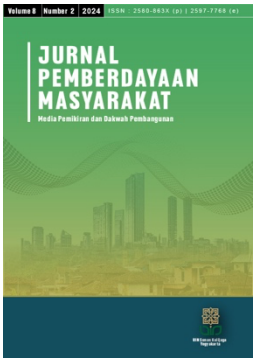

Jurnal Pemberdayaan Masyarakat
Media Pemikiran dan Dakwah Pembangunan

ISSN: (Print) (Online) Journal homepage:
https://ejournal.uin-suka.ac.id/dakwah/JPMI/index

Jogja Darurat Sampah: Examining the Effectiveness of Zero Inorganic Waste Policy in Various Perspective to Solve Waste Problem in Yogyakarta

Fachrurizal Mahendra Sujono, Nadadistya Fourysa, Fadli Putra Pratama, Nayla Dhiyaa, Hani Yerdiant, & Kafa Abdallah Kafa

To cite this article: Fachrurizal Mahendra Sujono, Nadadistya Fourysa, Fadli Putra Pratama, Nayla Dhiyaa, Hani Yerdiant, & Kafa Abdallah Kafa (2024): *Jogja Darurat Sampah*: Examining the Effectiveness of Zero Inorganic Waste Policy in Various Perspective to Solve Waste Problem in Yogyakarta, Jurnal Pemberdayaan Masyarakat: Media Pemikiran dan Dakwah Pembangunan, DOI:10.14421/jpm.2024.082-03

Type of paper: Research article

To link to this article: https://doi.org/10.14421/jpm.2024.082-03

Jurnal Pemberdayaan Masyarakat: Media Pemikiran dan Dakwah Pembangunan
https://doi.org/10.14421/jpm.2024.082-03

Jogja Darurat Sampah: Examining the Effectiveness of Zero Inorganic Waste Policy in Various Perspective to Solve Waste Problem in Yogyakarta

Fachrurizal Mahendra Sujono[a], Nadadistya Fourysa[a], Fadli Putra Pratama[a], Nayla Dhiyaa[a], Hani Yerdiant[a], and Kafa Abdallah Kafa[a]

[a]Universitas Gadjah Mada, Indonesia

ABSTRACT

Jogja Darurat Sampah represents the urgency of the waste problem due to obstacles in the waste downstream cycle to TPST Piyungan. Waste management policies are identified as ineffective with a reduction in waste transport below 8% until 2022. On 1 January 2023, the Yogyakarta City Government issued the Zero Inorganic Waste Policy as a strategic vision to reduce 15% of downstream waste by 2023. The research aims to evaluate the Zero Inorganic Waste Policy in reconstructing the waste management paradigm of Yogyakarta City. This research applies a case study method by adopting Formative Policy Evaluation. Before the Zero Inorganic Waste policy was issued, the community had a tendency of 'collect-transport-dispose' waste management behaviour. In the context of Evidence-Based Policy Making, this policy was formulated based on evidence of the escalation of waste problems in Yogyakarta City. In the dynamics of policy implementation, there has been a change in 'sort-reduce-reuse-recycle' behaviour in waste management. However, the challenges of misperceptions and community adaptation to the new policy simultaneously emerged. In the formative evaluation framework, the Zero Inorganic Waste policy was evaluated as effective. There was an average decrease in waste haulage of 24% or 56.42 tonnes/day in the first semester of 2023.

ARTICLE HISTORY
Received 22 October 2023
Accepted 21 October 2024

KEYWORDS
Formative evaluation, vidence-based policy making, Urban waste management

Introduction

Waste management is a crucial issue for urban areas globally. The efficiency of urban waste management is essential to maintain ecological balance, public health, and the aesthetics of public spaces (Ramaiah et al., 2020); (Abuhasel, 2023). Within the scope of Indonesia, Yogyakarta City is an area facing waste management challenges (H. P. Putra et al., 2020); Ariantie and Hidayat, 2019). Jogja Darurat Sampah is a narrative that represents the escalation of waste problems in Yogyakarta City. This is caused by

CONTACT Fachrurizal Mahendra Sujono fachrurizal2020@mail.ugm.ac.id Department of Social Development & Welfare, Faculty of Social and Political Science, Universitas Gadjah Mada. Jl. Sosio Yustisia No.1, Karang Malang, Caturtunggal, Special RegionYogyakarta, Indonesia,55281

urbanisation, population growth, and changes in people's consumption patterns. The waste problem in Yogyakarta City is intertwined with the Piyungan Integrated Waste Disposal Site (TPST) (Farahdiba et al., 2021). TPST Piyungan is an integrated waste disposal area that serves Yogyakarta City, Sleman Regency, and Bantul Regency (S. A. Mulasari et al., 2016). TPST Piyungan must bear waste beyond its designed daily capacity of 700 tonnes/day on average (Setyawati, et al, 2023). Observations and technical calculations show that TPST Piyungan can only accommodate up to June 2023 (Suhardono, et al., 2023).

