



## Bridging Inequality in Environmental Governance: A Case Study of Waste Management in Kupang City, Indonesia

 Muhammad Rifki Rosman<sup>1\*</sup>,  Rahman Mulyawan<sup>1</sup>, and  Neneng Yani Yuningsih<sup>1</sup>

<sup>1</sup>Department of Government Science, Universitas Padjadjaran, Indonesia

\*Corresponding Author Email: [muhammad24318@mail.unpad.ac.id](mailto:muhammad24318@mail.unpad.ac.id), Telp: +6281394373198

Received: 9 March 2026; Revised: 9 March 2026; Accepted: 13 April 2026

### Abstract

Waste management in Kupang City continues to face complex challenges that are not only technical but also closely related to issues of equity in environmental governance. This study aims to examine how the principle of equity is implemented in waste management governance in Kupang City using the environmental governance framework proposed by Bennett and Satterfield. A qualitative case study approach was employed to explore the experiences and perspectives of multiple stakeholders, including local government officials, environmental communities, private sector actors, and affected residents. Data were collected through interviews, observations, and document analysis and were analyzed thematically. The findings reveal that the Kupang City Government has demonstrated an initial commitment to inclusive waste governance by involving diverse stakeholders, including vulnerable groups, in waste management initiatives and community surveys. However, participation remains largely concentrated at the implementation stage and is not yet fully integrated into policy planning and evaluation processes. The study also identifies significant inequalities in the distribution of waste management services, particularly in the availability of waste collection facilities and transportation services in suburban areas. Furthermore, communities living near the Alak landfill continue to bear disproportionate environmental and health risks without adequate protection mechanisms. This study contributes to the environmental governance literature by providing empirical evidence on how equity principles operate in urban waste management in developing cities. Strengthening institutional capacity, expanding participatory mechanisms, and improving the protection of vulnerable groups are essential to achieving more inclusive and sustainable waste governance in Kupang City, Indonesia.

**Keywords:** Environmental Governance, Equity, Waste Management, Sustainable, Kupang City

**How to Cite:** Rosman, M. R., Mulyawan, R., & Yuningsih, N. Y. (2026). Bridging inequality in environmental governance: A case study of waste management in Kupang City, Indonesia. *Government & Resilience*, 4(1), 86-103. <https://doi.org/10.62503/gr.v4i1.50>

## Introduction

Indonesia is a country with a declining population growth rate, from 1.38% in 2015 to 1.09% in 2025. However, Indonesia still has the fourth largest population in the world (Central Statistics Agency, 2025). This has led to an increase in the amount of waste produced by the community. From 2020 to 2023, waste generation in Indonesia has continued to increase. The following is data on waste generation in Indonesia:

**Table 1.** Waste Generation Data in Indonesia

Year	Daily Waste Generation (Tons)	Annual Waste Generation (Tons)
2020	75,596	27,592,603
2021	78,332	28,591,323
2022	105,671	38,570,232
2023	118,521	43,260,356

Source: Ministry of Environment, Republic of Indonesia (2025)

This condition shows that population growth not only affects space and infrastructure needs, but also increases pressure on urban waste management systems. Rapid urbanization has led to increased economic activity, household consumption, and increasingly consumptive lifestyles.

Another factor contributing to the increase in waste generation is ineffective waste management. Indonesia produces 56.63 million tons of waste per year, but only 39.01% (22.09 million tons) is managed properly. As much as 21.85% (12.37 million tons) of waste is still dumped in landfills using the open dumping method, while another 39.14% (22.17 million tons) is disposed of in the environment through burning, illegal dumping, or disposal into waterways. On average, more than 90% of districts/cities in Indonesia still use the open dumping system, which is a method of waste disposal carried out in open areas without any special treatment or adequate handling of waste. Waste is simply piled up in landfills without any sorting or processing efforts (Ministry of Environment, 2025).

This condition shows that waste management in Indonesia still faces major challenges, especially in stopping open dumping practices that damage the environment and public health. Waste that is not properly managed can damage the environment, cause odors, and lead to various diseases. However, the public is unaware of these dangers.

One of the cities in Indonesia experiencing population growth is Kupang City, with 474,800 people as of 2024. This figure has increased compared to five years ago, which was 446,100 people in 2020 (Central Statistics Agency, 2024). As the capital and the only city in East Nusa Tenggara Province, Kupang City is the center of social and economic activities that have an impact on increasing waste production. The following is data on waste generation in Kupang City:

**Table 2.** Amount of Waste Generated in Kupang City

Year	Daily Waste Generation (Tons)	Annual Waste Generation (Tons)
2020	217.49	79,382
2021	221.38	80,803
2022	227.93	83,192
2023	234.46	85,576
2024	233.32	85,160

Source: Ministry of Environment, Republic of Indonesia (2025)

This condition reflects that the population growth rate is not balanced by an increase in sustainable waste management capacity, resulting in an increase in the amount of waste generated in Kupang City from 2020 to 2023. The decline in 2024 cannot be interpreted as a significant management success, but may be fluctuating due to seasonal factors, changes in measurement methods, or the temporary influence of certain cleanliness programs.

The Kupang City Government has implemented comprehensive waste management policies based on sustainable principles through Kupang City Regulation No. 03 of 2011 concerning the Management of Household Waste and Household-like Waste, as well as Local Regulation No. 04 of 2011 concerning the Implementation of Reduction of Household Waste and Similar Household Waste, up to Kupang Mayor Regulation No. 19 of 2019 concerning the Policy and Strategy of Kupang City in the Management of Household Waste and Household-like Waste, and the formation of a Waste Management Task Force. However, in practice, waste management in Kupang City has not yet achieved satisfactory results due to various challenges and obstacles in its management.

