Decentralized Waste Management Policy: A Study in the Special Region of Yogyakarta Government

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Abstract. Humans generate an average of around 0.68 kg of waste per day. Waste should be the responsibility of all parties, both individuals and organizations. The Special Region of Yogyakarta has the Piyungan Landfill (TPA Piyungan). The Piyungan Landfill has reached its waste capacity limit, leading to several closures. Through the Governor of DIY's Letter No. 658/11898, concerning the Decentralization of Waste Management in Regencies/Cities across DIY, all regencies and cities in DIY are required to manage their own waste independently. The purpose of this study is to describe the implementation process of decentralized public services in the Special Region of Yogyakarta. This study uses a qualitative method, focusing on the Government of the Special Region of Yogyakarta. The results show that the four categories of decentralization- political, administrative, fiscal, and economic- have been successfully implemented, allowing waste management to run smoothly and gradually resolve the waste crisis.

Keywords: *Waste Management; Decentralization; Public Administration.*

1. Introduction

Elephants die leaving ivory, humans die leaving garbage, the dime quote looks simple but has a very deep meaning, how very sinful humans are if they are not responsible for the environment they live in. Humans on average produce around 0.68 kg of waste every day, so each individual is expected to manage the waste produced wisely with the simplest way is to dispose of waste in its place, then at an advanced stage is to sort waste according to the category of waste. The Ministry of Environment of the Republic of Indonesia launched data in 2020 that the national waste production reached 67.8 million tons from 270 million Indonesians, which means that the waste produced by the Indonesian population is 185,753 tons every day and on average this waste adds to the mounting piles in landfills (TPA). The mountains of waste, in addition to causing environmental pollution, also increase the production of methane gas from waste. The case of the methane gas explosion at the Cireundeu landfill, Leuwigajah, Cimahi City, West Java, on January 21, 2005 [15] has opened the eyes of many parties, especially about how good waste management should be done.

In recent months, there have been numerous reports about the waste crisis, especially in the Special Region of Yogyakarta. The limited capacity of the Piyungan final disposal site (TPA), located in Bantul Regency, has left the province struggling to manage waste. Many piles of garbage have accumulated on main roads because garbage trucks cannot transport waste due to the lack of a disposal site, as the only TPA in the Special Region of Yogyakarta has exceeded its capacity. As an initial step, at the end of 2023, the Sleman Regency government constructed a temporary waste disposal site (TPS) located in Tamanmartani Village, Kalasan subdistrict, Sleman Regency, to address the waste crisis. Meanwhile, Bantul Regency has increased the capacity of the Patihan Integrated Waste Processing Site (TPST)

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and accelerated the construction of three TPSTs in the region. Vacant government land has been transformed into a temporary waste disposal site, hoping to accommodate waste from the community. However, contrary to expectations, the Piyungan TPA did not resume operations and was permanently closed as of April 1, 2024.

The dependency on the Piyungan TPA, operated by the Environmental Agency of the Special Region of Yogyakarta, has led to a complacency in the region, making it reliant on dumping waste at Piyungan. On the other hand, Sleman Regency has the potential in terms of land and other resources to manage and process its own waste. The district and city governments in the Special Region of Yogyakarta, particularly Sleman Regency and Yogyakarta City (which heavily depend on the Piyungan TPA), must act swiftly to reduce their reliance on Piyungan by independently managing waste. Various policies have been implemented to address the ongoing waste crisis, including the construction of an Integrated Waste Processing Site, enhancing the productivity of the 3-R (Reduce, Reuse, Recycle) Integrated Waste Processing Sites in communities, and initiating collaborative efforts with other parties to innovate in waste management.

