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Implementation of Waste Reduction Policy under Regional Regulation No. 13/2019 on Amendments to Regional Regulation No. 3/2013 on Waste Management in Tangerang Selatan

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Abstract: Rapid urbanization in Tangerang Selatan has intensified solid waste generation, averaging over 1,000 tons per day, creating urgent challenges for local waste management. In response, Regional Regulation No. 13/2019 introduced a comprehensive waste reduction policy. This study examines the extent of its implementation through Merilee S. Grindle's policy implementation framework. A mixed-methods approach, combining interviews, surveys, and observations, was employed to analyze stakeholder perspectives and community practices. The results show partial progress: programs such as Zero-Waste Homes, TPS 3R, and Intermediate Treatment Facilities (ITF) demonstrate localized success, yet the overall impact remains limited. Barriers include inadequate human resources, weak public engagement, insufficient incentives and sanctions, and persistent illegal dumping. Household waste sorting remains inconsistent, undermining reduction targets. Nonetheless, public awareness campaigns, private sector initiatives, and technology adoption provide enabling support. To strengthen policy outcomes, this study recommends broader collaboration with the private sector through Corporate Social Responsibility (CSR), adoption of Extended Producer Responsibility (EPR), capacity building for waste management personnel, strategic use of social marketing, greater integration of processing technologies, and a transparent compliance monitoring system. Together, these measures could enhance the effectiveness and sustainability of Tangerang Selatan's waste management efforts..

Keywords: Waste Management, Policy Implementation, Waste Reduction, Tangerang Selatan, Grindle Framework

Abstrak: Penelitian ini menganalisis implementasi kebijakan pengurangan sampah di Kota Tangerang Selatan sebagaimana diatur dalam Peraturan Daerah No. 13 Tahun 2019 dengan menggunakan kerangka implementasi kebijakan Merilee S. Grindle. Latar belakang penelitian berangkat dari tingginya timbulan sampah harian yang masih mencapai ±1.000 ton, sementara kebijakan pengurangan sampah belum menunjukkan hasil optimal. Tujuan penelitian adalah mengevaluasi efektivitas kebijakan serta mengidentifikasi faktor pendukung dan penghambat dalam pelaksanaannya. Metode yang digunakan adalah pendekatan campuran dengan desain sekuensial eksploratori. Data primer diperoleh melalui wawancara semi-terstruktur, survei terhadap 71 responden, dan observasi non-partisipan, serta diperkuat dengan data sekunder dari laporan resmi. Hasil penelitian menunjukkan bahwa meskipun program seperti Zero-Waste Homes, TPS 3R, dan fasilitas

Intermediate Treatment Facility (ITF) telah berjalan, efektivitas kebijakan masih terbatas. Hambatan utama meliputi keterbatasan sumber daya manusia, komunikasi publik yang belum efektif, serta ketiadaan sistem kepatuhan berbasis insentif dan sanksi. Selain itu, praktik pembuangan sampah ilegal dan rendahnya partisipasi pemilahan sampah rumah tangga tetap menjadi kendala. Faktor pendukung yang teridentifikasi mencakup kampanye kesadaran publik, kolaborasi dengan sektor swasta, serta pemanfaatan teknologi dalam pengelolaan sampah. Rekomendasi penelitian mencakup penguatan kerja sama melalui program CSR, penerapan Extended Producer Responsibility (EPR), peningkatan kapasitas SDM, pemanfaatan strategi pemasaran sosial, integrasi teknologi dalam pemrosesan, serta pembentukan sistem pemantauan kepatuhan yang terstruktur.

Kata kunci: Pengelolaan Sampah; Implementasi Kebijakan; Pengurangan Sampah, Tangerang Selatan; Kerangka Grindle

INTRODUCTION

Waste management is one of the most pressing environmental challenges in Indonesia. With rapid population growth and urbanization, waste generation continues to rise, threatening environmental sustainability and public health. In 2018, the Ministry of Environment and Forestry (KLHK) reported that municipal solid waste in Indonesia consisted of 44% food waste, 15% plastic, 13% yard waste, 11% paper, 3% textiles, and 2% metal, rubber, and glass, with the remaining 8% categorized as other materials. Plastic waste is of particular concern: in 2016 alone, Indonesians consumed approximately 9.8 billion plastic bags, 95% of which ended up as waste (Sea Circular, 2021). The consequences are evident in both terrestrial and marine ecosystems, as Indonesia ranks among the world's largest contributors of marine plastic debris.

