

Waste Management Through the TPS3R Program for Urban Communities in Optimizing the Implementation of Government Number 81 of 2012

Destina Balqis Anggiyanti 

Universitas Negeri Semarang, Semarang, Indonesia
destinabalqis20@students.unnes.ac.id

Ubaidillah Kamal 

Universitas Negeri Semarang, Semarang, Indonesia
ubaidillahkamal@mail.unnes.ac.id

Abstract

This study aims to analyze how the TPS3R Program can be optimally implemented to meet the waste management standards stipulated in Government Regulation Number 81 of 2012. The main problem studied is the gap between normative provisions regarding waste reduction and handling based on the Reduce, Reuse, Recycle (3R) principle and its implementation conditions in various urban areas. The method used is normative legal research with a statutory regulatory approach linked to empirical conditions through a literature study of primary, secondary, and tertiary legal sources. The analysis is conducted by comparing normative provisions (*das sollen*) with the reality of implementation in the field (*das sein*). The results of the study indicate that normatively the legal framework related to TPS3R is adequate and provides a systematic, comprehensive, and sustainable basis for local governments in managing waste. However, in practice, various challenges remain, including limited facilities and infrastructure, dependence on regional budgets and community contributions for funding, uneven institutional capacity, and fluctuating levels of community participation. Differences in success rates between



cities indicate that the program's effectiveness is greatly influenced by the synergy between regulations, institutional support, and changes in community behavior. Therefore, it is necessary to strengthen guidance, provide economic incentives, innovate waste processing technology, and improve coordination between stakeholders so that 3R-based waste management can run effectively, measurably, and sustainably.

KEYWORDS

Optimization, TPS3R, Urban Communities, Waste Management

Introduction

Waste is a crucial issue that continues to increase, especially household waste in urban areas. Population growth, changes in lifestyles in consuming goods, and the urbanization process occurring in various provinces and districts/cities in Indonesia have caused the volume of household waste to increase significantly each year. This situation causes environmental damage, health problems, and an increasing burden on final disposal sites (TPA).¹ In addition, the increase in waste generation that is not balanced with an adequate management system has the potential to cause groundwater pollution due to leachate, air pollution due to open burning practices, and methane gas emissions that contribute to climate change.

The limited capacity of TPA in various regions has now reached a critical point that increases the risk of an urban environmental crisis, thus requiring significant waste reduction efforts directly from the source. Under these conditions, waste management is no longer seen as a purely technical issue, but has become a strategic issue that requires commitment and a clear division of responsibilities between the central and local governments in maintaining the sustainability of environmental functions.

As an implementation of applicable legal norms, the Government established Government Regulation No. 81 of 2012 to regulate household

¹ Ferdinan, Suyud Warno Utomo, Tri Edhi Budhi Soesilo, and Herdis Herdiansyah. "Household waste control index towards sustainable waste management: a study in Bekasi City, Indonesia." *Sustainability* 14, no. 21 (2022): 14403.

waste management by strengthening efforts to reduce and handle waste from the source. This regulation mandates that waste management must be carried out systematically and sustainably through strategies of limiting waste generation, recycling, and reuse. In its implementation, this mandate is realized through the Reduce, Reuse, Recycle (3R) approach, which is integrated into the TPS3R program, a community-based management model that places residents as the main subjects in environmental conservation.² The 3R principle evolved from the concept of sustainable waste management, which was initially introduced by international institutions such as the United Nations Environment Programme (UNEP) and later implemented in Indonesia's national policy.³

The TPS3R program began to be developed in a structured manner in the early 2010s by the Directorate General of Human Settlements under the Ministry of Public Works and Public Housing, with support from the Ministry of Environment and Forestry (KLHK) as an effort to reduce pressure on waste management sites (TPA) and encourage community participation in environmental development.⁴ In terms of implementation, TPS3R has been applied in several regions, namely in Surabaya, Bandung, and Denpasar, which have been adopted by the respective city governments. Local governments are tasked with providing the necessary facilities and regulations, while the community is responsible for managing operational activities at the local level. However, in practice, various obstacles are still encountered, such as limited sorting facilities, inadequate processing capacity, low community compliance in paying levies, and weak supervision and ongoing guidance.

² Lupiyanto, Ribut, Nurhasanah Nurhasanah, and Hadian Pratama Hamzah. "Analisis Kinerja Pengelolaan Lingkungan TPS3R Perkotaan (Studi Kasus: TPS3R Kenanga, Kabupaten Sleman, DIY)." *Briliant: Jurnal Riset dan Konseptual* 8, no. 4 (2023): 927-939.

³ Kumar, Amrendra. "United nations environment programme (UNEP)." *Yearbook of International Environmental Law* 35, no. 1 (2024).

⁴ Lupiyanto, Ribut, Nurhasanah Nurhasanah, and Hadian Pratama Hamzah. "Analisis Kinerja Pengelolaan Lingkungan TPS3R Perkotaan (Studi Kasus: TPS3R Kenanga, Kabupaten Sleman, DIY)." *Briliant: Jurnal Riset dan Konseptual* 8, no. 4 (2023): 927-939.