The waste management capacity is only able to accommodate around 65 percent of the waste generated. As a result, waste accumulation often occurs at various points. The Alak landfill is the only disposal site, which is now almost full. The open dumping system at the landfill is not environmentally friendly because waste is simply dumped without any treatment. In fact, there have been frequent fires at the landfill, causing it to be declared an emergency. As a result, many local residents have contracted respiratory tract infections (Detik Indonesia, 2024).

Supporting infrastructure for waste management remains limited, including the availability of temporary waste storage sites (TPS), transportation fleets, and waste banks. In several areas such as Tuak Daun Merah and Naikolan, the closure of TPS has reduced the community's access to proper waste disposal facilities, leading to confusion regarding disposal locations. In Namosain Village, waste is often left uncollected due to severely damaged transportation vehicles. Public awareness of proper waste sorting and disposal schedules is also relatively low, resulting in waste accumulation before collection and the mixing of household waste with hazardous materials. These conditions have caused waste to spread in public spaces and coastal areas, highlighting the urgency of improving both infrastructure and community engagement in waste management (Pos Kupang, 2025; Merdeka.com, 2025).

The above description illustrates that the waste problem in Kupang City is the result of a combination of limited management capacity and low community participation and awareness in maintaining environmental cleanliness. This condition has resulted in air and soil pollution, as well as health risks such as respiratory tract infections due to repeated fires at the landfill. This problem shows that the waste issue in Kupang City is not only technical, but also concerns governance, community behavior, and weak infrastructure. Integrated efforts are needed in the form of improving management facilities, optimizing the fleet, enforcing regulations, and providing environmental education to create an effective and sustainable waste management system.

In the modern era, waste issues are not only viewed as technical problems related to collection, transportation, and disposal, but also as environmental governance issues involving various actors, policies, and government systems. Therefore, to address these issues, waste management needs to be examined from the perspective of good governance, especially in the context of the environment, known as the concept of Environmental Governance. This approach emphasizes the balance between the utilization of natural resources and their protection/conservation, the enforcement of sustainable development principles, and low levels of violations of environmental destruction activities (Azizy, 2007). Environmental governance is a new paradigm in the environmental aspect

that is the essence of successful good governance. The principles of environmental governance are expected to prioritize environmental aspects in sustainable development.

Bennett S Satterfield (2018) categorize environmental governance as having four principles that can be generalized and differentiated, namely effective, equitable, responsive, and robust, which must be considered comprehensively in all institutional, structural, and procedural elements. These principles emphasize that good environmental management must effectively support the integrity and function of the system, implement inclusive and fair processes, allow for adaptation to diverse contexts and changing conditions, and ensure strong institutional functions, performance, and resilience to disruptions and crises.

This study aims to analyze the principle of equity because it is relevant to waste management issues related to inclusiveness, participation, and equality of waste services in Kupang City. The principle of equity contains five elements, namely Recognition, which means a policy and process that recognizes, respects, and is inclusive of the thoughts, knowledge, values, culture, and rights of stakeholders, including marginalized groups (women, indigenous peoples, or other minority groups) or vulnerable groups (the poor and people with disabilities). Participation means that participation requires certain conditions and spaces, processes, and structures to achieve inclusion, representation, and involvement of stakeholder groups in the joint policy-making process. This facilitates the division of authority, democratic discussion of policies, maintenance of dignity, and the creation of representative plans and actions. Fair means ensuring that social and economic costs and benefits are distributed equitably. Rights and responsibilities are shared and determined fairly. Just means that there are laws and policies to protect rights and property, ensuring that permits are granted free of charge and that there is access to defend oneself against attacks.

Previous studies have proven that environmental governance is highly relevant in efforts to address environmental issues. Rusadi's (2024) research reveals that active community participation in planting and preserving mangroves can overcome coastal erosion. Then, in their research, Putri S Eprilianto (2022) explain that there must be more specific legal derivatives regarding the management of Green Open Spaces (RTH) to improve RTH in accordance with the standards. On the other hand, research by Agung Budi Prastyo (2021) shows that the suboptimal functioning of the authority of the local environmental agency has led to environmental damage, characterized by weak protection and management of the environment.

Many studies have been conducted on waste management in Kupang City, but they have focused more on the implementation of waste management policies (Ndoloe, 2024) and pentahelix collaboration in waste management (Keluli, 2025), which emphasize collaborative governance and environmental policy implementation approaches. Studies that specifically link the principle of environmental governance to urban waste management are still very limited.

Based on the gaps identified in previous studies and the growing urgency of waste management challenges in Kupang City, this study aims to analyze how the principle of equity is implemented within the framework of environmental governance in urban waste management. Specifically, the research examines the extent to which recognition, participation, fairness, and justice are reflected in waste management policies and practices, as well as the challenges faced in achieving more inclusive and equitable waste governance.

## **Research Methods**

This study employs a qualitative research approach using a case study design to examine how the principle of equity is implemented in environmental governance in waste management in Kupang

City. A qualitative approach was chosen because it enables an in-depth exploration of experiences, perceptions, and institutional practices that cannot be adequately captured through quantitative methods. According to Creswell (2018), qualitative research is appropriate for understanding complex social phenomena, exploring participants' perspectives, and interpreting contextual processes. The case study strategy was adopted to allow a comprehensive and contextual analysis of governance practices within a real-life setting (Yin, 2018).

Kupang City was selected as the research site because it represents a rapidly growing urban area facing significant waste management challenges and governance inequalities. Informants were selected using purposive sampling to ensure the inclusion of actors directly involved in waste governance and those affected by waste management policies. The informants consisted of:

1. Local government officials (Mayor's Office and Environmental and Sanitation Agency)
2. Village officials and sanitation workers
3. Environmental community organizations and NGOs
4. Private sector representatives involved in waste initiatives
5. Residents and informal waste pickers affected by waste management practices

The selection of these actors aimed to capture diverse perspectives and ensure the representation of multiple stakeholder groups relevant to the principle of equity in environmental governance.

