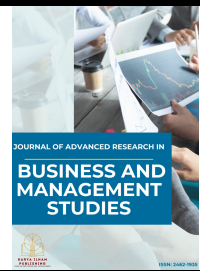




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Institutional Capacity and Collaborative Governance in Solid Waste Policy Enforcement: Evidence from Selected Barangays in Marawi and Iligan, Philippines

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ABSTRACT

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Solid waste policy is difficult to enforce when legal duties are not matched by reliable services, organizational resources, and coordination between city and barangay actors. This study examined how local implementers in selected barangays of Marawi and Iligan described the institutional and collaborative conditions that support or constrain enforcement of Republic Act No. 9003. A comparative qualitative case-study design was used. Fourteen semi-structured key-informant interviews—seven in each city—were coded deductively and inductively and compared as contextual cases rather than citywide estimates. Five themes emerged: enforcement became more credible when embedded in visible service routines; shortages of personnel, vehicles, equipment, and operating funds created a mandate–resource mismatch; coordination depended on clear allocation of city and barangay roles; monitoring was useful only when reports and field checks led to corrective action; and language-accessible communication and barangay leadership connected formal policy to practical participation. Marawi informants more often described social difficulty in applying rules, resource shortages, unclear responsibilities, and language barriers. Iligan informants described more routinized enforcement and monitoring while also identifying needs for expansion and modernization. The findings indicate that effective local waste enforcement requires an integrated governance chain linking service reliability, role clarity, accessible communication, monitoring, and documented corrective action. The study is context-bound and does not rank the two cities or generalize beyond the selected barangays.

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1. Introduction

Municipal solid waste management is a technical problem of collection, transport, recovery, and disposal, but it is also a public-administration problem. Guerrero, Maas, and Hogland identify institutional, social, financial, and technical challenges that shape municipal systems [1]. Kaza and colleagues document the growing scale and cost of global waste generation [2], while the United Nations Environment Programme emphasizes resource recovery and circular approaches [3]. Ferronato and Torretta connect waste mismanagement to environmental and public-health risks [4]. Marshall and Farahbakhsh show that these risks must be addressed through integrated systems rather than isolated technical interventions [5]. For local governments, rules must therefore be translated into daily routines, front-line workers need resources and authority, barangays must coordinate with city offices, and residents need services that make compliance feasible.

In the Philippines, Republic Act No. 9003 establishes an integrated and decentralized framework for segregation at source, collection, diversion, materials recovery, and disposal [6]. Its implementing rules specify the planning, institutional, and operational responsibilities of local governments and barangays [7]. Philippine studies nevertheless report uneven implementation. Atienza highlights governance and community participation in segregation and recycling [8]. Camarillo and Bellotindos examine the link between policy implementation and participation [9], while Coracero and colleagues synthesize persistent national waste-management problems [10]. Dataman and colleagues document conditions in Marawi City [11]. Del Rosario assesses municipal compliance with RA 9003 [12], and Vanguardia examines implementation at the barangay level [13]. Consistent with these findings, the national status report identifies continuing gaps in segregation, diversion, disposal, and local implementation capacity [14].

These gaps cannot be understood only as failures of citizen discipline. Wu, Ramesh, and Howlett distinguish the skills and resources required for policy functions from the political and organizational conditions that enable their use [15]. Andrews, Pritchett, and Woolcock explain why formal structures do not by themselves produce state capability [16], while Grindle and Hilderbrand emphasize sustainable public-sector capacity [17]. In waste management, collection staff and barangay personnel are also street-level implementers whose practical choices shape the policy experienced by residents, as explained by Lipsky [18]. Matland further shows how ambiguity and conflict affect implementation [19].

A collaborative-governance lens adds a second requirement. Ansell and Gash identify institutional design, facilitative leadership, and trust-building as important conditions for collaboration [20]. Emerson, Nabatchi, and Balogh explain how principled engagement, shared motivation, and joint capacity support collaborative action [21]. Provan and Kenis show that network effectiveness also depends on how coordination is governed [22]. Bryson, Crosby, and Stone identify design and implementation conditions for cross-sector collaboration [23], while Emerson and Nabatchi extend these ideas to collaborative governance regimes [24]. These contributions are relevant because waste enforcement spans city environment offices, barangay leaders, collection crews, community groups, households, and sometimes private or civil-society partners.

