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**Socio-Ecological Justice in Waste Governance: Community Resilience in Peri-Urban Piyungan, Yogyakarta**

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***Abstract:*** *This study explores the socio-ecological injustices embedded in urban waste governance, focusing on the overburdened Piyungan Final Disposal Site (TPA) in Special Region Yogyakarta, Indonesia. Despite the official declaration of the facility's overcapacity in 2024, it persists in operating under emergency conditions in 2025, exerting a disproportionate impact on nearby peri-urban communities. The present study employs a socio-ecological justice theoretical framework that emphasizes distributive, procedural, and recognitional dimensions to explore the exacerbation of spatial inequalities by policy failures, governance dissonance, and lack of public participation. The study utilizes qualitative methodologies, encompassing document analysis, media reports, and secondary interviews, to elucidate systemic exclusion of affected residents from decision-making processes and the absence of sustained compensatory mechanisms. Concurrently, the research identifies bottom-up resilience strategies, including citizen-formed waste cooperatives and media-based advocacy. The findings indicate that sustainable urban development in the Global South cannot rely solely on technocratic or green branding initiatives. Rather, it must address more profound political and ethical questions concerning environmental justice, recognition, and community agency. This paper calls for a paradigm shift toward inclusive governance that repositions peri-urban citizens as co-architects of equitable waste management.*

***Keywords;*** *Socio-ecological justice; urban waste governance; Piyungan landfill; environmental inequality; community resilience.*

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**INTRODUCTION**

Urban waste management has come to the fore as a critical governance challenge for rapidly urbanizing regions in the Global South. In Indonesia, issues concerning waste management have been intricately intertwined with the expansion of urban areas, institutional inefficiencies, and environmental degradation. A particularly salient example of this crisis is the case of the Piyungan Landfill in Special Region Yogyakarta. Officially closed in 2024 due to overcapacity, the Piyungan landfill continues to operate under emergency status until 2025, thereby exposing the vulnerabilities in the social and ecological fabric of urban life in the region [1].

Waste is not merely a technical issue; rather, it is indicative of systemic inequalities and deficiencies in urban governance. The Piyungan landfill, which was originally designed to accommodate waste from three administrative areas (Yogyakarta City, Sleman Regency,

and Bantul Regency), has long exceeded its carrying capacity. The accumulation of more than 700 tons of waste per day without systemic intervention has resulted in overflowing piles of waste, the release of toxic gases, and damage to the surrounding ecosystem. The case under consideration is of particular significance insofar as it demonstrates a disproportionate burden on communities residing in peri-urban areas in the vicinity of the disposal site. These communities are exposed to significant health risks, water contamination, and social stigmatization, while concurrently being marginalized in mainstream environmental policy discourse [2] .

This study posits that the waste crisis in Piyungan must be understood through the lens of socio-ecological justice. This concept establishes a nexus between the distributional, procedural, and recognition dimensions of justice, particularly within the context of environmental burdens. From this vantage point, the communities surrounding the Piyungan landfill are not merely passive recipients of inadequate waste management practices; rather, they are marginalized actors within a system that systematically externalizes the burden of urban waste to politically vulnerable and geographically marginalized groups. Their experiences reflect underlying structural patterns, wherein social and ecological damage accumulates in areas characterized by limited political access and infrastructure.

Moreover, this crisis must be situated within the global framework of urban development and environmental governance. In recent years, Yogyakarta has been frequently lauded as a leader in the development of sustainable urban areas, with a focus on the promotion of green infrastructure, digital tourism, and ecocultural innovation. These aspirations are heavily influenced by global sustainability discourses, including frameworks such as the Sustainable Development Goals (SDGs), UN-Habitat's New Urban Agenda, and various transnational environmental partnerships. However, an analysis of the situation on the ground reveals a paradox: while the city center pursues a "green" agenda, waste management in the suburbs remains archaic, exploitative, and unfair. The discrepancy between the established norm of commitment and its practical implementation signifies governance dissonance, a phenomenon in which the policy discourse deviates from the actual experiences of the community[3] .