The delegation of tasks and authority from the Provincial Government to the Regional Government is one of the processes of regional autonomy, with the primary goal of bringing services closer to the community. The decentralization of public services has been underway in Indonesia for quite some time and has expanded significantly following the issuance of Law No. 23 of 2014 on Regional Government. Gradually, various public services are managed by local governments in accordance with the characteristics and potential of their respective regions. Waste management services are one of the vital services provided by the government to the community, especially in urban areas. Waste can become a disaster if not managed properly, so each region must prepare adequately to manage local waste production to prevent it from becoming a problem in the future. The issuance of the Special Region of Yogyakarta Governor's Letter No. 658/11898, dated October 19, 2023, regarding the Decentralization of Waste Management in Regencies/Cities in DIY serves as a catalyst for regions to enhance waste management services at the regency and city levels in the Special Region of Yogyakarta. Regions must be prepared for local waste management so that the community can be served well, ensuring that waste is managed appropriately and does not become an issue in the future.

Based on the background description, this research formulates the problem of how the process of implementing public policy decentralization occurs, particularly in the regional waste management services. The objective of this study is to describe the process of decentralizing waste management in the Special Region of Yogyakarta, along with the achievements and weaknesses of the decentralization process, ultimately aiming to improve services to the community.

2. Literature Review

2.1. Decentralization

The 1945 Constitution of the Republic of Indonesia states that local governments are granted the authority to organize and control their governance based on the principles of decentralization and delegated tasks. The broad delegation of authority aims to accelerate the realization of citizen welfare through improved services, empowerment, and public participation. Additionally, regions will become more competitive through greater autonomy while upholding the principles of democracy, equality, justice, privilege, and uniqueness, while also respecting the potential and diversity of regions within the Unitary State of the Republic of Indonesia. Regions have the power to develop local policies to serve the community, enhance

participation, empower initiatives and society, and improve the welfare of the people. The principle of genuine and responsible autonomy allows for governance to be conducted in accordance with obligations and authority, enabling growth and development in line with this principle by tapping into local potential and uniqueness.

The decentralization concept implemented in Indonesia has significant implications, particularly concerning fiscal policies and state administration policies. Rondinelli and Cheema (1983) define decentralization as the transfer of planning, decision-making, and/or administrative authority from the central government to regional organizations, local administrative units, semi- autonomous organizations, parastatal enterprises, local governments, or non-governmental organizations [2]. The differences in decentralization concepts are primarily determined by the level of authority transferred for planning, decision-making, and management by the central government, as well as the extent of autonomy granted to perform these tasks. Furthermore, Rondinelli (2007) identifies four dimensions of decentralization, which are outlined in the following table [3].

Table 1
Categories of Decentralization by Purpose and Instruments [3]

No	Type of Decentralization	Purpose	Instruments
1	Political Decentralization	To increase power for residents and their political representatives in public decision-making	Differences in constitutions and laws, development of political parties, strengthening legislatures, establishment of local political institutions, support for effective public interest groups
2	Administrative Decentralization	To improve management efficiency for the provision of public services	Decentralization, delegation, and devolution, each with distinct characteristics.
3	Fiscal Decentralization	To improve financial performance through enhanced decision-making in creating rational revenue and expenditure	Restructuring of expenditures, revenues, and fiscal transfers among different levels of government
4	Economic and Market Decentralization	To create a better environment for business and provide goods and services based on responses to local needs and market mechanisms	Transfer of government functions to business organizations, community groups, or NGOs through privatization and strengthening market economies through deregulation

2.2. Definition of Waste

Every individual produces waste daily, with each person generating at least 0.68 kg. Waste is defined as solid materials or items that are no longer used by humans, or solid objects that are no longer utilized in an activity and are discarded. Based on its nature and characteristics, waste can be divided into four categories [5]:

a. Biodegradable waste (remnants of animal, plant, vegetable, and fruit matter, etc.)
b. Non-biodegradable waste (byproducts of industrial processes)

c. Combustible waste (plastic, paper, rubber, wood)
d. Non-combustible waste (glass, cans, metals, iron)

Article 1, number 1 of Law No. 18 of 2008 on Waste Management in the Republic of Indonesia states, "Waste is the residue of daily human activities and/or natural processes in solid form." Waste managed under Law No. 18 of 2008 consists of:

a. Household waste, which comes from daily household activities, excluding feces and specific waste.
b. Waste from commercial areas, industrial zones, special areas, social facilities, public facilities, and/or other facilities.
c. Specific waste includes:
   1) Waste containing hazardous and toxic materials.
   2) Waste containing hazardous and toxic waste.
   3) Waste generated due to disasters.
   4) Debris from building demolitions.
   5) Waste that cannot yet be processed technologically; and/or
   6) Waste that arises irregularly.