Several previous studies have shown that success in waste management depends not only on the rules that are made, but also on their actual implementation and active community involvement. Rispaini Nur Aziza and Anugrah Anditya found that the waste fee policy still faces problems of low compliance and lack of supervision.⁵ Mradipta Nindya Tama and Subagyo emphasized the imbalance between the amount of waste produced and the existing processing capacity, thus requiring an increase in the capacity and institutionalization of TPS3R.⁶ Amalia Nurrahma Dwi Farrasy and Agus Joko Pitoyo emphasized the role of waste banks and community participation, but did not analyze TPS3R as an integrated system.⁷

Nevertheless, the implementation of TPS3R has not reached an optimal level because it still faces various challenges, such as capacity, funding, supervision, and community participation.⁸ Therefore, the increasing trend of household waste in Indonesia requires an evaluation that is not only technical but also normative, with the aim of ensuring consistency between legislation and the implementation of the TPS3R program.

Methods

This research is a descriptive legal study with a normative approach that aims to systematically describe the implementation of the Reduce, Reuse, Recycle Waste Management Site (TPS3R) program in urban areas.⁹ The

⁵ Aziza, Rispaini Nur. "ANALISIS IMPLEMENTASI RETRIBUSI SAMPAH DAN PENGARUH TERHADAP PENGELOLAAN SAMPAH DI MATARAM." PhD diss., Universitas Gadjah Mada, 2025.

⁶ Tama, Mradipta Nindya. "Pengembangan Sistem Pengelolaan Sampah Untuk Mencegah Darurat Sampah Di Kota Yogyakarta." PhD diss., Universitas Gadjah Mada, 2025.

⁷ Farrasy, Amalia Nurrahma Dwi. "Kajian Pengelolaan Sampah Berbasis Masyarakat Melalui Program Bank Sampah dan Relevansinya dengan Penerapan Ekonomi Sirkular di Kota Yogyakarta." PhD diss., Universitas Gadjah Mada, 2025.

⁸ Pradnyana, I., and Dedi Kusmana. "Efektivitas Program Pengelolaan Sampah Berbasis Sumber Oleh Dinas Lingkungan Hidup Dan Kebersihan Di Kabupaten Badung Provinsi Bali." PhD diss., IPDN, 2024.

⁹ Soekanto & Mamudji. "Penelitian Hukum Normatif: Suatu Tinjauan Singkat". (2018).

selection of urban areas was based on the high volume of waste generated and the social complexity of the community, which requires a structured and sustainable management system as mandated by Government Regulation No. 81 of 2012. Through a normative approach, this study analyzes the regulatory framework regarding waste management and TPS3R to understand the extent to which these provisions provide convenience and applicable solutions for the community in their practical implementation in the field.¹⁰

Data collection was conducted through a literature study by analyzing various primary, secondary, and tertiary legal sources.¹¹ All legal regulations are organized based on their hierarchical level and examined in depth by understanding the meanings in the regulations. The analysis was conducted by comparing the provisions contained in the normative regulations (*das sollen*) with the conditions that occur in the field (*das sein*).¹²

Result and Discussion

1. Implementation of Government Regulation No. 81 of 2012 Regarding the TPS3R Program in Urban Communities

The government has affirmed its national commitment to waste management through the enactment of Government Regulation No. 81 of 2012 concerning the Management of Household Waste and Similar Household Waste, which serves as an implementing instrument and legal basis for the central and regional governments in exercising their

¹⁰ Mertokusumo. "Teori Hukum". 2016.

¹¹ Wiraguna, Sidi Ahyar. "Metode normatif dan empiris dalam penelitian hukum: Studi eksploratif di Indonesia." *Public Sphere: Jurnal Sosial Politik, Pemerintahan dan Hukum* 3, no. 3 (2024).

¹² Mabruroh, Ima, Emilia Susanti, and Rini Fathonah. "Kesenjangan Norma dan Praktik Penegakan Hukum di Indonesia Dalam Mekanisme Penghentian Penyidikan (SP3) terhadap Tersangka yang Meninggal Dunia." *Al-Zayn: Jurnal Ilmu Sosial & Hukum* 4, no. 1 (2026): 3386-3395.

authority.¹³ The presence of this regulation is not merely an administrative response to the waste problem, but a tangible manifestation of the state's seriousness in fulfilling its constitutional obligation to guarantee the right of every citizen to a good and healthy environment. Through this legal framework, waste management policies are directed at providing equitable protection for the community and ensuring more structured governance at the regional level.

Waste management is no longer considered merely a routine technical activity, but rather a system that encompasses various stages of waste reduction and handling, from the source of waste to the final management process. Thus, the approach used covers aspects of planning, implementation, control, and supervision, thereby establishing accountable waste management that focuses on the interests of the community.

Government Regulation No. 81 of 2012 emphasizes that the principles of reduce, reuse, and recycle (3R) must be the main basis for every waste management policy and practice. From an environmental law perspective, this principle reflects prevention efforts aimed at reducing waste generation, increasing reuse, and reducing dependence on final processing sites (TPA), which have increasingly limited capacity. Therefore, the current waste management paradigm has transformed from a mere disposal activity into a sustainable control and utilization effort to ensure the preservation of environmental functions. As a concrete implementation of this norm, the Reduce, Reuse, Recycle Waste Management Site (TPS3R) program was developed as a community-based waste management model that combines legal obligations with local community empowerment.

