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STRENGTHENING LOCAL WASTE GOVERNANCE IN INDONESIA: PARTICIPATORY APPROACHES, INSTITUTIONAL DYNAMICS, AND ETHICAL INTEGRATION

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Abstract

Plastic waste, with its wide-ranging implications, has become a critical concern in both environmental governance and public health, particularly in Indonesia. The problem is exacerbated by inadequate infrastructure, fragmented legal and institutional arrangements, and limited public awareness. This study explores how participatory governance, institutional reform, and the integration of ethical principles can enhance plastic waste management at the local level. Employing a qualitative approach, the study draws insights from in-depth interviews, document analysis, and field observations of community-based initiatives in urban areas. The findings indicate that strategies such as waste banks, Islamic-based environmental education, and public private partnerships have contributed to increased community participation and measurable waste reduction. Supporting factors include a clear legal framework, decentralized policy implementation, and collaboration with non-governmental actors. Nevertheless, persistent challenges such as infrastructural deficiencies, cultural resistance, and institutional constraints continue to hinder progress. By aligning formal policy instruments with local ethical norms and everyday practices, this study offers a context-sensitive approach to sustainable waste governance, which is particularly relevant for developing regions.

Keywords: Participatory Governance; Plastic Waste; Environmental Ethics; Waste Banks; Decentralized Policy; Stakeholder Engagement; Sustainable Development.

INTRODUCTION

Indonesia is currently facing an increasingly severe plastic waste crisis that affects not only urban areas but also rural regions. As the second-largest contributor of plastic waste to the oceans globally, Indonesia generates approximately 20.5 million tons of plastic waste annually, with an estimated 1.2 million tons entering marine environments each year (Wibowo et al., 2021; Maruf, 2019; Apriadi et al., 2024). The impacts are far-reaching, threatening marine ecosystems, disrupting biodiversity, and introducing microplastics into the human food chain, which over time poses serious risks to public health (Rahmawati et al., 2023; Hantoro et al., 2019). These conditions are further aggravated by weak infrastructure and ineffective enforcement of environmental regulations (Abdelkarim & Hafez, 2023). Overall, plastic waste management has not yet received adequate policy attention, a situation that is likely to exacerbate environmental degradation and social vulnerability.

Rapid urbanization has also altered consumption patterns, particularly in Southeast Asia, thereby intensifying waste generation, especially plastic waste. Cities now produce significantly higher volumes of municipal solid waste than in previous decades (Kurniawan et al., 2022; Rahman et al., 2020). Conventional solutions, such as reliance on landfills, have proven insufficient, while alternative approaches, including waste-to-energy technologies, must be carefully adapted to local conditions to ensure their effectiveness and sustainability (Tun et al., 2020; Hoang & Fogarassy, 2020; Ismail et al., 2020; Arfanuzzaman & Dahiya, 2019). As a result, plastic waste management can no longer be addressed through traditional perspectives alone; the adoption of new technologies must be closely aligned with the specific socio-economic and institutional contexts of each region.

This study focuses on the misalignment between Indonesia's national waste management policies and their implementation at the local level. Despite the existence of regulatory frameworks such as Law No. 18/2008 and Presidential Regulation No. 97/2017, policy outcomes have fallen well below expectations. This gap is largely attributable to low levels of public participation, weak coordination among stakeholders, and overlapping institutional mandates (Hardi et al., 2024; Putra & Phahlevy, 2021; Elizabeth et al., 2025; Latanna et al., 2023).

To address these shortcomings, this research explores a holistic approach that combines participatory governance with local policy innovation. Waste management, as conceptualized in this study, is not merely a policy issue but a shared responsibility between government and society. Community-based models such as waste banks and Islamic eco-pesantren initiatives illustrate how environmental management can be grounded in ethical and cultural values (Wijsen, 2023; Anam & Siwiendrayanti, 2023). In this sense, waste management constitutes a collective obligation borne jointly by public institutions and local communities.

Empirical evidence from local programs, such as the Kang Pisman initiative in Bandung, demonstrates how behavior change campaigns can improve efficiency in waste management practices (Sumaryana et al., 2025). At the same time, Islamic teachings have been mobilized to foster environmental awareness at the community level (Nisa & Surtikanti, 2024; Saleh et al., 2024; Alamsyah et al., 2017). Nevertheless, these promising initiatives continue to face challenges related to scalability and institutionalization (Sukoco et al., 2024; Wirawan et al., 2025). Valuebased waste management approaches are increasingly introduced through bottom-up processes, predominantly initiated by local communities.

