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Stakeholder Analysis Waste Management in Tanjungpinang City

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ABSTRACT

Solid waste management in urban areas has become a pressing environmental and governance issue, particularly in rapidly developing secondary cities such as Tanjungpinang, Indonesia. Despite the existence of regulatory frameworks like Regional Regulation No. 3 of 2015, the city's waste management system remains underdeveloped, marked by inefficient collection services, inadequate infrastructure, and limited public participation. This study aims to examine the stakeholder landscape in Tanjungpinang's waste governance to identify institutional gaps, coordination challenges, and opportunities for improved collaboration. The research employs a qualitative and interpretive methodology, combining document analysis and stakeholder mapping using Eskerod & Jepsen's influence-interest matrix and the Friedman and Miles stakeholder salience framework. Findings indicate that the Department of Environment (DLH) holds the highest level of authority but often lacks the urgency and resources needed for effective intervention. Meanwhile, actors with high urgency, such as informal waste workers and local communities, lack legitimacy and power, leading to their exclusion from formal governance processes. The stakeholder network is characterized by low mutuality and fragmented relationships, particularly between state and non-state actors. Waste banks and NGOs operate with limited support despite their significant roles in community outreach and recycling initiatives. The study concludes that sustainable urban waste management in Tanjungpinang requires inclusive governance reforms that build institutional capacity, strengthen stakeholder interdependence, and integrate informal actors into formal waste systems. These findings offer practical insights for enhancing stakeholder engagement and aligning local waste policies with Sustainable Development Goal 11 on sustainable cities and communities.

Keyword: Stakeholder Analysis, Waste, Management

INTRODUCTION

Solid waste management has become one of the most urgent environmental issues in urban areas, including Tanjungpinang City, Indonesia. As the capital of the Riau Islands Province, Tanjungpinang faces increasing waste generation due to population growth and economic development. With a population density of 1,595 people per square kilometer, the city's capacity to manage waste lags behind its development pace (Dinas Lingkungan Hidup Kota Tanjungpinang, 2023). Despite the existence of Regional Regulation No. 3 of



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2015 concerning waste management, the system remains underdeveloped in terms of reduction, collection, and final disposal services.

This urgency is underscored by the environmental and socio economic consequences of mismanaged waste. Poor waste disposal contributes to pollution, health hazards, and greenhouse gas emissions. It also affects community harmony and damages the city's tourism image (Dinas Lingkungan Hidup Kota Tanjungpinang, 2023). Although the Ganet landfill was designed as a sanitary facility, current operations deviate from environmental standards. These systemic challenges highlight the need for comprehensive stakeholder collaboration in municipal waste governance.

Stakeholder theory emphasizes the importance of engaging all parties who affect or are affected by an issue (R. E. E. Freeman & McVea, 2005; Mahajan et al., 2023). In waste management, stakeholder alignment among government bodies, private actors, and civil society is essential for achieving sustainability goals (Brugha & Varvasovszky, 2000; Bryson, 2004). Previous studies have shown that participatory governance increases compliance, improves policy design, and builds long term institutional trust (Rinaldi, 2013; Silberberg & Martinez-Bianchi, 2019). Research in both developed and developing countries supports the idea that inclusive stakeholder approaches enhance accountability and efficiency in waste related policies (Buanes et al., 2005; Ndlela, 2019). Such approaches are particularly relevant in decentralized governance contexts like Indonesia, where responsibilities are shared across multiple institutions and levels of government (Aaltonen, 2011; Bosse & Coughlan, 2016)

This article offers a context specific contribution by applying stakeholder mapping to the case of Tanjungpinang's waste system, using analytical tools such as the Eskerod & Jepsen matrix and environmental interpretation frameworks (Aaltonen, 2011; Eskerod & Jepsen, 2016). It aims to uncover inter institutional gaps and influence pathways in order to formulate actionable recommendations that enhance coordination and performance. This study also contributes to the underexplored literature on urban waste governance in Indonesian secondary cities (Bunn et al., 2002)

article seeks to provide an operational model for stakeholder collaboration in Tanjungpinang's waste governance framework. By aligning roles, interests, and institutional mandates, the findings are expected to help local authorities and development actors enhance policy effectiveness, citizen participation, and infrastructure investment while also supporting the localization of Sustainable Development Goals, particularly SDG 11 on sustainable cities and communities (Bryson et al., 2006; Koromila et al., 2022; Ndlela, 2019)

METHODOLOGY

This study adopts a qualitative and interpretive approach to examine the complexities of stakeholder dynamics and relationships (Clark, 1998; Patton, 2002). The research methodology triangulates three core techniques: document analysis, and stakeholder mapping, in order to comprehensively capture institutional roles, policy frameworks, and inter actor collaboration patterns within the local waste governance system (Ackermann & Eden, 2011; Bowen, 2009).