The TPS3R program aims to reduce the operational burden and capacity of final processing sites (TPA), which currently serve as the end point of the conventional waste management system. By implementing waste

¹³ Rafif, Muhammad Husni, Agus Sukristyanto, and Muhammad Roisul Basyar. "Implementasi Kebijakan Tempat Pengelolaan Sampah Reduce-Reuse-Recycle (TPS3R) diKabupaten Sidoarjo." *Triwikrama: Jurnal Ilmu Sosial* 10, no. 3 (2025): 61-70.

management at the neighborhood level, the amount of waste that needs to be transported and processed at final disposal sites can be significantly reduced. On the other hand, this program also encourages increased legal awareness and active community participation from the waste management stage, whether in the form of sorting, reducing, or recycling. Community participation is an important factor, because success in implementing legal regulations in the environmental sector is highly dependent on the involvement of the community as the party with the main interest. Therefore, the provisions in Government Regulation No. 81 of 2012 and the development of the TPS3R program demonstrate the government's structured efforts to build a waste management system that not only pays attention to administrative compliance, but also leads to changes in community behavior and increases a sense of shared responsibility.

Normatively, Government Regulation No. 81 of 2012 stipulates that local governments are required to carry out systematic, comprehensive, and sustainable waste reduction and management. The principles of reduce, reuse, and recycle (3R) are considered the main basis for waste management, with a primary focus on waste reduction efforts at the source. Within this framework, the TPS3R Program was established as a strategic policy instrument designed to minimize the volume of waste at final disposal sites (TPA) by optimizing active community participation in the sorting and processing of waste from the upstream stage. The main focus of this model is to create an organized and sustainable area-based waste management system to ensure a balance between fulfilling the administrative obligations of the government and empowering local communities in maintaining the quality of the environment. This norm also requires local governments to provide facilities and infrastructure, conduct training, and ensure the sustainability of the waste management system.¹⁴

¹⁴ Najwa, Nola Natalingga, Didik Supriyanto, and Hirshi Anadza. "IMPLEMENTASI PENGELOLAAN SAMPAH BERBASIS REDUCE, REUSE, RECYCLE (3R)(Studi Pada Tempat Pengelolaan Sampah 3R

However, when these regulations are compared with the actual situation in several major cities such as Surabaya, Bandung, and Denpasar, there are differences in the level of success in their implementation.

1. Surabaya City

In Surabaya, the implementation of TPS3R is based on regional policy, namely Surabaya City Regulation No. 5 of 2014 concerning waste management and cleanliness. The Surabaya City Government is implementing an approach that combines the TPS3R system with a waste bank program, environmentally-based composting activities, and capacity building for environmental cadres. Based on empirical research at the Tenggilis TPS3R, the average weight of waste received is 5,047.29 kg per day. The composition of the waste consists mostly of organic waste, which accounts for 65.79%, while inorganic waste is also present and has been processed through sorting and composting, both manually and using BSF (Black Soldier Fly) larvae. After processing, the waste residue is then transported to the Benowo Landfill.¹⁵

The local government acts as a supervisor and supporter by providing facilities and infrastructure, offering technical guidance, and providing operational assistance through the sanitation department. This support is also evident in the composting house program run by the Surabaya Environmental Agency (*Lingkungan Hidup Surabaya*), where the processing of organic waste through 27 composting houses has succeeded in reducing transportation and processing operational costs by billions of rupiah each year, as well

BASAMA, Kelurahan Bandungrejosari, Kecamatan Sukun, Kota Malang.). " *Respon Publik* 19, no. 9 (2025): 40-46.

¹⁵ Ulum, Muhammad Bachrul, Arneisya Hefmaulia Ardina, Shinfi Wazna Auvaria, and Sulistiya Nengse. "Pengelolaan Sampah di Tempat Pengolahan Sampah Reduce, Reuse, dan Recycle (TPS 3R) Tenggilis, Kota Surabaya." *Envirous* 5, no. 2 (2025): 33-38.

as being able to handle more than 100 tons of organic material per day.¹⁶

In its implementation, the city of Surabaya applies the TPS3R system in an integrated manner with the waste bank program and composting activities carried out at the neighborhood level. The model used is collaborative, where the government provides support and guidance, while the community is responsible for sorting and processing. Other studies also show that the waste bank program integrated with the 3R principle in Surabaya has succeeded in increasing the level of waste sorting in households and helping to reduce the volume of residual waste brought to landfills, thanks to the active participation of the community in the process of sorting and collecting materials that have economic value.¹⁷

Satisfactory results were observed in areas where the community participated actively, although there were still challenges in maintaining sustainability and consistency in the sorting process. At several waste collection points (TPS3R) such as Tenggilis and Super Depo Sutorejo, the potential for waste reduction through the implementation of more effective management scenarios is estimated to reach more than 50 percent, and nearly 60 percent in the best-case scenario. This shows that community involvement and good technical management can significantly reduce the volume of waste going to landfills.¹⁸

¹⁶ Dinas Lingkungan Hidup Kota Surabaya, "Olah Sampah Organik Jadi Pupuk, DLH Surabaya Hemat Biaya Angkutan Rp6,73 Miliar per Tahun". 13 Januari 2026.