Data were collected through semi-structured interviews, participant observation, and document analysis. Semi-structured interviews were conducted with key stakeholders to explore their perceptions, experiences, and challenges in implementing equitable waste management. Participant observation was carried out to obtain a contextual understanding of waste management practices, including collection, transportation, and community-based waste initiatives. In addition, document analysis was conducted on local regulations, planning documents such as the RPJMD, RKPD, and agency strategic plans, as well as policy reports and media coverage related to waste management in Kupang City. The triangulation of these data sources was used to enhance the validity and credibility of the research findings.

The data were analyzed using an interactive qualitative analysis model consisting of data reduction, data display, and conclusion drawing and verification. During the data reduction stage, raw data obtained from interviews, observations, and documents were organized, selected, and simplified. The data were then categorized and displayed according to the four elements of equity recognition, participation, fairness, and justice to facilitate interpretation. Finally, conclusions were drawn and continuously verified through comparison across data sources and triangulation. This analytical framework enabled a systematic and transparent interpretation of how equity principles are reflected in waste management governance in Kupang City.

## **Results**

### **General Description of Waste Management in Kupang City**

The waste problem in Kupang City is one of the urban environmental issues that is becoming increasingly complex in line with population growth, increased economic activity, and changes in community consumption patterns. Waste is no longer just a technical issue of transportation and disposal, but has become a management issue involving various actors, interests, and resource constraints. In this context, waste management requires an integrated and sustainable approach.

Waste management in Kupang City is guided by Local Regulation No. 3 of 2011 concerning the Management of Household Waste and Household-like Waste and Local Regulation No. 4 of 2011 concerning the Management of Reduction of Household Waste and Household-like Waste. However, in practice, these policies have not yet achieved satisfactory results due to various challenges and obstacles.

The city of Kupang still uses an open dumping system, so the Alak landfill is the only final disposal site that appears to be reaching capacity. However, Law No. 18 of 2008 on Waste Management prohibits the use of open dumping methods and requires a switch to safer management methods such as sanitary landfills. Therefore, the central government, through the Ministry of Environment, has imposed sanctions on the Kupang City Government to immediately close the landfill.

To address this issue, in 2025 the Mayor of Kupang created an Integrated Waste Management Roadmap program, starting from households with a waste sorting system facilitated by the provision of separate waste bins (organic/green, inorganic/yellow, hazardous/red). After that, waste at the neighborhood association (RT) level is transported to temporary waste storage sites (TPS) in each urban village and then processed at the Integrated Waste Management Site (TPST) at the sub-district level using simple technologies such as plastic shredders, maggot cultivation (organic waste), and even pyrolysis (converting plastic into fuel). The target is to process 85% of waste at the TPST so that only 15% of residue that cannot be processed is disposed of at the landfill. The mayor of Kupang is also strengthening collaboration and education in waste management, which are important factors in the success of this program. Support from various parties, including the private sector, banks, community organizations, communities, and universities, can realize a clean, green, and healthy Kupang City, as well as reduce the amount of waste generated in Kupang City (Prokopim Kota Kupang, 2025).

The principle of equity in the framework of environmental governance emphasizes that waste management must be based on social and environmental justice. This principle is very important considering that the impact of waste is not felt equally by all levels of society. Therefore, the Kupang City Government must apply this principle in managing waste by considering the diversity of community groups, strengthening policy legitimacy, and encouraging multi-stakeholder collaboration. Without the principle of equity, waste management has the potential to deepen environmental and social inequalities, thereby hindering the realization of sustainable environmental governance in Kupang City.

### **Recognition Aspect**

The principle of equity in environmental governance emphasizes one aspect that refers to the extent to which a system or policy recognizes, respects, and includes the existence and voices of various community groups, especially vulnerable or marginalized groups, in a decision-making process. In the context of waste management, these groups can include women and children, scavengers, and people with disabilities.

The results of the study show that recognition of affected community groups in waste management policies has been carried out. This can be seen from the community satisfaction survey conducted by the Kupang City Government in collaboration with Nusa Cendana University. The survey accommodated interviews with almost all community groups, including women, the elderly, people with disabilities, and scavengers. As a result, the survey results reflect the suggestions, perspectives, and viewpoints of these groups on waste management. The following are the

characteristics of the respondents in the community satisfaction survey on waste management in Kupang City:

**Table 3.** Characteristics of Respondents in the Public Satisfaction Survey on Waste Management in Kupang City

Respondent Characteristics		Frequency	Percentage
Gender	Male	242	42
	Female	334	58
Age	<20 years	63	11
	21-30 years	196	34
	31-40 years	104	18
	41-50 years	86	15
	>50 years old	127	22
Education Level	Elementary	52	9
	Junior High School	40	7
	High School/Vocational School/Equivalent	328	57
	DIII	17	3
	Bachelor's Degree	132	23
	Master's/Doctorate	6	1
Occupation	Civil Servant	46	8
	Laborers/Daily workers	12	2
	Housewives	63	11
	Students	104	18%
	Entrepreneurs/SMEs	23	4
	Farmers/Fishermen	35	6
	Private	81	14
	Self-employed	115	20
	Not working	86	15
	Other	12	2

Source: Nusa Cendana University (2025)

The characteristics of the respondents show that this survey has covered a relatively diverse and inclusive group of people. This provides a strong basis for comprehensively assessing public satisfaction with waste management in Kupang City. From an environmental governance perspective, the diversity of respondents strengthens the aspect of recognition, as various social groups with different characteristics have been accommodated in the waste policy evaluation process. However, this diversity also requires the government to design adaptive, fair waste management policies and strategies that are able to respond to the specific needs of each community group. The following are the community's needs based on the results of the community satisfaction survey on waste management in Kupang City:

**Table 4.** Community Needs Regarding Waste Management in Kupang City

No	Community Suggestions	Percentage
1	Addition of waste collection points in the form of bins and containers	45.31

2	Improvement of waste transportation services	15.45
3	Imposition of sanctions	10.07
4	Management of landfills and waste collection sites	8.16
5	Education on waste management and socialization of waste services to the community	7.99
6	Community-based waste management empowerment	5.73
7.	Fair attention to the entire community (including settlements far from main roads)	3.99
8	Installation of CCTV and improvement of infrastructure to support waste monitoring and management	3.99
9	Expansion and empowerment of waste banks and waste recycling communities	3.47
10	Collaboration among stakeholders in waste management	3.30

Source: Nusa Cendana University (2025)

The results of this survey indicate that the aspect of recognition in waste management in Kupang City has begun to be established through a mechanism for absorbing community aspirations. However, this recognition is still normative and has not been fully institutionalized in policies and planning that are responsive to the diversity of social and geographical conditions of the community.

