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Dimensions of Systemic Failure in Traditional Market Waste Management: A Scoping Review of Empirical Studies in Bandung Raya Metropolitan Area

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Abstract: Traditional markets in Indonesia consistently rank as the second-largest contributor to national solid waste, yet the management problem remains unresolved despite over a decade of intensive empirical research. In Bandung Metropolitan Area, at least twelve empirical studies were conducted between 2014 and 2025, yet field conditions show no significant improvement, indicating systemic and multidimensional failure. This study synthesizes evidence from these twelve studies to map existing conditions, identify key actors, and analyze the gap dimensions that explain why this failure persists. This study employs a scoping review design, with reporting guided by PRISMA-ScR. Studies were identified through systematic searches conducted on Google Scholar, SINTA, Garuda, and Scopus, and the synthesis employed a three-tiered thematic analysis. The synthesis identifies five mutually reinforcing gap dimensions: a technical-operational gap (infrastructure non-compliance); a behavioral-awareness gap (low environmental literacy among vendors); a participation-incentive gap (passive participation absent behavior-changing incentives); a governance-coordination gap (fragmented multi-stakeholder operations, no permanent collaborative institutions); and an institutional-regulatory gap (persistent misalignment between regulation and operational implementation). Failures across Bandung Raya metropolitan area cannot be attributed to any single factor but to the systemic interaction of all five dimensions. These findings call for integrated and simultaneous intervention strategies and provide a roadmap for a more effective research and policy agenda.

Keywords: Environmental Governance, Gap Analysis, Market Waste, Organic Waste Generation, Traditional Market, Scoping Review, Waste Management.

INTRODUCTION

Waste from cities is one of the biggest environmental problems that growing countries have to deal with today. As more people move to cities, the amount of trash that urban

businesses and people do keeps going up, often more than what the current waste management systems can handle. In this situation, traditional markets have become a major source of waste, mostly because of the large amount of organic waste that breaks down quickly and can be harmful to the environment and people's health if not handled properly.

In 2023, 11.63% of all national waste came from traditional markets activities, making them the second-largest source of waste after households 60.44% (Asri, n.d.); and by 2025, approximately 13.6% of all waste disposed of at landfills will come from traditional markets (Prihatini & Jatmiko, 2025). Economic activities in traditional markets generate a massive amount of waste, which remains a major challenge for the national waste management system. Bandung Raya metropolitan area is one of the largest urban agglomerations in Indonesia, with a population of over 8 million people. In 2026, Bandung Regency recorded 1,500 – 1,800 tons of waste generated per day (Sukirman, 2026). Meanwhile, the City of Bandung faced extraordinary pressure from waste management and declared a waste emergency following the fire at the Sarimukti Landfill in August 2023 (Ritonga, 2023). This situation persists until 2026 because waste shipments from the City of Bandung to the Sarimukti Final Waste Processing Facility have been halted and restricted. Sarimukti is the only landfill for waste from the City of Bandung, Bandung Regency, the City of Cimahi, and West Bandung Regency (Costa, 2026). In this challenging regional context, traditional markets at dozens of locations and the high daily volume of organic waste generated represent one of the most urgent critical issues that needs to be addressed.

Waste management in traditional markets in the Bandung Raya metropolitan area has actually received considerable scientific attention over the past decade, unlike many other environmental issues. Between 2014 and 2025, at least twelve empirical studies were conducted in various traditional markets in this region, including Gegerkalong, Ujungberung, Ciroyom, Caringin, Gedebage, Kordon, Baleendah, Kiaracondong, and Ciparay. These studies employed a variety of methodological approaches, ranging from descriptive qualitative and quantitative methods to mixed methods, to examine various aspects of waste management in traditional market environments (As-Safraa Nurzimat & Angestiwi, 2025; Chaerul & Dewi, 2020; Djafar et al., 2014; Karmini et al., 2022; Prabowo et al., 2025; Rofifah & Tarlani, 2023; Safitri & Setiobudi, 2023; Silfia & Surtikanti, 2024; Utamy et al., 2025; Wicaksono & Lesnusa, 2022; Zahra et al., 2025; Nurfitriana et al., 2016).

Despite conducting these various studies, the conditions on the ground have not significantly improved. Nearly all existing studies reveal similar patterns of findings: substandard waste management infrastructure, suboptimal waste sorting practices, low vendor participation, weak coordination among stakeholders, and policy implementation that is out of step with operational realities in the market. This serves as the starting point for the necessity of this study. Twelve studies across nine locations over more than a decade continue to reveal relatively similar and recurring patterns of problems. The situation brings up important academic issues. It indicates that the primary issue is not a lack of information about how things really are on the ground, as previous studies have already provided a sufficiently robust database. However, we still need to answer the question of why this waste management failure is systemic, persists over time, and involves various intertwined dimensions. Furthermore, it remains unclear exactly which dimensions of these gaps interact with one another, such as economic, social, and environmental factors, making improvement efforts difficult to achieve despite various studies and policy interventions. Thus, the primary obstacle to progress in traditional market waste management policy is not a lack of data, but rather a limitation in comprehensively understanding the underlying structure of the problem.

This study aims to provide a more comprehensive understanding of the challenges in managing waste at traditional markets in the Bandung Raya metropolitan area through three main focuses. First, this study synthesizes empirical evidence from twelve existing studies to

construct a more comprehensive and cross-location picture of the current state of market waste management. Second, this study analyzes various dimensions of systemic gaps that cause persistent failures in waste management, covering technical-operational aspects, behavior and awareness, participation-incentives, and governance and coordination, as well as institutional and regulatory aspects. Third, this study identifies the implications of these findings for the development of future research agendas as well as for the design of more effective policy interventions in traditional market waste management in Bandung Raya metropolitan area and similar regional contexts. To achieve the aims, this study is guided by three interrelated research questions: 1) What does the synthesis of twelve empirical studies on traditional market waste management in the Bandung Raya metropolitan area reveal regarding existing conditions, key actors, and recurring patterns of failure? 2) What are the persistent and cross-dimensional systemic gap dimensions technical-operational, behavioral-awareness, participation-incentive, governance-coordination, and institutional-regulatory, that explain the persistence of waste management failures in traditional markets across this region? And 3) What are the implications of these gap analysis findings for future research agendas and the design of more effective policy interventions for traditional market waste management in the Bandung Raya metropolitan area and comparable regional contexts?