The Special Region of Yogyakarta is experiencing a high increase in waste volume (Rinepta, 2023). In 2021, regional waste production reached 1,133.94 tonnes/day. In the following year the volume of waste production reached 1,231.55 tonnes/day. The problem does not stop at the increase in waste production volume, but also the imbalance between the amount of production and the volume of waste distributed. The volume of waste handled by TPST Piyungan is only 61.52% of the total daily average. This percentage is equivalent to 757.72 tonnes/day. According to data from the DIY Environmental Agency, Yogyakarta City is the area with the largest waste supplier to TPST Piyungan than other districts with a percentage of 51.02%.

Various efforts to deal with the waste problem have been made by the Yogyakarta City Government. One of the efforts made is the application of a regulatory instrument, namely policy. Policy is a decision or action that regulates the management and distribution of resources for the public interest in society. Many policies regarding waste management in Yogyakarta have been carried out by the Yogyakarta City Government, such as the Green Village Programme and the Waste Bank Programme. The Green Village Programme was launched to educate the public about the importance of environmental management, such as waste management based on its type. In addition to the Green Village Programme, the Yogyakarta City Government also launched the Waste Bank Programme to tackle the production of inorganic waste in Yogyakarta City through the collection of usable waste at the community level (Amalia, 2019). However, the Kampung Hijau and Waste Bank programmes have not been evaluated to be effective in reducing the waste problem in Yogyakarta (S. asti Mulasari et al., 2020). According to the evaluation results of the Green Village Programme, only 6 out of dozens of villages have good scores in green village management, such as in Rejowinangun, Sorosutan, Pringgokusuman, Suryatmajan, Wirogunan, and Wirobrajan villages (A. N. A. S. Putra & Fajarwati, 2017). Likewise, the Waste Bank Programme has died out in 180 out of 565 Waste Bank groups in Yogyakarta City (Leon, 2022). The community is still vulnerable to the problem of waste depot overload that disrupts daily activities (Santoso, 2022).

Responding to the unresolved waste problem and the ineffectiveness of previous policies, the Yogyakarta City Government presents a new step, namely the Zero Inorganic Waste Policy which will be implemented on 1 January 2023 (Baskoro, 2023). This policy is basically presented as a collective-collaborative effort to handle the urban waste problem. This has been stated in the first provision of the policy which reads ‘every head

of regional apparatus/work unit, head of government office, head of school/madrasa/college head, business actors, citizens of Yogyakarta City must carry out waste management'. The government encourages all elements of the people of Yogyakarta City to participate as active actors in managing waste from the source (upstream). In this policy, the people of Yogyakarta City are prohibited from disposing of inorganic waste to 14 waste depots in Yogyakarta City. The community is obliged to manage their own inorganic waste or it can be done collectively through the Waste Bank (Putra, 2023).

Ultimately, policy implementation as an instrument that regulates people's behaviour is important. However, various policies that have previously been implemented by the Yogyakarta City Government have not shown the expected results in shaping public awareness in waste management (Habibah et al., 2020). Therefore, the priority of this research is to examine the role of the Zero Inorganic Waste Policy in solving the waste problem in Yogyakarta City. The implications of the policy through the Zero Inorganic Waste movement on people's behaviour patterns in managing waste are the focus of this research. On the other hand, the formative evaluation applied in this research will investigate the waste transport reduction output of the policy implementation. The urgency of this research is carried out in Yogyakarta City because the Zero Inorganic Waste Policy has only been implemented in Yogyakarta City out of the five districts/cities in Yogyakarta.

Evidence-based Policy Making (EBPM)

Evidence-based policymaking (EBPM) is a decision-making process based on scientific research and other relevant data. The main objective of EBPM is to ensure that policies are based on available evidence. EBPM should include identifying key policy questions, collecting and analyzing relevant data, evaluating policy options, and disseminating findings to decision-makers (MCLaren, 2018). In addition, it is crucial to build capacity, foster collaboration among the various actors involved in the policy-making process, and ensure that policies are aligned with the local context. EBPM is used as an instrument to look at the dynamics of agenda-setting, formulation, and policy implementation dynamics (Sutcliffe & Court, 2005). EBPM was chosen because it has a link to the collection of pre-policy evidence in determining the direction of the Zero Inorganic Waste policy. EBPM is also used to see the dynamic process that occurs during policy implementation. Analysis using the EBPM approach in this study is intended to review the stages of the policy process from formulation to implementation. EBPM has the characteristics of a gradual review to see the evidence used in identifying existing problems.