Based on the results of an interview with the Head of Waste Management, Mr. Meksy Pingak, on December 9, 2025, the Kupang City Government supports and does not restrict certain groups from participating in waste management. A concrete example can be seen at the Asmaraloka waste bank in Nefonaek Village. A mother with physical limitations who uses a walking stick is actively involved in waste management. The existence of this example also has a broader social impact, namely encouraging the emergence of collective motivation and awareness among the community to participate in sustainable waste management. Recognition of the of vulnerable groups not only strengthens social justice but also increases the legitimacy of environmental policies in the eyes of the community. When vulnerable groups are recognized and involved, waste management policies tend to be more accepted and supported by the wider community.

Thus, it can be interpreted that the Kupang City Government has shown an initial commitment to implementing the aspect of recognition by involving all community groups in policy surveys and waste management practices at the community level. However, this recognition needs to be expanded and institutionalized so that it does not stop at certain activities, but becomes an integral part of a fair and sustainable waste management governance system in accordance with Bennett's (2018) environmental governance framework.

### **Participation Aspect**

Participation is one of the key aspects of the principle of equity in the environmental governance framework according to Bennett (2018), which emphasizes the importance of the active involvement of various actors in the decision-making, implementation, and evaluation of environmental policies. In the context of waste management in Kupang City, in general, the Kupang City Government always involves all parties in activities related to waste management.

The most common form of participation is community involvement in community service activities, waste management socialization, and the implementation of programs designed by the government. However, this participation does not fully extend to the planning and evaluation stages of waste management policy, so that the community plays more of an implementing role than a partnership role in decision-making. During awareness campaigns, the community is always given the space and

opportunity to express their aspirations and complaints regarding waste issues in their neighborhood, but these aspirations cannot be fully accommodated by the Kupang City Government due to various factors, one of which is a lack of waste collection vehicles.

The community tends to request that more TPS be added to make them more accessible. However, when more TPS are added, the Kupang City Government will find it increasingly difficult to reach all TPS due to its limited fleet. As a result, uncollected TPS piles up and causes odors that disturb the surrounding environment. This condition indicates a tension between the participatory aspirations of the community and the institutional capacity of the government, which could ultimately undermine public trust if not managed transparently.

In addition to the general public, non-governmental actors such as environmental communities, non-governmental organizations, and the private sector also participated, such as in public discussions organized by Nusa Cendana University students involving the Kupang City Government, Undana academics, and environmental communities. Undana itself is committed to this through the initiation of a waste bank managed by the Dharma Wanita Persatuan Undana, which has become a model in the Timor region (Nusa Cendana University, 2025).

Environmental communities in Kupang City also play a massive role in waste management, which is manifested in the form of initiatives such as the Creative Injection Center Community in the waste-free program, the Beta Bersih Community in the mass community service action "Kupang Bersih, Indah dan Asri (Kupang Bersinar)" (Clean, Beautiful and Lovely Kupang), and the Sahabat Lingkungan Community in the Waste Awareness Campaign. Then there is the Mutiara Timor Waste Bank, which plays a very important role in educating and managing plastic waste through the concept of a circular economy. This Waste Bank has collaborated with 37 agencies, including the Kupang City Government, and has managed around 800 tons of waste over a period of 5 years and has educated nearly 10,000 people.

Then, from the NGO sector, the NTT Regional National Bank Association is also committed to supporting waste management by donating 50 trash bins to the Kupang City Government (Perbanas, 2025), as well as from the private sector, namely PT Pertamina Patra Niaga through the Kampung Berseri CSR program. This activity was demonstrated through the handover of Hoist Crance equipment and occupational safety and health (K3) training for sanitation workers. This shows that participation does not always take the form of direct involvement in policy, but also through the provision of resources, technology, and capacity building (Prokopim Kota Kupang, 2025).

Overall, the participation of non-governmental actors in Kupang City has developed quite dynamically. The involvement of environmental communities, non-governmental organizations, academics, and the private sector demonstrates the existence of multi-stakeholder collaboration in waste management. The aspect of participation in waste management in Kupang City has developed quantitatively, as indicated by the large number of actors involved. However, qualitatively, this participation has not been fully integrated into the policy decision-making system. Therefore, strengthening participation in the future needs to be directed towards more structured, inclusive, and sustainable collaboration mechanisms so that the contributions of various actors can be optimized in realizing effective and equitable waste management in accordance with the environmental governance framework by Bennett (2018).

### **Fair Aspect**

The fairness aspect in the principle of equitable environmental governance refers to justice in the distribution of benefits, burdens, and environmental risks caused by waste management policies. In

Bennett's (2018) framework, fairness is not only interpreted as formal equality, but also as substantive justice that takes into account differences in the social, economic, and geographical conditions of communities. Thus, fair waste management requires that no particular group or region bear a disproportionate environmental burden.