3. Methodology

This research employs a descriptive type with a qualitative approach. Qualitative methods include document observation, interviews, and literature review [4]. Literary studies are conducted to gather information and data using various types of reference materials such as documents, books, magazines, past studies, historical narratives, etc [1]. The site of this research is the Regional Development Planning Agency of the Special Region of Yogyakarta. The subjects of the study involve employees of the Regional Development Planning Agency of the Special Region of Yogyakarta. The type of data used is qualitative data sourced from primary and secondary data. Data collection techniques include in-depth interviews, observation, and documentation. Data analysis is conducted through data reduction, data presentation, and conclusion drawing. Meanwhile, data quality is ensured through the triangulation of theories, sources, and techniques.

4. Result

4.1. Waste Management at Piyungan Landfill.

The Piyungan Landfill, or Integrated Waste Disposal Site (TPST) Piyungan, is located in the Ngablak and Watugender hamlets of Sitimulyo Village, Piyungan subDistrict, Bantul Regency, Special Region of Yogyakarta. The Piyungan Landfill was constructed between 1994 and 1996 and has been in operation since 1996, managed by the Joint Secretariat (Sekber) Kartamantul based on Governor's Decree No. 18 of 2000. In 2015, it was managed by the Department of Public Works, Housing, and Energy and Mineral Resources in accordance with Governor's Regulation No. 99 of 2014 concerning the Management and Use of Facilities and Services for Waste Management at Regional Final Processing Sites under the Urban Sanitation and Drinking Water Infrastructure Management Agency. In 2019, the management of the Piyungan Landfill was transferred to the Waste Management Agency of the Department of Environment and Forestry of the Special Region of Yogyakarta.

The Piyungan Landfill spans an area of 12.5 hectares and primarily serves as a waste reception facility for the City of Yogyakarta and Sleman Regency. These two areas are the largest contributors of waste in the Special Region of Yogyakarta, while Bantul Regency, where the Piyungan Landfill is located, manages most of its own waste, sending only a small portion to the

landfill. Meanwhile, Kulonprogo and Gunungkidul Regencies do not utilize the Piyungan Landfill as they can manage their own waste production. The amount of waste entering the Piyungan Landfill each day is approximately 742 tons, with the City of Yogyakarta contributing the largest share at 270 tons per day.

Table 2
Volume of Waste Entering Piyungan Landfill

No	Year	Amount of waste (tons/day)
1	**2022**	**742,2**
2	**2021**	**700,9**
3	**2020**	**569,7**
4	**2019**	**544,0**
5	**2018**	**551,2**
6	**2017**	**552,8**

Source: www.harianjogja.com [14]

From the data above, it can be seen that the volume of waste entering the Piyungan Landfill has increased each year. This is due to the rising economic activity and consumption among the community, as well as the declining efforts of individuals to manage the waste they produce or changes in community waste management practices.

The waste management method at the Piyungan Landfill is carried out conventionally, through burial with layers of soil intended to mitigate the potential for pollution and contamination. The majority of the waste entering the Piyungan Landfill consists of residual waste that cannot be easily processed and requires further technology and processing to be reused. Some waste from the regions has been sorted and reused, while the residual waste that cannot be processed is sent to the Piyungan Landfill for burial. However, only a small portion can be sorted and processed due to the lack of waste management facilities in the regions, which is not proportional to the amount of waste produced.