Despite substantial literature on Philippine solid waste management, limited implementer-centered evidence explains how service routines, institutional capacity, city–barangay role allocation, monitoring, and accessible communication operate together in selected local settings. To address this gap, the study examines how implementers in selected barangays of Marawi and Iligan describe the practical enforcement of solid waste rules and the institutional and collaborative conditions that support or constrain that enforcement. The study is significant because it reframes enforcement as a service-and-governance process and develops an operational enforcement-capacity chain for local

officials. Aparcana identifies institutional barriers and success factors in integrating waste actors [25]. Wilson, Rodic, and Scheinberg emphasize governance in developing-country waste systems [26], while the Wasteaware indicators connect institutional, financial, technical, and social dimensions [27]. Building on these contributions, the present comparison identifies transferable operational questions without ranking either city or making citywide claims.

The contribution is threefold. First, it treats enforcement as a service-and-governance process rather than solely as sanctioning. Second, it uses a bounded qualitative comparison to identify transferable operational questions without presenting either city as a universal model. Third, it develops a practical enforcement-capacity chain for local officials: clear rules must be coupled with a feasible service routine, assigned responsibility, usable communication, monitoring, and a response when noncompliance or service failure is detected. This framing is consistent with international evidence that integrated waste systems depend on governance, finance, behavior, and technical arrangements working together [25], [26], [27].

2. Methodology

The article reports the qualitative component of a broader doctoral study on solid waste management enforcement. Only the key-informant interviews were analyzed for this manuscript; no household-survey data, statistics, or survey interpretations are included. A comparative qualitative case-study approach was used to understand how actors with direct implementation experience interpreted enforcement, capacity, coordination, monitoring, and community engagement in their local settings. Case-study inquiry is appropriate when the object of explanation is embedded in a real-world context and the boundaries between policy, organization, and service delivery cannot be cleanly separated [28].

Table 1

Selected barangays and qualitative interview sample

Contextual case	Selected barangays	Key informants	Purpose in the comparison
Marawi City	Papandayan; Papandayan Caniogan; Pantaon	7 (MC-R1 to MC-R7)	To examine implementation where participants described waste-related concerns and proximity to disposal- or landfill-related areas.
Iligan City	Poblacion; Tubod; San Miguel	7 (IC-R1 to IC-R7)	To examine routines in barangays selected for more visible or organized waste-management practices.

Note. The sites were purposively selected and were not statistically matched. The article therefore makes no citywide or causal comparison. Source: Authors' qualitative study.

Fourteen key informants participated: seven from Marawi City and seven from Iligan City. They were selected purposively because they held city- or barangay-level roles connected to solid waste implementation, enforcement, coordination, or monitoring. The group included environment-office personnel, barangay officials with environment or sanitation responsibilities, youth or community leaders, and designated solid-waste coordinators. The study reports participants through anonymous identifiers (MC-R1 to MC-R7 and IC-R1 to IC-R7), which preserve the traceability of evidence while

protecting identities. The small, information-rich sample is suited to an explanatory account of implementation conditions, not to measurement of prevalence across either city.

Semi-structured interviews were conducted at agreed locations after consent was obtained. Questions covered the operational application of RA 9003, organizational and resource capacity, coordination, monitoring and accountability, community participation, and recommended improvements. With consent, interviews were audio-recorded; detailed notes were used where recording was not permitted. Interviews conducted in Bisaya/Cebuano, Filipino, or Maranao were translated into English for analysis and reporting. The English renderings used in this article were checked against the original-language statements to retain intended meaning. Quotations below are translated excerpts.