This study makes three interrelated contributions to existing literature. Empirically, it produces the first comprehensive cross-study synthesis of all available empirical evidence on traditional market waste management in Bandung Raya metropolitan area, moving beyond the fragmented single-site case studies that have characterized the field to date. Analytically, it identifies five systemic gap dimensions that explain the persistence of failure, not merely its existence, offering a more robust analytical foundation for policy design than descriptive documentation alone. Strategically, it provides a roadmap for integrated, simultaneous intervention across all five gap dimensions, drawing on the only study in the corpus that proposes an alternative model: a circular-economy-based approach with projected revenue potential of IDR 2.09 billion per month at a single market (Rofifah & Tarlani, 2023). Beyond these substantive contributions, the finding that none of the twelve studies in this corpus is indexed in international databases, with searches on Scopus and Web of Science returning zero results, constitutes a significant meta-level contribution. This study thus serves as the first bridge between a decade's worth of locally produced empirical knowledge and the international academic conversation on urban waste governance in the Global South.

This study is structured as follows. Section 2 presents the literature review underpinning the study, covering traditional market characteristics, urban solid waste management, multi-actor environmental governance, vendor participation, and the analytical frameworks adopted. Section 3 describes the scoping review methodology, including the systematic search strategy, inclusion and exclusion criteria, the PRISMA-ScR selection flowchart, the data charting matrix, and the three-tiered thematic synthesis procedure following the thematic synthesis procedure (Thomas & Harden, 2008). Section 4 presents the results: first, the profile and characteristics of the twelve studies comprising the corpus; and second, the multi-gap analysis identifying five mutually reinforcing dimensions of systemic failure. Section 5 discusses the theoretical and policy implications of these findings, including a prioritized research agenda. Section 6 concludes with the study's main arguments and recommendations.

Literature Review

Traditional Markets: Definition, Characteristics, and Socioeconomic Role

Traditional markets are one of the oldest forms of commerce that are still around today. They are crucial to the local economy and the way food is distributed in developing countries. In Indonesia, traditional markets are defined by Minister of Trade Regulation No. 37 of 2017 as those that are established and managed by local governments, the private sector, state-owned

enterprises, and local government-owned enterprises. These markets, which may include partnerships with the private sector, feature business premises such as shops, kiosks, stalls, and tents that are owned or operated by small and medium-sized traders and cooperatives with limited capital, where the buying and selling of goods occurs through bargaining. From a social perspective, traditional markets are more than just places where people buy and sell goods. People from low-income areas can meet, talk, and obtain what they need every day there. They are trade and buying spots. Therefore, the problem with waste management in traditional markets is not just a matter of keeping things clean; it also directly affects public health, the environment in small cities, and the long-term health of the informal economy, which is how millions of people make a living (Kaza et al., 2018). Improper waste management in traditional markets is an example of unequal access to satisfactory environmental services in the context of environmental justice.

Traditional markets are characterized by high activity levels, a predominance of fresh produce (vegetables, fruits, meat, and fish), long operating hours, and a dense layout; these characteristics result in waste composed primarily of easily decomposable organic matter (Al-Hanniya et al., 2022; Mangarengi et al., 2020). Organic waste is the dominant component of market waste in Indonesia (Ganing et al., 2023; Rahayu & Sukmono, 2013), and this is increasing the difficulty of managing organic waste because it decomposes rapidly, produces toxic leachate, and serves as a breeding ground for disease vectors if not managed within 24 hours.

Urban Waste Generation: Scale, Trends, and the Contribution of Traditional Markets

Managing solid waste from cities is a problem that needs to be fixed right away because more and more people are moving to cities around the world. (Kaza et al., 2018), in their World Bank report called What A Waste 2.0, say that the world will produce 3.40 billion tons of waste each year by 2050, which is 70% more than the 2.01 billion tons that were produced in 2016. This rise is not happening everywhere. Lower-middle-income countries, like Indonesia, are expected to have the most waste, which makes sense since they are urbanizing quickly.

According to the National Waste Management Information System in Indonesia, traditional markets contributed 11.63% of national waste, making them the second-largest source after households (60.44%). Indonesia has more than 13,000 traditional markets, so this problem is enormous and cannot be ignored. This reflects the significant waste generated by market activities, which remains a major challenge for Indonesia's waste management system. The Bandung Raya metropolitan area, with a population exceeding 8 million, illustrates this issue, where Bandung Regency alone produced 1,500–1,800 tons of waste per day in 2026. At the same time, the City of Bandung has faced severe pressure, declaring a waste emergency following the fire at the Sarimukti landfill in August 2023, a situation that continues until 2026 due to restrictions and disruptions in waste transportation to the facility.

Urban Waste Management Systems: Concepts, Components, and Dimensions of Failure

Several interrelated tasks, including source separation, collection, transportation, treatment, and final disposal, are important for efficient urban waste management. In Integrated Solid Waste Management, Tchobanoglous et al. (1993) stated that an effective waste management system must actively address institutional, financial, social, and regulatory issues rather than depending just on technical-engineering elements. In Indonesia, the technical framework for waste management is governed by Law No. 18 of 2008 on Waste Management (Republic of Indonesia, 2008), which mandates the "reduce, reuse, recycle" (3R) approach as the primary paradigm, marking a shift from the "collect and dispose" approach that has long dominated the field. The central government, local governments, waste generators, and area managers, including markets, clearly divide responsibilities under this law. However,

numerous studies indicate that the operational realization of these regulatory mandates remains distant.