To address this issue, Indonesia has established a legal framework mandating comprehensive waste management. The Waste Management Act (Law No. 18/2008) and the Environmental Protection and Management Act (Law No. 32/2009) provide the foundation for waste handling, emphasizing shared responsibility among government, society, and the private sector, as well as adherence to the 3R (Reduce, Reuse, Recycle) principle. Government Regulation No. 81/2012 further provides technical guidelines on household waste reduction and treatment. At the local level, regional governments are required to develop regulations that operationalize these national directives. In Tangerang Selatan, Banten Province, this responsibility has been translated into Regional Regulation No. 13/2019, which amends Regulation No. 3/2013, focusing on waste reduction

measures, including restrictions on single-use plastics, adoption of eco-friendly technologies, and stricter sanctions for violations.

Globally, various countries have introduced innovative policies to reduce waste and promote sustainability. For example, China's 13th Five-Year Plan reduced plastic consumption growth and raised recycling rates above 30% by 2021 (Liu & Liu, 2023). San Francisco has achieved an 80% diversion rate through comprehensive recycling programs and bans on plastic products. Japan enforces stringent waste separation rules alongside waste-to-energy technologies, while Singapore integrates mandatory recycling, education, and strict regulatory measures (Zaman, 2023). These cases highlight the critical role of strong regulatory frameworks, technological innovation, and public participation in achieving waste reduction.

Several studies in Indonesia and abroad have evaluated the implementation of such policies. Internationally, researchers have examined plastic bag bans and recycling regulations in contexts such as China, Kenya, Australia, and Nepal, underscoring the importance of enforcement, sanctions, and community engagement (Ali et al., 2022; Paul & Mironga, 2020; Macintosh et al., 2020; Bharadwaj et al., 2020). In Indonesia, studies have analyzed plastic reduction initiatives in Bekasi, Jakarta, Bengkulu Selatan, Balikpapan, and Blora, revealing common challenges including limited resources, weak coordination, bureaucratic rigidity, and gaps in public commitment (Husain & Hertati, 2023; Iqbal et al., 2022; Hastuti et al., 2021; Khaerani et al., 2021; Yudianto et al., 2021). While these studies provide valuable insights, most focus either on national frameworks or on isolated aspects of waste management, leaving limited understanding of the concrete implementation of local-level waste reduction policies.

Against this backdrop, Tangerang Selatan presents a critical case for analysis. The city generated 369,177.50 tons of waste in 2023, up from 355,000 tons in 2022, despite regional regulations intended to curb waste growth. Its primary landfill, Cipeucang, has exceeded capacity, causing serious environmental and social impacts (Kompas, 2020). In response, the local government has introduced initiatives such as 38 community-based 3R facilities

and an Intermediate Treatment Facility (ITF) using incineration technology (Republika, 2024). Yet, questions remain regarding how effectively Regional Regulation No. 13/2019 has been implemented and whether it has delivered meaningful reductions in waste.

This study therefore focuses on examining the implementation of Tangerang Selatan's waste reduction policies as stipulated in Regional Regulation No. 13/2019. By applying Merilee S. Grindle's policy implementation framework, it seeks to provide nuanced insights into the successes achieved and the challenges encountered in translating regulatory mandates into practice.

METHODS

This study employs a mixed-methods descriptive research approach, integrating both qualitative and quantitative methodologies to provide a comprehensive analysis of policy implementation. The mixed-methods approach allows for the combination of numerical data with contextual insights, ensuring a more nuanced understanding of the waste reduction policy in Tangerang Selatan (Creswell, et al., 2018). The research follows a sequential exploratory design, where qualitative findings inform the development of quantitative instruments. This structure enables an in-depth exploration of policy implementation before quantifying trends and validating findings. The qualitative phase includes interviews and observations, while the quantitative phase involves survey analysis. The integration of these methods strengthens the study's validity and reliability, providing a holistic perspective on policy effectiveness (Miles & Huberman, 1994).
Primary data for this study were collected through interviews, observations, and surveys. Interviews were conducted using a semi-structured format with purposively selected informants based on their relevance to the implementation of waste reduction policies. Informants for the interviews are:

1. Head of the Sanitation Division at the Environmental Agency of Tangerang Selatan (strategic policymaker)

2. Head of the Cipeucang Landfill Management Unit (operational implementer) Two (2) waste bank and 3R facility facilitators from the Environmental Agency (daily field actors)
3. Head of a community-based waste bank in RW 10, Benda Baru, Pamulang District (grassroots environmental actor).

