



(RESEARCH ARTICLE)



## Local governance of solid waste management in selected highly urbanized cities in Metro Manila, Philippines for Sustainable Development

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### Abstract

This mixed-method study examines the relationship between local governance and effective solid waste management (SWM) in three highly urbanized cities (HUCs) within Metro Manila, Philippines. Analyzing data from surveys and interviews with key stakeholders, the research identifies current SWM conditions, governance challenges, and opportunities for improvement. Applying Good Governance Theory principles, the study reveals gaps in planning, budgeting, implementation, and monitoring of SWM programs, alongside concerns about corruption and inequitable service provision. To foster sustainable development through effective SWM, the paper proposes enhanced strategies aligned with legal frameworks and good governance principles. These recommendations emphasize stakeholder participation, enforcement of regulations, transparency, responsiveness, consensus building, equity, effectiveness, accountability, and strategic vision. By adopting these strategies, local government units can improve SWM service delivery, promote resource recovery, and contribute to a cleaner and healthier environment.

**Keywords:** Local Governance; Solid Waste Management; Environmental Protection; Highly Urbanized Cities; Good Governance Theory

### 1. Introduction

Solid waste management (SWM) presents a formidable global challenge with significant impacts on human health, environmental sustainability, and economic progress [1]. The World Bank's "What a Waste 2.0" report (2018) underscores the urgency of this issue, projecting a 70% surge in global waste generation to 3.4 billion tons annually within the next three decades [1]. This escalating crisis is particularly pronounced in rapidly urbanizing nations like the Philippines, where improper disposal, inefficient collection, and inadequate facilities exacerbate the problem, especially in densely populated urban centers [2]. The consequences of these deficiencies are far-reaching, leading to water contamination, flooding, air pollution, and the spread of diseases, as highlighted by the Philippine Senate Economic Planning Office (2017) [2].

In response to this mounting crisis, the Philippines enacted Republic Act No. 9003 (RA 9003), the Ecological Solid Waste Management Act of 2000 [3]. This landmark legislation establishes a comprehensive framework for ecological solid waste management (ESWM), prioritizing public health and environmental protection [3]. ESWM, a function devolved to local government units (LGUs) under Republic Act No. 7160 (RA 7160), the Local Government Code of 1991 [4], encompasses a range of activities, including waste segregation, transportation, processing, and disposal in an environmentally sound manner [3].

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While the legislative framework exists, the effective implementation of ESWM remains a challenge. This study focuses on the critical relationship between local governance practices and the success of SWM initiatives in achieving sustainable development within the context of RA 9003 and RA 7160 [3, 4]. Specifically, it examines three highly urbanized cities (HUCs) within Metro Manila, Philippines, to understand how governance structures, decision-making processes, and resource allocation influence SWM outcomes. By analyzing data from surveys and interviews with key stakeholders, this mixed-methods research identifies current SWM conditions, governance challenges, and potential avenues for improvement.

The study applies the principles of Good Governance Theory to assess local government performance in environmental management and explores gaps in planning, budgeting, implementation, and monitoring of SWM programs [5]. Concerns regarding corruption, inequitable service provision, and inadequate stakeholder participation are also investigated.

Ultimately, this research aims to answer the following questions:

- What are the current SWM conditions in the selected HUCs?
- How do these conditions relate to local governance practices?
- What is the role of local governance in ensuring effective and efficient SWM?
- What strategies can LGUs implement to enhance SWM performance and contribute to sustainable development?

By addressing these questions, this study seeks to generate actionable recommendations for local government units (LGUs), policymakers, and stakeholders. These recommendations will be grounded in legal frameworks, good governance principles, and empirical evidence, with the goal of promoting sustainable development through effective and equitable SWM practices.

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## 2. Methodology

This mixed-methods study sought to understand the complex relationship between local governance and solid waste management (SWM) effectiveness in three highly urbanized cities (HUCs) within Metro Manila. By incorporating both quantitative and qualitative data collection and analysis, the research aimed to provide a comprehensive view of the challenges and opportunities present in SWM governance.

Ethical considerations were central to the research process. The researcher, a licensed Environmental Planner in the Philippines, adhered to the profession's code of ethics and ensured the protection of participant rights through informed consent, confidentiality, and transparency [6]. Data privacy regulations were also strictly followed in accordance with the Data Privacy Act of 2012 [7].

The study focused on Quezon City, San Juan City, and Taguig City, three HUCs selected for their diverse socio-economic profiles and varying SWM challenges. A total of 70 key stakeholders, representing civil society organizations, the private/business sector, and government officials, were purposively selected to participate in the research.

