

## GOOD ENVIRONMENTAL GOVERNANCE ROLES IN SUSTAINABLE SOLID WASTE MANAGEMENT IN INDONESIA: A REVIEW

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### Abstract

Indonesia is an archipelagic country consisting of more than 17,500 islands. Urbanization and community agglomeration in urban areas in Indonesia are increasing the complexity of solid waste management in Indonesia. The old paradigm of 'collect-transport-disposal' waste management still occurs frequently in cities in Indonesia. This research is designed to be a systematic qualitative review. The relationships between good environmental governance and sustainable solid waste management are synthesized from a perspective of current conditions in Indonesia. The solution to sustainable waste management is generally carried out through well-organized waste management in an integrated manner from upstream to downstream with a 'cradle-to-grave' mindset, including the impacts that may arise therein. Implementing sustainable solid waste management requires commitment and support from all aspects of stakeholders. Good environmental governance is a comprehensive, dynamic, and complex concept that attempts to improve environmental conditions while promoting sustainable solid waste management. The results show that good environmental governance is very influential for sustainable solid waste management, but it still needs to be implemented optimally in Indonesia. Integration and synchronization of policies between the central government and local government must be further improved to implement good environmental governance.

**Keywords:** *good environmental governance, sustainable solid waste management, Indonesia*

### Introduction

According to the 1945 Constitution of the Republic of Indonesia (UUD 1945) article 28H, every citizen of Indonesia has the right to a good and healthy living environment. The large population and the diversity of city activities in Indonesia have resulted in problems in urban infrastructure services (Munawar et al., 2018). One of the negative impacts of urban

development is the increasing complexity of solid waste management problems (Pasang et al., 2007). In line with increasing urban complexity, waste emerges as a problem that requires special attention and handling (Muis et al., 2023). Currently, waste management in Indonesia still needs to be improved, in part due to policies or management programs that are less integrated and a lack of support and community participation (Fariz et al., 2023). Coupled with the still limited supporting facilities and infrastructure, especially waste transportation, which causes the waste problem in cities to become more complex (Shekdar, 2009). The waste in the big cities of Indonesia is estimated

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that only about 60% can be transported to landfills. However, the amount of uncollected waste is most likely not recorded properly and systematically. That happens because it is usually calculated based on the trip of the waste truck to the landfill (Hettiarachchi et al., 2018).

Previously, all planning, designs, and construction of landfills, temporary waste storage areas, and other solid waste facilities, as well as waste management throughout Indonesia, were handled centrally by the Ministry of Public Works. However, after decentralization in 1999, waste management responsibility was transferred to provinces and regencies/cities.

With the issuance of Law 32/2004 about regional autonomy and government regulation (GR) 38/2007 about the division of governmental affairs between the central government, provincial governments, and regency/city governments, the responsibility for municipal waste management was transferred from the central government to regional governments with the hope that municipal waste management could be improved more efficiently and effectively. This change resulted in a transitional phase for provincial and regency/city governments to develop knowledge and capacity in managing municipal solid waste in their regions.

The old paradigm of 'collect-transport-disposal' waste management still occurs frequently in cities in Indonesia, and the mainstay of a city's solution to its waste problem is burying it in landfills (Ferdinan et al., 2022). Local governments tend to pay little attention to the landfill, so cases of landfill failure arise (Munawar et al., 2018). Local governments think that landfills can solve all waste problems without having to pay proportional attention to these facilities. The quality of the landfills and waste collection and transportation system is highly dependent on the quality of its

management, maintenance, and development (Syafudin et al., 2023).

Solid waste generation cannot be stopped but must be managed, reduced, or appropriately minimized. Funding for waste management must be managed effectively by the local government (Hertomo et al., 2018). Because in general, waste management requires a large budget or cost, especially for technical operational costs from collection, transportation, and processing to the landfills.

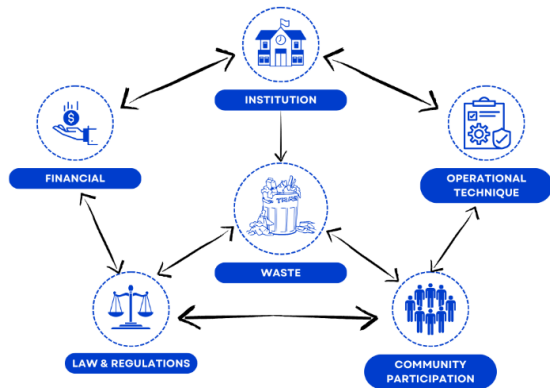
Law 18/2008 on Waste Management, the primary legal foundation for managing waste in Indonesia, defines waste management as a systematic, comprehensive, and ongoing activity that involves waste reduction and management. Actions to limit waste generation include reducing, recycling, and reusing materials. All production actors should use materials that create minimal waste, are reusable or recyclable, and decompose quickly through natural processes.