In accordance with Kupang City Regulation Number 3 of 2011 concerning the Management of Household Waste and Household-like Waste, the Kupang City Government has the duty and responsibility to facilitate the provision of waste management infrastructure and facilities. In waste management, particularly the implementation of a waste sorting system from households using three types of waste bins, the government provides 40 waste collection points (TPS) for 51 subdistricts, which will later be increased so that each sub-district has one TPS. The city government also distributes 1,300 large plastic containers to the neighborhood association (RT) level, of which 200 units are available with the support of the community and business actors. From the RT level, waste is disposed of at the TPS at the urban village level and then transported by the Kupang City Government through the Environment and Sanitation Agency using arm roll trucks to the Integrated Waste Processing Site (TPST) at the sub-district level to be processed into maggots and compost from organic waste and into bricks, plastic pellets, and alternative fuels from inorganic waste.

In reality, equitable waste management services in Kupang City have not been fully realized. This is reflected in the uneven distribution of waste services, particularly in terms of TPS availability. There are still subdistricts in Kupang City that do not have a TPS. The following is data on the number of TPS in Kupang City:

**Table 5.** Number of TPS in Kupang City in 2025

No	District	Neighborhood	Type S Number of TPS	
			Permanent	Container
1	Alak	Alak	10	1
		Manulai II	0	0
		Penkase Oeleta	0	0
		Namosain	4	1
		Nunbaun Sabu	1	1
		Nunbaun Dhela	1	0
		Nunhila	3	1
		Fatufeto	3	0
		Mantasi	1	0
		Manutapen	1	0
		Batuplat	0	0
		Naioni	0	0
		2.	Old Town	Tears
Solor	0			0
Bonipoi	2			2
Tode Kisar	9			0
Merdeka	3			7
Oeba	3			4
Fatubesi	1			0
Long Sand	4			20
Nefonaek	0			2

		Lai-lai Bisi Kopan	0	0
	Kota Raja	Fontein	1	17
		Kuanino	7	5
		Nunleu	4	7
		Air Nona	1	6
		Naikoten I	8	19
		Naikoten II	2	27
		Bakunase I	0	0
		Bakunase II	0	0
4.	Oebobo	Oebobo	7	10
		Oetete	10	14
		Fatululi	5	0
		White Wood	1	38
		Red Leaf Tuak	3	11
		Oebufu	2	0
		Liliba	3	2
5.	Kelapa Lima	Kelapa Lima	16	88
		Oesapa	1	1
		South Oesapa	2	0
		West Oesapa	1	3
		Lasiana	0	0
6.	Maulafa	Penfui	6	9
		Kolhua	5	0
		Bello	0	2
		Fatukoa	0	0
		Oepura	0	1
		Maulafa	0	0
		Sikumana	0	0
		Naimata	0	0
		Naikolan	2	0
	Total		139	306

Source: Kupang City Environment and Sanitation Agency (2025)

Based on the table above, the number of waste collection points in Kupang City consists of 139 permanent waste collection points and 306 container waste collection points spread across six subdistricts. The data shows that the provision of waste facilities is not evenly distributed in Kupang City. The districts of Kelapa Lima and Kota Raja are areas with a relatively high number of TPS. This condition indicates that these areas are priorities for the provision of TPS due to factors such as population density, economic activity, or high volume of waste. Conversely, a number of villages in the subdistricts of Alak, Maulafa, and Kota Lama have no TPS at all, either permanent or container, such as Manulai II, Penkase Oeleta, Batuplat, Naioni, Solor, Lai-lai Bisi Kopan, Bakunase I and II, as well as several villages in Maulafa such as Maulafa, Sikumana, and Naimata. The unavailability of TPS in these areas has the potential to force the community to dispose of waste in an unmanaged manner, which ultimately increases the risk of environmental pollution and health hazards.

In addition to the availability of TPS, the waste transportation services provided by the Kupang City Government still do not cover all areas in Kupang City, especially in the suburbs. There are several TPS that are not included in the transportation route, for example, the TPS in Naimata Village (Koran Timor, 2026). This condition has forced the community of Naimata Village to look for unsuitable disposal sites, which has the potential to cause environmental hygiene and health problems. According to the Head of Waste Management, Mr. Meksy Pingak, the factors causing the area to be bypassed by waste collection trucks are difficult road access and the limited quantity and physical condition of the fleet itself, which is starting to deteriorate. The Kupang City Government has 43 dump trucks, of which only 28 are in good working condition, while the rest are severely damaged. There are 12 arm roll trucks, of which 10 are in good working condition.

This data shows that the operational capacity of the waste management fleet is significantly below the ideal requirement to cover all 51 subdistricts in Kupang City. The gap between service requirements and operational capacity has a direct impact on the regularity of waste collection, especially in areas with narrow access roads or inadequate infrastructure. Efforts are needed to improve the fleet, increase regional accessibility, and develop more adaptive service planning to achieve fair, inclusive, and sustainable waste management.

### **Just Aspect**

Justice or recognition of rights emphasizes the existence of laws and policies that protect the rights and property of the community, guarantee equal access to permits, and provide defense mechanisms for the community when they experience environmental impacts or injustices. In waste management in Kupang City, this aspect affects the community's right to a clean and healthy environment.

Normatively, the Kupang City Government has a legal basis and policy that regulates waste management and the role of the community in it, namely Regional Regulation Number 3 of 2011 concerning the Management of Household Waste and Household-like Waste. The existence of this regulation is an initial instrument in guaranteeing the protection of the community's rights to obtain waste services and avoid harmful environmental impacts. In addition, the community is also given the right to participate in the planning, implementation, and supervision of waste management. Furthermore, policies that enable community involvement in activities such as waste banks and community-based programs reflect efforts to provide relatively equal access without burdensome licensing fees.