This purposive sampling ensured that perspectives from government, operational staff, and community representatives were all incorporated. The selection criteria followed Merilee S. Grindle's policy implementation framework, which categorizes key factors into two main variables: Content of Policy, which includes interest affected, type of benefits, extent of change envisioned, site of decision-making, program implementor, and resources committed, and Context of Implementation, which includes power, interest, and strategies of actors involved, institutional and regime characteristics, compliance, and responsiveness.

In addition to interviews, non-participant observations were conducted to examine community waste management behaviors, such as household-level waste sorting, the reduction of single-use plastics, and producer-led waste minimization initiatives (Miles & Huberman, 1994). Surveys were also employed to measure public compliance with waste reduction policies. The structured online questionnaire was distributed across all sub-districts (kecamatan) in Tangerang Selatan, and a total of 71 residents responded. Respondents were not subject to strict selection criteria, as the survey was designed to capture diverse household experiences across the city. The questionnaire consisted primarily of close-ended multiple-choice questions assessing: (1) household waste management practices (e.g., sorting, composting), (2) satisfaction with government awareness campaigns, and (3) knowledge of and exposure to illegal dumping sites. To complement these, several open-ended questions were included to explore respondents' reasoning behind their answers and provide richer qualitative insights (Babbie, 2020). Secondary data were obtained from official government reports, statistical databases, and prior research studies related to waste management. Sources included government agencies such as the Ministry of Environment and Forestry, the local Environmental Agency of Tangerang Selatan, and the Indonesian Bureau of Statistics.

The qualitative data analysis involved coding interview transcripts and grouping responses based on Merilee S. Grindle's policy implementation framework. Responses were categorized under Content of Policy and Context of Implementation to identify key themes, challenges, and facilitators of policy execution. Observational data were similarly analyzed by categorizing findings according to waste management behaviors and policy compliance indicators (Miles & Huberman, 1994). For quantitative data, survey responses were analyzed to identify trends in public attitudes and compliance with waste reduction policies. Descriptive statistical methods were used to interpret data patterns, providing measurable insights into the effectiveness of policy implementation. The integration of both qualitative and quantitative findings allowed for triangulation, enhancing the study's overall validity (Creswell, 2014).

The geographical scope of this study is limited to Tangerang Selatan, where Regional Regulation No. 13/2019 on waste reduction is enforced. The study examines waste management trends post-enactment, providing an evaluation of policy effectiveness and challenges faced during implementation. The selected timeframe for analysis focuses on recent developments in waste reduction efforts to ensure relevance and applicability. However, certain limitations exist in this study. First, data availability may pose challenges, as gaps in official documentation could limit the comprehensiveness of secondary sources. Second, the findings may not be directly generalizable to other regions due to differences in local governance structures, community engagement levels, and waste management infrastructure. Lastly, respondent bias could affect the neutrality of findings, as interviewee responses may be influenced by personal or institutional perspectives despite efforts to maintain objectivity (Babbie, 2020).

This research adhered to ethical research principles, ensuring voluntary participation and informed consent from all interviewees. Given that the interviews were not anonymized, explicit consent was obtained for data usage. Participants were informed about the study's objectives, the use of their statements, and their right to withdraw at any time. Observations were conducted in public settings where waste reduction activities naturally occurred, ensuring no disruption or

ethical concerns regarding privacy. The research also ensured transparency and accuracy in data reporting to uphold academic integrity

RESULTS AND DISCUSSIONS

The implementation of waste reduction policies in Tangerang Selatan, as outlined in Regional Regulation No. 13/2019, has shown progress but also faces significant challenges. Interviews with key waste management stakeholders revealed that daily waste handling is conducted through TPS3R (Reduce, Reuse, Recycle Waste Processing Sites) and the Intermediate Treatment Facility (ITF). The TPS3R system focuses on waste sorting and selling recyclable materials, while the ITF processes non-organic waste through incineration. However, the limited number of ITF facilities and the operational constraints of TPS3R have restricted the effectiveness of waste reduction efforts.