What remains insufficiently explored in the existing literature is the interaction between formal governance structures and informal, community-based practices, particularly in terms of how ethical norms shape compliance and behavior within a multicultural context such as Indonesia (Baker, 2024; Muhtar et al., 2024). This study addresses this gap by examining how legal frameworks, grassroots initiatives, and ethical values interact to improve policy outcomes.

Conducted in Bone Regency, this research tests an innovative governance model and offers practical insights as well as a conceptual framework for integrating formal and informal governance mechanisms. The main hypothesis advanced is that synergy between legal mandates and local norms leads to higher levels of participation and more robust policy outcomes.

LITERATUR REVIEW

Sustainable plastic waste management is supported by a growing body of literature that emphasizes participatory governance, stakeholder integration, and

frameworks that combine environmental ethics with governance practices. This literature converges on the view that effective waste governance requires more than infrastructure or regulatory instruments alone. Instead, it highlights the importance of community engagement, institutional reform, and value-oriented leadership in shaping sustainable outcomes.

Participatory approaches constitute a central theme in the literature on waste management. As noted by Wibowo et al. (2021) and Sahide et al. (2021), waste management cannot be separated from the involvement of local actors, including residents, community groups, and civil society organizations. Such inclusive models challenge state-centered approaches and promote shared ownership of environmental outcomes. In Indonesia, this shift is reflected in the emergence of “waste-aware communities” and local waste banks, where residents actively sort and manage waste through financial and environmental incentives (Hardi et al., 2024; Auliani et al., 2024). These grassroots movements have increasingly attracted academic attention, transforming local practices into scholarly discussions and contributing new empirical knowledge to the field.

Stakeholder coordination remains a persistent issue in the literature on waste governance. Fragmentation among institutions and overlapping mandates often constrain policy effectiveness. Pranyoto et al. (2024) argue that achieving policy coherence requires a multilevel governance model in which coordination among central, provincial, and municipal authorities becomes routine rather than reactive. Similarly, Elizabeth et al. (2025) emphasize the role of performance-based incentives and inter-institutional networks in ensuring that decentralization does not weaken accountability. Coordination across institutions and governance levels must therefore remain anchored to the primary objective of effective waste management policy implementation.

Another important strand of the literature highlights the growing influence of ethical and religious narratives in shaping environmental behavior. Islam, as practiced in many regions of Indonesia, has increasingly been mobilized to promote responsible environmental management. Islamic boarding schools (*pesantren*) and faith-based organizations integrate environmental ethics into educational practices and daily routines (Nazar et al., 2024; Nisa & Surtikanti, 2024). These initiatives offer

governance models in which values are not merely complementary elements but constitute the core foundation of environmental governance.

Educational and awareness campaigns also feature prominently in the literature. Public figures, media actors, and religious leaders are actively engaged to encourage behavioral change related to waste management (Shen et al., 2020; Wang & Lin, 2023). Workshops, counseling activities, and school-based programs have played a significant role in promoting the principles of reduce, reuse, and recycle, while strengthening a sense of shared responsibility among communities (Hasibuan & Salsabila, 2022; Khotimah et al., 2023). Participation is therefore recognized as a key component of waste governance, with all segments of society expected to be actively involved through diverse and context-appropriate methods.

Finally, the literature on institutional innovation suggests that the most sustainable progress occurs when legal frameworks actively support grassroots initiatives. Laws such as the Environmental Protection and Management Act (2009) provide a platform for participatory governance, but their effectiveness depends on supporting local regulations, enforcement mechanisms, and political commitment (Yustitiantingtyas et al., 2025; Musiana et al., 2024). Public–private partnerships and environmental non-governmental organizations further contribute by mobilizing resources and bridging gaps between policy design and practical implementation (Afful et al., 2023; Saragih et al., 2023). Such collaboration requires a clear legal foundation to facilitate coordination and prevent overlapping authorities.