In its implementation, the aspect of justice has not been fully realized optimally. Although the community is given space to convey their aspirations and complaints through socialization, surveys, and dialogue forums, the mechanism for defending against the impact of waste has not been effective. Communities living around TPS or areas not served by transport fleets still bear the environmental burden of waste accumulation and unpleasant odors, without any mechanism for compensation or quick and fair handling. According to the Acting Head of Alak Village, Mr. Yohanes

B. Dami, SH, who was interviewed on Monday, January 26, 2026, there is no adequate mechanism to protect the community living around the Alak landfill. The existence of a landfill as a public facility should be accompanied by clear protection policies for residents in the surrounding area who are directly affected by waste management activities. There are also many people who work collecting plastic waste at the Alak landfill to exchange for cash. They enter the landfill without any protective equipment. This activity is very risky because people are potentially exposed to hazardous waste, methane gas, pungent odors, and the risk of accidents caused by heavy equipment and landslides. The situation is exacerbated by the fact that the Alak landfill has repeatedly caught fire

from 2022 to 2024, either due to methane gas accumulation or suboptimal waste management (Timex Kupang, 2025).

On the other hand, the results of the study also show that protection for waste transporters has been relatively fulfilled, particularly in the provision of personal protective equipment (PPE) such as gloves, boots, safety vests, and masks. The fulfillment of PPE reflects the government's efforts to ensure the safety and health of waste transporters as part of the formal worker group in the waste management system.

From an environmental governance perspective, particularly the principle of equity in terms of justice, this has begun to be applied to waste collectors who are part of the local government institutional structure. However, serious issues remain regarding the protection of communities living near landfills. This situation shows that although landfills exist for the purpose of public service, the environmental burden and health risks are disproportionately borne by the surrounding communities. The absence of protection mechanisms, such as the provision of personal protective equipment (PPE), regulation of scavenger activities, and health insurance, indicates that substantive justice has not been realized. Affected communities do not have adequate access to defend their rights to a safe and healthy environment.

## **Discussion**

The findings of this study demonstrate that waste management governance in Kupang City reflects early progress toward equity-based environmental governance, yet significant gaps remain in translating equity principles into fully institutionalized governance practices. These findings can be interpreted through the broader literature on environmental governance, participatory governance, and environmental justice.

One of the central findings of this research is the growing recognition of multiple stakeholders in waste governance, including informal waste pickers, local communities, private actors, and educational institutions. This aligns with the recognition dimension of environmental governance, which emphasizes the importance of acknowledging diverse knowledge systems, social identities, and vulnerability in environmental decision-making (Bennett S Satterfield, 2018; Fraser, 2009). Recognition is widely considered a foundational step toward equitable governance because marginalized groups are frequently excluded from environmental policymaking despite being disproportionately affected by environmental risks (Schlosberg, 2007). The involvement of community organizations and informal waste workers in Kupang therefore indicates a gradual shift from technocratic governance toward more socially inclusive approaches.

However, this recognition has not yet been fully translated into meaningful participation in policy formulation and evaluation. The findings show that participation remains concentrated at the implementation stage, particularly in community clean-up programs and awareness campaigns. This pattern is consistent with Arnstein's (1969) classic ladder of citizen participation, which explains how many participatory initiatives remain at the level of tokenism rather than genuine power-sharing. Similar findings have been reported in studies of participatory governance in developing cities, where participation often functions as consultation rather than co-decision making (Newig S Fritsch, 2009; Fung, 2015). This suggests that participatory mechanisms in Kupang are still evolving and require stronger institutionalization to move toward collaborative governance and co-production.

The study also reveals persistent inequalities in the distribution of waste management services, particularly in suburban and coastal areas. Limited access to temporary waste storage sites

and waste transportation services reflects spatial inequality in public service provision. Urban environmental governance literature consistently shows that waste management services in developing cities tend to be concentrated in central areas while peripheral communities experience service gaps (Wilson et al., 2015; Guerrero et al., 2013). These findings confirm that environmental governance challenges are closely intertwined with broader issues of urban inequality and infrastructure disparities.

Another important finding concerns environmental justice, particularly the disproportionate burden experienced by communities living near the Alak landfill. Residents in this area face long-term exposure to environmental and health risks without adequate protection mechanisms. This reflects a classic environmental justice issue in which marginalized communities bear the environmental costs of urban development (Bullard, 2000; Walker, 2012). Previous research shows that landfill sites are frequently located near low-income or politically marginalized communities, reinforcing patterns of environmental inequality (Mohai, Pellow, S Roberts, 2009). The Kupang case therefore provides further empirical evidence of this global phenomenon.

Despite these challenges, the research also highlights promising multi-actor collaborations that contribute to more inclusive governance. The involvement of universities, environmental communities, and the private sector demonstrates the emergence of a penta-helix governance model in waste management. Collaborative governance has been widely recognized as a key driver of sustainable urban environmental management because complex environmental problems require cross-sector partnerships and shared responsibility (Ansell S Gash, 2008; Emerson S Nabatchi, 2015). The Kupang experience suggests that strengthening these collaborative networks could significantly enhance institutional capacity and innovation in waste management.

Overall, this study contributes to the literature on environmental governance by providing empirical evidence from a secondary Indonesian city, a context that remains underrepresented in global scholarship. While many studies focus on large metropolitan areas, research increasingly calls for greater attention to medium-sized cities in the Global South, where governance capacity and resource constraints differ significantly from megacities (Parnell S Oldfield, 2014; UN-Habitat, 2020). The findings therefore expand the geographical scope of environmental governance research and provide insights into how equity principles can be operationalized in similar urban contexts.

## **Conclusion**

This study demonstrates that the implementation of equity in waste management governance in Kupang City has begun to emerge but remains uneven and incomplete. The findings show that the local government has initiated inclusive efforts by involving multiple stakeholders, including community groups, educational institutions, private actors, and informal waste workers. However, participation is still largely concentrated at the implementation stage and has not yet been fully integrated into policy planning and evaluation. Significant disparities persist in the distribution of waste management services, particularly in suburban areas with limited access to infrastructure and transportation. In addition, communities living near the Alak landfill continue to face disproportionate environmental and health risks, indicating ongoing challenges in achieving environmental justice.

