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Implementation of Waste Management Policy by the Environment Agency: A Case Study of Waste Transportation Equipment at the Gunung Santri Landfill, Cirebon Regency

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ABSTRACT
Waste management is a crucial issue in urban environmental governance, particularly concerning the effectiveness of transportation systems to final disposal sites (FDS). This study aims to examine the implementation of waste management policies by the Cirebon Regency Environmental Agency, focusing on a case study of waste transportation vehicles at the Gunung Santri FDS. The approach used is qualitative, with a case study method to deeply explore the dynamics of policy implementation in the field. The analysis is conducted using George C. Edward III's policy implementation theory, which includes four main variables: communication, resources, implementer disposition, and bureaucratic structure. Data is collected through in-depth interviews, participatory observation, and document analysis. The research findings indicate that the implementation of waste transportation policies still faces various challenges, such as limited fleet capacity, suboptimal distribution of transportation schedules, and weak coordination among technical departments within the DLH bureaucratic structure. However, there are also improvement efforts, including updates to transportation standard operating procedures (SOPs), procurement of new fleets, and the involvement of village officials in the transportation system. The conclusion of this study emphasizes the importance of strengthening resources and cross-sector communication, as well as the need to reformulate the operational system of transportation based on regional mapping and the frequency of waste generation. This study contributes in the form of technical policy recommendations for local governments and enriches the literature on the implementation of environmental policies at the local level.

INTRODUCTION

Population growth inevitably leads to an increase in the amount of waste, as every human being produces waste daily (World Bank, 2018). Population growth, along with changes in consumption patterns and lifestyles, has increased the amount, types, and diversity of waste characteristics (Nguyen et al., 2020; Magazzino et al., 2022). The rising purchasing power of the community for basic commodities and technological products further escalates municipal and electronic waste generation (ITU & UNITAR, 2024). Moreover, business expansion supporting regional economic development contributes to both the quantity and complexity of waste streams (UNEP, 2024). Additionally, the rapid growth of industry impacts the amount of waste produced and poses significant management challenges, particularly in developing countries (Zhang et al., 2024).

Overall, global projections show waste volumes surging through mid-century without systemic interventions (World Bank, 2018; UNEP, 2024).

Geographically, Cirebon Regency is located in West Java Province on the island of Java (BPS Kabupaten Cirebon, 2023). It consists of 40 sub-districts with 424 villages/neighborhoods (Pemkab Cirebon, 2022). In Cirebon Regency, waste management tasks are carried out by the Cirebon Regency Environmental Agency (*Dinas Lingkungan Hidup*), which includes road and open channel cleaning, TPS provision services, waste transportation, and waste management at the *Tempat Pemrosesan Akhir* (TPA) or Final Processing Site (FDS) (DLH Kabupaten Cirebon, 2022; Wulandari et al., 2021; Andriani & Haryanto, 2020).

The *DLH* of Cirebon Regency operates 136 (one hundred thirty-six) *Tempat Penampungan Sementara* (*TPS*) and 4 (four) Transfer Depot Systems spread throughout the region. The regency has 1 (one) *TPA*, namely the Gunung Santri *TPA*. The mechanical equipment at the Gunung Santri Final Waste Processing Facility includes several units of heavy machinery, such as 40 (forty) dump trucks/armroll trucks, 2 (two) Hitachi Zaxis 200 excavators used for excavation and moving waste with specifications requiring a bucket size of 0.5–1.5 m^3, and 2 (two) units of Bull Dozer D31Q used for pushing, spreading, and leveling. The condition of the heavy equipment units at the Gunung Santri *FDS* in Cirebon Regency is, on average, ±80%.

Various operational activities related to waste disposal at the landfill site, along with the required equipment, begin with waste collection and spreading, aiming to move waste to the landfill site (Jaya, 2023). This consists of sub-tasks such as waste collection and spreading (*feeding and spreading-in*), typically carried out by heavy equipment like excavators. The second activity involves leveling or arranging the waste already at the landfill site, carried out using heavy machinery such as bulldozers.

The Cirebon Regency Government, through the *DLH*, plays a strategic role in implementing policies related to waste collection, transportation, processing, and utilization. The *DLH* of Cirebon Regency is responsible for enforcing waste management regulations in accordance with *Peraturan Daerah Kabupaten Cirebon* No. 5 of 2022 on Waste Management, which establishes the principles and mechanisms for waste management from reduction, collection, and transportation to processing (*Peraturan Daerah Kabupaten Cirebon* n.d.). One of the key elements in the waste management system is waste transportation, which serves as the link between waste collection points (such as households, markets, and public areas) and the Final Disposal Site (*FDS*) (Harirah 2020).