Overall, the literature underscores that waste governance is not merely a technical challenge. It represents a deeply social and moral endeavor that requires cross-sectoral collaboration and the integration of values into policy frameworks. These insights inform the methodological and analytical choices of this study, which seeks to examine how such principles are applied in real governance contexts within Indonesian cities, with particular attention to the research setting of Bone Regency.

METHODOLOGY

This study adopts a qualitative research design to examine how participatory and ethicsbased approaches shape waste governance practices in an Indonesian regency, namely Bone Regency. The focus is not limited to institutional actions alone,

but also extends to how communities engage with governance processes, including the ways in which policies are interpreted, implemented, and adapted by actors at the local level.

Data collection was conducted through a combination of in-depth interviews, field observations, and document analysis. Interviews were carried out with key stakeholders, including local government officials, community leaders, religious educators, and representatives of nongovernmental organizations (Hardi et al., 2024; Nazar et al., 2024; Saragih et al., 2023). These interactions provided insights into the motivations, constraints, and innovations underlying local waste management programs. Observations of waste sorting facilities, educational campaigns, and pesantren-based environmental activities helped link empirical data to everyday practices on the ground. Supporting documents, such as policy reports, program manuals, and legal texts, were also analyzed to trace the formal frameworks shaping local governance arrangements (Yustitiningtyas et al., 2025; Musiana et al., 2024).

To ensure analytical depth and reflexivity, the study employed purposive sampling, selecting participants based on their relevance and contributions to waste-related activities (Khotimah et al., 2023; Afful et al., 2023). Methodological triangulation across data sources and methods was applied to enhance the credibility and richness of the findings.

Data were analyzed thematically through a coding process that moved from descriptive patterns to interpretative categories. The analysis was guided by the study's core questions: how legal, institutional, and cultural elements interact in shaping waste governance; what factors facilitate or constrain participation at the local level; and how ethical frameworks, whether religious or otherwise, influence waste-related behavior (Baker, 2024; Muhtar et al., 2024; Nisa & Surtikanti, 2024).

This methodological approach recognizes that waste governance is not solely a matter of efficiency or policy compliance, but also involves relationships, values, and lived experiences. Accordingly, the research design seeks to capture both the structural and human dimensions of environmental governance in Indonesia, with particular emphasis on the local context of Bone Regency.

RESULTS

Implemented Strategies

This study identifies a range of community-level and institutional strategies that have been effectively implemented to improve waste governance. These strategies, which emphasize education, participatory mechanisms, and infrastructural support, collectively contribute to the development of more sustainable waste management practices.

Education constitutes a foundational pillar in promoting sustainable waste sorting behavior. A substantial body of literature highlights the effectiveness of awareness campaigns, delivered through both traditional and digital media, in enhancing public understanding of environmental policies and encouraging broader community participation (Shi, 2023; Yan et al., 2021; Liu et al., 2022). The involvement of public figures and local leaders has facilitated the normalization of environmentally responsible practices by embedding them into everyday social life (Shen et al., 2020; Wang & Lin, 2023). Interactive educational initiatives, such as workshops and household-level counseling, have proven particularly effective in empowering residents to adopt the principles of reduce, reuse, and recycle (Hasibuan & Salsabila, 2022; Khotimah et al., 2023). These efforts align with Tuanaya's (2024) argument that sustainable urban transformation is grounded in the co-production of knowledge and practices between citizens and local governments.

From an infrastructural perspective, community-based models, particularly the integration of waste banks and 3R facilities (temporary facilities for reducing, reusing, and recycling waste), have emerged as critical components of waste management systems. In addition to reducing reliance on landfills, these facilities provide economic incentives that strengthen community participation (Mensah, 2023; Pusung et al., 2019; Auliani et al., 2024). Waste banks have increasingly functioned as hubs for environmental education, facilitating grassroots collaboration and knowledge exchange (Suwerda et al., 2018; Brasika et al., 2022). Similarly, the operational effectiveness of 3R facilities is positively associated with improved waste sorting practices and reduced volumes of waste disposal (Royhan et al., 2023; Saleh & Sururi, 2024). The long-term sustainability of these infrastructural models is closely linked to levels of community

knowledge and prevailing attitudes toward waste management practices (Yasri & Sidabutar, 2024).