This research contributes to the literature on environmental governance by providing empirical evidence on how equity principles operate in urban waste management in a secondary city context in the Global South. The study highlights the importance of recognition, participation, fairness, and justice as interconnected dimensions of equitable governance. It also demonstrates the potential of multi-actor collaboration in strengthening waste management systems through

community initiatives, academic involvement, and private sector support. These findings offer practical insights for policymakers seeking to develop more inclusive and sustainable environmental governance frameworks in rapidly growing urban areas.

This study has several limitations. The research focuses specifically on the equity dimension of environmental governance in waste management, while the other key principles of environmental governance such as effective, responsive, and robust have not yet been explored. As a result, the analysis provides only a partial understanding of the overall environmental governance framework in Kupang City. Future research is therefore encouraged to examine these remaining dimensions to develop a more comprehensive understanding of environmental governance in urban waste management.

### **Declaration of Competing Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### **Acknowledgment**

We would like to express our gratitude to the Graduate Program in Government Science, Faculty of Social and Political Sciences, Universitas Padjadjaran, Indonesia, for the academic guidance and support. Our sincere thanks also go to Universitas Padjadjaran for its institutional support, which made it possible to complete this research and prepare it for publication.

### **Use of Artificial Intelligence (AI)-Assisted Technology**

The authors declare that no artificial intelligence (AI) tools were used in the preparation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

### **References**

- Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, 18(4), 543–571. <https://doi.org/10.1093/jopart/mum032>
- Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, 35(4), 216–224. <https://doi.org/10.1080/01944366908977225>
- Azizy, A. Q. A. (2007). *Change management in bureaucratic reform*. Gramedia Pustaka Utama.
- Bennett, N. J., & Satterfield, T. (2018). Environmental governance: A practical framework to guide design, evaluation, and analysis. *Conservation Letters*, 11(6), e12600. <https://doi.org/10.1111/conl.12600>
- Bullard, R. D. (2000). *Dumping in Dixie: Race, class, and environmental quality* (3rd ed.). Westview Press.
- Central Statistics Agency. (2025). *Population growth rate (percent), 2025*. Statistics Indonesia. <https://www.bps.go.id/id/statistics-table/2/MTk3NiMy/laju-pertumbuhan-penduduk.html>

- Central Statistics Agency. (2025). *Population of Kupang City*. Statistics Indonesia. <https://kupangkota.bps.go.id/id/statistics-table/2/Mjg5Izl=/jumlah-penduduk.html>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Detik Indonesia. (2024). *Alak Kupang landfill burns again, residents block road access*. Detik. <https://www.detik.com/bali/berita/d-7442131/tpa-alak-kupang-kembali-terbakar-warga-tutup-akses-jalan>
- Emerson, K., & Nabatchi, T. (2015). *Collaborative governance regimes*. Georgetown University Press.
- Fraser, N. (2009). *Scales of justice: Reimagining political space in a globalizing world*. Columbia University Press.
- Fung, A. (2015). Putting the public back into governance: The challenges of citizen participation and its future. *Public Administration Review*, 75(4), 513–522. <https://doi.org/10.1111/puar.12361>
- Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste Management*, 33(1), 220–232. <https://doi.org/10.1016/j.wasman.2012.09.008>
- Keluli, Y. F. L., Djani, W., & Pradana, I. P. Y. B. (2025). Pentahelix collaboration in waste management: A case study of the role of government, academia, business, community, and media in Kupang City. *Journal of Public Administration Science AsIAN (Association of Public Administration Scientists)*, 13(1), 29–49.
- Kompas Indonesia. (2024). *Tourist beach in Kupang City polluted by piles of waste*. Kompas Indonesia. <https://www.kompas.id/artikel/pantai-wisata-di-kota-kupang-tercemar-tumpukan-sampah>
- Koran Timor. (2026). *GMNI Kupang holds hearing with Mayor, highlights waste management in Naimata subdistrict*. Koran Timor. <https://www.korantimor.com/kota-kupang/1547045819/gmni-kupang-audiensi-dengan-wali-kota-soroti-pengelolaan-sampah-di-kelurahan-naimata>
- Kupang City Government. (2011). *Kupang City Regulation Number 03 of 2011 concerning the management of household waste and similar waste*.
- Kupang City Government. (2011). *Kupang City Regulation No. 04 of 2011 concerning the management of household waste reduction and similar household waste*.
- Kupang City Government. (2019). *Kupang Mayor Regulation No. 19 of 2019 on the policy and strategy of Kupang City in the management of household waste and household-like waste*.
- Merdeka.com. (2025). *Viral video of trash scattered on the highway, NTT deputy governor-elect immediately 'tags' Kupang City Government on social media*. Merdeka. <https://www.merdeka.com/peristiwa/viral-video-sampah-berserakan-di-jalan-raya-wakil-gubernur-ntt-terpilih-langsung-colek-pemkot-kupang-di-medsos-274631-mvk.html?page=2>
- Ministry of Environment. (2025). *End open dumping of waste, build a harmonious civilization with the environment, nature, and culture*. <https://www.kemenlh.go.id/news/detail/akhiri-open-dumping-sampah-bangun-peradaban-harmonis-dengan-lingkungan-alam-dan-budaya>