Stakeholders emphasized that the main waste reduction strategies in the regulation focus on limiting certain waste types (e.g., plastic) and encouraging household waste sorting. However, actual implementation remains inconsistent due to low community participation, inadequate infrastructure, and limited funding. TPS3R sites operate with minimal resources, relying on community funding and waste sales, whereas ITF facilities depend on government budgets. Further challenges include operational limitations, such as financial constraints in TPS3R and equipment maintenance problems in ITF, as well as compliance issues where residents often continue to mix organic and non-organic waste. A key informant from the Cipeucang Landfill explained that although organic waste is processed through a maggot program handling up to two tons per month, the mixing of waste during collection has discouraged residents from sorting:

> “Residents already separate waste into different bins, but during transportation it is combined again in one truck. As a result, people feel it is pointless to sort their waste, and many lose motivation” (Head of Cipeucang Landfill).

This indicates that logistical weaknesses in waste transportation undermine community participation and policy effectiveness.

Regulatory and bureaucratic constraints also remain significant. Waste banks are hindered by inconsistent local regulations, and enforcement of illegal dumping penalties is weak. Below is direct quote from the Head of the Tangerang Selatan Environmental Agency (DLH), on the enforcement action on illegal dumping penalties:

> "sanction implementation is not yet optimal, as although penalties exist in the regulation, there is no clear mechanism on how fines should be collected or to which authority they should be paid."

Furthermore, overlapping responsibilities among government agencies exacerbate enforcement problems—for instance, waste in rivers is often categorized under the jurisdiction of the Public Works Department rather than DLH, creating confusion and weakening compliance monitoring.

Survey results support these findings, Figure 1 shows that while 77% of respondents understand how to sort waste, only 55% actively practice it, primarily due to the lack of supporting facilities and concerns that sorted waste is later mixed again during collection. Despite this, the public largely supports stricter enforcement against illegal dumping and wants stronger government commitment to waste reduction efforts.

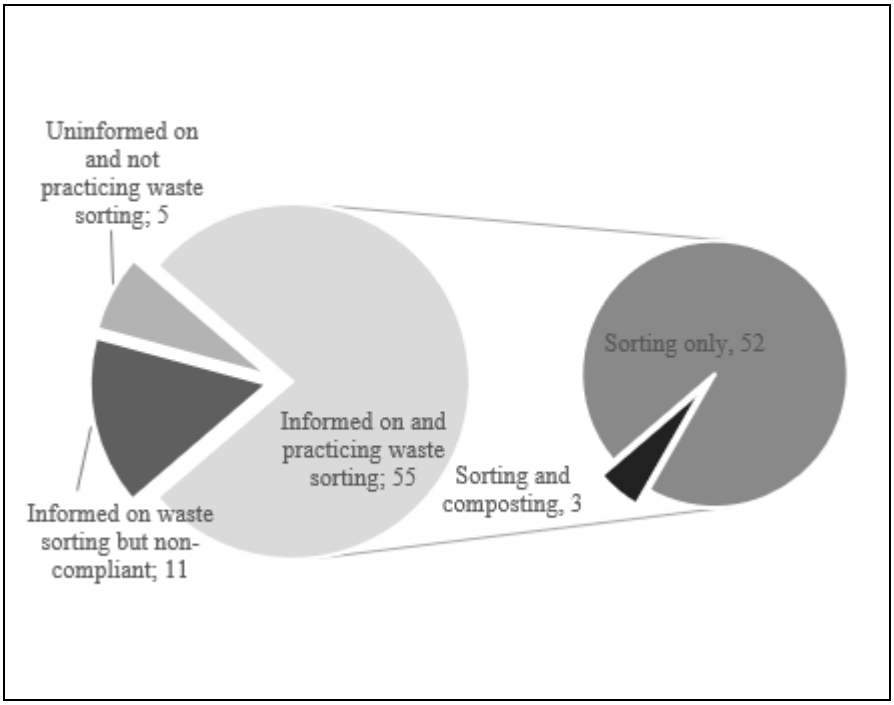

Figure 1. Distribution of Waste Sorting Awareness and Behavior

Tangerang Selatan has implemented several waste reduction initiatives, including TPS 3R (Reduce, Reuse, Recycle Waste Processing Sites), Waste Banks, Zero-Waste Homes, Composting Programs, Waste Pickers, and the Intermediate Treatment Facility (ITF). TPS 3R plays a crucial role in waste reduction and circular economy efforts by sorting waste, processing organic waste using maggots, and recycling inorganic materials. The city currently operates 40 TPS 3R facilities with a total capacity of 120 tons per day, managing 107 tons daily (89% capacity) (kabar6.com; wartatangerang.com). However, illegal waste disposal sites remain widespread, indicating inefficiencies in the official TPS 3R system, likely due to uneven distribution of facilities, limited transportation capacity, and low public participation.