Stage of the policy process	Description	Various evidence issues
Agenda Setting	Awareness and priority given to an issue	The need for evidence here is in terms of identifying new problems or gathering evidence on the magnitude of a problem so that relevant policy actors realise that the problem is important. The key factor here is the credibility of the evidence but also the way it is communicated.
Formulation	There are two key stages in the policy formulation process: defining policy options and then selecting the preferred option (see Young and Quinn, 2002: 13-14).	For both of these stages, policymakers should ensure that their understanding of the specific situation and different options is as detailed and complete as possible - only then can they make an informed decision about which policies to pursue and implement. This includes the instrumental link between an activity and its outcomes as well as the costs and expected impacts of an intervention. The amount and credibility of evidence matters.
Implementation	Actual practical activities	Here the focus is on operational evidence to improve the effectiveness of initiatives. This can include analytical work as well as systematic learning around technical skills, expert knowledge and practical experience. Action research and pilot projects are often important. The key here is evidence that is practically relevant across a range of contexts.
Evaluation	Monitoring and assessment of the process intervention	The first objective here is to develop monitoring mechanisms. Thereafter, according to Young and Quinn (2002), 'comprehensive evaluation procedures are essential in determining the effectiveness of implemented policies and in providing a basis for future decision-making'. In the monitoring and evaluation process, it is important to ensure that evidence is not only objective, thorough and relevant, but also that it is then communicated successfully into the ongoing policy process.

Table 1. Policy Process. *Source: processed by team*

Formative Policy Evaluation

Policy evaluation is defined as a systematic assessment of the effectiveness, efficiency, and impact of a public policy or programme. Policy evaluation can be used to identify problems and factors that affect the policy formulation and implementation process. It can be used to improvise policy design, improve policy strategies, and make decisions regarding resource allocation and evidence-based policy design so that the objectives of the policy can be achieved (Berman & Wang, 2016). The form of evaluation used in this study is formative evaluation, which is monitoring and carried out periodically. Formative evaluation is a process or intervention assessment that aims to provide feedback on the design and implementation of a policy (Scriven, 1967). The results of the evaluation are used by policymakers to improve the effectiveness of implementation. The relevance of the concept to the research lies in assessing the output or results of a policy to solve problems even though the implementation has not been completed.

Methods

The method used for this research is a case study with a qualitative approach. Case study is a useful method to find out a phenomenon that is currently popular and has an impact on many aspects of life (Creswell, 2015). The phenomenon of waste problems in Yogyakarta is one of the most popular cases that has an impact on many aspects of life. Using the case study method, the research was conducted comprehensively and in-depth to explore the implementation of the Zero Inorganic Waste policy from the perspectives of the community, waste depot officers, and the Yogyakarta City Environmental Agency. A qualitative approach was used to deepen the waste problem and policy implementation.

Data collection was conducted offline or face-to-face with in-depth interviews with research subjects, namely DLH Yogyakarta City, waste depot officers, and the community to obtain primary data. The interview process with the community was determined based on a purposive sampling approach. The number of informants from the community cluster was 29 people spread across 14 sub-districts. Informants from the waste depot officers cluster totalled 10 people and 1 person from the Yogyakarta City Environmental Agency. Policy implementation in solving the waste problem in Yogyakarta City is the object of the research. The data collection step in the research began with an initial survey, followed by observation, and in-depth interviews. This research also uses a crosscheck observation method regarding waste problems that occur in Yogyakarta City to collect field evidence of the phenomena that occur and policy implementation. Furthermore, secondary data collection in this research was obtained through literature including government documents, news articles, and previous research relevant to the topic.

The data obtained was then analysed using a qualitative approach. This research applies descriptive analysis methods and thematic analysis in explaining each process, from policy issuance, implementation, to outputs and outcomes achieved from the policy. The analysis method is elaborated with the Evidence Based Policy Making (EBPM) policy formulation framework. The data analysis process is based on formative evaluation research that aims to test the policy format and implementation by the community (Scriven, 1967). After field data collection, the next process was transcription followed by

data classification by type. Thematic analysis was carried out by grouping data on research themes to find information that matches the research topic. Descriptive analysis was then conducted to describe the results of the research. In the next stage, the results of the analysis were interpreted and conclusions were drawn.

Result

Tracking the Dynamics of Zero Inorganic Waste Policy in the Framework of Evidence Based Policy Making