Data collection was conducted through both secondary and primary sources. Secondary data were obtained from key governmental documents including the Rencana Induk Pengelolaan Sampah Kota Tanjungpinang 2023, the Rencana Tata Ruang Wilayah (RTRW) Kota Tanjungpinang 2014–2034, and the Rencana Pembangunan Jangka



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Menengah Daerah (RPJMD) 2018–2023. These documents were instrumental in identifying the city's regulatory structures, strategic policy objectives, spatial planning schemes, and environmental commitments relevant to waste management. These included representatives from the Dinas Lingkungan Hidup (DLH), officials at the kecamatan and kelurahan levels, private sector waste transporters, managers of waste banks (bank sampah), members of the informal sector such as scavengers and independent waste collectors, and representatives from environmental non governmental organizations (NGOs). The interview data provided insights into on the ground challenges, institutional mandates, and stakeholder perceptions of policy effectiveness.

To systematically identify and categorize stakeholders, this study employed the stakeholder identification framework developed which emphasizes three critical dimensions: power, interest, and legitimacy (Ferreira et al., 2021; Johnson et al., 2003; Pomeroy & Douvere, 2008). Power refers to a stakeholder's ability to influence waste management decisions or policy outcomes; interest captures the degree to which a stakeholder is concerned with or impacted by the waste management agenda; and legitimacy denotes the recognized social or institutional right to be involved in the policy process. Based on this classification, stakeholders in Tanjungpinang's waste management system were grouped into three primary categories.

Primary stakeholders included the DLH, local government agencies, and policymakers, as these actors possess both high power and legitimacy in shaping the regulatory and operational environment. Secondary stakeholders consisted of private waste service providers, NGOs, and waste banks, which play important supporting roles with varying degrees of influence. Tertiary stakeholders encompassed informal waste collectors, tourism based businesses, and community members, whose voices are often underrepresented in formal decision making yet are critically affected by waste governance outcomes.

Stakeholder mapping was then conducted using the influence interest matrix approach as proposed (Jepsen & Eskerod, 2009). This matrix enabled the categorization of stakeholders along two axes power and interest and provided a visual representation of their roles in the system. It also helped illustrate the flow of interaction, decision making hierarchies, and potential coordination bottlenecks among stakeholder groups. Furthermore, the mapping process was supplemented with qualitative network analysis to highlight relational dynamics and interdependencies. Data synthesis was achieved through triangulation, combining policy document review, thematic analysis of interview transcripts, and theoretical cross validation using established frameworks in stakeholder theory (Aaltonen, 2011; R. E. Freeman & David, 1983). This comprehensive methodological design ensured that both formal institutional structures and informal relational nuances were adequately captured, providing a robust foundation for the subsequent analysis of stakeholder effectiveness in urban waste management in Tanjungpinang.

RESULTS AND DISCUSSION

1. Waste Conditions in Tanjungpinang City

Tanjungpinang City, as the capital of the Riau Islands Province, faces increasing pressure in managing municipal solid waste due to rapid urbanization, population growth, and limited infrastructural development. The city is divided into four administrative districts Bukit Bestari, Tanjungpinang Timur, Tanjungpinang Kota, and Tanjungpinang



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Barat covering a total area of 146.95 square kilometers. With a population density of 1,595 people per km², the amount of daily waste generation has surpassed the collection and disposal capacities of local infrastructure. According to the 2023 Master Plan, the city produces over 150 tons of waste per day, yet only approximately 60–70% is adequately transported to the Ganet Final Disposal Site (TPA Ganet), while the remainder accumulates in temporary storage sites or is illegally dumped in waterways and open areas.