¹⁷ Nampira, Anisa Apriliani, and Talent Nia Pramestyawati. "Potential waste reduction through 3R (reduce, reuse, and recycle) in Surabaya City: Focus on East and South Surabaya." *Journal of Earth and Marine Technology (JEMT)* 4, no. 2 (2024): 167-177.

¹⁸ Krisna, Wahyuni, and Widy Angga Windyantoto. "Efektivitas Penegakan Hukum Dalam Bidang Pengelolaan Sampah Pada Kawasan Wisata Religi Sunan Ampel Surabaya Berdasarkan Peraturan Daerah Kota Surabaya Nomor 5 Tahun 2014 Tentang Pengelolaan Sampah dan Kebersihan." *Court Review: Jurnal Penelitian Hukum (e-ISSN: 2776-1916)* 1, no. 04 (2021): 11-22.

2. Bandung City

The legal basis for the implementation of TPS3R in Bandung City is regulated in Bandung City Regulation Number 9 of 2018 concerning waste management. Normatively, this regulation stipulates the obligation to reduce waste at the source and develop processing facilities based on the local area.

In its implementation, the city of Bandung applies a TPS3R model based on regional areas and a decentralized approach. The city government plays a role in regulating and providing facilities, while the community and environmental groups are responsible for managing daily activities. A number of studies show that the implementation of TPS3R functions in the Bandung area still faces obstacles in achieving operational effectiveness, particularly in relation to strengthening institutional structures and optimizing community participation, which are considered to have not yet reached the maximum standard. As an illustration, evaluations of the Saling Asih II and Hikmah TPS units indicate that technical aspects, governance management, and public involvement still require significant improvement so that the process of reducing waste to the landfill can be carried out in accordance with regulatory mandates.¹⁹

Several TPS3R units have developed by utilizing composting and recycled materials, but not all units are operating optimally due to constraints in management and resource availability. An evaluation of TPS3R performance in Bandung shows that although the number of TPS3R locations continues to grow, their operational effectiveness remains low. Therefore, strategies are needed to increase institutional capacity, provide more adequate facilities, and

¹⁹ Khodijah, Fitriana, and Kancitra Pharmawati. "Evaluasi TPS 3R di kota bandung: studi kasus TPS saling asih II dan TPS hikmah." *Jurnal Pengelolaan Lingkungan Berkelanjutan (Journal of Environmental Sustainability Management)* (2023): 148-164.

actively increase community participation so that the target of reducing waste at the source can be achieved effectively.²⁰

3. Denpasar City

The implementation of TPS3R in Denpasar City is based on Denpasar City Regulation Number 3 of 2015, which regulates waste management. This regulation emphasizes the importance of reducing waste from the outset and encouraging active community participation, in accordance with the provisions of Law No. 18 of 2008 and Government Regulation No. 81 of 2012, which explain the responsibilities of local governments in managing waste based on the 3R principle.

In its implementation, TPS3R in Denpasar has developed with a community-based approach and is supported by local social structures. The government provides infrastructure facilities and training assistance, while daily activities are carried out by management groups at the village or sub-district level. Empirically, research on organic waste management using Black Soldier Fly (BSF) larvae at the 3R Waste Processing Site (TPS) in Kesiman Kertalangu shows that the method can significantly accelerate the process of reducing organic waste and produce additional products with economic value.²¹ Additionally, research on operational risk management at TPS3R in Panjer Subdistrict, Denpasar, shows that operational smoothness is highly dependent on the stability of

²⁰ Aledeh, Muhammad. "Measurement of performance community-based waste treatment facility (tps 3r saling asih) bandung city." *Regional and Rural Studies* (2023).

²¹ Nambung, Hermes Henryanto, I. Made Sastra Wibawa, Shinta Enggar Maharani, and I. Made Nada. "Teknologi Pengelolaan Sampah Organik Menggunakan Larva Black Soldier Fly di TPS3R." *Jurnal Ilmiah Teknik Universitas Mahasaraswati Denpasar (JITUMAS)* 4, no. 1 (2024): 58-67.

funding sources, the capabilities of managers, and the consistency of the waste sorting process at the source.²²

Although the community is increasingly aware of the importance of waste sorting, the main obstacles remain limited funds and inconsistent participation.²³ A review of the design of the Mertasari TPS3R in South Denpasar shows that several units need improvements in infrastructure and management capacity in order to operate optimally and sustainably. These findings indicate that, normatively, the regulatory framework is adequate, but in reality, the effectiveness of the TPS3R in Denpasar still depends heavily on improved management, sustainable budgetary support, and consistent community participation in waste sorting from the source.

Normatively, Government Regulation No. 81 of 2012 has established waste management based on reduction and handling at the source, which includes strengthening the role of the community and the preparation of facilities and infrastructure by local governments. However, in the implementation of the TPS3R Program in various regions, there are still differences between the stipulated provisions (*das sollen*) and the actual conditions in the field (*das sein*).