One of the pillars of implementing good governance is a commitment to the environment, which means that it is necessary to deal with waste management that is still based on environmental preservation so that the negative impacts it generates on the environment are kept to a minimum.

The solution to sustainable waste management is generally carried out through well-organized waste management in an integrated manner from upstream to downstream with a 'cradle-to-grave' mindset, including the impacts that may arise therein (Shekdar, 2009). The waste generated from human activities must be adequately managed to prevent various problems affecting human life and the environment. These problems include environmental pollution, the spread of disease, decreased aesthetics, and disease-carrying (SAMBO et al., 2020).

Solid waste management will be optimal if all management aspects are balanced and support each other (Puchongkawarin & Mattaraj, 2020). Waste management consists of several aspects, including institutional, legal & regulation, financial, operational technique, and community participation, shown in **Figure 1**.

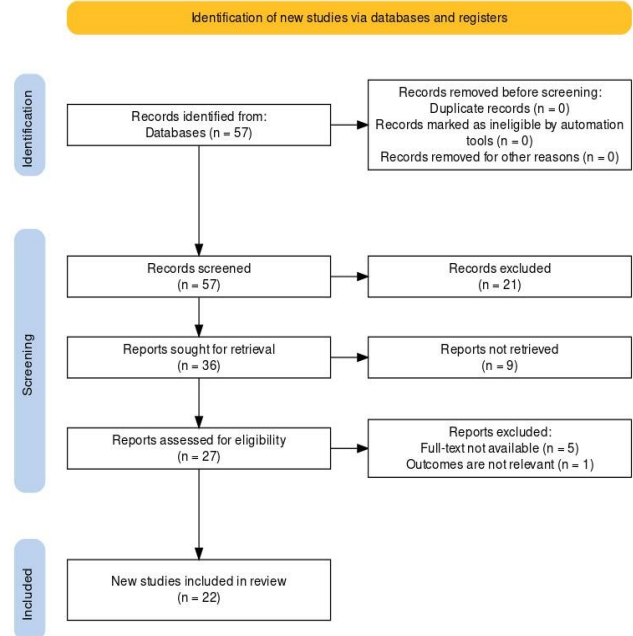
If solid waste management does not run as it should, it will have implications for various other problems, including decreased environmental quality due to waste pollution. Therefore, this research aims to review the extent of the role of good environmental governance in sustainable solid waste management in Indonesia.



**Figure 1.** Scheme of the municipal solid waste management system (SK-SNI T-13-1990-F)

### Research Methodology

This research is designed to be a systematic qualitative review. The data and information have been gathered through a comprehensive review of relevant literature and policies. Research and discussion references related to Indonesia's good environmental governance are gathered in the specific sustainable solid waste management concern theme. The relationships between good environmental governance and sustainable solid waste management are synthesized from the viewpoint of current conditions in Indonesia.



**Figure 2.** PRISMA Flow Diagram

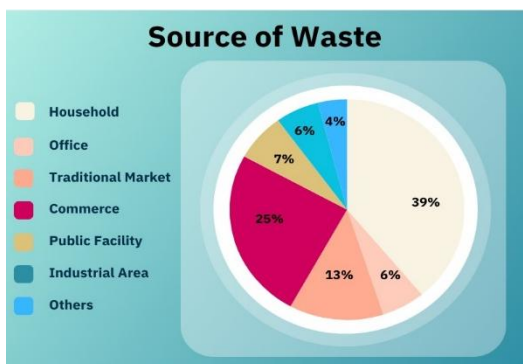
### Results and Discussion

#### *Solid Waste Management in Indonesia*

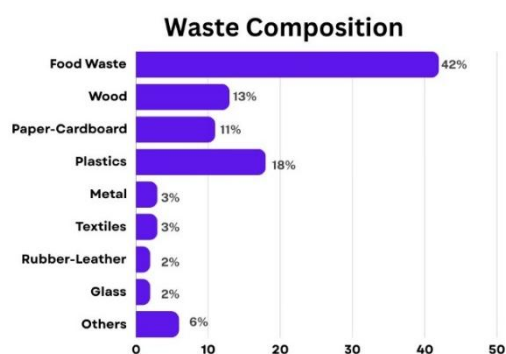
Indonesia is an archipelagic country consisting of more than 17,500 islands, 6,000 of which are inhabited. The additional surrounding sea areas bring Indonesia's recognized territory (land and sea) to about 5 million km<sup>2</sup>, extending 5,120 kilometers from east to west and 1,760 kilometers from north to south. The country is comprised of 34 provinces, 502 cities and regencies, 6,543 districts, 8,506 wards and 74,961 villages.