A salient aspect of this discordance pertains to the procedural exclusion of local community participation in decision-making processes pertaining to waste management. The planning and management of the Piyungan landfill has been carried out in a top-down manner, with low levels of transparency and weak community participation. Nevertheless, it is imperative to acknowledge that they constitute the demographic most profoundly impacted. The community has minimal involvement in determining the future of the landfill, its operational standards, or the form of environmental compensation it should receive. This practice stands in direct opposition to the fundamental tenets of environmental democracy and perpetuates patterns of ecological injustice that engender socio-spatial inequality.

Notwithstanding, the community surrounding the Piyungan landfill has exhibited noteworthy social resilience. Through grassroots mobilization, informal advocacy, and internal solidarity networks, they have developed a variety of adaptive strategies to survive the crisis. In response, community groups have established autonomous sanitation patrols, informal waste sorting cooperatives, and public protests to exert pressure on the local government. Despite frequently encountering limitations in resources and experiencing fragmentation, these endeavors exemplify the capacity of marginalized groups to establish collective agency in the face of structural neglect. This dynamic merits further scrutiny, both to document the forms of social resilience and to critique the systemic conditions that necessitate such resilience.

From a relational international relations perspective, the Piyungan case also reflects how the global economy of waste and transnational environmental norms intersect with local governance practices. Indonesia is a participant in numerous international environmental agreements and has obtained technical and financial support for its waste management initiatives through bilateral and multilateral collaboration. For instance, the Japan International Cooperation Agency (JICA) has provided assistance in the realm of sanitation planning in urban areas of Java. Nevertheless, a considerable implementation gap persists. One potential explanation for this phenomenon is the incongruity between the technical models that are imported and the local socio-political contexts in which they are implemented. The Piyungan case demonstrates that external frameworks frequently neglect to address local vulnerabilities, thereby underscoring the imperative for a governance approach that is just, contextual, and participatory [4].

The crisis has given rise to discourse surrounding the commodification and politicization of urban sustainability. In the context of cities vying for international investment, the "green" image has emerged as a strategic marketing instrument. However, this image frequently obscures the disparate distribution of environmental burdens. Peripheral areas such as Piyungan are often designated as sacrifice zones, wherein the ecological integrity of the city center is prioritized over the needs of these peripheral regions. This process is analogous to critiques of eco-modernism and sustainable urbanism, wherein sustainability is constrained to technical indicators such as reduced carbon emissions, while disregarding aspects of social equity and people's political voice.

In academic discourse, the concept of social-ecological justice is increasingly employed as a corrective to the ambiguity present in sustainable development discourse. This concept presents a significant challenge to academics and policymakers, compelling them to analyze the distribution of environmental damage, the actors involved in environmental governance, and the recognition or disregard of their voices. In the context of waste management, this approach underscores not only technical efficiency, but also ethical and political dimensions: who benefits from the existing system? It is imperative to ascertain the entity that assumes the financial burden of these expenditures. Which historical and structural factors have given rise to these conditions? The present study is concerned with these questions.

Consequently, the present study aims to address several knowledge gaps in the extant literature. First, it presents a contextual analysis of how ecological injustice is experienced and addressed by affected communities in Yogyakarta. Secondly, it situates these experiences within the broader framework of urban governance discourses and transnational norms, thereby unveiling the intricate interplay between local conditions and global pressures. Thirdly, the concept of community resilience is not presented as a romantic narrative, but rather as a lens for examining state accountability and policy failure. This study makes a significant contribution to the interdisciplinary discourse on environmental justice, urban resilience, and governance ethics in the Global South.

To guide this study, the researcher formulated the following main question: The objective of this study is to examine how the prevailing waste governance structure in Yogyakarta engenders and perpetuates socio-ecological injustice, with a particular focus on the Piyungan landfill crisis.

### ****RESEARCH METHODOLOGY****

This study adopts a qualitative descriptive-analytical approach to examine the governance of urban waste from the perspective of socio-ecological justice. The method is appropriate for capturing complex social dynamics and the lived experiences of marginalized communities. Data collection relies on secondary sources, including government reports, academic literature, and media publications. The analysis employs content and thematic techniques, guided by the three pillars of justice: distributive, procedural, and recognitional. In addition, the study is informed by insights from collaborative leadership theory, emphasizing the importance of inclusive, multi-actor engagement in addressing governance challenges. To enhance the study’s validity, source triangulation is applied by cross-examining policy documents, scholarly interpretations, and media narratives [5] .