A systemic failure arises from the interaction of various subsystems, rather than a single factor, and occurs when these subsystems are not functioning optimally (Regulation of the Minister of Public Works No. 03/PRT/M/2013 on the Provision of Waste Infrastructure and Facilities in the Management of Household Waste and Waste Similar to Household Waste). Systemic failure is self-reinforcing, meaning that infrastructure weaknesses lead to poor trader behavior, low participation weakens governance, and the absence of coordination mechanisms slows regulatory improvements. This cycle of failure explains why the waste problem in traditional markets is so difficult to resolve even after repeated interventions.

Multi-Actor-Based Environmental Governance

Waste management in traditional markets involves a complex and multi-layered network of actors, including local governments as regulators and asset owners, Regionally Owned Enterprises (Badan Usaha Milik Daerah - BUMD) managing the markets as operators, the Regional Technical Implementation Unit (Unit Pelaksana Teknis Daerah-UPTD) of the Environmental Agency as the entity responsible for sanitation, the Traders' Cooperative (Koperasi Pedagang- KOPPAS) as the representative of business operators, individual traders as waste generators, and the surrounding community as the affected parties. The complexity of these inter-actor relationships demands a governance approach that goes beyond the conventional hierarchical-bureaucratic model. Ansell and Gash (2008), in their seminal article titled Collaborative Governance in Theory and Practice, propose a framework for collaborative governance that conceptualizes governance as a collaborative process between public and non-public actors within a collective decision-making forum. Their model identifies four critical variables that determine the success of collaboration: starting conditions (initial levels of trust and the history of the relationship), facilitative leadership, institutional design (an inclusive institutional framework), and the collaborative process (a sustained process of dialogue and negotiation). In the context of market waste management in the Bandung Raya metropolitan area, these four variables have not been adequately realized; this is a finding empirically demonstrated by the study by Prabowo et al. (2025).

The theory of government roles developed by Rasyid (2000) proposes four essential functions that the state should perform: as a regulator (establishing rules), a dynamizer (promoting behavioral change), a facilitator (providing infrastructure), and a catalyst (accelerating change through synergy among actors). Furthermore, the study by Utamy et al. (2025) on the Environmental Agency's Technical Implementation (Dinas Lingkungan Hidup - DLH) at Gedebage traditional market indicates that although these four roles have been formally carried out, their implementation is still far from optimal, suggesting a significant institutional gap between institutional mandates and operational capacity.

Participation of Traders and Behavioral Dimensions in Waste Management

The participation of traders is a key factor in the success of a waste management system for markets. Even the most advanced technical and institutional systems will not work well if traders, who are the main source of waste, do not actively participate. Reed (2008) argues that meaningful stakeholder participation in environmental management requires movement along a spectrum, from passive engagement, where stakeholders merely receive information or contribute material resources, toward active and transformative participation grounded in empowerment, equity, and learning. A study by Safitri and Setiobudi (2023)at Kiaracondong Market found that trader participation was concentrated in passive forms (material resources and labor), while more transformative participation (skills and intellectual contributions) remained very low.

From a behavioral psychology perspective, Herzberg's Two-Factor Theory distinguishes between motivating factors (intrinsic factors that drive positive behavior) and hygiene factors (extrinsic factors that prevent dissatisfaction) (Alshmemri et al., 2017). In the context of market waste management, the findings of Nurfitriana et al. (2016) at Gedebage Market reveal a relevant phenomenon: the majority of vendors have a strong desire to participate in 3R programs, yet possess limited knowledge of how to do so. This implies that the primary barrier lies not in motivation but in capacity and access to information, a distinction that has direct implications for intervention design.

Analytical Framework: Thematic Synthesis and Scoping Review

To synthesize the empirical evidence from a selection of methodologically heterogeneous studies, this study adopted the scoping review approach as developed by Arksey and O'Malley (2005) and updated by Levac et al. (2010). A scoping review was chosen for its ability to encompass studies with diverse research designs, identify knowledge gaps, and produce a comprehensive literature map without restrictions on specific methodological types. Cross-study thematic synthesis was conducted using the thematic synthesis method developed by Thomas & Harden (2008). This method consists of three progressive layers of analysis: line-by-line coding (generating descriptive codes from each study finding), the development of descriptive themes (grouping codes based on shared meaning), and abstraction into analytical themes (cross-study interpretations that yield new understandings beyond individual findings). It is this third layer that enables this study to identify systemic dimensions of the gap, an analytical contribution that cannot be derived from reading individual studies alone. Epistemologically, this study adopts an interpretivist-constructivist stance that acknowledges that the process of synthesis and gap identification involves the researcher's interpretive judgments, yet ensures transparency and auditability through the systematic documentation of all analytical decisions.

METHODS

This study employs a scoping review design based on the methodological framework of Arksey and O'Malley (2005) and Levac et al. (2010). A scoping review is a form of evidence synthesis that aims to map the scope, coverage, and characteristics of the existing literature on a topic, identify knowledge gaps, and provide a foundation for subsequent research or policy. The reporting follows the PRISMA Extension for Scoping Reviews (PRISMA-ScR) by Tricco et al. (2018) guidelines (see Figure 1). The choice of a scoping review design was based on three mutually reinforcing methodological considerations. Firstly, the research questions posed are exploratory and mapping in nature. Secondly, the studies in the corpus employ a wide variety of methodologies, including qualitative, quantitative, and mixed methods, making statistical meta-analysis unfeasible. Third, the aim of this study includes the identification of knowledge gaps across studies, which is one of the primary objectives and specific strengths of the scoping review design compared to other types of synthesis (Peters et al., 2020).