Theoretically, the effectiveness of a regulation's implementation can be analyzed using Soerjono Soekanto's framework, which emphasizes that the success of a law is not solely based on the text of the norm, but is determined by the synergy of five essential factors: clarity of legal substance, professionalism of law enforcement officials, availability of supporting facilities, level of compliance of the community as legal subjects, and developing legal culture. This approach allows for an in depth evaluation of

²² Arya, I. Gede, Kadek Diana Harmayani, and Ida Bagus Putu Adnyana. "Risk Management in the Development and Operation of TPS 3R in Panjer Urban Village, Denpasar." *Journal of Asian Multicultural Research for Economy and Management Study* 6, no. 4 (2025): 67-72.

²³ Permata, Aurelia Dwi, Aprilia Putri Malaya, and Ubaidillah Kamal. "Strategi Pengurangan Penggunaan Plastik Melalui Implementasi Zero Waste Menuju Gaya Hidup Ramah Lingkungan." *Jurnal Multidisiplin Ilmu Akademik* 1, no. 3 (2024): 371-383.

the extent to which Government Regulation No. 81 of 2012 functions in practice in guiding the collective behavior of the community and related institutions. Through this analytical tool, the study can identify whether there is a gap between the written rules (law in books) and the reality of practice in the field (law in action), in order to ensure that the law is a real solution to environmental problems.²⁴

In terms of resources, the study shows that limitations in sorting and processing facilities, as well as the collection fleet, are the main obstacles to optimizing TPS3R.²⁵ These conditions have led to a decline in processing capacity and the failure to achieve the established operational standards. In addition, the aspect of funding, which still depends on funds from the Regional Revenue and Expenditure Budget (APBD) and community contributions, causes the sustainability of TPS3R operations to be quite vulnerable. Institutional issues are also an important factor influencing this. Low incentive systems, limitations in technical training, and suboptimal standard operating procedures (SOPs) in several regions have contributed to a lack of professionalism in management. On the other hand, cooperation between local governments, TPS3R managers, and the community has not been effective, so that the policies adopted are often unable to respond to changing social conditions in the field.²⁶

In general, various studies show that although the normative objectives of Government Regulation No. 81 of 2012 are progressive in nature, its implementation still faces various structural and social obstacles, which are quite complex. The success rate of the program depends on institutional

²⁴ Soekanto, Soerjono. "Pengantar Penelitian Hukum". Jakarta: UI Press (2014).

²⁵ Aziza, Rispaini Nur. "ANALISIS IMPLEMENTASI RETRIBUSI SAMPAH DAN PENGARUH TERHADAP PENGELOLAAN SAMPAH DI MATARAM." PhD diss., Universitas Gadjah Mada, 2025.

²⁶ Prastya, Imam Yudhi, and Nur A. Dwi Putri. "Analisis Kelembagaan Pada Pengelolaan Sampah Berbasis Masyarakat di Kota Semarang." *Journal of Indonesian Rural and Regional Government* 9, no. 1 (2025): 169-177.

capacity and community participation.²⁷ Thus, the main issue in urban waste management lies not only in the existence of legal regulations, but also in the extent to which these regulations are implemented in sustainable policies.

2. Factors Influencing the Implementation of the TPS3R Program

Government Regulation No. 81 of 2012 concerning the Management of Household Waste and Household-like Waste states that waste management must be carried out by reducing and handling waste from the outset, actively involving the community as a key part, and supporting local governments as parties that assist and regulate. Officially, this provision explains the duties of district or city governments to provide waste reduction facilities and infrastructure, provide guidance, and ensure that the 3R system continues to run well. However, in the actual implementation in several major cities shows differences in the level of success of the TPS3R program, indicating a gap between the expected goals and the reality.

1. Factors of Community Participation and Behavior

From a development law perspective, the effectiveness of a public policy is largely determined by the degree of participation of the community as the legal subjects affected. This participation is not merely understood as physical presence, but rather active involvement in every stage of the law, from the planning and implementation phases to the evaluation of the program. This concept emphasizes that the community has the right to be involved in identifying problems, decision-making, operationalizing solutions, and continuously assessing results. Thus, the community is no longer positioned as a passive object of policy, but as a legal

²⁷ Adani, Abdillah Ahmad Fadhil. "Efektivitas pasal 31 peraturan pemerintah nomor 81 Tahun 2012 tentang pengelolaan sampah rumah tangga dalam menjamin kesehatan dan keselamatan kerja di TPST 3R Mulyoagung Bersatu." PhD diss., Universitas Islam Negeri Maulana Malik Ibrahim, 2025.

subject that has a crucial role in shaping and overseeing policy implementation, as applied in TPS3R-based waste management to ensure the effectiveness of regulations in the field.