Innovations in organic waste management provide further evidence of community-driven sustainability efforts. One prominent example is the cultivation of Black Soldier Fly larvae for maggot farming. This technique has been shown to reduce organic waste by more than 80 percent while generating valuable by-products such as compost and animal feed (Mkilima, 2022; Rosdiana, 2024; Rehman et al., 2022). However, the effectiveness of this system depends on adequate infrastructure, environmental control, and increased public awareness (Nurkhin et al., 2024; Triani et al., 2024). When properly implemented, such initiatives reflect the principles of a circular economy and offer viable pathways for reducing the environmental impact of organic waste through reuse, recycling, composting, and its utilization as industrial raw material.

At the institutional level, a series of legal and policy innovations have strengthened the governance framework for waste management. Decentralized environmental policies, as stipulated in the Environmental Protection and Management Act (2009) and subsequent local regulations, have reinforced participatory governance mechanisms at the grassroots level (Yustitiningtyas et al., 2025). An expanding body of research also highlights the role of pesantren, or Islamic boarding schools, in fostering environmentally conscious behavior. These institutions operate as moral exemplars by embedding environmental ethics into education and extending their influence through community outreach and educational activities (Nazar et al., 2024). Such bottom-up initiatives align with broader multilevel governance frameworks that emphasize institutional capacity and synergistic relationships among stakeholders in addressing complex environmental challenges (Pranyoto et al., 2024).

Accordingly, one of the key leading sectors in waste governance is the education sector. Pesantren, which primarily function as religious educational institutions, also play a strategic role in translating religious teachings into everyday practice, including the preservation of environmental sustainability through innovative and sustainable waste management activities.

Supporting Factors

This section outlines the key enabling conditions that facilitate the effective implementation of waste governance, with particular attention to legal, institutional, collaborative, and community-based dimensions that contribute to an environment conducive to sustainable outcomes.

A strong legal foundation is widely recognized as a primary pillar of effective waste governance. Comprehensive local regulations that clearly define stakeholder responsibilities and integrate sustainability principles provide a critical framework for participatory and accountable governance structures (Musiana et al., 2024; Tembani et al., 2022). When legal frameworks are aligned with broader sustainability agendas, such as the Sustainable Development Goals (SDGs), they help ensure policy coherence and sustained commitment to long-term environmental objectives (Zaman, 2022; Hoareau et al., 2021). However, as emphasized by Lissah et al. (2021), the mere existence of regulatory instruments is insufficient. Their effectiveness depends heavily on enforcement mechanisms and the institutional capacity of local authorities to implement them. Clear legal frameworks must therefore be accompanied by consistent application in practice to ensure compliance across all stakeholders.

Collaborative governance arrangements, particularly public–private partnerships, offer significant potential for strengthening waste management systems by leveraging private sector advantages such as technical expertise, operational efficiency, and financial resources, while regulatory oversight remains the responsibility of the public sector. Empirical evidence from Ghana, Cambodia, and Sri Lanka demonstrates how such partnerships have improved service delivery, enhanced operational outcomes, and increased community participation in waste-related programs (Afful et al., 2023; Hettiarachchi et al., 2021; Spoann et al., 2019). Nevertheless, as noted by Ferronato and Torretta (2019) and Ogutu et al. (2020), the success of these collaborations depends on goal alignment, clearly defined roles, and enforceable contractual mechanisms. International cooperation may further strengthen local efforts through capacity-building support, although it often introduces additional layers of coordination and accountability complexity.

The emergence of environmental non-governmental organizations as influential stakeholders has also shaped the contemporary landscape of waste governance. These

organizations contribute to mobilizing community participation, disseminating environmental education, shaping policy discourse, and implementing community-based innovations. By bridging gaps between citizens and formal institutions, environmental non-governmental organizations promote more inclusive and responsive governance processes (Saragih et al., 2023; Saputra et al., 2025). Notable examples include the Healing Himalayas initiative and grassroots campaigns in Bangladesh, both of which underscore the importance of community trust and institutional collaboration in scaling decentralized environmental initiatives (Roy et al., 2024; Shahan, 2024).