In addition to 3R initiatives, the Tangerang Selatan government has implemented plastic waste reduction policies. Regional Regulation No. 13/2019 mandates raising awareness among residents and businesses to reduce plastic bag use. This was further reinforced by Mayor Regulation No. 83/2022, which restricts single-use plastic bags and encourages businesses to provide eco-friendly alternatives. However, observations show low public compliance, with many residents still using plastic bags and businesses failing to offer sustainable shopping alternatives. Observation results illustrate the daily habits of residents, where awareness of waste reduction remains low. Among the 3R principles, reducing consumption (reduce) is the most critical, yet compliance is inconsistent. While formal businesses (e.g., chain restaurants, minimarkets, and supermarkets) strictly enforce plastic bag restrictions, informal businesses (e.g., traditional markets, street vendors, and small shops) continue to provide plastic bags, highlighting gaps in policy enforcement.

The implementation of Tangerang Selatan's waste reduction policy (Regional Regulation No. 13/2019) was analyzed using Merilee S. Grindle’s policy implementation framework, focusing on policy content and implementation context.

Policy Content Analysis

1. Interests Affected: The affected interests play a crucial role in policy implementation, as they determine which individuals, groups, or

organizations experience either positive or negative impacts. The more stakeholders involved, the more complex the implementation process becomes, often leading to conflicts or resistance (Grindle, 1980). In Tangerang Selatan's waste reduction policy, the primary affected groups include residents, businesses, and private sector stakeholders, particularly those near TPS 3R and ITF facilities. Community resistance to additional ITF construction stems from concerns over air pollution and odors, despite government efforts to control emissions using cyclone and scrubber technology. However, health concerns persist, as some ITF workers continue to experience respiratory issues. On the business side, the absence of waste sorting regulations for enterprises further weakens policy effectiveness. Meanwhile, private sector interest in PLTSa development remains uncertain, as the project is still in the planning phase. Tangerang Selatan government has attempted to accommodate stakeholder interests, but environmental concerns remain a key barrier to optimal implementation. Improving communication strategies is essential to gaining public trust and ensuring smoother policy execution. One approach is leveraging social media to enhance engagement, as it plays a significant role in modern public communication. Additionally, social marketing—which applies behavioral change theories to policy communication—can be explored to effectively address concerns and encourage public compliance (Fredriksson et al., 2015).

2. Types of Benefits: The types of benefits in policy implementation refer to the economic, social, and environmental advantages a policy provides. Policies with clear and measurable benefits tend to gain stronger public support, whereas those perceived as unfair or ineffective may face resistance (Grindle, 1980). Tangerang Selatan's waste reduction policy primarily delivers environmental benefits, promoting cleaner, healthier, and more livable surroundings. Additionally, it provides economic advantages, particularly through waste bank programs, which allow communities to sort and recycle waste for financial incentives. Survey data indicate 75% of respondents believe waste bank programs are well-implemented, with 17

respondents specifically highlighting them as the most effective initiative. This is supported by interviews with the Head of the Waste Bank in RW 10 Benda Baru, Pamulang, who noted that the program operates every two to three months due to high community participation and its combined environmental and economic benefits.

3. Extent of Change Envisioned: The extent of envisioned change in policy implementation refers to the scale and depth of transformation expected as a result of a policy. It can range from incremental change (gradual improvements), substantial change (major modifications in behavior or systems), radical change (complete overhauls of structures), to structural change (fundamental societal reforms) (Grindle, 1980). Tangerang Selatan's waste reduction policy under Regional Regulation No. 13/2019 outlines a mix of incremental and significant changes. Incremental change is reflected in efforts to raise public awareness and encourage waste sorting, as mandated in Article 6 of the regulation. However, officials highlight that public mindset remains a major challenge, as resistance to behavioral change slows down policy effectiveness. A significant change is targeted through the Waste Reduction Master Plan, which aims for a 30% reduction in daily waste generation by 2033. Currently, the reduction stands at 19.53% (196.47 tons/day), leaving a 10.50% gap to meet the target. Efforts focus on plastic waste reduction through Zero-Waste Homes, TPS 3R, Waste Banks, and recycling programs (Dinas Lingkungan Hidup Kota Tangerang Selatan, 2023). For long-term success, radical change in public mindset is essential. The government has initiated this shift by enforcing plastic waste reduction through Mayor Regulation No. 83/2022 and plans to strengthen regulations on illegal waste disposal for stricter enforcement. The policy framework includes clear numerical targets, such as expanding Zero-Waste Homes from 255 units (2023) to 4,839 units by 2033, contributing to 8% of waste reduction, while also building four new waste banks and TPS 3R annually to support the 30% waste reduction goal. Study indicates that behavioral shifts require long-term reinforcement through consistent government campaigns and incentives (Liu & Liu, 2023)