**RESULTS, DISCUSSION, AND ANALYSIS**

**Social-Ecological Justice Theory and Urban Waste Governance**

In contemporary environmental studies, social-ecological justice has emerged as a seminal theoretical framework for understanding the nexus between environmental degradation and social inequality. This framework underscores the intertwined nature of these issues, demonstrating how environmental degradation impacts physical ecosystems and, in turn, fosters and perpetuates social inequalities. This concept underscores the necessity to assess sustainability beyond the confines of technical efficiency or emission reductions, emphasizing an examination through fundamental questions: who shouldered the ecological burden? Who was included in the decision-making process? And who was legitimately recognized in governance processes? The aforementioned three inquiries constitute the foundational principles of the "just sustainabilities" approach, as pioneered by Agyeman, Bullard, and Evans [6].

**Figure 1.** Conceptual framework of socio-ecological justice in urban waste governance.



*Source: Author’s illustration based on Agyeman et al.*

In this approach, social-ecological justice consists of three fundamental pillars: distributive justice, procedural justice, and recognition justice. Distributive justice underscores the tendency for environmental burdens, including but not limited to pollution, odor, and health risks, to be concentrated in marginalized areas inhabited by groups with limited bargaining power. Procedural justice is concerned with the rights of communities to be involved in decision-making. In contrast, recognition justice is concerned with the importance of recognizing social groups that have been historically marginalized from public participation spaces. These three dimensions are of particular pertinence in evaluating the structural implementation of the urban waste management system, including in Yogyakarta.

The principles of social-ecological justice have indeed been emphasized in international documents, including the New Urban Agenda from UN-Habitat and the 2030 Agenda for Sustainable Development [7]. The two frameworks under consideration both emphasize the need for inclusive, participatory, and equitable urban governance for all citizens. However, in local practice, the implementation of these principles often encounters challenges related to technocratic and exclusive governance. This phenomenon is exemplified by the management of the Piyungan TPA, where the residents who are in closest proximity to the impacted area are not granted the opportunity to determine the fate of their environment.

Cornea's research demonstrates the pivotal role of the informal sector in waste management in Global South cities, despite its lack of legal recognition. A similar phenomenon occurs in the vicinity of the Piyungan landfill, where communities establish cooperatives, waste banks, and other local initiatives, yet are not formally recognized as part of the official system. These practices exemplify a manifestation of community resilience that is compelled to manifest due to the absence of the state in its capacity to serve as a guardian of its citizens' fundamental ecological rights[8].

Moreover, the political ecology approach proposed by Loftus posits that waste management is never neutral; rather, it is a domain of conflict between the state, the private sector, and civil society. The strategic placement of landfills, the imposition of restrictions on access to information, and the disregard of citizen protests are all manifestations of domination in the governance of space and resources. Within the context of Piyungan, the decision to extend the operational life of the landfill without open public consultation is indicative of systemic procedural inequality[8].

Moore advances the concept of Piyungan as an exemplar of the geography of disposability, a social construct wherein specific areas are deemed deserving of sacrifice to uphold the aesthetic standards and cleanliness of the city center. This signifies that the right to a healthy, clean, and dignified environment is inextricably linked to the prevention of waste disposal in the area. The social stigma against residents living in proximity to landfills, who are often stigmatized as part of the city's "problems," illuminates the symbolic violence that accompanies ecological violence.

This condition is exacerbated by governance dissonance, defined as an imbalance between narrative and practice. City administrations frequently adopt slogans such as "green city" or "smart city" to meet global sustainability standards, yet continue to neglect social sustainability in peripheral regions. Policies that appear inclusive in rhetoric are a reinforcement of exclusion when not accompanied by changes in power structures and real participatory mechanisms[9] .