Waste management is one of the most pressing and complex environmental issues faced by local governments throughout Indonesia, including Cirebon Regency. With the increase in population, growth of residential areas, and heightened economic activity, the volume of waste produced by communities has also increased significantly. In this context, the effectiveness of waste management is a key benchmark in creating a healthy, clean, and sustainable environment.

Comprehensive waste management is regulated by *Undang-Undang* No. 18 of 2008 on Waste Management, which emphasizes that waste management must be carried out in an integrated manner, from upstream to downstream, starting with reduction, sorting, collection, transportation, processing, and final disposal. One of the crucial aspects of waste management is the transportation of waste from the source to the *FDS*. Without an efficient and sustainable waste transportation system, waste management efforts will not be maximized.

Waste management in Cirebon Regency is the responsibility of the *DLH*. One of the main final disposal sites is the Gunung Santri *FDS*, which is the central waste collection point for various sub-districts, especially from the East and Central Cirebon areas. However, in its implementation, there are still various obstacles, particularly related to waste transportation equipment. Limited fleet size, vehicles that are no longer roadworthy, suboptimal transportation routes, delays in transportation, and coordination issues between work units are the main challenges to smooth policy implementation. These issues not only impact the effectiveness of waste management but can also lead to health risks, environmental pollution, and a decline in the quality of life for surrounding communities. In this context, the strategic role of the *DLH* of Cirebon Regency is essential to ensure that waste management policies are implemented optimally, including the transportation of waste to the Gunung Santri *FDS* (Putri, Sotyawardani, and Rafael 2023).

Prior research by Verawati and Dyas Tuti (2020) analyzed the implementation of solid waste management policies in South Jakarta using Edward III's model (communication, resources, disposition, bureaucratic structure) and revealed shortcomings such as limited policy socialization to neighborhood levels and inadequate resource allocation. Meanwhile, Yudithia et al. (2024) applied the same model in examining waste bank management in Tanjungpinang and found that, despite an efficient bureaucratic structure and proactive implementers, barriers such as low public awareness and insufficient funding persisted. Both studies provide valuable insights, yet neither addresses the specific logistical challenges of handling waste transportation fleets within a decentralized local system.

This study aims to examine in greater depth the implementation of this policy in relation to the waste transport fleet, using an analysis based on public policy implementation theory. One relevant approach is George C. Edward III's implementation theory, which highlights four important variables in the policy implementation process, namely: communication, resources, the disposition or attitude of implementers, and bureaucratic structure. Through this approach, researchers can trace the extent to which policies established at the local government level are actually implemented in the field, as well as identify obstacles and opportunities for improvement.

The author hopes that this research can provide a comprehensive picture of the services and obstacles in implementing waste transportation policy, as well as offer policy recommendations for local governments to improve a more efficient and sustainable waste management system (Wicaksono 2022).

METHOD

The method used in this study was qualitative research. This approach was chosen because the situation could not be measured accurately in quantitative terms, requiring an in-depth exploration of the informants to gain a proper understanding. The qualitative research method was employed by the author to address the research problem identified in this study, namely how the implementation of waste management policies in Cirebon Regency's Western Region is carried out. Data collection techniques involved participant observation and in-depth interviews, while the data collection methods included literature review, field studies, observation, interviews, and documentation (Khumayah 2021).

The main focus of this study is the policy implementation process of waste management, with particular emphasis on the procurement, use, and management of waste transportation equipment; coordination of technical implementation at the *DLH*; schedules and distribution systems; and *SOPs* for transportation, as well as the technical and non-technical obstacles encountered in policy implementation.

Data validity testing techniques used in this study included triangulation methods, such as cross-checking and double-checking (Khumayah 2021), involving data obtained from various sources in terms of both timing and methodology. The data analysis technique employed was descriptive, aiming to present an accurate depiction of the actual conditions of the research subject as they existed during the course of the study (Khumayah 2021).

RESULTS AND DISCUSSION

Public policy implementation is the process of translating political decisions or regulations into concrete actions on the ground. Implementation is not merely about following orders but also involves adaptation, interpretation, and the involvement of implementing actors. In this study, the main focus of policy implementation is on waste management carried out by the Environmental Agency, particularly in the context of transporting waste to the Final Disposal Site (FDS). In order to analyze this systematically, George C. Edward III's implementation theory approach is used.