Analysis combined deductive and inductive coding. Initial deductive codes reflected the study questions and RA 9003 implementation domains: enforcement, administrative and resource capacity, coordination, monitoring and accountability, and community engagement. Open coding then identified meaningful statements; axial coding connected related codes; and selective coding consolidated them into higher-order themes. A coding matrix linked each theme to its participant code, original statement, English rendering where needed, initial code, and category. Themes were first reviewed within each contextual case and then compared across cases. This process follows the principle that thematic analysis should make the path from data to interpretation visible and coherent [29], [30], [31].

The research received ethical clearance from the College of Public Affairs Research Ethics Committee, Mindanao State University–Marawi (CPA-REC 2026-161). Participation was voluntary; informed consent and separate permission for recording were sought when applicable. Identifying information was excluded from the analytical files, and quotations were attributed only to participant codes. Because participants discussed organizational constraints and enforcement practices, the analysis avoids attributing fault to identifiable offices or individuals.

3. Results and Discussion

The analysis produced five linked themes. They are not a scorecard of cities or a claim that one system is uniformly stronger than the other. Instead, they show how implementers connected rules, resources, relationships, information, and accountability in the selected barangays. Table 2 provides a concise cross-case map before the themes are discussed in detail.

Table 2

Governance themes and operational implications

Theme	Illustrative account from Marawi	Illustrative account from Iligan	Operational implication
Enforcement as a service routine	Informants described difficulty applying rules strictly when confronting residents or establishments.	Informants described regular inspections, CCTV-supported monitoring, and a collection rule for unsegregated waste.	Connect the rule to a visible, predictable service and response routine.
Mandate–resource fit	Participants described personnel, truck, equipment, and budget constraints.	Participants described existing teams but also a need for additional budget, personnel, equipment, and modernization.	Use service targets to align personnel, fleet, facilities, and operating funds.
Role clarity and coordination	Participants reported confusion when responsibilities were passed between actors.	Participants described good city–barangay coordination.	Specify task ownership, hand-offs, and escalation paths in a joint operating plan.
Monitoring that leads to action	Some reports were described as compliance-oriented and violations as often settled informally.	Participants described inspections, barangay reports, and field validation.	Track reports through validation, corrective action, and feedback to barangays.
Usable communication and local leadership	Participants emphasized local-language communication and the role of barangay heads in mobilizing residents.	Participants emphasized continued source segregation, clean-up participation, and ordinance compliance.	Make messages practical, locally intelligible, and delivered through trusted barangay channels.

Note. Source: Authors' thematic analysis of 14 key-informant interviews.

3.1 Enforcement Becomes Credible When It Is Embedded in Service Routines

The first theme distinguishes a rule written on paper from a rule experienced in daily service delivery. In the Marawi interviews, enforcement was frequently framed as socially difficult. One participant described that rules were not strictly followed because it was difficult to confront residents and establishment owners. Another explained that implementers did what they could but could not always be very strict. These accounts do not show that rules were absent. Rather, they point to the gap between a legal mandate and the practical authority, service support, and social conditions needed to apply it consistently.

“Rules are not strictly followed because of weak discipline and difficulty confronting residents and establishment owners.” (MC-R1, translated)

In the Iligan interviews, by contrast, participants described enforcement through recurring operational routines: regular monitoring and inspections, 24-hour CCTV coverage in a cited setting, and instructions for collectors not to accept unsegregated waste. The last practice is especially important analytically. It turns a general segregation requirement into an immediate, intelligible point of interaction between a household and a public service. It is not simply a punitive sanction; it makes the collection routine itself an enforcement mechanism. This aligns with implementation scholarship that emphasizes how front-line practice and administrative discretion shape the content of public policy [18], [19].

“Collectors are instructed not to collect waste if it has not been segregated.” (IC-R4, translated)

The implication is not that every barangay should reproduce surveillance technology or refuse collection in every circumstance. A refusal rule can be inequitable or counterproductive if residents lack practical information, collection is irregular, or safe alternatives are unavailable. The broader lesson is that enforcement needs a credible service design: residents must know what is expected, when collection occurs, what happens to noncompliant waste, who can answer questions, and how a problem is corrected. Global waste-governance literature likewise cautions that technical systems work only when governance and user-facing arrangements make participation feasible [5], [26].