- Ministry of Environment. (2025). *Waste generation data in Indonesia*. National Waste Management Information System. <https://sipsn.kemenvh.go.id/sipsn/public/data/timbulan>
- Mohai, P., Pellow, D., & Roberts, J. T. (2009). Environmental justice. *Annual Review of Environment and Resources*, 34, 405–430. <https://doi.org/10.1146/annurev-environ-082508-094348>
- Moleong, L. J. (2002). *Qualitative research methods*. Remaja Rosdakarya.
- National Bank Association. (2025). *From city streets to residents' hands: When trash bins become a symbol of collaboration in PERBANAS' green initiative in Kupang for a cleaner future*. Perbanas. <https://perbanas.org/publikasi/berita-perbanas/dari-jalan-kota-ke-tangan-warga-ketika-tempat-sampah-jadi-simbol-kolaborasi-inisiatif-hijau-perbanas-di-kupang-untuk-masa-depan-yang-lebih-bersih>
- Ndoloe, A. J. A., & Jamaruddin, J. (2024). *Implementation of policies on the management of household waste and household-like waste in Kupang City, East Nusa Tenggara Province* [Doctoral dissertation, Institut Pemerintahan Dalam Negeri].
- Newig, J., & Fritsch, O. (2009). Environmental governance: Participatory, multi-level – and effective? *Environmental Policy and Governance*, 19(3), 197–214. <https://doi.org/10.1002/eet.509>
- Nusa Cendana University. (2025). *Kupang waste emergency: Undana students hold policy dialogue, push for holistic solutions*. Undana. <https://undana.ac.id/2025/kupang-darurat-sampah-mahasiswa-undana-gelar-dialog-kebijakan-dorong-solusi-holistik/>
- Nusa Cendana University. (2025). *Survey report on community satisfaction with waste management in Kupang City*. FISIP Undana.
- Parnell, S., & Oldfield, S. (Eds.). (2014). *The Routledge handbook on cities of the Global South*. Routledge. <https://doi.org/10.4324/9780203387832>
- Pos Kupang. (2025). *Garbage in Namosain Alak Village rarely collected, Achmad Likur: Garbage trucks severely damaged*. Pos Kupang. <https://kupang.tribunnews.com/2025/03/05/sampah-di-kelurahan-namosain-alak-jarang-terangkut-achmad-likur-mobil-pengangkut-rusak-berat>
- Prastyo, A. B. (2021). Environmental protection and management models in realizing good governance. *Sasi*, 27(1), 85–92. <https://doi.org/10.47268/sasi.v27i1.385>
- Protocol & Communication Office of the Mayor of Kupang. (2025). *Deputy Mayor appreciates Pertamina's support in waste management at Bank Mutiara Timor*. Kupang City Public Relations Office. <https://prokopim.kupangkota.go.id/site-berita/read/83-wawali-apresiasi-dukungan-pertamina-dalam-pengelolaan-sampah-bank-mutiara-timor>
- Protocol & Communication Office of the Mayor of Kupang. (2025). *Mayor of Kupang presents roadmap for integrated waste management and motivation for young people at the 7th National Science and Technology Seminar*. Prokopim Kota Kupang. <https://prokopim.kupangkota.go.id/site-berita/read/39-wali-kota-kupang-paparkan-roadmap-pengelolaan-sampah-terpadu-dan-motivasi-generasi-muda-di-seminar-nasional-sainstek-vii>
- Putri, C. A., & Eprilianto, D. F. (2022). Application of good environmental governance principles in green open space management in the Gresik Regency Government. *Publika*, 695–710. <https://doi.org/10.26740/publika.v10n3.p695-710>

- Radio Republik Indonesia. (2025). *Public awareness key to overcoming waste in Kupang City*. RRI. <https://rri.co.id/kupang/daerah/1571576/kesadaran-masyarakat-kunci-atasi-sampah-kota-kupang>
- Rusadi, S., Mulyawan, R., Suwaryo, U., & Yuningsih, N. Y. (2024). Implementing good environmental governance to manage coastal abrasion in Bengkalis Regency, Indonesia. *Journal of Sustainable Development & Planning*, 19(5), 1911–1919. <https://doi.org/10.18280/ijstdp.190529>
- Schlosberg, D. (2007). *Defining environmental justice: Theories, movements, and nature*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199286294.001.0001>
- Timex Kupang. (2024). *TDM Village faces serious waste problems*. Timex Kupang. <https://timexkupang.fajar.co.id/2024/06/26/kelurahan-tdm-hadapi-masalah-serius-sampah/>
- Timex Kupang. (2025). *The phenomenon of burning waste at the Alak Landfill and the city government's promise to the community*. Timex Kupang. <https://timexkupang.fajar.co.id/2025/01/31/fenomena-terbakarnya-sampah-di-tpa-alak-dan-janji-pemkot-bagi-masyarakat/>
- UN-Habitat. (2020). *Waste wise cities tool: Step-by-step guide to assess municipal solid waste management performance through SDG 11.6.1 monitoring*. United Nations Human Settlements Programme.
- Wilson, D. C., Rodic, L., Modak, P., Soos, R., Carpintero, A., Velis, C., Iyer, M., & Simonett, O. (2015). *Global waste management outlook*. United Nations Environment Programme.
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.

#### Authors Bio\*

**Muhammad Rifki Rosman** (MRR) is a Researcher in the Department of Government Science Universitas Padjadjaran, Indonesia. His research interests include Public Policy, Government Science and Social Equity. Email: [muhammad24318@mail.unpad.ac.id](mailto:muhammad24318@mail.unpad.ac.id). (<https://orcid.org/0009-0008-1085-8947>)

**Rahman Mulyawan** (RM) is an Associate Professor in the Department of Government Science Universitas Padjadjaran, Indonesia. His research interests include Government Systems, Governance and Regional Finance. Email: [rahman.mulyawan@unpad.ac.id](mailto:rahman.mulyawan@unpad.ac.id). (<https://orcid.org/0000-0002-5253-6734>)

**Neneng Yani Yuningsih** (NYY) is a Lecturer in the Department of Government Science Universitas Padjadjaran, Indonesia. Her research interests include Local and Village Government Politics, Public Administration and Public Policy. Email: [neneng.yani@unpad.ac.id](mailto:neneng.yani@unpad.ac.id). (<https://orcid.org/0000-0002-2789-1929>)