Community participation is an important factor in the implementation of TPS3R because waste management activities such as sorting (reduce), reducing (reuse), and recycling (recycle) waste are highly dependent on changes in the way of thinking and acting at the household level. Data from the Ministry of Environment and Forestry's National Waste Management Information System (SIPSN) for 2023-2024 shows that the rate of waste reduction using the 3R method in several major cities is still only around 15 to 25% of the total waste produced, even though the national target for waste reduction is 30%.²⁸

In the city of Surabaya, the implementation of TPS3R shows considerable progress. Research by Ulum, M. B., et al. (2025) in an article titled "Waste Management at the Reduce, Reuse, and Recycle Waste Processing Site (TPS3R) Tenggilis, Surabaya City" published in the *Envirous Journal* notes that TPS3R Tenggilis is capable of managing approximately 5,047.29 kg of waste per day. Of the total waste, around 65.79% is organic waste, which significantly reduces the amount of waste disposed of at the final disposal site (TPA). In addition, strengthening the waste bank as a tool that involves the community also helps increase success in reducing waste. Research on waste management in cities shows that areas that are frequently mentored and monitored regularly usually have a community participation rate of over 60%.²⁹

²⁸ Irtanti, Marsya Dwi. "Kebijakan Pengelolaan Sampah Plastik Sebagai Solusi Pertumbuhan Ekonomi Eamah Lingkungan." *Jurnal Adimas FKIP UTP* Vol 7 No 1 (2026).

²⁹ Ulum, Muhammad Bachrul, Arneisya Hefmaulia Ardina, Shinfy Wazna Auvaria, and Sulistiya Nengse. "Pengelolaan Sampah di Tempat Pengolahan Sampah Reduce, Reuse, dan Recycle (TPS 3R) Tenggilis, Kota Surabaya." *Envirous* 5, no. 2 (2025): 33-38.

In Bandung, community participation in waste sorting is still not fully stable. A study conducted by Arindita Dessi P. and Djoko Setyanto in 2025 entitled "Evaluation of Reduce Reuse Recycle (TPS3R) Waste Management Operations in Bandung City" published in the journal Engineering, Mathematics and Computer Science states that based on SIPSN data from 2023, waste reduction in Bandung City was only around 14.46% of the total waste produced, indicating that there are still obstacles in the operation and community participation in TPS3R-based waste management. The study also shows that some people still do not routinely sort waste at the source, and the practice of burning household waste is still carried out because it is considered easier than following the waste collection schedule and paying sanitation fees.³⁰

In Denpasar City, a community based approach through traditional villages and banjars shows that there is strong social support, but the sustainability of community participation still depends on adequate guidance and increased economic incentives. Research conducted by I Gede Arya, Kadek Diana Harmayani, and Ida Bagus Putu Adnyana in 2025, entitled "Risk Management in the Development and Operation of TPS3R in Panjer Tourism Village, Denpasar City," published in the Journal of Asian Multicultural Research for Economy and Management Study, identified several risks that occur in the operation of community-based TPS3R, including changes in the level of community participation and limitations in the technical support provided. These findings indicate that changes in community behavior, which are a key requirement for the implementation of the 3R system, have not been applied

³⁰ Royhan, Winneyi Salsabila. "Measurement of Performance Community-Based Waste Treatment Facility (TPS 3R Saling Asih) Bandung City." *Journal of Regional and Rural Studies (RRS)* Vol 1 No 2 (2023).

evenly, so that the implementation of legal norms still faces obstacles in social and cultural aspects.³¹

This situation shows that behavioral change has not yet fully become part of the legal culture in society. Although legal regulations have determined the task of reducing waste at the source, its implementation still depends heavily on public awareness, economic incentives, and a good monitoring system.

2. Availability and Resource Management Factors

The effectiveness of TPS3R also depends on the condition of existing facilities and infrastructure, the adequacy of funds, and the technical capabilities of its managers. In Bandung, an evaluative study conducted by Arindita Dessi P. and Djoko Setyanto (2025) in the same journal shows that several 3R waste processing centers are not yet operating optimally due to limited sorting equipment, insufficient shredder capacity, and a lack of land for waste processing.³² The lack of operational funds, which depend on community arrangements and insufficient assistance from the regional budget, often results in irregular processing schedules.

In Denpasar City, research conducted by Arya et al. (2025) on improving the Mertasari TPS3R system in South Denpasar shows that the main problems are a lack of funding, an insufficient number of waste collection trucks, and inconsistent work standards.³³ This study shows that even though the role of the community is getting stronger, the continuation of TPS3R work still depends on the

³¹ Arya, I Gede, Kadek Diana Harmayani, and Ida Bagus Putu Adnyana. "Risk Management in the Development and Operation of TPS 3R in Panjer Urban Village, Denpasar." *Journal of Asian Multicultural Research for Economy and Management Study* Vol 6 No 4 (2025).

³² Khodijah, Fitriana, and Kancitra Pharmawati. "Evaluasi TPS 3R di kota bandung: studi kasus TPS saling asih II dan TPS hikmah." *Jurnal Pengelolaan Lingkungan Berkelanjutan (Journal of Environmental Sustainability Management)* (2023): 148-164.

³³ Setiawan, I Kadek Hendra Setiawan, I Gusti Ngurah Dwi Mega Ambara, and Ayu Putu Utari Parthami Lestari. "REDESAIN TEMPAT PENGOLAHAN SAMPAH 3R MERTASARI, SIDA KARYA, DENPASAR SELATAN" *Jurnal Wastukola*, Vol 1 No 1, (2023).

availability of stable funds and the ability of local managers to manage the program.