Data collection involved multiple methods. Surveys with closed-ended questions were administered to gather quantitative data on SWM practices, governance structures, and stakeholder perceptions. Semi-structured interviews with open-ended questions were conducted to delve deeper into the experiences, challenges, and potential solutions identified by participants. Additionally, secondary data from government reports and research organizations provided context and complemented the primary data.

Quantitative data analysis employed descriptive statistics (frequencies, percentages, means) and inferential statistics (correlation) to identify patterns and relationships among variables. Thematic analysis was applied to qualitative data to uncover recurring themes and insights from interview responses. This integrated approach allowed for a nuanced understanding of the complex interplay between local governance and SWM practices.

The quantitative data analysis focused on understanding the current state of SWM practices, governance structures, and SWM performance, while also examining the relationship between governance and SWM outcomes. The qualitative data analysis delved into the challenges faced in SWM implementation, the role of local governance, strategies for effective SWM, and barriers to sustainable development, such as corruption and political will.

By combining these diverse data sources and analytical methods, this mixed-methods study aimed to provide a comprehensive and insightful assessment of SWM governance in the selected HUCs, ultimately informing recommendations for improved practices and policies that can contribute to sustainable development in the region.

### 3. Results and Discussion

#### 3.1. Current Solid Waste Management Conditions in HUCs

##### 3.1.1. Waste Generation and Composition

The three HUCs studied (Quezon City, San Juan City, and Taguig City) generate substantial waste, primarily consisting of biodegradable and recyclable materials. Table 1 presents the per capita waste generation, daily waste generation based on 2021 population figures, and projected daily waste generation for 2025. A detailed breakdown of waste composition for each city is shown in Tables 2, 3, and 4. These findings confirm the National Capital Region's status as the largest waste generator in the Philippines, attributed to its dense population and numerous commercial and industrial activities. Notably, the COVID-19 pandemic has also contributed to increased waste generation, particularly healthcare waste.

**Table 1** Waste Generation

HUC	Per Capita Waste Generation (grams/ person/ day)	2021 Daily Waste Generation Based on Population (kilograms/ day)	2025 Daily Waste Generation Based on Population Projection (kilograms/ day)
Quezon City	440 g	827,000	895,171
San Juan City	404 g	56,987	61,480
Taguig City	245 g	243,571	273,666

Based on data provided by LGUs and DENR-EMB NCR

**Table 2** Waste Composition in Quezon City

Waste Classification	Percentage from the Total Waste Generated
Biodegradable Wastes	54%
Recyclable Wastes	20%
Residual Wastes	19%
Special Wastes	7%

Based on data provided by the LGU and DENR-EMB NCR

**Table 3** Waste Composition in San Juan City

Waste Classification	Percentage from the Total Waste Generated
Biodegradable Wastes	45%
Recyclable Wastes	40%
Residual Wastes	7%
Special Wastes	8%

Based on data provided by the LGU and DENR-EMB NCR

**Table 4** Waste Composition in Taguig City

Waste Classification	Percentage from the Total Waste Generated
Biodegradable Wastes	59%
Non-Biodegradable Wastes	27%
Hazardous Wastes	2%
Special Wastes	12%

Based on data provided by the LGU and DENR-EMB NCR

### 3.1.2. Waste Management Practices

All three HUCs have established ordinances mandating waste segregation at source, and they claim to enforce a "no segregation, no collection" policy. However, survey results and interviews with barangay (local community) representatives revealed challenges in implementation, especially in areas with transient populations and informal settlements. Non-compliance with segregation often leads to improper waste disposal, further exacerbating sanitation issues.

While most survey respondents confirmed regular garbage collection services, the frequency and efficiency of collection varied across the cities. Furthermore, although all three cities possess material recovery facilities (MRFs), interviews revealed that some are non-functional or underutilized, highlighting potential inefficiencies in the recycling process.

The cities differ in their approaches to waste transfer and transport. Quezon City utilizes the Payatas Controlled Disposal Facility as a transfer station, while San Juan City is developing a new facility with a planned transfer station. Taguig City operates the Lionel Waste Management Transfer Station for sorting and transfer before final disposal at the Rizal Provincial Sanitary Landfill.

### 3.1.3. Planning, Budgeting, and Policy Development

Survey respondents from Quezon City and San Juan City reported involvement in SWM planning and budgeting, but concerns were raised about inadequate funding and resource prioritization. Taguig City respondents indicated limited participation in these processes. Interviews further highlighted the need for greater transparency and stakeholder involvement in planning and budgeting to ensure effective allocation of resources.

Regarding policy development, most respondents were aware of their LGU's policies for waste prevention, reduction, and disposal. However, interviews revealed a need for policy revisions and updates to address emerging challenges, such as the increased waste generation during the COVID-19 pandemic.