The composition of waste in Tanjungpinang is predominantly organic, accounting for nearly 65% of the total volume. Household waste, market refuse, and restaurant scraps are the primary contributors. This is followed by plastic waste (15%), paper (6%), textiles, metals, and other residues. The high proportion of biodegradable waste indicates a strong potential for composting and bioconversion technologies, yet these strategies remain underutilized. Moreover, there is minimal source separation of waste, and the recycling rate remains low due to the absence of robust waste bank systems, low public awareness, and the lack of institutionalized 3R (reduce, reuse, recycle) campaigns. Waste segregation is mostly performed by the informal sector at the collection or landfill level, with limited coordination with official waste handlers.

From a spatial and logistical perspective, waste collection services are highly uneven. Urban core areas and commercial zones receive more consistent services, while peripheral neighborhoods and lower income settlements face irregular or absent waste collection. The Department of Environment (DLH) operates with insufficient resources both in terms of personnel and vehicle fleets to cover the entire city effectively. For instance, the available number of dump trucks and collection bins is significantly below the standard required to serve the city's needs. Additionally, the city's topography, which includes hills, valleys, and coastal zones, presents challenges for waste logistics and routing, leading to delays, fuel inefficiencies, and increased operational costs.

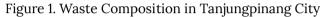
The performance of the TPA Ganet also reflects the broader systemic weaknesses in waste management. Initially designed as a controlled landfill with leachate treatment and gas capture systems, the facility currently operates below acceptable environmental standards. Overloading, inadequate daily cover, leachate leakage, and the encroachment of informal waste pickers have further diminished its functionality. Despite the availability of composting units and RDF (Refuse Derived Fuel) technology, these innovations are either idle or underused due to operational challenges, lack of technical capacity, and insufficient budget allocations. This situation underscores the urgency for both technological upgrades and institutional strengthening in Tanjungpinang's waste infrastructure.

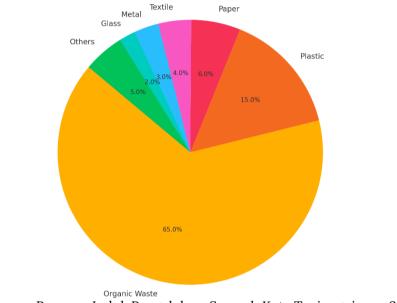
Lastly, the city lacks a fully integrated waste information system and community based monitoring mechanism. Although some initiatives such as waste banks, coastal clean up programs, and school based education have been launched, these remain fragmented and sporadic. Public participation in waste reduction efforts is still limited, largely due to insufficient awareness, lack of incentives, and minimal enforcement of local regulations. Moreover, coordination among stakeholders including municipal departments, community groups, private transporters, and informal actors is weak, often resulting in overlapping responsibilities and missed opportunities for collaborative solutions. Overall, the current waste management condition in Tanjungpinang calls for immediate systemic reform through stakeholder empowerment, technology investment, and stronger public policy enforcement.



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The pie chart illustrates the composition of municipal solid waste generated in Tanjungpinang City as of 2023. Organic waste constitutes the largest share at 65%, indicating that food scraps, garden trimmings, and biodegradable household waste dominate the waste stream. Plastic waste accounts for 15%, followed by paper (6%), textiles (4%), metals (3%), glass (2%), and miscellaneous items (5%). The data reflect a high potential for composting and bioconversion strategies, especially given the predominance of organic matter. However, the proportion of non organic materials, particularly plastics, also signals the need for improved recycling systems and stronger regulatory frameworks to control non biodegradable waste.





Source: Rencana Induk Pengelolaan Sampah Kota Tanjungpinang 2023

Findings from stakeholder policy documents, this data reveals significant gaps in infrastructure and stakeholder alignment. The high share of organic waste is consistent with patterns in many Southeast Asian cities but highlights missed opportunities in composting and waste valorization. While local regulations such as the Regional Regulation No. 3 of 2015 promote waste segregation, indicate a lack of enforcement and public incentives. Stakeholder mapping suggests that although the DLH has institutional authority, its operational limitations combined with the minimal engagement of secondary stakeholders like waste banks and NGOs hinder the material recovery rate (Currie et al., 2009; Derakhshan et al., 2019). Moreover, the informal sector plays a critical but undervalued role in the segregation of recyclables, often operating without systemic support or integration into the official waste system.