Effective inter-institutional coordination and the development of governance networks are likewise essential for achieving coherence across sectors and governance levels. Strong vertical and horizontal coordination mechanisms help minimize duplication, optimize resource allocation, and promote policy integration. Huang et al. (2017) highlight the value of collaborative platforms and integrated data systems in enhancing transparency and harmonization among stakeholders. Governance networks also contribute to building adaptive capacity and empowering stakeholders through dialogue, shared learning, and trust (Yang, 2024; Bixler et al., 2016). Despite these benefits, challenges persist, particularly in formalizing inter-agency roles and ensuring equitable distribution of responsibilities and resources. Institutional conflicts and accountability gaps may arise in the absence of clear governance arrangements, as documented by Li and Jing (2021) and Wang et al. (2023).

Taken together, these enabling conditions legal resilience, collaborative partnerships, community participation, and inter-institutional coordination constitute the structural backbone of sustainable waste governance. Their effectiveness is determined not only by policy design, but also by implementation quality, inclusiveness, and the capacity to adapt to evolving environmental and social dynamics.

Inhibiting Factors

Despite notable progress, waste management continues to face persistent challenges that undermine its overall effectiveness. These constraining factors, ranging from socio-cultural resistance and inadequate infrastructure to institutional fragmentation and gaps in policy implementation, pose significant barriers to achieving long-term sustainability.

Socio-cultural dynamics remain a major obstacle to meaningful community participation in waste management. The widespread perception that waste management is solely the responsibility of government authorities contributes to low levels of public engagement (Gunasiri & Senadheera, 2019). Deeply embedded traditional norms, household practices, and limited environmental awareness further hinder active participation in waste sorting and recycling initiatives (Muheirwe et al., 2023; Amasuomo et al., 2015). In addition, cultural beliefs often shape attitudes toward waste in ways that discourage the adoption of sustainable behaviors (Assuah, 2023; Khosravani et al., 2023). In response to these challenges, scholars have advocated for aligning waste management strategies with local cultural contexts and strengthening civic education as a means of fostering behavioral transformation (Amalia, 2019; Mamun et al., 2022). Infrastructure limitations constitute another critical constraint. Many local governments operate with outdated or insufficient waste collection systems, limited recycling capacity, and inadequate waste separation facilities (Jadhav, 2015; Kareem et al., 2024). In areas where landfills or transfer stations are poorly managed or entirely absent, informal waste disposal practices become widespread, increasing environmental degradation and public health risks (Issahaku et al., 2025). Addressing these challenges requires a holistic approach that integrates infrastructure improvements with investments in technical training, regulatory alignment, and community engagement (Onwuzulike & Ezeodili, 2024; Tristianoka et al., 2024).

Institutional and financial constraints further exacerbate these conditions. Local environmental agencies often operate with limited budgets and insufficient technical capacity, constraining their ability to enforce and monitor effective waste management mechanisms (Ding et al., 2022; Liu et al., 2021). Compounding these challenges, competing priorities between economic development and environmental protection at the local government level frequently result in policy stagnation or selective enforcement (Deng et al., 2019). The continued reliance on outdated technologies and fragmented administrative arrangements also weakens inter-agency coordination and accountability (Inman et al., 2021).

Although decentralization is often promoted as a pathway toward more responsive and context-sensitive governance, it can also trigger institutional fragmentation and weakened oversight. Studies have documented the prevalence of

symbolic policy implementation and uneven law enforcement within decentralized governance structures (Zhang et al., 2022; Chu et al., 2022). In the absence of strong institutional frameworks, robust monitoring systems, and adequate fiscal incentives, decentralization may reinforce inequalities and impede progress toward sustainability objectives (Fajri & Munawaroh, 2023; Cai & Guo, 2023).

These findings highlight the complex interaction between grassroots innovation and structural constraints within the context of local environmental governance. While communitybased initiatives and cross-sectoral partnerships offer promising avenues for reform, they must be supported by deliberate efforts to address persistent socio-cultural, infrastructural, and institutional barriers. Ensuring inclusive, resilient, and effective waste governance in Indonesia, as well as in comparable contexts globally, will require sustained commitment to integrated policy frameworks, community empowerment, and institutional capacity building.

DISCUSSION

Although this study identifies many promising strategies, it also reveals persistent challenges that continue to constrain waste management in Indonesia. These challenges are not limited to infrastructural or policy deficiencies alone; they are deeply embedded in social norms, institutional dynamics, and uneven patterns of implementation. Addressing such complexities requires a more nuanced and community-oriented approach to environmental governance.

