be more successful than purely instructional approaches. However, challenges remain because not all members of the community share the same level of awareness and commitment to sustainability.

The use of the latest technology is also a crucial component of modern waste management systems. GIS-based spatial data and remote sensing can help map areas with high waste concentrations, monitor land-use changes, assess infrastructure capacity, and serve as the foundation for more accurate and transparent urban development planning. Furthermore, the development of digital waste bank applications powered by artificial intelligence enables digital record-keeping, automatic classification, and improved operational efficiency. Even Waste-to-Energy (WtE) technology has become a choice for many countries to reduce waste while generating alternative energy. Thus, the literature review demonstrates that effective waste management requires a simultaneous combination of policies, social innovation, public education, and technological advancements.

III. Method

This study employs a literature review method by examining various national and international scientific journals on waste management in urban areas. The review focuses on case studies of Bogor Regency, Surabaya City, and Makassar City, as well as various references discussing the 3Rs, multi-stakeholder collaboration, waste bank systems, the application of spatial data, digital technology, and WtE. Based on this literature, a thematic analysis was conducted to identify patterns of differences in governance between city and regency levels, as well as the factors influencing the effectiveness of each approach. The data were analyzed descriptively to explore challenges, successes, and strategies that can be developed in the context of sustainable waste management..

IV. Results and Discussion

A literature review shows that city and regency governments face different challenges in waste management. City governments generally face pressure due to high volumes of waste and limited landfill space. As a result, cities tend to innovate more quickly through the development of waste banks, the digitization of waste management, partnerships with the private sector, and the use of Waste-to-Energy technology as a long-term solution. Surabaya serves as an example of how a community-centered approach can significantly increase

participation. Residents who save waste receive direct economic benefits, which in turn encourages voluntary behavioral change. This success demonstrates that environmental awareness can be fostered through a combination of education and realistic economic incentives.

District governments tend to face fundamental challenges such as inadequate waste processing, reliance on landfills, insufficient budgets, and weak coordination among departments. Research in Bogor District indicates that although a collaborative governance approach has been implemented, its execution has not been optimal because commitments among stakeholders remain misaligned and supporting capacities are not yet fully in place. Strengthening collaboration across different actors is crucial because local governments cannot operate alone, given the ever-increasing volume and complexity of the issues. A tiered approach—starting from the household level, through the subdistrict level, up to the city level—is considered an effective strategy for addressing problems in a layered manner.

Social issues also play a major role in determining the success of waste management. International studies confirm that low levels of public awareness often serve as the primary barrier to systemic change; thus, technical policies without behavioral change will not yield results. Therefore, environmental education must be an integral part of long-term strategies. Waste management must be understood as a new cultural norm, not merely an administrative obligation. Technology is also playing an increasingly important role in improving management efficiency, ranging from reporting apps and AI-based automatic classification systems to spatial mapping to support accurate urban planning. Technology offers opportunities, but its success depends heavily on the readiness of human resources, regulations, and adequate financial support.

V. Conclusion

Waste management in urban areas shows that city governments tend to be more effective because they face higher waste volumes, which drives them to develop innovations, digitalization, multi-stakeholder collaboration, and community-based programs such as waste banks. In contrast, regency governments still face fundamental challenges such as limited budgets, infrastructure, and institutional coordination, so policy implementation has not yet been fully optimized.

Sustainable waste management can only be achieved through changes in public behavior, the strengthening of collaborative governance, the implementation of supporting technologies, and consistent policies from upstream to downstream. With such synergy, both cities and regencies can improve the effectiveness of waste management and create a cleaner, healthier, and more sustainable urban environment.

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