In Indonesia, solid waste is classified as organic and non-organic based on its characteristics and domestic or non-domestic based on its sources, the latter being further divided into non-hazardous and hazardous waste. Following the latest statistics from the Ministry of Environment and Forestry (MoEF), Indonesia generated an estimated 24.6 million tons of waste in 2022. Of this total, 38.49% comes from households, while commercial sectors account for 25.16% and traditional markets for 13.16%, shown in **Figure 3**.

Meanwhile, based on its composition, food waste dominates the waste generated in Indonesia, accounting for 41.83% of the total waste generation in 2022, which is around 10.3 million tons. Plastic waste is the second-largest contributor, with 18.07%, shown in **Figure 4**.



**Figure 3.** Source of Waste (SIPSN, 2022)



**Figure 4.** Waste Composition (SIPSN, 2022)

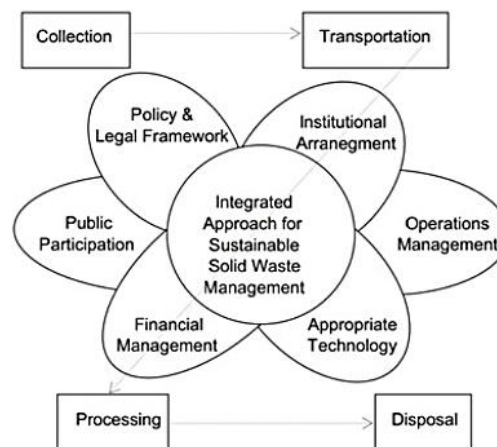
Urbanization and community agglomeration in urban areas in Indonesia are increasing the complexity of waste management in Indonesia (Ferdinan et al., 2022). Population growth and activities that continue to grow result in a significant increase in waste generation. Changes in people's consumption patterns that change from traditional societies to modern societies also contribute to changes in waste composition.

In recent years, in several developing countries, efforts have been made to reduce the amount of waste disposed of in landfills by means of stricter solid waste regulations, promoting the reduction of waste at its source, reuse and

recycling, and converting waste to energy (SAMBO et al., 2020).

Transportation of waste from its source is also a separate problem in solid waste management in Indonesia. Inefficiency in waste collection and transportation will cause many issues, such as uncollected waste and ending up in illegal waste disposal sites (Abubakar, 2017).

Only now, the problems that often arise in solid waste management include the increasingly expensive operational costs and the low availability of land for waste disposal facilities (Arni Sarah et al., 2018). Many of the existing landfills in urban areas were constructed years ago when land was still plentiful, and currently, many of the landfills have exceeded their capacity (Abubakar et al., 2022). Mountains of waste are gradually forming in many landfills in Indonesia, not to mention illegal waste disposal sites that should not be used to dispose of solid waste, such as rivers and open spaces (Munawar et al., 2018). Such conditions lead to the emergence of various environmental problems. For example, the waste avalanche that buried 71 houses and claimed the lives of 143 scavengers working at the Bantar Gebang landfills in 2005. The concept of solid waste management can be seen in **Figure 5**.



**Figure 5.** Integrated sustainable solid waste management system.

### Good Environmental Governance

Good governance may be utilized to establish a healthy government by focusing on openness, accountability, participation, legal empowerment, effectiveness and efficiency, and justice (Wijayanti & Azzahra, 2022). The term 'good governance' is usually associated with a package of public sector reforms designed to achieve positive and lasting change in line with crucial governance principles.

Meanwhile, good environmental governance is essential to prioritize environmental sustainability. That necessitates system transparency in environmental institutions as well as community participation in policy development and program implementation (Asiyah, 2019).

Good environmental governance is a comprehensive, dynamic, and complex concept that attempts to improve environmental conditions while promoting sustainable development. Good environmental governance encompasses various stakeholder engagements and informal arrangements, such as private business compliance with voluntary codes of conduct and government partnerships with major groups and stakeholders, including non-governmental organizations (NGOs) (Lothar Gündling, 2017).