The city's dense areas, which generate the majority of waste, often suffer from limited access to source separation bins and scheduled collection. Public participation initiatives though present remain sporadic, uncoordinated, and underfunded (J. K. Clark, 2021; Innes & Booher, 2004). These systemic deficiencies are compounded by weak inter stakeholder communication, as identified in stakeholder network analyses, where overlapping responsibilities and low trust prevent coordinated responses to the organic waste challenge. Consequently, without a holistic strategy that integrates technical



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capacity, regulatory enforcement, and stakeholder synergy, the current composition profile may persist or worsen, undermining the city's progress toward sustainable waste management and urban resilience goals (Day, 2008; Ruiz et al., 2023).

2. Stakeholder analysis using the Friedman and Miles (2006) framework

Stakeholder analysis in the context of Tanjungpinang's waste management system reveals a multi actor environment characterized by varying degrees of power, legitimacy, and urgency dimensions originally conceptualized later refined by (Friedman & Miles, 2006). Applying the salience model, it becomes evident that the Department of Environment (DLH) holds significant power, supported by its formal mandate to regulate, manage, and oversee the city's waste infrastructure. This coercive and normative power is derived from local regulations, national policies, and administrative control. However, despite its power and legitimacy, DLH sometimes lacks the perceived urgency to respond promptly to stakeholder concerns, reducing its functional effectiveness in certain high pressure scenarios such as landfill overcapacity or flooding caused by unmanaged waste.

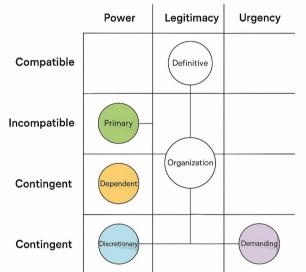


Figure 2. Stakeholder Analysis Friedman and Miles

In contrast, local communities and informal waste workers often demonstrate high urgency facing daily consequences of poor waste collection and sanitation but tend to lack institutional power and formal legitimacy. They are directly affected by health, hygiene, and economic concerns stemming from uncollected waste, yet their voices are often excluded from formal planning and policy forums. This creates a scenario where some stakeholders possess high urgency but are not recognized as definitive stakeholders. According to Friedman and Miles' typology, this misalignment between stakeholder salience and institutional response reflects a structural imbalance that hampers inclusive governance and limits the effectiveness of intervention strategies.

Private sector actors, particularly waste transport companies and waste banks, exhibit varying levels of salience depending on their contractual relationships with the local government. When these entities operate under formal partnerships, their legitimacy and influence increase, especially if they deliver services in underserved areas. However, their urgency tends to be contingent upon economic incentives and profit

Source: Friedman and Miles (2006).



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structures. If not aligned with broader public health or sustainability goals, their commitment may diminish. Therefore, their power is largely utilitarian rather than normative, and their legitimacy depends heavily on performance outcomes and public perception.

Framework also offers valuable insights into the network typology or the nature of relationships between stakeholders and the organization (in this case, the waste management system led by DLH). For example, the relationship between DLH and NGOs can be described as compatible when both share common environmental goals, such as promoting waste segregation or recycling education. On the other hand, the relationship with informal scavengers is often incompatible, as their survival driven practices (e.g., open dumping or unsanctioned collection) frequently conflict with regulatory norms. Despite this incompatibility, their role remains structurally necessary due to their contribution to material recovery, especially in the absence of widespread formal recycling infrastructure.

Further, the network typology reveals contingent relationships, particularly in the tourism and business sectors. Their involvement in waste governance becomes more active only when waste mismanagement begins to impact their revenue streams or reputational standing. For example, hotel owners may participate in beach clean up drives during peak seasons but remain disengaged otherwise. This contingency based involvement reflects a reactive stance rather than sustained commitment, highlighting the need for more integrated and mandatory engagement frameworks within local waste policy.