Meanwhile, in Surabaya, research conducted by Ulum et al. (2025) shows that adequate TPS3R infrastructure, consistent budget support, and a performance-based monitoring system help maintain smooth operations in various subdistricts.

3. Institutional Factors and Coordination

Organizational structures and coordination mechanisms between relevant parties also influence how effectively TPS3R policies can be implemented. In Surabaya, synchronization between regional policies and technical implementation at the sub-district level can increase the effectiveness of achieving waste reduction goals. In Bandung and Denpasar, as described in the studies by Arindita & Setyanto (2025) and Arya, et al. (2025), there are still obstacles in terms of operational coordination and differences in implementation standards at each TPS3R. This shows that even though the policy framework is in place, its technical and administrative implementation still needs to be strengthened.³⁴

Based on this description, it can be seen that the implementation of the TPS3R Program is influenced by three important factors, namely the level of community involvement, the abundance of available resources, and the capacity of institutions and the level of cooperation between institutions. The city of Surabaya shows more consistent progress in realizing the actual conditions in line with the expected objectives, while the cities of Bandung and Denpasar still face technical and managerial problems despite having a fairly adequate policy framework.

³⁴ Adani, Abdillah Ahmad Fadhil. "Efektivitas pasal 31 peraturan pemerintah nomor 81 Tahun 2012 tentang pengelolaan sampah rumah tangga dalam menjamin kesehatan dan keselamatan kerja di TPST 3R Mulyoagung Bersatu." PhD diss., Universitas Islam Negeri Maulana Malik Ibrahim, 2025.

Thus, the differences between the provisions of Government Regulation No. 81 of 2012 and the conditions of its implementation in the field show that the success of the 3R waste management system is highly dependent on the cooperation between regulations, institutional capacity, and changes in community behavior patterns.

3. Efforts Made to Optimize the Implementation of the TPS3R Program to Meet Waste Management Standards in Accordance with Government Regulation No. 81 of 2012

The optimal implementation of the TPS3R Program is highly dependent on the level of public awareness and discipline in managing waste, starting from the household level. Public legal awareness must be increased through concrete, planned, and sustainable education programs, involving cooperation between the community, government, and entrepreneurs so that the principles of Reduce, Reuse, and Recycle can become part of everyday life.

Normatively, Articles 12 and 19 of Government Regulation No. 81 of 2012 state that local governments are obliged to assist in the implementation of waste reduction activities by limiting the amount of waste generated, recycling, and reusing existing waste. This provision implicitly requires affirmative policies in the form of incentives or incentive reductions. In practical application, several regions have begun to implement reward schemes based on participation, such as increasing the capacity of waste banks, subsidizing the operation of Household Waste Processing Facilities (TPS3R), and integrating a point system based on waste deposits.

In the city of Surabaya, relatively good results in optimizing TPS3R have been achieved thanks to a combination of educational approaches and local

fiscal policy support. Research by Ulum, M. B., et al. (2025) in an article titled "Waste Management at the Reduce, Reuse, and Recycle Waste Processing Facility (TPS3R) Tenggilis, Surabaya City" published in the *Envirous Journal* shows that the Tenggilis TPS3R is capable of processing an average of $\pm 5,047.29$ kg of waste per day. The composition of organic waste reached 65.79%, which significantly reduced the volume of residue sent to the final disposal site (TPA).³⁵

This success is supported by consistent guidance from the Environmental Agency and integration with a waste bank system that provides direct economic benefits to the local community. Surabaya can be said to be an area that has achieved a higher level of success in implementing the program consistently, as it has met several indicators for source-based waste reduction as stipulated in Government Regulation No. 81 of 2012.

Unlike Surabaya and Bandung City, which still face challenges in improving operational efficiency. Research conducted by Arindita Dessi P. and Djoko Setyanto in 2025 entitled "Evaluation of the Operational of Reduce Reuse Recycle Waste Treatment Facility (TPS3R) in Bandung City" published in the *Engineering, Mathematics and Computer Science Journal* shows that the level of waste reduction in Bandung City, based on SIPSN 2023 data, has only reached around 14.46% of the total waste produced.³⁶

This figure shows that the 30 percent reduction target in accordance with national policy has not been fully achieved. The factors that hinder this include limited facilities, inconsistency in the sorting process at the household level, and the economic incentive system provided to the community not being maximized. Therefore, the implementation of TPS3R

³⁵ Ulum, Muhammad Bachrul, Arneisya Hefmaulia Ardina, Shinfi Wazna Auvaria, and Sulistiya Nengse. "Pengelolaan Sampah di Tempat Pengolahan Sampah Reduce, Reuse, dan Recycle (TPS 3R) Tenggilis, Kota Surabaya." *Envirous* 5, no. 2 (2025): 33-38.

³⁶ Permatasari, Arindita Dessi, and Djoko Setyanto. "Evaluation Operational of Reduce Reuse Recycle Waste Treatment Facility (TPS 3R) in Bandung City (Case Study: TPS 3R Saling Asih and TPS 3R Hikmah)." *Engineering, MAThematics and Computer Science Journal (EMACS)* 7, no. 1 (2025): 35-43.

in Bandung still shows some inability to achieve the waste reduction standards of as stipulated in Government Regulation No. 81 of 2012, despite the necessary regulatory policy framework already being in place.