4.2. Waste Management Post-Closure of Piyungan Landfill

On April 1, 2024, the Piyungan Landfill was closed as a follow-up to the issuance of the Special Region of Yogyakarta Governor's Letter No. 658/11898, dated October 19, 2023, regarding the Decentralization of Waste Management in the Regencies/Cities of DIY. With the issuance of this letter, waste management must be conducted independently by each regency and city in the DIY area. The permanent closure of the Piyungan Landfill has effectively left three regions—Yogyakarta City, Sleman Regency, and Bantul Regency—struggling to manage community waste. Each region has taken several steps to address this waste crisis, including the creation and/or revitalization of Integrated Waste Processing Sites (TPST), promoting Community Waste Processing Sites (TPS-3R), Waste Banks, and educating the public on independent waste management.

Sleman Regency has established TPST Tamanmartani and TPST Sendangsari to accommodate waste quickly. TPST Tamanmartani is located in Kalasan sub-district, Sleman Regency, with a waste processing capacity of 80-90 tons per day, employing around 30 workers. This 11,684-square-meter facility processes waste into Refuse Derived Fuel (RDF). RDF is a waste processing technology that uses a homogenization process to reduce waste size or form it into pellets that can then be converted into alternative fuel, producing 30-40 tons of RDF per day.

Meanwhile, TPST Sendangsari, located in Minggir subDistrict, Sleman Regency, has a

capacity of 60 tons per day. This 6,688 square meter facility employs 59 workers and has an initial RDF production of 10-15 tons per day. Additionally, TPST Turi, located in Turi subDistrict, is currently under construction.

Moreover, the Sleman Regency Government is also increasing capacity at 28 supervised TPS-3R facilities spread throughout Sleman Regency. These TPS-3R facilities, which are mostly managed by communities, receive special attention as they are the frontline waste managers in society. Capacity-building efforts, including training, equipment assistance, and other support, are being implemented to educate the community on sorting waste at home and/or utilizing waste to create economically valuable products.

The Bantul Regency Government is addressing the closure of the Piyungan Landfill by increasing the capacity of the Patihan Integrated Waste Processing Site (TPST) and accelerating the construction of TPST Bawuran, TPST Modalan, and TPST Dingkikan, as well as promoting the establishment of Community Waste Processing Sites (TPS-3R) in every village in Bantul Regency. TPST Patihan, which covers approximately 3,600 square meters, is located in Patihan Hamlet, Gadingsari Village, Sanden subDistrict, Bantul Regency. This TPST is temporary and employs a burial method similar to that used at the Piyungan Landfill. Meanwhile, the construction of TPST Bawuran, located in Sentulrejo Hamlet, Bawuran Village, Pleret subDistrict, Bantul Regency, is currently being expedited. This TPST, with a planned area of 6.7 hectares using land from the Yogyakarta Sultanate, will have a maximum waste processing capacity of 300 tons per day. The construction of TPST Bawuran will be carried out in two phases. The first phase involves building a TPST with a processing capacity of 100 tons of waste per day, named the Intermediate Treatment Facility (ITF) Bawuran. Additionally, the Bantul Government is also constructing TPST Dingkikan, located in Dingkikan Hamlet, Argosari Village, Sedayu subDistrict, with a planned processing capacity of 60 tons of waste per day, and TPST Modalan in Baturetno Village, Banguntapan subDistrict, with a capacity of 50 tons per day. All three TPSTs will produce Refuse Derived Fuel (RDF), similar to the TPSTs already established by the Sleman Regency Government. The Sleman Regency Government and Bantul Regency Government have collaborated with PT. Solusi Bangun Indonesia for the utilization of RDF produced from the TPSTs, ensuring that the RDF generated has economic value that can help finance waste management operations in the regions.