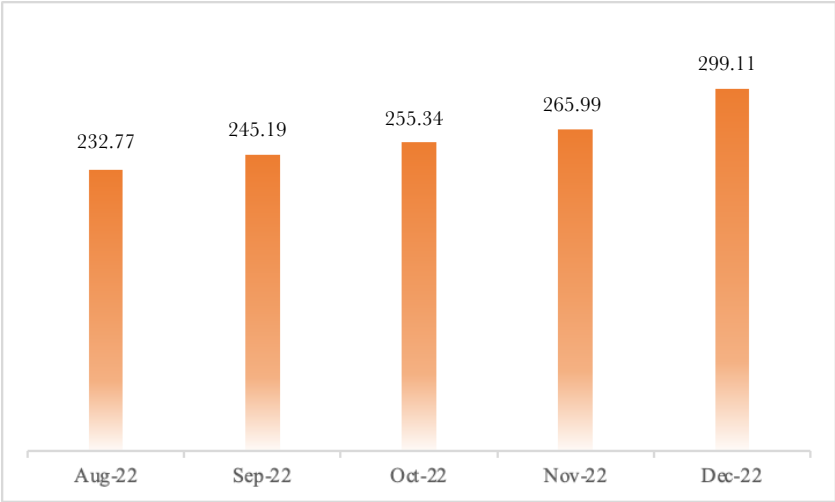

Figure 1. Waste Disposal To TPST Piyungan in August - December 2023 (Ton/Day).
Source: processed by team

The city of Yogyakarta is identified as facing a complex and escalating waste problem (Yusari & Purwohandoyo, 2020). Data from the Yogyakarta City Environmental Agency shows an increase in waste volume which is reflected in the waste disposal to TPST Piyungan. The distribution of waste from Yogyakarta City to TPST Piyungan increased to 299.11 tonnes per day. This is intertwined with the condition of Yogyakarta, which supplies 51.02% of waste to TPST Piyungan. This figure is the highest among Sleman Regency and Bantul Regency. The problem of increasing waste volume in Yogyakarta City is exacerbated by the fact of over capacity at TPST Piyungan. The complexity of the waste problem in Yogyakarta City represents the problem of the dependence of the waste management system of Yogyakarta City on TPST Piyungan (Setyaningrum, 2023).

In facing the urgency of the waste problem, various efforts have been made through waste management policies, such as Regional Regulation Number 10 of 2012 concerning Waste Management, Regional Regulation Number 1 of 2022 concerning Amendments to Regional Regulation on Waste Management Number 10 of 2012, Mayor Regulation Number 32 of 2022 concerning Yogyakarta City Waste Management Masterplan, to Circular Letter to DLH Number 188/004/SE/VIII/2022 concerning Efforts to Reduce Waste Entering TPS. Of course, these policies are accompanied by the emergence of various waste management programmes, namely the Green Village Programme and

Waste Bank. However, these programmes have been evaluated to be less effective in solving the waste problem at TPST Piyungan (DLH, 2023).

The initial identification of the ineffectiveness of waste management policies is related to the problem of internalising independent and sustainable waste management in people's understanding. Waste production will increase in line with population growth, changes in consumption patterns, and people's lifestyles (Kahfi, 2017). However, some communities still adopt the old paradigm that waste management is limited to collect-transport-dispose. This old paradigm has led to the emergence of excessive waste piles so that people need to gain a new understanding to reduce waste through sorting.

To improve the waste management system at TPST Piyungan, the Yogyakarta City Government through DLH formulated the Waste Management Masterplan 2022-2031 and set a waste reduction target of 50.42 tonnes/day by 2023. Cultural change in waste management is the focus of policy intervention. The community is directed to reduce and handle waste according to its type from the source of the waste itself. As an effort to achieve this, the Yogyakarta City Environmental Agency formulated the Zero Inorganic Waste policy.

The Zero Inorganic Waste policy is intended to manage waste from the source so as to reduce the volume of inorganic waste. This policy is implemented starting January 2023 Circular Letter (SE) of the Mayor of Yogyakarta Number 660/6123/SE/2022. The formulation of the Zero Inorganic Waste Movement policy began with the formation of a waste management acceleration team involving several local government organisations such as the Environmental Agency, Legal Section, Governance Section, Organisation Section, Public Works Agency, Kemantren, Kelurahan together with the PJ Mayor and Regional Secretary. The team then coordinated and discussed to form the Zero Inorganic Waste policy.

The Zero Inorganic Waste policy carries the narrative of independent waste management from the source (community). It was initiated through changing the old culture into a new culture of waste management in all elements of the population of Yogyakarta City. Inorganic waste was chosen because the government considers this type of waste to be relatively easy to recognise and has a longer shelf life, besides that inorganic waste also has the potential to add economic value and the function of this policy is aimed at reducing the volume of waste disposed of without burdening the community to manage organic waste independently because it has the potential to reduce community comfort.