The literature was systematically searched across four major databases and repositories: Google Scholar, SINTA (Science and Technology Index), Garuda (Garba Rujukan Digital), and Scopus. These four databases were selected on the basis that the majority of Indonesian academic publications, including proceedings and indexed national journals, are not yet fully represented in international databases such as Scopus or Web of Science. Searches on Google Scholar and SINTA were prioritised to ensure comprehensive coverage of local literature. Search strings were constructed using the following keywords in bahasa or english: "pengelolaan/management", "penanganan/handling", "sampah pasar/market waste", "Bandung" to comprehensively capture all key concepts reflected in the research question. All searches were conducted in October-December 2025 and documented in detail. The study

selection was conducted in two consecutive stages (Levac et al., 2010). first, a screening based on titles and abstracts; second, a full-text review of all records that passed the first stage. Inclusion and exclusion criteria were established before the selection process began to prevent selection bias and to ensure the relevance, quality, and consistency of the selected literature. The study focuses specifically on the Bandung Raya Metropolitan area, which includes the City of Bandung, Bandung Regency, Cimahi City, and West Bandung Regency. Studies conducted outside this geographical scope were excluded to maintain contextual consistency. Regarding the object of study, only research explicitly examining traditional markets (pasar tradisional), including main markets, district markets, and people's markets, was eligible for inclusion. Studies focusing on modern retail formats, such as supermarkets, or on waste facilities like landfills (Tempat Pembuangan Akhir-TPA), were excluded. From a topical perspective, the review includes studies addressing waste management and handling, waste generation, and market sanitation governance. Articles that discuss market management without any relation to waste or environmental aspects were excluded. In terms of publication type, only journal articles and peer-reviewed conference proceedings were included. Non-scholarly sources such as internal reports, news articles, and unpublished theses were excluded to ensure academic rigor. For language, only publications written in Indonesian or English were considered, while studies in other languages were excluded. Concerning the time period, the review covers studies published between 2010 and 2025, ensuring the inclusion of relatively recent and relevant research. Studies published prior to 2010 were excluded. Finally, in terms of methodology, only empirical studies employing qualitative, quantitative, or mixed-method approaches were included. Purely secondary studies without new empirical data were excluded, as the study emphasizes evidence-based findings.

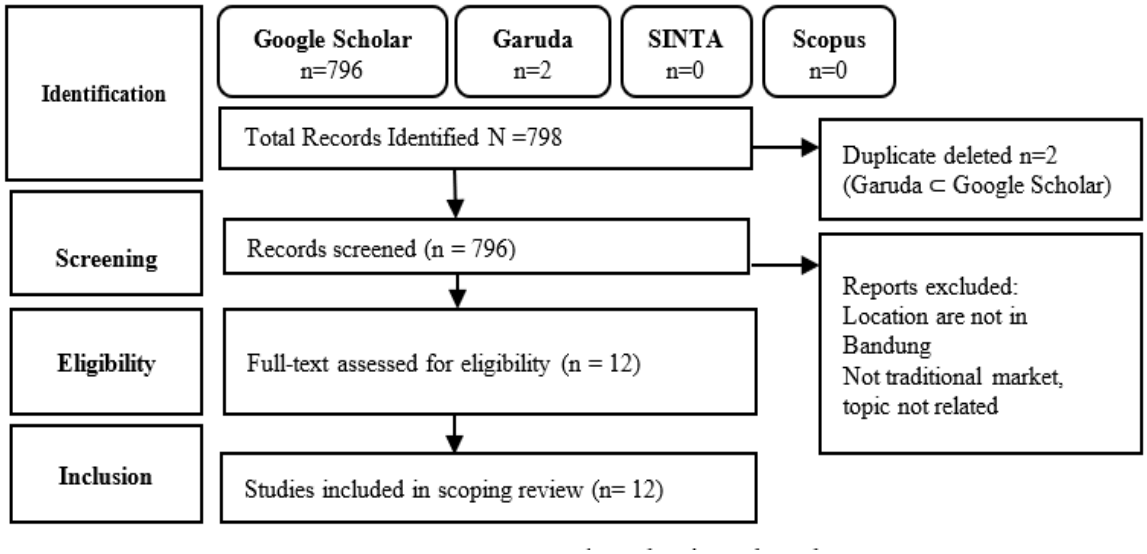

Figure 1. PRISMA-ScR Study Selection Flowchart

The search yielded a total of 798 records (Google Scholar 796 + Garuda 2 + SINTA 0 + Scopus 0). All 2 Garuda records were duplicates of those found in Google Scholar; thus, after deduplication, 796 unique records remained. During the title and abstract screening stage, 784 records were excluded (failing to meet the criteria for relevance regarding location, subject, or topic). This left 12 records that underwent full-text review. All 12 records fully met the inclusion criteria with none excluded; thus, n = 12 studies formed the corpus for this research analysis. The fact that Scopus and SINTA search results yield zero hits is a significant finding: the entire body of empirical research on waste management in traditional markets within the

Bandung Raya metropolitan area has not yet been indexed in international databases. This underscores the urgency of this study as a bridge between local knowledge and the global academic discourse. Data extraction was conducted using a twelve-variable matrix based on (Levac et al., 2010): study ID, bibliography, location, administrative region, market operator, objective, method, theory/framework, main findings, gaps, recommendations, and gap dimensions derived from the coding results. All entries were accompanied by verbatim quotations to ensure auditability.

The synthesis employed the thematic synthesis approach outlined by Thomas & Harden (2008): (1) line-by-line coding yielded descriptive codes closely tied to the data; (2) descriptive themes grouped codes with similar meanings; and (3) analytical themes abstracted these to a higher level through cross-study interpretation, resulting in five gap dimensions as the primary contribution of the research. This study adopts an interpretive-constructivist approach. The principles of auditability and transparency were applied to ensure the study's reliability. Limitations: (1) single-reviewer; (2) does not include gray literature; (3) ten of the twelve studies were conducted in Bandung; (4) no quality appraisal.