3.2 The Mandate–Resource Mismatch Turns Enforcement into an Aspirational Task

The second theme concerns the fit between responsibilities and the material means to deliver them. A Marawi participant described a large number of barangays alongside a small number of garbage collectors and dump trucks. This is an informant’s account rather than an independently audited inventory, yet it captures how personnel and fleet availability were experienced as a governing constraint. The same participant linked budget increases to the possibility of adding equipment and staff. When collection capacity is stretched, enforcement personnel face a difficult dilemma: strict requirements may be hard to sustain when the government cannot reliably complete the service sequence that follows segregation, storage, collection, and transfer.

“We have 101 barangays in Marawi City, and we only have 12 garbage collectors and 15 dump trucks.” (MC-R1)

Iligan should not be read as a capacity-saturated contrast. Its participants described the presence of collectors, monitoring teams, environmental staff, and barangay personnel, but also asked for a larger budget, more personnel, new equipment, and modernized facilities. The comparison therefore reveals two forms of capacity need. In one contextual case, actors foregrounded foundational shortages that made basic enforcement difficult. In the other, actors described an operating system that still needed expansion, renewal, and modernization. Treating capacity as a binary attribute—present in one locality and absent in another—would conceal these different administrative problems.

Policy-capacity research is useful here because it directs attention to the resources that allow an organization to carry out a mandate, not merely to its formal authority [15], [16]. For waste governance, a practical capacity review should begin with service questions: How many routes can be completed predictably? Which barangays have a functional collection point and recovery arrangement? What equipment is essential for safe service? Which staff member validates a missed collection or a noncompliance report? International municipal-waste research has similarly linked sound outcomes to the combination of institutional, financial, technical, and social dimensions rather than to a single infrastructure investment [1], [27].

3.3 Coordination Requires Operational Role Clarity, Not Merely Goodwill

The third theme is the quality of the working relationship between city-level and barangay-level actors. Marawi participants repeatedly described confusion over roles: responsibilities were said to be passed to others, while offices did not always agree clearly about their tasks. Such descriptions matter because solid waste management consists of interdependent functions. A city office may provide technical guidance, vehicles, or enforcement policy; barangays may mobilize residents, conduct local information activities, report concerns, or oversee localized compliance. When the

hand-offs are unclear, the result is not simply an administrative inconvenience. It can delay collection, weaken follow-up, and make it difficult for residents to know where to seek help or report a violation.

“There is confusion of roles because some actors pass their responsibilities to others.” (MC-R1, translated)

In Iligan, an informant characterized coordination between barangay and city government as good. The contrast should be interpreted cautiously because it is a perception from a purposive sample rather than a comparative measure of network effectiveness. It nonetheless illustrates the practical value of stable intergovernmental relations. Collaborative-governance scholarship identifies shared purpose, communication, and joint capacity as prerequisites for productive multi-actor action [20], [21]. Network research likewise shows that effectiveness depends on how coordination is organized, not merely on the number of organizations involved [22].

For local public-policy practice, the implication is concrete: an ordinance or local implementation plan should be translated into a simple joint operating matrix. The matrix can allocate ownership for collection schedules, resident education, inspection, complaint receipt, validation, violation response, equipment requests, and quarterly review. It should identify the responsible actor, the support actor, a deadline or routine, and an escalation route when a task cannot be completed. This modest administrative instrument can reduce role ambiguity without adding a new bureaucracy. It also creates the conditions for accountability because actors can distinguish a delayed service, an unclear mandate, and a resource gap.

3.4 Monitoring Has Value Only When It Produces Corrective Action

The fourth theme concerns the difference between observing a problem and acting on it. A Marawi participant said that reports were sometimes prepared “for compliance,” while another explained that some violations were resolved through amicable settlement. Informal resolution can be appropriate in particular cases, especially when it provides education or de-escalation. The governance concern arises when neither the basis for settlement nor the subsequent action is documented. If monitoring produces a report but not a verifiable response, the system may preserve an appearance of compliance while residents see little change in service or behavior.