4. Site of Decision-Making: Waste management is decentralized, with regional authorities responsible for planning and execution. The city collaborates with private partners, such as RDF waste processing in Bogor, and explores mini ITF prototypes to improve efficiency. Waste reduction policies are generally more effective when using a bottom-up approach. This is because bottom-up policies provide greater flexibility and allow for adjustments based on local needs. The closer decision-making is to field conditions, the higher the likelihood of effective policy implementation and the ability to address region-specific challenges (Maria Da Silva et al., 2020).
5. Policy Implementors: The Tangerang Selatan Environmental Agency (DLH) is the main policy executor, working with TPS 3R facilities, waste banks, and private sector partners. However, human resource shortages and inconsistent inter-agency coordination have weakened implementation efforts. Local policymakers or regional governments have a deeper understanding of policy content tailored to their area and can communicate it using methods adapted to local culture. This knowledge enables them to take proactive initiatives to enhance policy implementation without waiting for central government directives. In other words, when local governments are the primary policy actors, they gain greater autonomy in execution. However, in terms of oversight, policy content should establish a clear framework for collaboration between central and regional governments during policy formulation, ensuring that both control and advisory mechanisms are in place for effective implementation (Gruber, 2022).
6. Resources Committed: Infrastructure and funding constraints hinder policy effectiveness. TPS 3R and ITF facilities suffer from worker shortages and outdated equipment, with TPS 3R in Bambu Apus operating at only 35-40% efficiency. Additionally, ITF workers report occupational health risks, such as respiratory issues, due to inadequate safety measures. The required resources are not limited to human capital but also include financial, material, infrastructure, technical, and informational resources. Policy

content must consider resource availability and development planning to ensure optimal implementation (Trinh et al., 2021).

Policy Implementation Context:

1. Power, Interests, and Strategies of Actors Involved: The success of waste reduction policy implementation in Tangerang Selatan is influenced by power, interests, and strategies of key actors (Grindle, 1980). While the local government has the authority to enforce waste management regulations, the absence of clear enforcement mechanisms and inter-agency coordination has hindered effective implementation. Despite 100% of survey respondents opposing illegal dumping, regulatory ambiguities have led to enforcement challenges, as acknowledged by the Tangerang Selatan Environmental Agency (DLH). Top-down approaches provide strong regulatory control but are less adaptable to local challenges (Trinh et al., 2021). Meanwhile, bottom-up strategies improve implementation by involving daily waste actors, communities, and private stakeholders (Doeleman et al., 2022). Strengthening multi-stakeholder engagement and clarifying enforcement mechanisms is essential to improving policy effectiveness and achieving waste reduction goals.
2. Institution and Regime Characteristics: Institutional and regime characteristics play a crucial role in policy implementation. Strong and well-organized institutions enhance efficiency, while bureaucratic inefficiencies or corruption can hinder progress (Grindle, 1980). Institutional norms, flexibility, and technical capacity also determine an institution's ability to adopt and enforce new policies (Hill & Hupe, 2002). Decentralized systems often face coordination challenges between central and local governments, affecting policy execution. In the case of waste reduction policy implementation in Tangerang Selatan, the local government has demonstrated flexibility and innovation in addressing challenges. Despite suboptimal implementation, policies continue without significant resistance, and the government actively seeks alternative waste management solutions. As noted by the Head of UPT TPA Cipeucang, the government

remains proactive by collaborating with third-party waste management entities. These efforts highlight Tangerang Selatan's commitment to improving waste management despite existing limitations.