RESULTS AND DISCUSSION

Profile of Twelve Empirical Studies

Twelve studies published between 2014 and 2025, covering nine traditional market locations in the Bandung Raya metropolitan area. Table 1 presents the characteristics of 12 empirical studies.

Table 1. Characteristics of 12 empirical studies

No	Author	Location	Region	Method	Focus	Key Findings
S1	Silfia & Surtikanti (2024)	Gegerkalong Market	Bandung City	Qualitative	Effectiveness	60% organic waste; ineffective management; very low literacy
S2	Chaerul & Dewi (2020)	Ujungberung Market	Bandung City	Mixed	Waste Generation	0.464 kg/stall/day; highest in cooked food stalls 3.16 kg/day; temporary waste station overloaded
S3	Karmini et al. (2022)	Ciroyom Market	Bandung City	Quantitative	Handling	Containerization 83.33% non-compliant; collection 66.66% non-compliant; transportation 42.85% non-compliant
S4	Prabowo et al. (2025)	Gedebage & Caringin Markets	Bandung City	Qualitative	Collaborative Governance	Coordination not optimal; collaboration forums informal and non-permanent
S5	Djafar et al. (2014)	Caringin Main Market	Bandung City	Quantitative	Waste Generation	49.41 kg/day; 1.64 kg/m²/day; management system not optimal

No	Author	Location	Region	Method	Focus	Key Findings
S6	Wicaksono & Lesnusa (2022)	Kordon Market	Bandung City	Mixed	Process Management	Facilities inadequate; awareness programs do not change behavior; low efficiency
S7	Zahra et al. (2025)	Baleendah Market	Bandung Regency	Qualitative	Policy	Voluntary workers unpaid; policy ignores social behavior
S8	Utamy et al. (2025)	Gedebage Main Market	Bandung City	Qualitative	Role of UPTD	UPTD role not optimal; 90% organic waste; damaged infrastructure
S9	Safitri & Setiobudi (2023)	Kiaracondong Market	Bandung City	Mixed	Participation	97.8% pay fees; only 26.4% sort waste; low transformative participation
S10	Nurfitriana et al. (2016)	Gedebage Main Market	Bandung City	Quantitative	3R Participation	77% high willingness - low knowledge; composting 0% efficiency
S11	Nurzimat & Angestiwi (2025)	Ciparay Market	Bandung Regency	Mixed	Functional	Zoning, circulation, facilities not compliant with SNI 8152:2015
S12	Rofifah & Tarlani (2023)	Caringin Main Market	Bandung City	Mixed	Circular Economy	72 tons/day waste; circular economy potential IDR 2.09 billion/month; RDF technology (Hejo Tekno)

Source: Researcher-extracted data, 2025

Four key findings were identified. First, in terms of location, ten of the twelve studies were conducted in the city of Bandung and two in Bandung Regency (S7, S11), confirming a regional representation gap. Second, methodologically, the studies were distributed among qualitative (4), quantitative (3), and mixed methods (5). Third, eleven of the twelve studies focused on documenting failures, while S12 was the only study proposing an alternative model based on the circular economy. Fourth, there were two studies at the same locations (Caringin Central Market: S5 and S12; Gedebage Central Market: S8 and S10), providing an indirect longitudinal perspective on changes in conditions from 2014 to 2025.

Key Actors in Waste Management at Traditional Markets

A synthesis of twelve studies identified six categories of key actors that consistently emerged across locations and time periods. Table 2 presents these actors along with their formal roles and empirical findings regarding their actual circumstances.

Table 2. Key Actors formal role

Actor	Role	Findings
Local Government (City/regency administration)	Regulator, asset owner	Regulatory implementation remains suboptimal [13, 15]
UPTD Environmental Agency	Technical sanitation authority	Role not yet optimal; fleet limitations [14]
Regional Market Corporation PD Pasar / BP3C	Market Operator	Institutional heterogeneity complicates inter-actor coordination [17]
KOPPAS (Traders' Cooperative)	Vendor representative body	Not documented as active in the majority of studies
Vendors	Primary waste generators	Passive participation; only 26.4% sort waste at source [11]
Surrounding Community	Affected party	Marginally mentioned; not actively engaged [6–17]

The data shows that not a single study in the corpus documents a permanent collaborative forum involving all six actors simultaneously. Prabowo et al. (2025) note that existing coordination mechanisms are informal and non-permanent, making it impossible to systematically enforce accountability among the actors.

Analysis of Multi-Gap: Five Dimensions of Systemic Failure

Based on a three-tiered thematic synthesis of twelve studies, this research identifies five dimensions of systemic, persistent, and mutually reinforcing gaps. These five dimensions are the result of an analytical framework developed across the studies that explains why failures continue to recur

Technical-Operational Gaps

Karmini et al. (2022) found inconsistencies in compliance at Ciroyom Market: 83.33% of waste containers were non-compliant, 66.66% of waste collection was non-compliant, and 42.85% of waste transportation was non-compliant. Djafar et al. (2014) highlighted issues with the fleet and temporary disposal sites at Caringin Market. Wicaksono and Lesnusa (2022) documented operational inefficiencies at Kordon Market. A comparison of the two studies at Caringin Market reveals a deterioration in conditions over time: Djafar et al. (2014) reported a waste generation of 49.41 kg/day from the sample, while Rofifah and Tarlani (2023) reported total market waste generation reaching 72 tons per day, underscoring the true scale of the problem. Study S12 (Rofifah & Tarlani, 2023) also indicates that 10% of Bandung City's waste originates from Caringin Market alone, all of which is transported to the Sarimukti Landfill daily using an unsustainable conventional model.

Behavior-Awareness Gap

Silfia & Surtikanti (2024) found that vendors at Gegerkalong Market were "concerned but not yet educated." Nurfitriana et al. (2016) found that 77% of vendors at Gedebage Market had a strong desire to participate in the 3Rs but lacked knowledge about how to do so. Karmini et al.(2022) confirmed that staff knowledge was "adequate" (60%) but not put into practice due to a lack of resources. Findings across studies indicate that the main barrier is not motivation but rather behavioral capacity and infrastructure.