Iligan participants described regular monitoring through inspections, barangay reports, and field validation. This sequence is analytically stronger because it connects three functions: information from the local level, direct confirmation of conditions, and a basis for response. Yet monitoring should not be treated as an end in itself. The purpose is to guide service correction, targeted education, enforcement action where warranted, and resource allocation. Governance principles emphasize accountability and transparency as mechanisms that make institutional learning possible, rather than as paperwork alone [32], [33].

A usable monitoring loop can be simple: barangays record missed collection, recurring mixed waste, open dumping, or equipment failure; a responsible unit validates the report; the action and completion date are recorded; and the barangay receives feedback. Aggregated records can then identify patterns that deserve a policy response. This design avoids both punitive excess and purely symbolic reporting. It is also compatible with the decentralized architecture of RA 9003, which relies on local implementation but requires sufficiently visible accountability for those responsibilities to be meaningful [6], [7].

3.5 Accessible Communication and Barangay Leadership Connect Policy to Participation

The fifth theme shows why communication is a governance capacity, not a supplementary campaign. One Marawi participant explained that trainings were conducted but were not always fully understood when discussions used English or Tagalog. Another placed the barangay head at the center of mobilizing residents, with the city environment office serving as guide and support. Together, these accounts suggest that the policy challenge is not merely to disseminate RA 9003, but to make its daily implications intelligible: how waste should be separated, when it should be set out, what happens when it is mixed, where to ask for help, and how barangay and city roles relate.

“Trainings are conducted, but some participants do not fully understand because the discussion is in English or Tagalog.” (MC-R3, translated)

Iligan participants emphasized continued segregation at source, participation in clean-up drives, and compliance with ordinances. Both cases therefore point to the same principle: household participation is more likely to endure when communication is practical, repeated, and embedded in locally trusted channels. Evidence on pro-environmental behavior supports the value of clear, feasible actions and social reinforcement, while warning that information alone rarely overcomes barriers created by inconvenient services or a lack of facilities [34], [35], [36].

For selected Marawi barangays, the implication is to develop locally intelligible materials and demonstrations in the language residents use, with barangay leaders and community institutions involved in delivery. For selected Iligan barangays, the priority is to sustain communication so that operating routines do not depend only on the presence of monitors or collectors. In both contexts, a message should never be detached from a feasible service pathway. Asking households to segregate without explaining collection rules, recovery options, or what to do when service is missed shifts responsibility downward without resolving the institutional problem.

4. Conclusions

This qualitative study examined how 14 local implementers described solid waste policy enforcement in selected barangays of Marawi and Iligan. Its findings should be read as context-bound accounts, not as citywide estimates or a definitive ranking of local governments. Within those limits, the accounts show that enforcement is more likely to be credible when it is integrated with the everyday systems through which waste is collected, monitored, reported, and corrected. Rules without sufficient staff, vehicles, role clarity, accessible information, or a response to reports are difficult to enforce consistently.

The comparison also reframes institutional capacity. The relevant question is not whether a city has a waste-management office or an ordinance, but whether its governance chain is complete: Is the service feasible? Is responsibility assigned? Do residents receive usable information? Does monitoring identify a problem? Does someone act, record the action, and report back? Marawi informants foregrounded social constraints on strict enforcement, perceived resource shortages, role ambiguity, and language barriers. Iligan informants described more routinized enforcement and monitoring but still identified capacity requirements for expansion and modernization. Both cases therefore benefit from a graduated rather than binary approach to capacity building.

Three recommendations follow. First, city and barangay authorities should translate RA 9003 into a joint operating matrix that specifies service, education, inspection, complaint, and escalation responsibilities. Second, resource decisions should be tied to observable service targets—for example, route completion, response to missed collection, recovery arrangements, and the resolution of validated reports. Third, education should be language-accessible, repeated, and paired

with a service routine residents can realistically follow. Future research could test these propositions using longitudinal service records or examine how barangay-level collaborations adapt across changing service conditions. The present study provides an implementer-centered foundation for that work while keeping the analytic focus on public policy, bureaucracy, and local governance.

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