The analysis of dependency and mutuality sheds additional light on the operational vulnerabilities of Tanjungpinang's waste ecosystem. DLH demonstrates high organizational dependence on several actors most notably waste banks, NGOs, and the informal sector especially in achieving separation at source targets and community level education. Yet these actors receive minimal institutional support or capacity building incentives, revealing a lack of mutuality in the relationship. Conversely, stakeholder dependence is most visible among residents, who rely on timely and consistent collection services for public health and quality of life. When service delivery falters, community frustration escalates, further deteriorating mutual trust.

This asymmetry in dependency and power relations contributes to systemic fragmentation. While DLH depends on community cooperation and informal collectors, the lack of mutual recognition and shared benefits reduces motivation and compliance across the board. Mutuality is weak or non existent in many vertical relationships between state and non state actors. Friedman and Miles (2006) argue that mutuality is crucial for sustaining networked governance, especially in systems with distributed accountability. Therefore, enhancing reciprocity through inclusive planning, shared incentives, and participatory monitoring mechanisms is essential for creating a more cohesive stakeholder ecosystem.

Applying Friedman and Miles' stakeholder framework to the Tanjungpinang case highlights both the structural challenges and strategic opportunities within its waste governance system. High salience stakeholders such as DLH need to strengthen engagement with low power but high urgency groups like informal workers and marginalized communities. At the same time, network compatibility must be strategically cultivated through trust building, co management programs, and policy co design. Institutionalizing mutuality across both formal and informal relationships would enhance



sustainability outcomes and help align stakeholder incentives with long term urban waste management goals.

Stakeholder Category	Stakeholder Examples (Tanjungpinang)	Salience Attributes	Relationship Typology	Notes
Definitive	DLH (Dinas Lingkungan Hidup), Local Policymakers	Power, Legitimacy, Urgency	Compatible & Necessary	Central actors with regulatory and operational authority.
Primary	Private Waste Companies, Formal Contractors	Power	Incompatible (sometimes)	Economic power but often misaligned with environmental goals.
Dependent	Waste Banks, Community Environmental NGOs	Legitimacy, Urgency	Contingent	Support system for community driven recycling.
Discretionary	Tourism Sector, Educational Institutions	Legitimacy	Contingent	Involved when tourism is impacted by waste.
Demanding	Informal Waste Collectors, Affected Residents	Urgency	Contingent	Raise complaints but lack formal voice.

Table 1. Stakeholder Identification

Source: Author, 2024

The table above presents a stakeholder mapping framework for Tanjungpinang City's waste management sector, structured according to Friedman and Miles (2006). Each stakeholder category is classified based on three salience attributes power, legitimacy, and urgency as well as the nature of their relationship with the organization, such as whether it is compatible, incompatible, necessary, or contingent. Stakeholders labeled as Definitive notably the Department of Environment (DLH) and local policymakers possess all three attributes, making them the most influential actors. These stakeholders hold the authority to regulate, enforce, and implement waste policies, and their goals are structurally aligned with the functioning of the city's waste system. Their relationship with the system is both compatible and necessary, as they set the tone for planning, budgeting, and inter agency coordination.

On the other hand, stakeholders such as private waste companies and contracted service providers are classified as Primary stakeholders due to their economic power and operational role. However, their values and objectives may at times clash with public sector goals, making their relationship potentially incompatible. While they play a vital role in waste transportation and logistics, their commitment to sustainability may be driven more by profit than by environmental stewardship. Meanwhile, waste banks and community environmental NGOs fall into the Dependent category. They possess legitimacy and urgency especially in promoting recycling and community engagement but often lack the power to influence formal policy. Their relationship with governmental institutions is contingent, depending heavily on ad hoc partnerships or donor funded programs, and they often face capacity constraints in scaling up their impact.



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The Discretionary and Demanding categories include stakeholders who may lack institutional power but are nonetheless crucial in shaping perceptions, legitimacy, and grassroots action. The tourism sector and educational institutions, while legitimate stakeholders, often engage only when their direct interests such as cleanliness or reputation are at stake. They are therefore labeled as Discretionary, participating in clean up campaigns or education drives primarily during crises or events. Meanwhile, informal waste collectors and affected residents fall under the Demanding category. Their urgency stems from direct exposure to unmanaged waste, yet they remain largely excluded from formal governance processes. Although they lack power and institutional legitimacy, their lived experiences provide valuable insight into the system's shortcomings. This analysis highlights the need for inclusive governance mechanisms that recognize the contributions and vulnerabilities of all actors across the power spectrum, ultimately promoting a more equitable and effective waste management strategy in Tanjungpinang.