Participation-Incentive Gap

Safitri & Setiobudi (2023) found that 97.8% of Kiaracondong vendors paid fees, but only 26.4% ever sorted their waste. Nurfitriana et al. (2016) confirmed that the Gedebage

composting system has the potential to utilize 55% of organic waste but has 0% efficiency due to the lack of sorting participation. Rofifah & Tarlani (2023) propose an alternative: a circular economy model that links vendor participation to direct economic incentives, with a potential monthly revenue of Rp2.09 billion for operators. These findings indicate that aligning incentives between waste sorting and tangible economic benefits is the key element that has been missing.

Governance-Coordination Gaps

Prabowo et al. (2025) comprehensively documented governance gaps using the framework by Ansell & Gash (2008). They found that coordination among the Environmental Agency (Dinas Lingkungan Hidup), regional market corporation (Perusahaan Daerah Pasar), vendors, and the community remains limited despite the existence of Regional Regulation No. 9/2018 and an informal MoU. Utamy et al. (2025) confirm that the "Kang Pisman" program raises awareness, but fleet limitations and lengthy bureaucracy hinder its effectiveness. Zahra et al. (2025) add that vendors at Baleendah Market pay fees but do not know to whom responsibility is delegated; this indicates a lack of institutional accountability. Interestingly, Rofifah & Tarlani (2023) highlights that Caringin Central Market is managed by BP3C (Caringin Trade Center Management Agency) unlike PD Pasar Bermartabat, demonstrating institutional heterogeneity that complicates coordination among actors.

Institutional-Regulatory Gap

Law No. 18/2008 (Republic of Indonesia, 2008), and Ministry of Public Works Regulation No. 03/2013 (Ministry of Public Works of the Republic of Indonesia, 2013) have established detailed standards. However, Zahra et al. (2025) found no specific technical regulations regarding the hours and procedures for waste disposal at market waste collection points. Prabowo et al. (2025) revealed that institutional implementation remains hierarchical. Rofifah and Tarlani (2023) added a new dimension: there are no regulations accommodating a circular economy-based management model, even though the technology is already available; this finding reflects a regulatory lag regarding waste management innovation.

Systemic Interactions and the Role of the Circular Economy

These five gaps reinforce each other in a self-reinforcing cycle: poor infrastructure (Gap 1) reinforces traders' skepticism (Gap 2), the absence of incentives (Gap 3) eliminates rational reasons to change, siloed coordination (Gap 4) prevents accountability, and lagging regulations (Gap 5) eliminate external pressure. This explains why partial interventions always fail. Findings from Rofifah and Tarlani (2023) offer a significant new perspective: the circular economy model formulated by Rofifah and Tarlani (2023) has the potential to break this cycle through incentive alignment, transforming waste from a cost burden into a revenue source. However, the success of this model still requires the simultaneous resolution of the other four gaps: sorting infrastructure (Gap 1), trader capacity (Gap 2), participation mechanisms (Gap 3), and coordination among BP3C, DLH, and technology providers such as Hejo Tekno (Gaps 4 and 5).

Discussion

The findings of this study both confirm and extend existing theoretical frameworks in meaningful ways. The findings of this study are broadly consistent with previous research on urban waste management in developing countries, yet they also reveal important nuances that extend beyond what the individual studies have shown separately. Most prior studies on traditional market waste management in the Bandung Raya metropolitan area focused on a single market and documented problems at the site level (Chaerul & Dewi, 2020; Djafar et al.,

2014; Karmini et al., 2022; Nurfitriana et al., 2016; Prabowo et al., 2025; Rofifah & Tarlani, 2023; Safitri & Setiobudi, 2023; Silfia & Surtikanti, 2024; Utamy et al., 2025; Wicaksono & Lesnusa, 2022; Zahra et al., 2025; Z. As-Safraa Nurzimat & Angestiwi, 2025). In contrast, this cross-study synthesis shows that the problems are not isolated to any one location, they are structural and repeated across all nine market sites examined over more than a decade. This pattern suggests that the problem is not a matter of poor implementation at specific locations, but rather a deeper systemic issue that cannot be solved by site-by-site interventions alone. Compared to similar studies in other Indonesian cities, such as those conducted in Surabaya by Al-Hanniya et al. (2022) and Samarinda by Rahayu and Sukmono (2013), the Bandung Raya metropolitan area shows comparable levels of organic waste dominance and infrastructure non-compliance. However, what makes Bandung unique is the availability of an alternative model, the circular economy approach proposed by Rofifah and Tarlani (2023) which has not yet been documented in other regional markets in Indonesia. This positions Bandung as a potential test case for scaling up circular economy-based solutions in traditional markets, provided that the five gap dimensions identified in this study are addressed simultaneously.

This study makes two main contributions to existing theory. First, it confirms and extends the collaborative governance framework developed by Ansell and Gash (2008). Their model identifies trust, leadership, institutional design, and collaborative process as the four key variables for successful governance. What this study adds is that in settings where repeated failures have occurred over a long period of time, the absence of trust is not simply a starting condition that can be overcome by creating a new forum. Instead, it becomes a structural barrier, vendors and government actors have both learned to expect that interventions will fail, and this expectation itself reduces the motivation to participate fully. Addressing this "trust deficit" requires consistent small wins before larger coordination mechanisms can function. Second, this study contributes to the growing body of literature on stakeholder participation in environmental management (Reed, 2008). Reed (2008) argues that meaningful participation requires movement from passive to active and transformative forms.