To that end, a paradigm shift is imperative from technocratic waste management to justice-based governance. This transformation entails more than merely embracing novel technological advancements or augmenting budgetary capacities; it signifies a paradigm shift in our understanding of citizens. Rather than perceiving them as passive recipients, we now acknowledge them as proactive agents in shaping the future of their environment. The legitimacy of policies is contingent upon the procedural and substantive recognition of communities.

By establishing socio-ecological justice as a fundamental principle, the management of waste evolves from a mere matter of waste control to a means for fostering more equitable, humane, and genuinely sustainable urban environments. In the context of Piyungan Landfill, this necessitates the dismantling of closed decision-making systems, the recognition of community contributions, and the equitable distribution of environmental burdens and benefits among all city residents[9].

**Case Study of Piyungan Landfill and Peri-Urban Community Resilience**

The Piyungan Final Disposal Site (TPA) in Bantul Regency, Special Region of Yogyakarta, has been a pivotal site in the dynamics of urban waste management in Yogyakarta for more than two decades. The TPA was initially opened in 1995 to accommodate domestic waste from three administrative areas: Yogyakarta City, Sleman, and Bantul. It was designed with a limited operational period, which was supposed to end in 2015. Nevertheless, the facility will continue to operate as the primary disposal site until 2025, despite having reached its technical maximum capacity on several occasions [10].

The ongoing extension of emergency functions without a permanent solution has led to systemic failures in long-term planning, as evidenced by the case of Piyungan TPA. The Yogyakarta Special Region Government has indeed issued various official statements regarding capacity restrictions; however, the pressure from the increasing volume of waste reaching more than 700 tons per day is not balanced by an integrated processing system or diversification of disposal locations. The descriptive data summarized in Table 1 demonstrates the intricacy of the socio-ecological crisis in this region, encompassing overcapacity, substantial environmental impacts, and community responses that are dichotomous, with active resistance and economic dependence on the same system. This table underscores the necessity to comprehend the issues at the Piyungan TPA not merely as technical problems, but as manifestations of broader socio-economic and political factors, including spatial inequality, governance issues, and the systematic marginalization of community perspectives [9].

Table 1. Descriptive Conditions of TPA Piyungan

|  |  |
| --- | --- |
| **Aspect** | **Description** |
| Location | Kalurahan Sitimulyo, Bantul, DIY |
| Year of Establishment | 1995 (designed to close by 2015, still operating) |
| Service Area | Yogyakarta City, Sleman, Bantul |
| Daily Waste Volume | ±700 tons/day |
| Operational Condition | Emergency zone in effect, overcapacity |
| Environmental Impact | Odor, ISPA, groundwater pollution |
| Community Response | Road blockades, protests, media advocacy |
| Compensation Scheme | Temporary aid, unsystematic support |
| Public Participation | One-sided socialization, lack of dialogue |
| Community Initiatives | Waste banks, citizen patrols, and local media activism |

Source: Author's compilation based on references.

The Piyungan TPA is geographically classified as a peri-urban area, signifying a transitional zone between rural and urban regions. In many cases, areas like this tend to experience overlapping land use, weak environmental legal protection, and are vulnerable to externalization of the impacts of urban development. The residents of Sitimulyo Village and the surrounding area confront a series of challenges, including the presence of accumulating waste, deteriorating air quality, diminishing land economic value, and limited access to environmental amenities. In this context, ecological inequality manifests in a tangible and observable manner[11].

The pervasive odors of methane gas, the rising incidence of acute respiratory infections and skin diseases, and the contamination of groundwater are not merely incidental to the concept of a "green city." The DIY government itself acknowledges that the operational impact of the TPA has surpassed the limits of community tolerance. A multitude of grievances have been lodged, including through persistent demonstrations by residents over the past two years. In February 2025, residents once again impeded the entry of garbage trucks, thereby expressing their disapproval of the TPA's operations. This action was perceived as a manifestation of the residents' discontent with the perceived lack of transparency and the perceived detrimental impact of the TPA's operations [11].