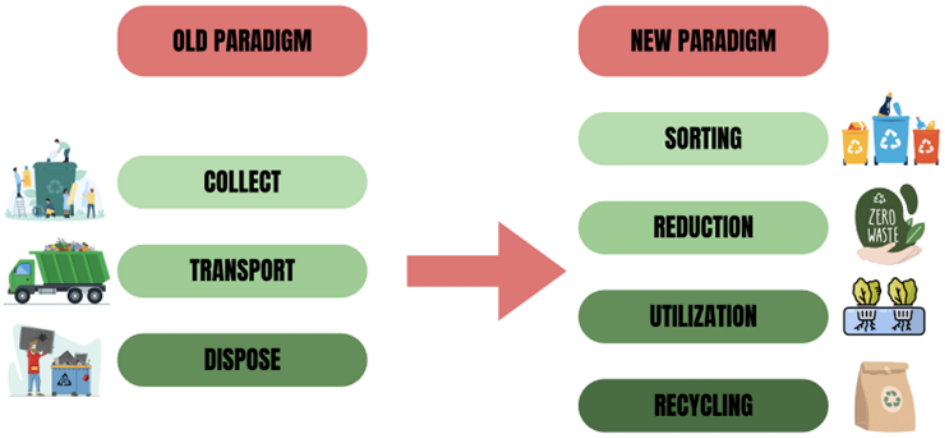

Figure 2. Zero Inorganic Waste Policy Design. *Source: processed by team*

Government intervention in the waste management system in the zero inorganic waste policy in Yogyakarta City is manifested in regulating the categories of waste types that can enter TPS/depots and guarding TPS/depots.

The projected timeline of the Zero Inorganic Waste Policy in Yogyakarta City is as follows:

1. Socialization of Zero Inorganic Waste Policy to each village.
2. Providing technical guidance to waste carters and collectors.
3. Socialisation and monitoring of waste management in the non-residential sector through special waste banks
4. Monitoring the Zero Inorganic Waste Policy by conducting surveillance by local DLH and Linmas officers and monitoring the progress of the policy through the Regional Secretary and his staff.
5. Waste management at each government agency
6. Advanced waste management that focuses on organic waste with the 'Mbah Dirjo' programme.
7. Establishment of Main Waste Bank

At the time of this research, the Zero Inorganic Waste Policy timeline was at the implementation stage. The Zero Inorganic Waste Policy has been implemented since January 2023. The implementation of this policy is that people are prohibited from disposing of inorganic waste to the nearest waste depot. This triggered misperceptions in the community due to the implementation of the policy. Inferred from the results of interviews with waste depot officers that at the beginning of the implementation of the policy there was an uproar in the community regarding the prohibition of inorganic waste disposal. The dispute was triggered by public ignorance about the form of implementation of the Zero Inorganic Waste policy. The research data shows that 69.6% of the total 29 community informants answered that they did not know about the ongoing policy implementation.

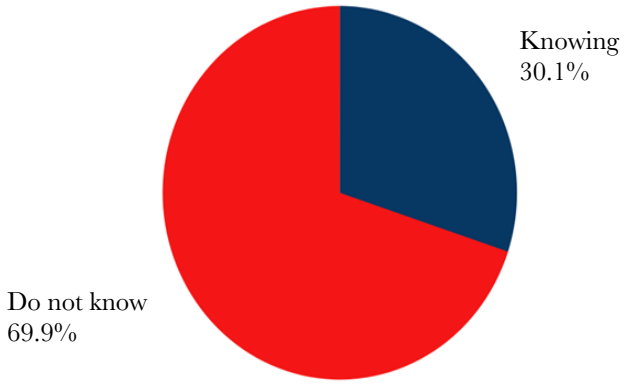

Figure 3. Survey statistics on public knowledge of the Zero Inorganic Waste policy.
Source: processed by team

Examining the dynamics of the policy through the community's perspective, it was identified that the policy had not been socialised holistically. The initial dynamics of policy implementation showed an adaptation effort for the community and depot officers regarding the new mechanism in waste management. The obstacle that occurred at the beginning of the policy was the ignorance of the community regarding policy implementation. This caused disputes between the community and the waste depot officers. The community still did not sort waste based on its type, resulting in a dispute between the waste depot officers and the community. This phenomenon shows confusion and misperceptions in the community regarding the implementation of the Zero Inorganic Waste policy. Misperceptions in the community sparked conflict with depot officers. The conflict was caused by the prohibition of mixed waste disposal that the community did not understand.

Another obstacle occurred in the middle of the year. In July 2023, the DIY Government closed TPST Piyungan. This hampered the implementation of the Zero Inorganic Waste policy. According to the results of interviews with DLH Yogyakarta City, the closure of TPST Piyungan was the cause of obstacles to the implementation of the policy, causing piles of garbage on the side of the road. Quoted from Detik.com, the closure of TPST Piyungan caused piles of garbage on the streets as a result of several waste depots being closed (DetikJogja, 2023). According to the results of interviews with waste depot officers, the closure of TPST Piyungan also had an impact on waste segregation carried out by the community. Furthermore, the obstacle that underlies the problem lies in the integrated system of waste management. Confirmed by the results of interviews with the community and waste depot officers, the waste management system is still experiencing problems. The implementation of waste segregation carried out by the community is not supported by waste processing by the government. Waste that has been sorted by the community is not managed based on its type during final processing. This phenomenon was also encountered during the observation of the activity. Unsynchronisation occurs due to the lack of system readiness for waste management by the government.