The findings here show that in the context of traditional markets, this movement is blocked not by a lack of willingness but by the absence of practical capacity and concrete incentives. This suggests that participation frameworks need to include not only process design but also material conditions (tools, infrastructure, and economic rewards) that make transformative participation possible and rational for vendors. Three practical implications follow from the findings. First, any intervention must address all five gap dimensions at the same time, not just one or two. Past efforts in the Bandung Raya metropolitan area have repeatedly targeted a single dimension, for example, building new waste containers (technical) or running awareness campaigns (behavioral), without changing the other four. As long as the other gaps remain open, the impact of any single intervention will be limited or short-lived.

Second, the economic case for change needs to be made visible to vendors and operators. The findings of Rofifah and Tarlani (2023) showing a revenue potential of IDR 2.09 billion per month from circular economy processing at a single market, offer a powerful argument that waste sorting is not just an environmental responsibility but also a business opportunity. Local governments and market operators can use this evidence to design fee-reduction schemes or profit-sharing arrangements that directly reward vendors who sort their waste at source.

Third, regulations need to be updated to keep pace with available technology. The fact that no existing regulation accommodates circular economy-based waste management, despite the technology being commercially available through providers such as Hejo Tekno, is a form of regulatory lag that prevents progress. Updating local regulations to explicitly allow and incentivize circular economy arrangements in market settings would remove a major institutional barrier. This study has several limitations: (1) it was a single-reviewer study; (2)

it did not include grey literature; (3) the representation of Bandung Regency was limited; (4) there was no quality appraisal, as is typical of scoping reviews.

CONCLUSION

This study confirms that the failure of waste management in traditional markets in the Bandung Raya metropolitan area is not caused by a single factor, but rather by the systemic interaction of five mutually reinforcing dimensions of gaps: technical-operational, behavioral-awareness, participation-incentives, governance-coordination, and institutional-regulatory. Additional key findings from the study by Rofifah and Tarlani (2023)indicate that a circular economy model has the potential to break the cycle of failure by shifting the paradigm from viewing waste management as a cost burden to a revenue source; there is a potential of IDR 2.09 billion per month at Caringin Central Market alone. However, realizing this potential still requires the simultaneous resolution of all five dimensions of the gap. As the first scoping review to synthesize twelve studies on traditional market waste management in Bandung Raya metroplitan area, this research provides an evidence-based roadmap for future researchers and policymakers, while bridging the gap between rich yet fragmented local knowledge and international academic discourse.

REFERENCES

Al-Hanniya, U.H., Purnomo, Y.S., Farahdiba, A.U.: Kuantifikasi dan Karakterisasi Timbulan Sampah Makanan (Food Waste) di Pasar Tradisional Kota Surabaya Timur. INSOLOGI: Jurnal Sains dan Teknologi. 1, 880–888 (2022). https://doi.org/10.55123/insologi.v1i6.1279.

Alshmemri, M., Shahwan-Akl, L., Maude, P.: Herzberg's Two-Factor Theory. Life Sci. J. 14, 12–16 (2017). https://doi.org/10.7537/marslsj140517.03.

Ansell, C., Gash, A.: Collaborative Governance in Theory and Practice. Journal of Public Administration Research and Theory. 18, 543–571 (2008). https://doi.org/10.1093/jopart/mum032.

Arksey, H., O'Malley, L.: Scoping studies: towards a methodological framework. Int. J. Soc. Res. Methodol. 8, 19–32 (2005). https://doi.org/10.1080/1364557032000119616.

Asri, C.: Data Sampah di Indonesia Tahun 2025 dan Infografisnya!, https://indonesiaasri.com/edukasi/data-sampah-di-indonesia/,last accessed 2026/04/14.

As-Safraa Nurzimat, Z., Angestiwi, T.: Analisis Kondisi Pasar Tradisional Berdasarkan Aspek Fungsional (Studi Kasus Pasar Tradisional Ciparay di Kabupaten Bandung). Jurnal Manajemen Aset Infrastruktur & Fasilitas. 9, (2025).

Chaerul, M., Dewi, T.P.: Analisis Timbulan Sampah Pasar Tradisional (Studi Kasus: Pasar Ujungberung, Kota Bandung). Al-Ard: Jurnal Teknik Lingkungan. 5, 98–106 (2020). https://doi.org/10.29080/alard.v5i2.861.

Costa, F.M.L.: Kota Bandung Darurat Sampah Saat Lebaran, https://www.kompas.id/artikel/saat-lebaran-kota-bandung-ditetapkan-darurat-sampah, last accessed 2026/04/14.

Djafar, J., Ainun, S., Dirgawati, M.: Identifikasi Timbulan Sampah di Pasar Induk Caringin Bandung. Jurnal Institut Teknologi Nasional. 2, 1–9 (2014).

Ganing, A., Mappau, Z., Saddania, S.: Analysis of Waste Generation and Characteristics; Mamuju Central Market in 2022. International Journal of Science and Healthcare Research. 8, 505–513 (2023). https://doi.org/10.52403/ijshr.20230267.

Karmini, M., Budiman, A., Kahar, K.: Tinjauan Penanganan Sampah di Pasar Tradisional Ciroyom. JURNAL RISET KESEHATAN POLTEKKES DEPKES BANDUNG. 14, 1–8 (2022). https://doi.org/10.34011/juriskesbdg.v14i1.2010.

Kaza, S., Yao, L.C., Bhada-Tata, P., Van Woerden, F.: What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Washington, DC: World Bank (2018). https://doi.org/10.1596/978-1-4648-1329-0.

Levac, D., Colquhoun, H., O'Brien, K.K.: Scoping studies: advancing the methodology. Implementation Science. 5, 69 (2010). https://doi.org/10.1186/1748-5908-5-69.

Mangarengi, N.A.P., Zubair, A., Abdurrahman, M.A.: Analysis of infrastructure needs and operational systems for traditional market solid waste management (A case study on Makassar – Niaga Daya traditional market). IOP Conf. Ser. Earth Environ. Sci. 419, 012156 (2020). https://doi.org/10.1088/1755-1315/419/1/012156.