One of the primary barriers identified is socio-cultural resistance. In many communities, waste is still perceived as an issue to be managed solely by government authorities. This perception, also noted by Gunasiri and Senadheera (2019), reinforces public apathy and inhibits community-led action. Traditional habits, limited environmental awareness, and the absence of participatory routines further weaken efforts to build collective responsibility (Muheirwe et al., 2023; Amasuomo et al., 2015). As suggested by Assuah (2023) and Khosravani et al. (2023), cultural beliefs significantly shape public attitudes toward waste, influencing whether individuals engage in or withdraw from sustainable behaviors. Consequently, environmental campaigns must be context-sensitive, aligned with local values, and supported by

strong civic education to encourage behavioral change (Amalia, 2019; Mamun et al., 2022).

This discussion also highlights how infrastructural gaps remain a serious constraint. Local governments continue to face shortcomings in basic services such as waste collection, recycling facilities, and household-level waste separation systems (Jadhav, 2015; Kareem et al., 2024). In some areas, unmanaged waste ends up in open dumping sites, increasing environmental and public health risks (Issahaku et al., 2025). Physical infrastructure alone, however, is insufficient. Successful waste governance depends equally on technical training, clear policy direction, and sustained community cooperation (Onwuzulike & Ezeodili, 2024; Tristianoka et al., 2024).

Institutional and financial limitations represent another pressing challenge. Local environmental agencies often operate with limited budgets, outdated equipment, and inadequate capacity, constraining their ability to enforce and monitor effective waste management systems (Ding et al., 2022; Liu et al., 2021). Policy objectives frequently clash with short-term economic interests, resulting in inconsistent enforcement and low levels of accountability (Deng et al., 2019). The persistence of outdated monitoring systems and fragmented decision-making processes, as identified by Inman et al. (2021), further restricts innovation and responsiveness at the local level. Decentralization, while intended to bring governance closer to communities, may also generate fragmentation if not supported by strong institutions. The literature documents instances of symbolic policy implementation, where regulations exist on paper but are not followed by meaningful action (Zhang et al., 2022; Chu et al., 2022). Such gaps reflect broader governance challenges, including weak coordination, limited monitoring capacity, and misaligned incentives. For decentralization to function effectively in practice, it must be supported by transparent local institutions, clear performance metrics, and fiscal instruments that encourage sustainable outcomes (Fajri & Munawaroh, 2023; Cai & Guo, 2023).

Overall, these findings suggest that while grassroots innovation plays an important role, scaling such efforts requires more than simple model replication. It demands deliberate efforts to embed environmental values within public consciousness, strengthen institutional cohesion, and ensure that governance structures are inclusive

and adaptive. This discussion reinforces the view that waste governance is not merely a technical endeavor, but a relational, ethical, and highly contextual process.

CONCLUSION

This study affirms that waste management in Indonesia constitutes a challenge that is equally human, technical, and legal in nature. Through the lenses of community participation, local innovation, and ethical integration, the findings present a compelling picture of what can be achieved when formal institutions and informal actors work collaboratively. Whether through waste banks, maggot cultivation, or faith-based environmental education, community-driven initiatives demonstrate that sustainable practices can emerge from the bottom up, provided they are supported by enabling legislation, responsive institutions, and shared values.

The success of these efforts, however, cannot be separated from the conditions that support or constrain them. Persistent challenges, including infrastructural deficiencies, cultural resistance, and fragmented institutions, continue to impede progress. Legal frameworks and decentralization policies offer an important foundation, but they must be accompanied by consistent implementation, cross-sectoral collaboration, and inclusive governance mechanisms.

Importantly, this study highlights that environmental ethics, rooted in cultural or religious traditions, can serve as powerful instruments for behavioral change. In contexts where top-down regulation alone may be insufficient, locally grounded, value-based practices often play a critical role in fostering participation and resilience. These insights are particularly relevant for developing regions, where institutional limitations frequently coexist with strong communal identities.

Looking ahead, a more integrated approach is essential, one that bridges policy and practice, formal and informal systems, as well as structural and cultural strategies. From this perspective, waste governance is not merely about managing materials, but also about cultivating trust, responsibility, and shared purpose among citizens, institutions, and leaders.

The Indonesian case offers a valuable lesson: when communities are empowered, and when their knowledge, ethics, and creativity are recognized, pathways

toward sustainability become not only more effective, but also more equitable, inclusive, and enduring.

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