## 3.2. Relationship Between SWM Conditions and Local Governance

The research findings illuminate a complex relationship between SWM conditions and local governance practices in the HUCs. Good governance principles—participation, rule of law, transparency, responsiveness, consensus building, equity, effectiveness, accountability, and strategic vision—are crucial for effective SWM. However, the study revealed variations in the application of these principles across the cities:

- Participation: Stakeholder involvement varied, with San Juan City showing the highest level.
- Rule of Law: Generally adhered to, but enforcement and compliance challenges were noted, particularly regarding segregation and waste diversion.
- Transparency: Concerns were raised about financial transparency in SWM, except in San Juan City.
- Responsiveness: Varied, with all cities showing some responsiveness to COVID-19 challenges but room for improvement in overall responsiveness.
- Consensus Building: Varied, with San Juan City demonstrating greater collaboration among stakeholders.
- Equity: Generally supported, but concerns were raised about the inclusion of informal waste pickers and equitable service provision in informal settlements.
- Effectiveness: Concerns about staff competence and capacity building were noted.
- Accountability: Perceived as lacking in some instances, particularly regarding resource utilization.

- Strategic Vision: Generally acknowledged, but the need for better alignment with sustainable development goals was highlighted.

### 3.3. Role of Local Governance and Recommendations for LGUs

The findings underscore the critical role of local governance in ensuring effective and efficient SWM. Good governance principles should guide decision-making, policy formulation, implementation, and stakeholder collaboration. LGUs must prioritize SWM in planning and budgeting, enforce regulations, promote public awareness, and regularly monitor and evaluate SWM programs.

Based on these findings, the study recommends the following strategies for LGUs:

- Enhance stakeholder participation: Actively involve all stakeholders, including marginalized groups, in decision-making and implementation processes.
- Strengthen enforcement: Ensure strict adherence to RA 9003 and other relevant regulations.
- Promote transparency: Ensure transparency in financial management and resource allocation.
- Foster responsiveness: Adapt SWM policies and programs to address emerging challenges.
- Build consensus: Encourage collaboration and partnerships among stakeholders.
- Ensure equity: Provide equitable access to SWM services for all communities.
- Enhance effectiveness: Prioritize staff competence and capacity building.
- Uphold accountability: Establish clear accountability mechanisms for decision-making and resource utilization.
- Develop strategic vision: Align SWM plans with broader sustainable development goals.

By adopting these strategies, LGUs can strengthen their SWM governance and make significant progress towards sustainable waste management practices, ultimately contributing to a cleaner and healthier environment for all.

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## 4. Conclusion

This mixed-methods study has illuminated the complex relationship between local governance and solid waste management (SWM) effectiveness in three highly urbanized cities in Metro Manila. Findings reveal that while substantial waste generation poses a persistent challenge, the quality of governance significantly influences the success of SWM programs and initiatives.

Despite apparent compliance with the legal framework of RA 9003, implementation gaps persist, particularly in areas such as waste segregation, resource recovery, and equitable service provision [3]. Governance challenges, including limited stakeholder participation, coordination issues, and perceptions of corruption, hinder the full potential of SWM efforts. The research underscores the critical role of local government units (LGUs) in ensuring effective and efficient SWM. By adhering to good governance principles such as transparency, accountability, and responsiveness, LGUs can foster public trust, encourage collaboration, and create a more conducive environment for sustainable waste management practices [5].

To address these challenges and improve SWM outcomes, the study recommends a multi-faceted approach that emphasizes:

- Enhanced Stakeholder Participation: Involving all relevant stakeholders, including marginalized communities and informal waste workers, in planning, implementation, and evaluation processes.
- Strict Enforcement of Regulations: Ensuring rigorous compliance with existing laws and regulations, particularly regarding waste segregation and resource recovery targets [3].
- Transparency and Accountability: Promoting transparency in budgetary allocation and expenditure, as well as establishing mechanisms for public scrutiny and feedback [5].
- Responsiveness and Adaptability: Developing SWM policies and programs that are responsive to emerging challenges and local needs.
- Collaboration and Consensus Building: Fostering collaboration among diverse stakeholders, including the private sector, civil society, and informal waste workers, to create a shared vision and coordinated action.

By embracing these recommendations, LGUs can strengthen their SWM governance, improve service delivery, promote resource recovery, and ultimately contribute to a cleaner, healthier, and more sustainable urban environment. The

findings of this research provide valuable insights for policymakers, practitioners, and communities seeking to address the pressing challenge of SWM in rapidly urbanizing regions.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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