Ministry of Public Works of the Republic of Indonesia: Regulation of the Minister of Public Works No. 03/PRT/M/2013 on the Provision of Waste Infrastructure and Facilities in the Management of Household Waste. (2013).

Nurfitriana, W., Hartati, E., Ainun, S.: Studi Tingkat Partisipasi Pedagang dalam Pengelolaan Sampah Berbasis 3R di Pasar Induk Gedebage. Jurnal Reka Lingkungan. 4, 57–65 (2016). https://doi.org/10.26760/rekalingkungan.v4i2.%25p.

Peters, M.D.J., Christina, G., Patricia, M., Zachary, M., Andrea C., T., Hanan, K.: Chapter 11: scoping reviews In E. Aromataris & Z. Munn (Eds.). In: JBI Manual for Evidence Synthesis. pp. 467–473. JBI (2020). https://doi.org/10.46658/JBIMES-20-12.

Prabowo, S., Subagyo, A., Nuradhawati, R.: Collaborative Governance dalam Pengelolaan Sampah di Kota Bandung (Studi Kasus di Pasar Induk Gedebage dan Pasar Caringin). Jurnal Mahasiswa Magister Ilmu Pemerintahan. 2, 2025 (2025). https://doi.org/10.36859/prinsip.v2i1.4728.

Prihatini, Z., Jatmiko, B.P.: Pasar Jadi Salah Satu Kontributor Sampah Terbesar Tingkat Nasional, https://lestari.kompas.com/read/2025/02/23/090000686/pasar-jadi-salah-satu-kontributor-sampah-terbesar-tingkat-nasional-, last accessed 2026/04/05.

Rahayu, D.E., Sukmono, Y.: Kajian Potensi Pemanfaatan Sampah Organik Pasar berdasarkan Karakteristiknya (Studi Kasus Pasar Segiri Kota Samarinda). Jurnal Sains &Teknologi Lingkungan. 5, 77–90 (2013). https://doi.org/10.20885/jstl.vol5.iss2.art2.

Rasyid, M.R.: Makna Pemerintahan: Tinjauan dari segi etika dan kepemimpinan. Mutiara Sumber Widya (2000).

Reed, M.S.: Stakeholder participation for environmental management: A literature review. Biol. Conserv. 141, 2417–2431 (2008). https://doi.org/10.1016/j.biocon.2008.07.014.

Republic of Indonesia: Law No. 18 of 2008 on Waste Management. (2008).

Ritonga, M.W.: Tumpukan Sampah Kota Bandung Pascakebakaran TPA Sarimukti Capai 8.000 Ton, https://www.kompas.id/artikel/tumpukan-sampah-kota-bandung-pascakebakaran-tpa-sarimukti-capai-8000-ton, last accessed 2026/04/14.

Rofifah, H., Tarlani, T.: Model Pengelolaan Sampah Pasar Tradisional Berbasis Circular Economy. Bandung Conference Series: Urban & Regional Planning. 3, 312–320 (2023). https://doi.org/10.29313/bcsurp.v3i2.8243.

Safitri, R., Setiobudi, I.A.: Partisipasi Pedagang dalam Pengelolaan Sampah Pasar Kiaracondong. In: Seminar Nasional dan Diseminasi Tugas Akhir (2023).

Silfia, R., Surtikanti, H.K.: Analisis pengelolaan sampah pasar tradisional di Pasar Gegerkalong, Kota Bandung, Indonesia. Journal of Waste and Sustainable Consumption. 1, 46–53 (2024). https://doi.org/10.61511/jwsc.v1i1.2024.696.

Sukirman, E.: Masuk Kategori Darurat Sampah, DPRD Kabupaten Bandung Desak Pemkab Lakukan Ini!, https://www.harapanrakyat.com/2026/04/masuk-kategori-darurat-sampah-dprd-kabupaten-bandung-desak-pemkab-lakukan-ini/, last accessed 2026/04/14.

Tchobanoglous, G., Theisen, H., A Vigil, S.: Integrated solid waste management: engineering principles and management issues. McGraw-Hill, Inc., New York (1993).

Thomas, J., Harden, A.: Methods for the thematic synthesis of qualitative research in systematic reviews. BMC Med. Res. Methodol. 8, 45 (2008). https://doi.org/10.1186/1471-2288-8-45.

Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., Moher, D., Peters, M.D.J., Horsley, T., Weeks, L., Hempel, S., Akl, E.A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M.G., Garritty, C., Lewin, S., Godfrey, C.M., Macdonald, M.T., Langlois, E. V., Soares-Weiser, K., Moriarty, J., Clifford, T., Tunçalp, Ö., Straus, S.E.: PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann. Intern. Med. 169, 467–473 (2018). https://doi.org/10.7326/M18-0850.

Utamy, A.N., Rochaeni, A., Zulfikar, W.: Peran Unit Pelaksana Teknis Daerah (UPTD) Dinas Lingkungan Hidup Dalam Pengelolaan Sampah di Pasar Induk Gedebage Kota Bandung. Praxis Idealist : Jurnal Mahasiswa Ilmu Pemerintahan. 2, (2025). https://doi.org/10.36859/jp.v2i3.4391.

Wicaksono, K.W., Yosaputra Lesnusa, C.E.: Manajemen Proses Pengelolaan Sampah oleh Perusahaan Daerah Kebersihan Kota Bandung: Studi Kasus di Pasar Kordon. Kebijakan : Jurnal Ilmu Administrasi. 13, 84–94 (2022). https://doi.org/10.23969/kebijakan.v13i2.5162.

Zahra, F.A., Febriyanti, N.S., Astuti, S., Septiadi, M.A.: Tantangan dan Solusi dalam Pengelolaan Sampah di Tempat Pembuangan Sementara di (TPS) Pasar Baleendah. Jurnal Solo Teknologi. 1, 1–7 (2025).