Comprehensive waste management is regulated in Law No. 18 of 2008 concerning Waste Management, which emphasizes that waste management must be carried out in an integrated manner, from upstream to downstream, starting from reduction, sorting, collection, transportation, processing, to final processing. One crucial aspect of waste management is the transportation of waste from the source to the Final Disposal Site (FDS). Without an efficient and sustainable waste transportation system, waste management efforts will not be optimal.

The results of an interview with the Head of the Waste Transportation Division, Mr. Ujang Uci Sanusi, S.Sos. "In general, we at the Cirebon Regency Environmental Agency have implemented the principles outlined in Law No. 18 of 2008 on waste management. Some of the steps that have been taken include encouraging waste reduction at the source, involving the community in waste management, and increasing the capacity

of Reduce-Reuse-Recycle (TPS 3R) waste management sites and final disposal sites (FDS). We also collaborate with villages and sub-districts in waste bank and household waste management programs, but there are several challenges, especially in terms of community behavior and the waste transport fleet. To support the implementation of this law, we have also drafted local regulations and district regulations derived from Law No. 18 of 2008 to ensure more effective implementation at the local level. Awareness campaigns targeting businesses and the public continue to be conducted to foster awareness of proper waste sorting and management.

The author's hope for the 1777nclude regarding the implementation of the Cirebon Regency Environmental Agency is that the synergy between government institutions, the private sector, and the community will become stronger so that the implementation of this management can be realized in the Cirebon Regency environment. According to the theory of George C. Edward III (1980), the success of policy implementation is influenced by four variables, namely:

Communication

Communication refers to how policies are conveyed to implementers. Clarity, consistency, and accuracy of messages are crucial. Communication is an important element in ensuring that the policies designed can be understood and implemented correctly by all parties involved. There are several issues regarding communication in the implementation of waste management policies, including the fact that internal communication (among DLH employees) regarding waste management policies is relatively good, but communication with sub-districts, villages, and the community is still minimal. Many waste collection officers do not receive detailed information regarding SOPs (Standard Operating Procedures), including collection routes, work schedules, and individual responsibilities. There is no adequate digital communication system to quickly report operational obstacles in the field. The lack of vertical and horizontal communication has led to a gap in understanding between policy makers and technical implementers in the field, which has impacted waste collection services. Most of the community (90%) is aware of the waste collection services provided by the DLH. They obtain this information through neighborhood association leaders, neighborhood WhatsApp groups, and direct observation of waste collection trucks in operation. However, some respondents mentioned that information regarding collection schedules is not always consistent. Some residents are confused because trucks sometimes arrive earlier than the scheduled time, or do not come at all on the scheduled day.

Interview results showed that policy information is communicated through monthly coordination meetings and also through internal department social media (WhatsApp). However, there are sometimes misunderstandings regarding changes to the collection schedule. Most staff understand their duties and policies, but the technical language used by superiors is sometimes difficult for non-administrative staff to understand. There is a need to adjust the language to make it more understandable for staff.

The author assesses that policy communication is still weak, and communication between policy makers (DLH) and implementers in the field, as well as village officials and the community, is not yet effective. Therefore, there is a need for policy socialization and SOPs for transportation to be communicated to field officers. Although most residents state that information is fairly easy to access, there is a need for improved official communication from the DLH or village government so that information can be more evenly distributed, consistent, and not solely dependent on informal channels.

Resources

Policies will not be successful if they are not supported by adequate resources. Local Regulation No. 5 of 2022 stipulates that funding can come from the regional budget, regional levies, and other legitimate sources.

The results of interviews conducted for this study show that resources include financial, human, and infrastructure aspects that support policies. The waste collection fleet owned by the Cirebon Regency Environmental Agency (DLH) in the western region has only 40 operational trucks, but only about 15-20 are in operation to serve 10 villages/sub-districts due to the fleet's age, which has been in operation for over 10 years. Only 18 staff members are assigned to two daily shifts. Budget allocations for fuel, fleet maintenance, and staff salaries often experience delays in disbursement. Supporting equipment such as personal protective equipment (PPE), waste bins, and other supporting facilities are inadequate. Based on field observations and confirmation, the DLH stipulates that each vehicle must make at least one trip per day, and during emergencies (when the Kubangdeleg FDS is closed), up to two trips per truck per day are made to cope with the volume load (R Arisandi, Nariyah, and Nursahidin 2019). Additionally, interview results indicate that the waste collection truck fleet regularly visits most of the respondents' areas. However, residents living in outlying areas or far from main roads complain that they are not regularly reached by the truck service. Some areas only receive service every two weeks, and some have never received direct service.