However, these acts of resistance are predicated on a vulnerability that is intricately intertwined with the economic dependence of the community on the existence of the TPA. As demonstrated in the research conducted by Riyadi and Murtiningsih, a subset of residents derives income from activities associated with the operation of the TPA. These activities include scavenging, guarding the gates, and conducting small business operations in the surrounding area. This predicament gives rise to a multifaceted sense of ambivalence, as residents simultaneously voice concerns regarding pollution and health concerns while concurrently maintaining their economic dependence on activities associated with the TPA. This suggests that the peri-urban community is not a homogeneous entity that collectively rejects the presence of the TPA. Rather, it is a social entity with internal dynamics influenced by uneven economic and social structures[12].

Community resilience in this context is defined not solely by the capacity to endure passively but rather by the community's mobilization of local knowledge, social solidarity, and informal initiatives in response to the ongoing crisis. As Hapsari explains, forms of local adaptation, including the establishment of community-based waste banks, odor monitoring by citizen groups, and the use of social media as an advocacy tool, demonstrate that socio-ecological resilience does not result from state intervention, but rather from the urgent need to protect fundamental rights to a decent living environment[12].

Local governments are subject to dual pressures. On the one hand, they are obligated to adhere to national and international sustainability targets as outlined in the 2030 SDGs and domestic waste management commitments. Conversely, they are compelled to address the concerns of local communities, who perceive that their interests are being compromised for the sake of a green city image. However, the government's response has been more administrative and short-term, such as opening new emergency cells or adding heavy equipment units. However, there is a paucity of strategic initiatives that genuinely engage residents in the redesign of the waste management system in its entirety[13].

Furthermore, claims of public participation frequently articulated by the government are often not aligned with established practices in the field. Program socialization is carried out unilaterally, failing to address substantive concerns from residents regarding land status, health risks, and the future of the area. The absence of a substantial consultation process underscores the deficiencies in the procedural justice dimension of environmental governance at the Piyungan TPA. Indeed, within the framework of socio-ecological justice, citizen involvement in the planning and decision-making process is a fundamental principle that cannot be negotiated.

The absence of structured, long-term compensation also serves to reinforce feelings of exclusion. The provision of assistance, including the distribution of masks and the implementation of complementary health assessments, is characterized by its transient and sporadic nature. In numerous countries, the establishment of landfill facilities is often accompanied by community-benefit agreements that ensure access to fundamental social services, local infrastructure investment, or economic empowerment of residents. In Piyungan, this approach has not been implemented systematically, and it manifests only in the form of CSR activities that are not integrated with governance policies[14]

This study demonstrates that the issue of the Piyungan Landfill extends beyond the realm of waste as a physical entity, encompassing the distribution of social burdens, risks, and power in shaping environmental policy. When the narrative of a green city is prioritized for international branding, yet the concerns of affected residents are overlooked, this can lead to governance fragmentation that disregards the principle of justice. A comprehensive transformation in the decision-making system is imperative, encompassing the recognition of informal contributions by residents, the establishment of a platform for two-way dialogue, and the implementation of a community-based compensation mechanism. Such changes will not only increase the legitimacy of public policy, but also become the foundation for truly inclusive and sustainable city development.

**Environmental Inequality, Power, and Socio-Ecological Justice**

A discussion of the Piyungan landfill case reveals that issues of waste management in urban areas of the Global South are inextricably linked to questions of power, access, and structural inequality. The technical approach that has dominated the policy narrative has proven incapable of addressing the complexity of social and ecological realities on the ground. In the context of socio-ecological justice, the mere projection of waste reduction targets or infrastructure expansion is insufficient. Of greater fundamental importance is the question of who is affected, who is involved, and who benefits from the existing system[13].

The observed inequality in Piyungan mirrors a broader pattern wherein ecological burdens are transferred to peripheral areas that are politically weak and economically dependent. The residents of Sitimulyo are not only the recipients of the impacts, but are also excluded from the decision-making processes that determine the future of their community. This disparity is characterized by multiple dimensions: distributional, involving concerns regarding pollution and health risks; procedural, involving a lack of involvement in policy development; and symbolic, involving a lack of recognition as legitimate stakeholders. This perspective aligns with the observations of Moore and Loftus, who have previously critiqued the rationale underpinning urban expansion, particularly regarding the establishment of "sacrifice zones" in the pursuit of enhancing the aesthetic sustainability and efficiency of the central metropolitan area.