In Denpasar City, an approach based on traditional villages and banjars serves as a social strategy that strengthens credibility in the implementation of TPS3R. Research conducted by I Gede Arya, Kadek Diana Harmayani, and Ida Bagus Putu Adnyana in 2025, entitled "Risk Management in the Development and Operation of TPS3R in Panjer Urban Village, Denpasar," published in the *Journal of Asian Multicultural Research for Economy and Management Study*, discusses various operational risks, such as changes in the frequency of community participation, limited funds, and technical difficulties in the management process.³⁷

Although community participation is quite high thanks to the support of traditional structures, the smooth implementation still depends on the availability of sustainable funds and improved managerial capabilities of the managers. In this context, Denpasar has achieved success in the social and cultural fields, but technically and in terms of quantity, it still faces obstacles in achieving its waste reduction targets.

Other efforts to maximize results were made by applying innovations in organic waste processing technology. Research conducted by Wijaya and Putri in 2024 entitled "Innovation in Organic Waste Processing through Black Soldier Fly (BSF) Technology at TPS3R" published in the *Mahasaraswati University Denpasar Scientific Journal* shows that the use of BSF technology has succeeded in increasing efficiency in the organic waste processing process while producing economically valuable products such as maggots and compost.³⁸ These findings indicate that technical innovation is

³⁷ Arya, I. Gede, Kadek Diana Harmayani, and Ida Bagus Putu Adnyana. "Risk Management in the Development and Operation of TPS 3R in Panjer Urban Village, Denpasar." *Journal of Asian Multicultural Research for Economy and Management Study* 6, no. 4 (2025): 67-72.

³⁸ Wibawa, I. Made Sastra, Shinta Enggar Maharani, and Hermes Henryanto Nambung. "Teknologi pengelolaan sampah organik menggunakan larva Black Soldier Fly di TPS3R Kesiman Kertalangu Denpasar Bali." *Jurnal Ecocentrism* 4, no. 1 (2024): 9-19.

part of an optimization strategy that aligns with the principles of recycling as stipulated in Government Regulation No. 81 of 2012.

In addition to technical and social aspects, environmental law literature also emphasizes the importance of incentive instruments in encouraging compliance. The book "Environmental Law in Indonesia" by Rahmadi (2022) states that the successful implementation of environmental regulations depends on a combination of two approaches, namely a regulatory approach in the form of orders and controls, and an economic approach through economic instruments. This approach is in line with the TPS3R context, as changes in community behavior cannot be achieved solely through obligations based on norms, but also require measurable incentives.

Therefore, efforts to improve the implementation of TPS3R to meet waste management standards in accordance with Government Regulation No. 81 of 2012 are carried out through:

- 1) Enhancing education and raising legal awareness among the public;
- 2) providing economic incentives and participatory rewards;
- 3) providing adequate infrastructure and financial support;
- 4) waste processing technology innovation; and;
- 5) strengthening institutional coordination and continuous guidance.

Empirical data from Surabaya shows a more consistent trend of success, while Bandung and Denpasar are still in the process of optimization with achievements that have not yet fully reached the waste reduction targets in accordance with national policies.

Conclusion

The implementation of Government Regulation No. 81 of 2012 through the TPS3R program has, normatively, a strong and progressive legal basis in its efforts to realize waste management based on the 3R principle.

However, empirically in the cities of Surabaya, Bandung, and Denpasar, there are still differences in the level of effectiveness between the intended legal provisions (*das sollen*) and the reality of their implementation in the field (*das sein*). The city of Surabaya shows a more consistent level of effectiveness thanks to institutional support and a structured guidance system. Conversely, program optimization in the cities of Bandung and Denpasar has not been fully achieved due to ongoing technical, managerial, and operational sustainability constraints, which have impacted the overall effectiveness of enforcing these legal norms.

The factors that influence the successful implementation of TPS3R are highly dependent on the degree of community participation, the availability and management of resources, and the effectiveness of institutions and inter-agency coordination. The factor of community participation occupies a dominant position, given that changes in the behavior of legal subjects in sorting and managing waste at the source are a key prerequisite for the normative success of the 3R system. On the other hand, limited infrastructure, unstable funding, and suboptimal inter-agency coordination in a number of regions are factors that hinder the achievement of waste reduction targets as mandated in national policy.

Optimizing the implementation of TPS3R to meet the waste management standards mandated in Government Regulation No. 81 of 2012 requires a comprehensive and sustainable approach. These strategic efforts include increasing public education and legal awareness, providing economic incentives to stimulate active participation by legal entities, strengthening infrastructures and financing schemes, and applying technological innovations such as Black Soldier Fly (BSF) based processing. In addition, strengthening institutional coordination is a crucial instrument in ensuring synchronization of governance. Through synergy between regulatory aspects, institutional capacity, and behavioral transformation among the public, the target of reducing waste at the source can be achieved more effectively and consistently in urban areas.

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