According to the author's observations, in terms of supporting facilities, some members of the community say that temporary landfills (TPS) are available, but they are often full because transportation is not regular. Residents complain about the poor cleanliness and lack of coverage of the TPS, which causes odors and attracts flies. This indicates that although the DLH fleet is available, its distribution is not yet equitable, and the capacity and quality of the TPS still need to be improved. Additionally, the limited availability of resources is the main obstacle to the effective implementation of waste management policies. Therefore, the author hopes that the government can allocate more funding to address the issue of resource constraints.

Disposition

Referring to the willingness, commitment, and attitude of policy implementers in carrying out their duties. The attitude of implementers is an important asset in the successful implementation of policies.

Although field officers generally have high morale, their motivation can decline if it is not balanced with recognition and systemic support. The majority of transport officers show high loyalty and work ethic, despite working in conditions of limited resources and low income. However, work enthusiasm is beginning to decline due to job uncertainty (many are still temporary workers) and a lack of health and safety guarantees. At the DLH leadership level, there is a commitment to improve the management system, but this is hampered by budget regulations and the rigidity of the bureaucratic structure. The majority of the community said that waste transporters have a good attitude, are polite, and work efficiently. The workers are considered professional in performing their duties, although some respondents mentioned that the collection time is too early (between 4 and 5 a.m.), which sometimes makes it difficult for residents who have not yet had the chance to dispose of their household waste. Some respondents also stated that collection is not always on schedule, and there is sometimes no notification if changes occur. This indicates that while the attitude of the workers is good, there are challenges in terms of service consistency, which is closely related to internal management and operational schedules.

Special attention is needed from local governments to strengthen the welfare and legal status of field workers so that implementation is more consistent and sustainable.

Bureaucratic Structure

This includes the organizational system, governance, division of tasks, and implementation procedures that form the framework for policy implementation. The formal organizational structure of the Cirebon District DLH includes a waste management division, but does not yet have a specific technical unit focused on transportation. Coordination between the DLH and sub-districts and villages is not yet optimal in suburban areas. Many villages are unaware of the exact waste collection schedule or lack a designated liaison officer. The Standard Operating Procedures (SOPs) for waste collection are not well-documented. Many actions in the field are based on habit rather than standard procedures. The lack of structure in the bureaucracy leads to weak governance of waste transportation services. In this context, minor reforms are needed in the DLH's organizational structure and internal SOPs,1779ncludeing the use of an integrated waste management information system to enable real-time monitoring of transportation and digital coordination between levels of government. In terms of reporting and problem handling, the majority of residents stated that they were more comfortable reporting to the RT or neighborhood head than directly to the DLH. Some residents were unaware of the formal complaint channel to the DLH and stated that when waste accumulated, the problem was more often resolved independently by residents or through coordination with the local Neighborhood.

Interviews with residents, particularly in areas far from the respondents, indicate that the bureaucratic structure has not yet fully optimized its ability to directly reach the community. Reporting and complaint channels need to be clarified, facilitated, and

disseminated evenly to the community to ensure that oversight and public service functions can operate transparently and responsively.

The implementation of waste management policies by the Environmental Agency regarding transportation services to the Gunung Santri Final Disposal Site (FDS) has not been optimal. The most dominant obstacles stem from limited resources and weak bureaucratic structures for waste transportation management. Despite the commitment of implementers in the field, unstructured communication, a lack of vehicles in good condition, and unwritten standard operating procedures (SOPs) pose serious obstacles (Abdussamad et al. 2022).

CONCLUSION

This study is not merely a record of the garbage trucks in operation but rather an examination of how policies can lose their meaning when they are not supported by clear communication, adequate resources, empowered implementers, and a responsive bureaucratic system. If these four pillars of Edward III's theory can be collectively strengthened, waste management is not merely about transporting waste but becomes part of a dignified public service. The people of *Cirebon Regency* deserve a clean environment, and the workers deserve a system that values their hard work. Therefore, improving the system is not just a technical issue but also a matter of commitment—commitment to the environment, to people, and to a more organized future.

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