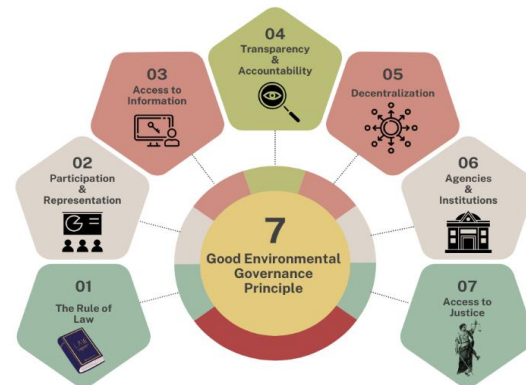
Good environmental governance is required for sustainable development and environmental protection (Belbase Narayan, 1997). Good environmental governance refers to the effective and responsible management of environmental resources and issues by governments, institutions, organizations, and individuals. It involves making informed decisions, implementing policies and regulations, and taking actions that promote sustainability, conservation, and protection of the environment.

In governance, there are three elements involved (Mustaghfiroh et al., 2020). First, the public government refers to government institutions.

Second, corporate governance refers to private businesses. Third, civil society or the community. The interaction of these three elements must be balanced, synergistic, and mutually controlled.

There are several principles of good environmental governance. According to (Belbase Narayan, 1997), good environmental governance consists of seven principles: the rule of law, participation and representation, access to information, transparency and accountability, decentralization, agencies and institutions, and access to justice, as shown in **Figure 6**.

The rule of law is a way to regulate society to comply with applicable laws or regulations. That is because the law has flexibility in regulating life, which has the aim that law enforcers and the community can apply in accordance with applicable law and not act arbitrarily.



**Figure 6.** Good Environmental Governance Principle

The first concept in the rule of law is that there is no arbitrary action by the government based on the rule of law itself, and the second is that the rule of law is based on the fact that law must be legal and based on the will of the people. From these two aspects, it can be interpreted that the rule of law aims to prevent arbitrariness by the government or those in power without regard to the people's will (Mustaghfiroh et al., 2020).

Participation is the involvement of governance components in realizing the goals to be achieved

both physically and non-physically. Meanwhile, representation is the re-expression of an idea that has been captured by the senses using its own language (Nugroho et al., 2023). The community's potential to develop self-help institutions has apparently increased as a result of its social and economic progress. In this case, community potential is defined as a civil society that needs to be improved and developed in a sustainable manner. Civil society awareness is characterized by the emergence of attention that people understand their rights to a good and healthy environment and are able to carry out their obligations and responsibilities to achieve the quality of the environment they demand (Ni Putu Depi Yulia Peramesti, 2017). Then empowered, namely, being able to make demands to get a good and healthy environment. Furthermore, they are independent in their ability to desire to carry out local initiatives to deal with environmental problems around them and actively not only fight for the aspirations and demands for a good and healthy environment continuously but also carry out local initiatives.

Access to information is an intermediary that can be used to receive or provide information to the public. Access to information is the provision of information related to the environment and the mechanism for providing environmental information by authorized holders (Mustaghfiroh et al., 2020). So that the community can find the latest information related to their natural resources and data related to the surrounding environment, it is the government's responsibility to provide this information to fulfill the right to report to the public.

Transparency is information about reports in the field, the decision-making process, and the results of decisions that are conveyed clearly, really, and not artificially. At the same time, accountability is a form of responsibility from an agency or institution. The principle of

transparency is needed so that oversight by the public and private sectors over governance can be carried out objectively (Ni Putu Depi Yulia Peramesti, 2017). Transparency is required in the preparation and implementation of government budgets. Transparency is a principle that guarantees freedom or access for everyone to obtain information related to government administration, both in terms of policy formulation or the implementation of a policy and the results achieved. The principle of transparency emphasizes two aspects: public communication and information access. The principle of decentralization is the authority of local governments to regulate and manage their regions. Decentralization, in simple terms, can be interpreted as governance that gives greater power to the regions in terms of delegating tasks, obligations, authorities, and responsibilities. Decentralization is expected so the regions concerned can regulate and manage their areas. Decentralization based on Article 18 of the 1945 Constitution of the Republic of Indonesia is stated as 'The division of Indonesia's regions based on large and small regions, with the form of government structure determined by law, by looking at and bearing in mind the basis of deliberation in the system of state government and origin rights in the region's special area.' Decentralization in Good Environmental Governance emphasizes the extent to which rights to manage the environment and natural resources are placed (Nugroho et al., 2023). Decentralization is expected to be carried out at the lowest level. This environmental management can start at the central government level, go down to the regional level, and then go down again to the local level. Because the government at the local level understands better the problems and situations being faced, it is hoped that an appropriate decision can be obtained in accordance with the existing conditions and does not harm many parties.