The implementation of the Zero Inorganic Waste policy in the first two months was still in the adjustment stage. The policy became effective in March, which was shown by

the decrease in the average daily waste production, which was 52.23 tonnes/day. This figure has exceeded the target set in the masterplan, which is 50.42 tonnes/day. The decrease in the average daily amount went well until June, except in May which experienced an increase due to the Eid moment.

In implementing the Zero Inorganic Waste policy, there is a control mechanism in place to supervise the community in waste disposal. Confirmed from the results of the interview with DLH Yogyakarta City, the control mechanism carried out is the guarding of the waste depot by linmas and the local village task force. This is intended to keep people from throwing inorganic waste into the waste depot. In addition, this statement was confirmed by an interview with the waste depot officer who stated that supervision is carried out by the local village task force and linmas. Control mechanisms are also carried out by checking ID cards and prohibiting the disposal of waste using black plastic bags. These controls are intended to maintain the discipline of policy implementation.

Formative evaluation results (how effective is the policy within the formative evaluation framework)

The issuance of the Zero Inorganic Waste policy is targeted to have an output target of reducing the volume of waste disposed of at the Piyungan Landfill by 50.42 tonnes/day every month in 2023. Based on data from DLH Yogyakarta City, the volume of waste transported to TPST Piyungan has decreased every month from the time the policy was issued (January) to the time of the closure of the TPST (June). The amount of waste generated by the community in December 2022 was 299.11 tonnes/day. This amount of waste generation has decreased since the first month of the Zero Inorganic Waste policy implementation, which decreased by 26.9 tonnes/day in January 2023. The decrease in waste generation continued until June 2023. The decrease in waste haulage in February was 39.58 tonnes/day, March was 52.23 tonnes/day, April was 74.11 tonnes/day, May was 58.45 tonnes/day, and June was 87.26 tonnes/day.

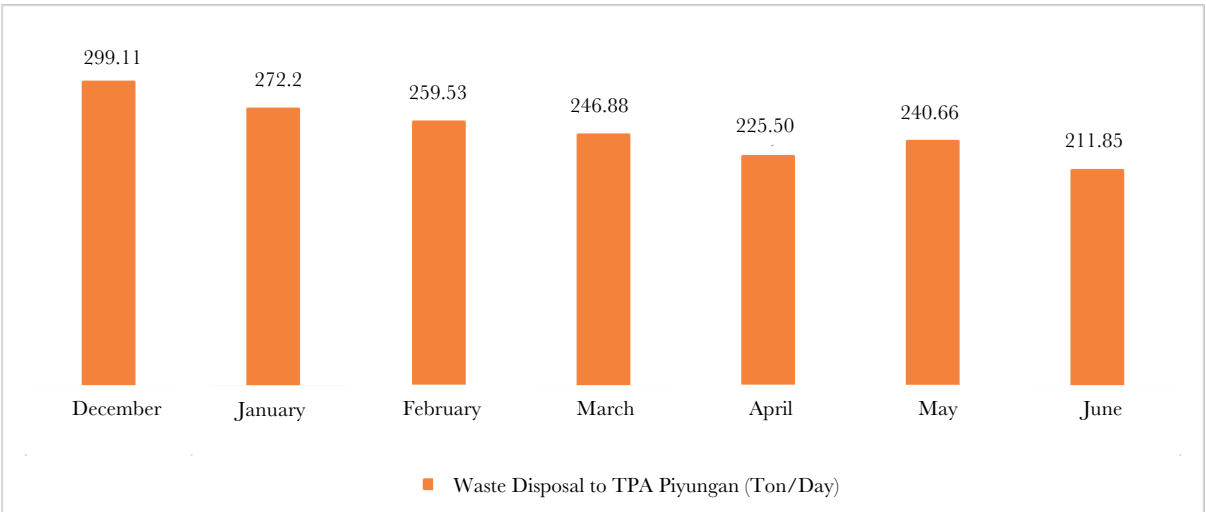

Figure 4. Waste Disposal To TPST Piyungan. *Source:* processed by team

The output target of the Zero Inorganic Waste policy was only achieved after three months of policy implementation, namely in March 2023 with an achievement of 52.23 tons/day. The policy of prohibiting inorganic waste from being thrown into the Waste Depot, which is accompanied by socialization, has a positive impact in the form of changes in people's habits to sort waste by type. This is intended to facilitate waste recycling which ultimately reduces waste generation to TPST Piyungan. According to Sidauruk (2023), changes in culture or community habits are influenced by the cultivation of certain values, such as in the implementation of policies. The next positive impact is that the waste bank has also become more active because it accommodates inorganic waste from people who sort waste. This has an impact on waste management which has become more organized. In addition, economic impacts arise in the form of economic income from the process of exchanging inorganic waste to the waste bank. However, there was also a negative impact after the policy was implemented, namely that some people did not carry out the instructions to sort waste and there was an accumulation of illegal waste on the side of the road.