Moreover, the analysis demonstrates that the governance dissonance that emerges between formal policies and socio-ecological practices is not solely attributable to technical deficiencies. Instead, it is also indicative of an absence of a justice orientation in governance. Local governments often adopt a normative response, characterized by the use of sustainability-related language, yet they fail to implement the necessary institutional transformations that would enable significant citizen participation. Practices such as one-way socialization, symbolic compensation, and a security approach to citizen protests have been demonstrated to actually strengthen community distrust of the state.

In this regard, it is imperative to acknowledge that sustainability encompasses more than mere indicators of carbon emissions or the technical efficiency of waste transportation systems. It is essential that sustainability be viewed through the lens of social sustainability, particularly in communities that are disproportionately impacted by ecological concerns. When the concept of sustainability is dissociated from the tenets of justice, the pursuit of green development often devolves into an aesthetic exercise devoid of substantive content. Piyungan exemplifies the potential pitfalls of the green city narrative, highlighting the possibility of such narratives becoming instruments of exclusion when citizens lack agency over their living environment.

A salient lesson from this case is the imperative to establish a more relational form of governance, characterized by a paradigm shift from perceiving citizens as mere administrative entities to acknowledging them as subjects endowed with experiential knowledge and legitimate interests. Strategies that integrate technical and social approaches hold considerable promise for enhancing equitable and sustainable governance. Illustrative of such strategies are community-based waste management initiatives supported by affirmative policies and citizen rights protection frameworks.

Of particular significance is the necessity to translate socio-ecological justice into concrete policies that regulate the relationship between the urban center and its periphery. This includes the redistribution of environmental burdens, the establishment of long-term compensation systems, the strengthening of local capacity, and the reforming of the participation process so that it is not merely ceremonial. Local governments must allocate space for representatives of affected communities on environmental planning boards and establish citizen-based impact monitoring systems.

This discussion underscores the necessity for a novel paradigm in policy formulation to address the environmental crisis in urban areas, such as Yogyakarta. The prevailing development paradigm, which is oriented towards output and global indicators, must give way to a new paradigm that prioritizes the recognition, distribution, and participation of grassroots communities as the primary pillars of sustainability. It is imperative to acknowledge that in order to confront the prevailing environmental crisis in urban areas, such as Yogyakarta, a novel paradigm is requisite in the formulation of policies. The prevailing development paradigm, which is oriented exclusively towards output and global indicators, must be replaced with a new paradigm that prioritizes the recognition, distribution, and participation of grassroots communities as the fundamental pillars of sustainability[13].

**CONCLUSION AND RECOMMENDATIONS**

The results of the Piyungan landfill case study demonstrate that the management of urban waste in Global South countries, particularly in Indonesia, is inextricably linked to issues of justice, power distribution, and community engagement. Government policies, which often prioritize technical aspects such as overcapacity, have neglected to address underlying systemic issues including socio-ecological injustice, procedural exclusion, and symbolic marginalization. In the context of Sitimulyo Village, peri-urban communities continue to experience a disproportionate environmental burden. However, these communities do not have meaningful involvement in the planning and decision-making processes.

The primary strength of this study lies in its capacity to establish a nexus between the theoretical framework of socio-ecological justice and the empirical conditions that prevail in the field. It further illustrates how these abstract concepts are transformed into the daily lived experiences of affected communities. This study underscores the significance of community resilience capacity as a domain for innovation and resistance. However, the study's limitations must be acknowledged. Primarily, it relies on secondary data, excluding the potential for direct observation or in-depth interviews. Subsequent research endeavors may employ participatory methodologies and ethnographic approaches to more thoroughly explore the social and political dynamics involved.

Therefore, it is recommended that the urban environmental governance framework be reformulated by integrating the voices of citizens not only as beneficiaries, but also as partners in policy formulation. The development of institutional mechanisms, such as community-benefit agreements, environmental complaint platforms, and citizen-based monitoring bodies, is imperative. It is imperative to recognize that enhancing the efficacy, democratic nature, and social justice of the waste management system is contingent upon the adoption of a participatory and justice-oriented approach.

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