Institutions are organizations that play a role in realizing the goals to be achieved. Institutions consist of government, private, and community institutions (Asiyah, 2019). The existence of institutions and organizations is essential because it refers to informal norms, regulations, and organizations that coordinate human behavior. The presence of institutions and organizations in the community is expected to produce information, give citizens a voice, respond to feedback, and encourage learning for the local level community. Existing institutions and organizations must balance interests by negotiating change and agreements to avoid stagnation and conflict. The establishment of an institution that oversees environmental and conservation affairs is a sign of seriousness from the existing government to participate in managing and protecting the current environment appropriately and sustainably. The institution must also be formed, from the central government to the local government. So that the implementation of environmental governance can run smoothly, and good environmental governance will be created. Access to justice means intermediaries used to obtain authority and rights that must be accepted. Access to justice not only refers to the availability of justice services but also represents an increased capacity to use justice services, which is expected. Increasing the ability to use justice

services can contribute to increasing service accountability and guaranteeing people's rights. Access to justice is an essential aspect of accountability as it provides an avenue for enforcing substantial and procedural environmental obligations and rights.

#### *Law and Regulation in Solid Waste Management*

Legal certainty and clear responsibilities and authorities are essential in solid waste management. It is important to define the roles of the central government, local government, community, and corporation to ensure solid waste's effective and efficient management. That will help to maintain proportionality in waste management practices (Maskun et al., 2023).

The legal framework is designed to regulate the disposal of waste. The aim is to solve the problem of societal behavior, which includes terrible habits in disposing of waste.

Infrastructure is expected to further develop along with the installation of new technology in the future, which will accelerate solving waste problems.

However, the implementation could be better than the plan. The lack of law enforcement, monitoring, and evaluation results in many violations of regulations that are not acted upon by law enforcement officials. As a result, behavioral problems are not entirely resolved (Sundana, 2019).

**Table 1.** Core Provisions of Indonesia's National Legal Instruments Concerning Waste Management

<b>National Laws and Regulations</b>	<b>Core Provisions</b>
2008 Law 18/2008 about Waste Management GR 81/2012 about Domestic Waste and Domestic Waste Equivalent	There are two mechanisms involved in solid waste management: reduction and handling. The reduction mechanism involves limiting solid waste generation and recycling and reusing waste. On the other hand, the handling mechanism involves sorting, collecting, transporting, processing, and final waste process.
GR 27/2020 about Specific Waste Management	In 2025, the goal is to reduce waste by 30%, equivalent to about 20.9 million tons, and handle 70% or 49.9 million tons of waste.
PR 97/2017 about National Policy and Strategy for Domestic Waste and Domestic Waste Equivalent Management (JAKSTRANAS)	

In Indonesia, two laws regulate waste management: Law 18/2008 about Waste Management, which focuses on municipal solid waste management, and Law 32/2009 about Environment Protection and Management. Indonesia introduced the Law of Solid Waste Management (Law 18/2008) on May 7, 2008, initially drafted in 2003.

This law is enforced by Government Regulation (GR) 81/2012, which mandates minimizing waste through a 3R approach. Waste handling must be done at the earliest possible stage at the sources that can provide value and potential economic benefits. Additionally, the regulation also mandates that local governments immediately switch from the open dumping system to a sanitary landfill with a more environmentally friendly dumping method.

According to Law No. 18/2008, waste with economic potential can be accommodated by implementing a Material Recovery Facility (MRF) (Sasaki et al., 2014). In Indonesia, MRF is referred to as 3Rs Transfer Point (TPS-3R and TPST). According to GR No. 81/2012, TPS-3R is established at the sub-district level and is community-based, while TPST is established at the city level and is institution-based.

Indonesia has two main recycling flows for municipal solid waste management. The first flow involves collectors, scavengers, and informal sectors collecting recyclable materials at sources. In the second flow, the local government separates and recycles these materials after solid waste collection (Fariz et al., 2023). Recycling activities in this context refer to any activity that involves reusing objects previously referred to as 'waste', whether directly self-reusing or selling to recycling industries (Fatimah et al., 2020).