Discussion

Waste problems in Yogyakarta City are a common phenomenon. Piyungan Landfill is the cause of the waste problem. This phenomenon results in the accumulation of garbage on the roadside of Yogyakarta City. The main problem of this phenomenon is that the Piyungan landfill is overloaded, so frequent waste depot closures hamper waste distribution to the community. Waste management carried out by the community before the zero inorganic waste policy was only a collection pattern. This pattern causes the amount of waste entering the Waste Depot to be poorly managed. The condition of the waste still needs to be clarified, and very difficult to process further at the next level of waste management. Awareness about waste segregation is still not formed in people's habits, which causes much-mixed waste.

Looking back at the main focus of the waste problem in Yogyakarta, namely the dependence of Yogyakarta City on the Piyungan landfill, there needs to be a policy breakthrough to reduce mixed waste. Waste segregation is one of the policies that can be implemented to change people's habits in disposing of waste. The Zero Inorganic Waste Policy is one of the solutions presented by the government to instruct people to sort their waste. However, the initial implementation of the policy had misperceptions among the community. The policy that prohibits the community from disposing of inorganic waste at the Depot or TPS made the community misunderstand. At first, people were confused about disposing of inorganic waste. Over time, the Zero Inorganic Waste policy prioritizes waste segregation so that waste management can be carried out from the time waste is generated, namely at the household level.

According to data from the Yogyakarta City Environmental Agency, the decrease in the amount of waste transportation from Yogyakarta City has decreased. The target of reducing the amount of waste produced by Yogyakarta City, according to the 2021 Waste Management Master Plan, is 50.4 tons/day. In December 2022, the amount of waste produced by Yogyakarta City was 299.11 tons/day. This amount became the initial benchmark of the policy to see the effectiveness of the policy by the Yogyakarta City Government. Waste reduction did not meet the target in the first and second months of

policy implementation. Waste reduction exceeded the target after entering the third month. The waste reduction calculated from December 2022 to June 2023 experienced a daily decrease of 29%. However, it is predicted that TPST Piyungan will no longer be able to accommodate the incoming waste.

The effect of the implemented policy is to increase the community's functioning of the waste bank. With the prohibition of inorganic waste disposal, the flow of inorganic waste that the community has sorted goes to the Waste Bank. In addition, the implemented policy also forms a new habit for the community to sort waste by type. With the prohibition of inorganic waste disposal, the community began to sort waste, which decreased the amount of waste transportation entering Piyungan Landfill from Yogyakarta City.

Midway through the policy, there was an additional program to strengthen waste segregation. The program is Mbah Dirjo instructs the people of Yogyakarta to manage organic waste from home. This program aims to reduce the amount of waste production that goes to TPST Piyungan. Once a good habit is formed in the community in waste management, it is expected to become a positive synergy to respond to the waste problem in Yogyakarta.

Acknowledgement

Our gratitude goes to the Ministry of Education, Culture, Research, and Technology for providing funding for this PKM-RSH activity; the Directorate General of Learning and Student Affairs; the Directorate of Student Affairs of Universitas Gadjah Mada; Mr. Drs. Sugeng Darmanto and the staff of the Yogyakarta City Environment Agency; the Waste Depot Officers; the Linmas Guardians of the Waste Depot; as well as the residents of Yogyakarta City who became informants and all parties who have supported this activity.

Author's declaration

In the implementation of this research, we carried out a division of tasks and cooperative teamwork starting from the initial survey, observation, data collection, data processing, data analysis, and compiling the findings of the research data. Fachrurizal Mahendra Sujono as the leader played an active role in collecting data in the field and making activity reports. Fadli Putra Pratama as member 1 observed field findings and formulated a research plan, Nadadistya Fourysa Iksani Putri as member 2 compiled transcripts and analyzed data using thematic analysis, Nayla Dhiyaa Izzati as member 3 compiled and formulated data on the concepts used, Hani Verdiant as member 4 conducted initial surveys and data processing. Other work such as progress reports, final reports, scientific articles, policy briefs, and social media content were done together. Kafa Abdallah Kafaa, S.Sos., M.A. as the supervisor provided direction and input from the beginning of the research process to the end of this activity process.

Funding

This research was funded by the Ministry of Education, Culture, Research, and Technology of Indonesia (Kemenristekdikbud) and University of Gadjah Mada Yogyakarta.

Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

References

Abuhasel, K. (2023). Geographical Information System Based Spatial and Statistical Analysis of the Green Areas in the Cities of Abha and Bisha for Environmental Sustainability. *ISPRS International Journal of Geo-Information*, *12*(8). https://doi.org/10.3390/ijgi12080333

Amalia, S. (2019). Analisis Implementasi Program Bank Sampah Di Kota Yogyakarta. *Jurnal Analis Kebijakan*, *1*(2). https://doi.org/10.37145/jak.v1i2.27

Baskoro, H. S. (2023, January 4). Gerakan Zero Sampah Anorganik, Pemkot Yogyakarta Berharap Perilaku Masyarakat Berubah. *Timesindonesia.Co.Id*. https://timesindonesia.co.id/peristiwa-daerah/442289/gerakan-zero-sampah-anorganik-pemkot-yogyakarta-berharap-perilaku-masyarakat-berubah

Berman, E., & Wang, X. (2016). *Exercising essential statistics*. CQ press.

Creswell, J. W. (2015). *Penelitian Kualitatif & Desain Riset*. Pustaka Pelajar.

Farahdiba, A. U., Adefitri, W., Yulianto, A., Putra, A. H., Qonita, A. Z., & Oktavitri, N. I. (2021). Sustainable sanitation assessment of settlements close to a landfill: A case study of Piyungan landfill, Yogyakarta, Indonesia. *Pollution Research*, *40*(1), 88–92.

Habibah, E., Novianti, F., & Saputra, H. (2020). Analisis Terhadap Faktor Yang Berpengaruh Terhadap Penerapan Kebijakan Pengelolaan Sampah Di Yogyakarta Menggunakan Pemodelan Sistem Dinamis. *Jurnal Analisa Sosiologi*, *9*, 124–136. https://doi.org/10.20961/jas.v9i0.39809

Kahfi, A. (2017). Overview of Waste Management. *Jurisprudentie: Department of Law, Faculty of Sharia and Law*, *4*(1), 12. https://doi.org/doi.org/10.24252/jurisprudentie.v4i1.3661

MCLaren, M. (2018). Evidence-based policy-making": a practitioner view. Accounting and Business Research. *Accounting and Business Research*, *48*(5), 609–611. https://doi.org/10.1080/00014788.2018.1470153

Mulasari, S. A., Husodo, A. H., & Muhadjir, N. (2016). Analisis Situasi Permasalahan Sampah Kota Yogyakarta Dan Kebijakan Penanggulangannya. *Jurnal Kesehatan Masyarakat*, *11*(2), 259. https://doi.org/10.15294/kemas.v11i2.3989

Mulasari, S. asti, Kusumaningtyas, D. A., & Rosyidah, R. (2020). Screening Dan Evaluasi Program Bank Sampah Kota Yogyakarta. *Jurnal Kesehatan Dan Pengelolaan Lingkungan*, *1*(1), 39–50. https://doi.org/10.12928/jkpl.v1i1.1643

Putra, A. N. A. S., & Fajarwati, A. (2017). Kajian Program Pengelolaan Sampah Rumah Tangga Mandiri (Bank Sampah) Berbasis Masyarakat di Kota Yogyakarta. *Jurnal Bumi Indonesia*, *4*(4), 1–11. https://core.ac.uk/download/pdf/295176365.pdf

Putra, H. P., Damanhuri, E., & Sembiring, E. (2020). The role of MRF in Indonesia's solid waste management system (case study of the Special Region of Yogyakarta, Indonesia). *Journal of Material Cycles and Waste Management*, *22*(2), 396–404.

https://doi.org/10.1007/s10163-020-00979-7

Ramaiah, M., Avtar, R., & Rahman, M. M. (2020). Land cover influences on LST in two proposed smart cities of india: Comparative analysis using spectral indices. *Land*, *9*(9). https://doi.org/10.3390/LAND9090292

Rinepta, A. G. (2023, August 3). Hii Jorok! Sampah Berserakan hingga Tutup Jalan di Pathuk Jogja. *Www.Detik.Com*. https://www.detik.com/jogja/berita/d-6857192/hii-jorok-sampah-berserakan-hingga-tutup-jalan-di-pathuk-jogja.

Scriven, M. (1967). *The Methodology of Evaluation. In Tyler et al, Perspective of Curriculum Evaluation*. American Educational Research Association.

Setyaningrum, P. (2023, July 7). TPA Piyungan, Muara Sampah Yogyakarta: Sejarah, Kapasitas, dan Permasalahannya. *Yogyakarta.Kompas.Com*. https://yogyakarta.kompas.com/read/2023/07/23/192516378/tpa-piyungan-muara-sampah-yogyakarta-sejarah-kapasitas-dan?page=all.

Sutcliffe, S., & Court, J. (2005). Evidence-Based Policymaking : What is it ? How does it work ? What relevance for developing countries ? In *Overseas Development Institute* (Issue November). Institute. Consult? en ligne au : http://www.odi.org.uk/sites/odi.org.uk/files/od i-assets/publications-opinion-files/3683.pd

Yusari, T., & Purwohandoyo, J. (2020). Potensi timbulan sampah plastik di Kota Yogyakarta tahun 2035. *Jurnal Pendidikan Geografi*, *25*(2), 88–101. https://doi.org/10.17977/um017v25i22020p088