3. Compliance and Responsiveness: Compliance and responsiveness are critical factors in policy implementation. Compliance refers to how well bureaucratic and public actors adhere to regulations. High compliance indicates effective policy enforcement, often supported by sanctions and incentives (Grindle, 1980). However, challenges arise when regulations are unclear or when conflicting interests lead to resistance. Survey results show 77% of respondents practice household waste sorting, indicating strong public awareness. However, waste collection remains a challenge, as sorted waste is often mixed again during transportation due to the absence of standardized regulations ensuring continued segregation. Additionally, illegal waste dumping and persistent plastic use observed in the field highlight areas of low compliance, primarily due to regulatory ambiguity and lack of enforcement mechanisms. Responsiveness reflects the government's ability to adapt policies based on community needs and feedback (Grindle, 1980; Hill & Hupe, 2002). The Tangerang Selatan government has demonstrated adaptability by introducing new waste management solutions such as mini ITFs and PLTSa while continuously expanding TPS 3R and waste bank programs. A combination of high compliance and adaptive responsiveness enhances policy implementation, ensuring both technical efficiency and social relevance, ultimately increasing the likelihood of long-term success (Doeleman et al., 2022).

Based on interviews, observations, and secondary data analysis, several supporting and inhibiting factors have been identified in the implementation of Tangerang Selatan's waste reduction policy. Supporting factors include the presence of well-established programs such as Zero-Waste Homes and TPS 3R, which effectively reduce household waste. Additionally, the implementation of waste treatment technology, specifically through the Intermediate Treatment Facility (ITF) using Hydrodrive Incinerator technology, has helped minimize waste ending up in landfills. The government has also conducted public awareness

campaigns on healthy living and household recycling, fostering better waste management habits. Collaboration with businesses has further supported waste reduction efforts, particularly in waste sorting and the ban on single-use plastic bags. Ongoing research on technology-based waste management solutions and training programs for daily waste management workers have also contributed to improved implementation.

However, several barriers hinder the policy's effectiveness. Budget constraints limit the availability of human resources for TPS 3R operations, affecting service efficiency. Additionally, unclear regulations on penalties for illegal waste disposal make enforcement difficult. The absence of an incentive- and fine-based monitoring system further weakens compliance, as there are no mechanisms to encourage responsible waste disposal or penalize violations. Moreover, the lack of regular monitoring prevents authorities from effectively assessing and ensuring public adherence to waste management policies.

CONCLUSION AND SUGGESTIONS

Conslusion

The analysis of Tangerang Selatan's waste reduction policy implementation, based on Grindle's policy implementation framework, demonstrates that the policy has not yet achieved its intended effectiveness. Although the regulation sets out clear objectives and measurable targets, its execution is hindered by limited institutional capacity, inadequate human resources, and the absence of a robust enforcement mechanism. Public compliance remains inconsistent, particularly because waste sorting efforts are undermined when separated waste is later remixed during collection. Weak inter-agency coordination and the lack of incentive and penalty systems further contribute to persistent challenges such as illegal dumping.

Nonetheless, the study also identifies encouraging developments. Initiatives such as Zero-Waste Homes, TPS 3R facilities, and community-based waste banks have produced incremental progress, while Intermediate Treatment Facility (ITF) technology and public awareness campaigns reflect government commitment to innovation. These elements show that although the current

implementation is suboptimal, the foundations for more effective waste reduction are already in place. The findings therefore highlight a dual reality: the presence of structural and operational barriers, but also the existence of practical entry points for more sustainable policy advancement.

Suggestions

Building on these findings, several strategic actions are recommended to enhance the effectiveness of Tangerang Selatan's waste reduction policy. Stronger collaboration with the private sector, particularly through Corporate Social Responsibility (CSR) initiatives, can expand funding, infrastructure, and technical expertise. Upstream interventions should be prioritized, including Extended Producer Responsibility (EPR) to ensure producers take greater responsibility for waste reduction. Human resource capacity can be strengthened through training programs for waste management workers and sustained public education campaigns to normalize household waste sorting. In addition, communication with stakeholders should move beyond one-way information delivery and incorporate social marketing strategies that promote behavioral change. Investment in technology-based waste processing should continue, with greater attention to scalability and maintenance. Finally, establishing a transparent regulatory framework for an incentive- and penalty-based monitoring system is critical to improving compliance, deterring illegal dumping, and ensuring long-term sustainability. These measures, if consistently pursued, can transform the current incremental progress into a more comprehensive and impactful waste reduction policy.

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