On the other hand, Yogyakarta City is struggling the most with the closure of the Piyungan Landfill, as it does not have vacant land like other areas that can be used for waste collection and management. Due to the limited space, waste has accumulated in waste depots, and even the Kridosono Stadium has been temporarily used to store waste. The TPS-3R and Waste Banks in Yogyakarta City are unable to accommodate the existing waste production, leading to significant waste piling up in street corners, disrupting road users and local residents. Consequently, the Yogyakarta City Government is enhancing the existing TPS-3R facilities. The Nitikan TPS-3R, located in Sorosutan, Umbulharjo subDistrict, Yogyakarta City, has been upgraded and can process waste into RDF. The Nitikan TPS-3R currently processes 75 tons of waste per day and produces 20 tons of RDF per day. Additionally, the Yogyakarta City Government has also improved the Karangmiri TPS-3R and Kranon TPS-3R, with capacities of 25 tons per day and 40 tons per day, respectively.

4.3. Implementation of Decentralized Waste Management

Decentralization is implemented as a means of transferring planning, decision-making, and/or administrative authority from the central government to regional organizations, local administrative units, semi-government organizations, local governments, or non-governmental organizations [2]. Furthermore, there are four dimensions of decentralization that

can be applied. In the context of implementing decentralized waste management in the Special Region of Yogyakarta, this concept of decentralization is fairly applicable and functioning well. The implementation process can be outlined as follows.

a. Political Decentralization

The goal of political decentralization is to enhance the power of the population and their political representatives in public decision-making. Indeed, the process of political decentralization has been implemented in Indonesia, including in the Special Region of Yogyakarta. however, in terms of instruments not much has been done especially in waste management. Through the Special Region of Yogyakarta Governor's Letter No. 658/11898, dated October 19, 2023, regarding the Decentralization of Waste Management in the Regencies/Cities of DIY, the door has been opened for regencies and cities in the Special Region of Yogyakarta to formulate waste management regulations through local political institutions, whether by regional leaders or local councils.

Following the issuance of the Governor's Letter, each regency and city promptly followed up on this delegation and politically issued the Bantul Regent's Decree No. 547 of 2023 concerning the Emergency Status of Waste Management. Being more prepared than neighboring regencies, Sleman Regency took a firmer stance by issuing Sleman Regency Regional Regulation No. 6 of 2023 on Waste Management Implementation, while Yogyakarta City issued Yogyakarta City Regional Regulation No. 1 of 2022 concerning Amendments to Yogyakarta City Regional Regulation No. 10 of 2012 on Waste Management. These political products demonstrate the seriousness of the regions in fulfilling their duties to serve the community, particularly in local waste management, so that the derivatives of these political products can serve as guidelines for local governments in carrying out their roles and functions as public services, especially in waste management.

b. Administrative Decentralization

The main objective of this administrative decentralization is to improve the quality of public service provision, with the primary instrument being administrative authority in accordance with Law No. 23 of 2014 on Regional Government of the Republic of Indonesia. Following the issuance of the Special Region of Yogyakarta Governor's Letter No. 658/11898, dated October 19, 2023, regarding the Decentralization of Waste Management in the Regencies/Cities of DIY, the delegation of administrative authority is now fully vested in the regencies and cities in the Special Region of Yogyakarta through their respective Technical Regional Devices, in line with the relevant matters and authorities they possess.

c. Fiscal Decentralization

The main objective of fiscal decentralization is to improve the financial performance of regions. The fiscal decentralization implemented by the Special Region of Yogyakarta takes the form of Special Financial Assistance to the regencies/cities within the Special Region of Yogyakarta. In the 2023 fiscal year, the Yogyakarta City Government received Special Financial Assistance (BKK) from the special fund amounting to IDR 97.9 billion [11], while Kulon Progo Regency received IDR 92.2 billion; Sleman Regency received IDR 71.6 billion; Gunungkidul Regency received IDR 61.7 billion; and Bantul Regency received IDR 52.2 billion [12]. This financial assistance is partially used by local governments to develop waste management infrastructure, including Integrated Waste Processing Sites (TPST), Community Waste Processing Sites (TPS-3R), Waste Banks, and supporting equipment [9][13].

d. Economic Decentralization

The purpose of economic decentralization is to create a better environment for businesses and to provide goods and services in response to local needs and market mechanisms. With the economic decentralization in waste management, new economic actors have emerged to support the government in providing waste services to the community. Local communities have initiated waste service providers, both through village-owned enterprises (BUMDes) and independent community initiatives, offering waste collection services to residents. Currently, TPS3-R and Waste Banks have been established across the Special Region of Yogyakarta. Additionally, in the private sector, waste collection services are starting to emerge, one of which is “Pasti Angkut,” accessible through a digital platform with reasonably low rates.