The solid waste laws and regulations in Indonesia outline approaches and strategies to reduce and manage municipal solid waste, which aims to achieve the goals set in the National

Policy and Strategy for Domestic Waste and Domestic Waste Equivalent Management (Jakstranas). This plan was enacted through Presidential Regulation (PR) 97/2017 and is an eight-year master plan that contains important targets for waste reduction and management in the country's municipal solid waste management system.

In response to policies and regulations on solid waste management, Indonesia's MoEF has been implementing some solid waste management programs. The MoEF encourages recycling activities in local communities by erecting Waste Banks, which enable communities to profit from waste recycling initiatives. The MoEF encourages recycling activities in local communities by erecting Waste Banks, which enable communities to profit from waste recycling initiatives. That was carried out by the Ministerial Regulation 13/2012 mandate, which lays out guidelines for the 3R through Waste Banks and encourages 3R activities through waste banks.

At the municipal level, the central government assists local governments in constructing waste facilities to promote waste reduction, i.e. MRF facilities and sanitary landfill (Damanhuri et al., 2009). The construction of 595 TPS-3R and 3 TPST was supported by the central government budget between 2007 and 2015. However, the last evaluation in 2015 of the existing 146 TPS-3R located at Java, Sumatra, and Kalimantan revealed that only 12% were functional while 41% were unused (Enri Damanhuri, 2017). That shows that implementing good environmental governance in Indonesia has not run optimally (Nugroho et al., 2023).

According to data from the National Policy and Strategy for Waste Management (Jakstranas) in Presidential Regulation 97/2017, the projected waste generation in 2025 is expected to reach 70.8 million tons. That is an increase of 7.6 percent from 65.8 million tons of waste



generated in 2017. The Indonesian government also aims to reduce waste by 30% of the total generated waste by 2025.

Good environmental governance is a comprehensive, dynamic, and complex concept that attempts to improve environmental conditions while promoting sustainable development. Good environmental governance roles significantly influence the acceleration of sustainable solid waste management.

Solid waste management in Indonesia is financed through the local government budgets fund (APBD). The waste fees collected from households are mainly used for transporting waste from the source to waste disposal sites rather than for treating waste, such as the landfill budget. These fees are usually collected by the neighborhood associations.

In addition to regulations set by the central government, local governments also have the power to regulate solid waste management in their regions. Municipal solid waste management policies may vary based on the region's unique characteristics, including local issues, society, and economic conditions. These policies rely heavily on the commitment of local governments.

Regional autonomy has caused the government to continue using a top-down approach in solid waste management, even though a bottom-up process is more suitable. The use of a bottom-up approach would enable the government to engage the community, private sector, and NGOs in carrying out solid waste management, thereby maximizing results through a stakeholder network.

## Conclusions

The escalation in waste generation is inevitable. The old paradigm of 'collect-transport-disposal' (end-of-pipe concept) waste management and the use of poorly managed facilities and informal uncontrolled dumping or open waste

burning occurs frequently in cities in Indonesia. Thus far, the Indonesian government has issued various programs and policies regarding waste that reflect the government's awareness of the threat and environmental effects of the waste problem.

The implementation of good environmental governance must be immediately improved. In the old days, individuals's attitude towards waste was often summarized as 'Not In My BackYard' (NIMBY), which meant that they didn't want waste in their immediate vicinity. However, we need to adopt a new attitude, 'Now I Must Be Involved' (NIMBI) and emphasize the importance of the 3R practices (reduce, reuse, and recycle) at the household level so that good environmental governance can be appropriately implemented and in line with it sustainable solid waste management can be achieved.

There is an urgent need to adjust immediately the priority allocations of local government budget funds (APBD) and the distribution of special allocation funds (DAK) from the central government to the local government to ensure sustainable solid waste management. That is especially necessary if cities or regencies want to implement advanced solid waste management technologies such as incineration, mechanical biological treatment, and refuse-derived fuel.

In addition, the central and local governments need to work together to create a legal framework and programs that support implementing a circular economy. The governments should also enforce the concept of Extended Producer Responsibility (EPR). Under EPR, companies are held accountable for their products and responsible for the local government's financial costs in managing the solid waste generated from packaging materials. That will help ensure that companies are more responsible and accountable for their products and waste management, ultimately contributing to a more sustainable and circular economy.

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