3. Barriers and Challenges Stakeholders in Waste Management

One of the primary challenges faced by stakeholders in Tanjungpinang's waste management system is the fragmentation of institutional roles and responsibilities. The Department of Environment (DLH), while holding the central regulatory authority, often lacks the financial and technical capacity to manage the growing volume and complexity of municipal waste. Inter-agency coordination remains weak, with limited collaboration between local planning offices, public works departments, and health agencies. This siloed governance model hinders the formulation and implementation of integrated waste strategies. Moreover, the absence of a centralized waste information system means data on waste generation, collection coverage, and recycling rates are inconsistent or unavailable, making evidence-based planning and evaluation difficult for policymakers and practitioners.

Another significant barrier is the low level of public awareness and participation. Despite local regulations mandating waste segregation and community involvement, compliance remains minimal due to a lack of incentives, insufficient socialization of policies, and general apathy among residents. Many households continue to mix waste types, which undermines downstream recycling efforts and increases operational burdens. Waste banks and environmental NGOs that attempt to fill these gaps often operate with limited funding and struggle to maintain long-term engagement without institutional support. Furthermore, educational institutions and the tourism sector, which could be strategic partners in public advocacy and behavior change, are only marginally involved and tend to participate sporadically, usually in response to immediate reputational risks rather than sustained environmental commitment.

The informal sector, including scavengers and independent waste collectors, also faces considerable structural and social challenges. Although they play a crucial role in recovering recyclables and reducing landfill pressure, they operate without legal recognition, social protections, or inclusion in policy dialogues. Their activities are often perceived as incompatible with formal waste management systems, leading to tension and even conflict with municipal authorities. This exclusion not only limits the sector's contribution to broader sustainability goals but also perpetuates social stigma and economic vulnerability. The lack of formal integration mechanisms, such as licensing, cooperatives, or inclusive waste zones, further exacerbates the marginalization of this group, reducing opportunities for scale-up and professionalization.



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Finally, financial constraints and technological gaps remain persistent obstacles across all stakeholder categories. DLH and local governments struggle to allocate adequate budgets for upgrading waste infrastructure, particularly for modern treatment facilities such as composting centers or waste-to-energy plants. The private sector, although more agile in adopting innovations, is often deterred by the lack of long-term investment guarantees or clear regulatory frameworks. Donor-funded pilot projects frequently fail to scale due to a lack of continuity or institutional ownership. Without a reliable funding model and consistent policy direction, stakeholders are unable to move beyond short-term, reactive solutions.

CONCLUSION

Waste management in Tanjungpinang City reflects the complex governance challenges faced by secondary urban centers in Indonesia. With rapid population growth and urban expansion, the city struggles with inadequate infrastructure and weak policy enforcement despite the presence of local regulations. The majority of the city's waste is organic, indicating a high potential for composting and bioconversion, yet these opportunities remain underutilized due to a lack of source separation and low recycling rates. Operational inefficiencies at the Ganet landfill, coupled with uneven waste collection services across districts, highlight logistical and institutional limitations. Peripheral communities experience irregular services, exacerbating socio-environmental disparities and undermining urban resilience.

The stakeholder analysis using the Friedman and Miles framework reveals a fragmented governance landscape marked by imbalanced power, legitimacy, and urgency among key actors. While the Department of Environment (DLH) holds formal authority and regulatory power, it often fails to act with the urgency required to address critical waste issues. In contrast, community members and informal waste workers face immediate risks but remain excluded from formal decision-making. Relationships between DLH and supportive stakeholders such as waste banks and environmental NGOs lack mutual reinforcement, limiting their long term impact.

To achieve a more effective and sustainable waste management system, Tanjungpinang must embrace inclusive governance, integrated planning, and multisector collaboration. Key reforms include strengthening DLH's institutional capacity, incentivizing public participation, and formally integrating the informal sector through recognition and empowerment schemes. Community-based waste monitoring and a unified information system should be developed to enhance transparency and accountability. Crucially, stakeholder mutuality must be institutionalized through comanagement models, shared benefits, and participatory policy-making.

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