5. Discussion

The process of decentralizing waste management in the Special Region of Yogyakarta has made significant progress, largely due to the emergency situation that forced all stakeholders to work hard to resolve the waste crisis that occurred throughout 2023, particularly in Yogyakarta City, Sleman Regency, and Bantul Regency. The long-standing political decentralization was unable to anticipate the looming waste disaster, and with the issuance of the Special Region of Yogyakarta Governor's Letter No. 658/11898, dated October 19, 2023, regarding the Decentralization of Waste Management in the Regencies/Cities of DIY, a strong impetus was given to local policymakers, prompting them to issue regulations to address the issues at hand. The issuance of Regional Regulations and Local Government Decisions automatically requires the government to pay greater attention by creating policies related to finance, permits, and other areas to promptly address the waste crisis. Consequently, the products of political decentralization emerge to serve the community. In the implementation of administrative decentralization, it is clearly outlined in the Special Region of Yogyakarta Regional Regulation No. 3 of 2013 concerning the Management of Household Waste and Similar Waste that regions are obligated to manage waste at the regency/city level. However, in this case, the Piyungan Waste Disposal Site is used by three Regencies/Cities, placing it under the management of the DI. Yogyakarta Regional Government. With the issuance of the aforementioned Governor's Letter, administrative decentralization is returned to the regions, which are now required to manage their own waste.

In the implementation of fiscal decentralization in DI. Yogyakarta, in 2023, the local government received financial assistance from special funds amounting to 375.6 billion, distributed to the regions through Special Financial Assistance. Each year, the allocation of special funds managed by the DI. Yogyakarta Regional Government is approximately 1.4 trillion [10], which is used to finance additional authorities held by local goverment of DI. Yogyakarta, such as procedures for filling positions, the roles, duties, and authorities of the Governor and Vice Governor, as well as institutional and cultural matters. However, in this situation, a portion of the special funds is used to finance and support local governments in preparing for waste management.

Meanwhile, in the implementation of economic decentralization, waste management has emerged from both communities and the private sector. Community-based management primarily takes the form of TPS-3R, particularly in the districts, while some are managed by BUMDes, fostering economic activity at the grassroots level. The private sector has also played a role in waste management, with services like "Pasti Angkut," which can be accessed through digital platforms. Additionally, the processing of waste into RDF by several TPSTs has involved collaboration with the private sector for marketing the RDF products, thus enabling a smooth

economic flow that helps support the operations of TPSTs, which employ dozens of workers at each site.

In the future, it is hoped that further collaboration with other private sectors in waste management will occur, encompassing innovation, technology, marketing, and other forms of partnership, transforming waste from a problem into an economic potential that can thrive.

6. Conclusion

The decentralization of public services, particularly in waste management in the Special Region of Yogyakarta, has been progressing well in terms of political, administrative, fiscal, and economic aspects. This is marked by the strengthening of political power in the region, evidenced by the issuance of local regulations related to waste management. Administratively, the authority and responsibilities in the region have been enhanced, allowing local governments to manage the waste produced within their areas independently. As a result, local governments are fully responsible for serving the community in waste management

Furthermore, from a fiscal perspective, the provision of Special Financial Assistance from the Yogyakarta Special Fund to local governments has helped accelerate waste management actions by facilitating the construction and provision of waste processing equipment in the regions. Economically, the decentralization of waste management has opened up opportunities for both communities and the private sector to engage in waste management, evidenced by the development of TPS-3R facilities serving specific communities and private waste collection services currently operating in the Special Region of Yogyakarta.

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