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Legal Framework Model for Sustainable Solid Waste Management in Indonesia: A Contemporary Environmental *Fiqh* Perspective

Abstract: Indonesia faces a severe solid waste crisis, with more than 60 million tons generated annually. Weak law enforcement and insufficient fiscal support—regional budget allocations averaging only 0.6–1% of APBD, far below the 3% benchmark—have further exacerbated the problem. This study aims to develop an integrative legal framework for sustainable waste management that harmonises national environmental law with contemporary Islamic environmental jurisprudence (*fiqh al-bi'ah*). Methodologically, the research employs a systematic review and doctrinal–normative analysis. Data were collected and classified from national statutes, government regulations, regional bylaws, and peer-reviewed literature, as well as case studies from Surabaya, Banyumas, and DKI Jakarta. These materials were then analysed through the lens of *uṣūl al-fiqh* and *qawā'id fiqhiyyah*, including the maxims *lā ḍarar wa lā ḍirār*, *maṣlaḥah 'āmmah*, *ḥifẓ al-bi'ah*, and the principle of *istikhlāf*. The findings reveal three critical gaps. First, underfunding hinders early-warning systems and sustainable infrastructure. Second, the absence of faith-based fiscal tools—such as Green Zakat and Eco-Waqf—limits financing capacity and raises questions of compatibility with APBN/APBD structures and formal zakat institutions. Third, regulatory disharmony between central and regional authorities undermines effective coordination. This study proposes a holistic model that mandates a minimum 3% APBD allocation, institutionalises Islamic green finance mechanisms, and scales up municipal innovations such as Surabaya's community-based 3R programs. It also highlights the socio-political dynamics affecting the acceptance of religiously informed legal frameworks. The novelty of this research lies in embedding *fiqh al-bi'ah* into positive law and policy instruments, offering a faith-grounded yet implementable roadmap for Indonesia's sustainable waste governance.

Keywords: *Fiqh Al-Bi'ah*, Environmental Law, Islamic Green Finance, Waste Governance.

INTRODUCTION

Solid waste management has emerged as one of the most pressing ecological challenges in Indonesia. Rapid population growth, urbanisation, and increasingly consumptive lifestyles have caused annual waste generation to exceed 60 million tons, with household waste as the largest contributor.¹ However, only a small proportion of this waste is recycled or reused, while the majority is disposed of through environmentally unsound practices such as open dumping and burning.² This situation not only accelerates environmental degradation but also raises serious public health and disaster risks,³ particularly in densely populated metropolitan areas such as Jakarta, Surabaya, and Bandung.⁴

To overcome these problems, the Indonesian government has initiated various policies and regulations.⁵ The main legal basis for waste management is Law Number 18 of 2008 concerning Waste Management, which emphasises the importance of waste reduction strategies from the source, the implementation of an integrated approach through the 3R principle (reduce, reuse, recycle), and collaboration of all elements of society. As a follow-up, various derivative legal instruments have also been prepared, such as Government Regulation Number 81 of 2012 and regional regulations concerning waste management. However, the implementation of these regulations in the field has not shown optimal effectiveness.⁶

¹ Kementerian Lingkungan Hidup dan Kehutanan, "Sistem Informasi Pengelolaan Sampah Nasional (SIPSN).," <https://sipsn.menlhk.go.id>, 2023.

² Hanim Kamaruddin, Maskun, Farida Patittingi, Hasbi Assidiq, Siti Nurhaliza Bachril, dan Nurul Habib Al Mukarramah, "Legal Aspect of Plastic Waste Management in Indonesia and Malaysia: Addressing Marine Plastic Debris," *Jurnal Sustainability* 14, no. 2 (2022): 6985, <https://doi.org/10.3390/su14126985>.

³ Mulyadi, T. & Putra, R. S., "Studi tentang Pengelolaan Sampah di Kota-kota Besar Indonesia," *Jurnal Lingkungan dan Kesehatan*. 3, no. 25 (2020): 178-191.

⁴ Khasanah, L., & Widyastuti, D, "Pengelolaan Sampah di Kota Surabaya: Antara Kebijakan dan Implementasi.," *Jurnal Perkotaan dan Lingkungan* 14, no. 2 (2020): 195-210.

⁵ Putra, "Upaya pemerintah dalam menangani masalah pengelolaan sampah di perkotaan," *Detik.com*, 2020.

⁶ "Peraturan Pemerintah Republik Indonesia Nomor 81 Tahun 2012 tentang Pengelolaan Sampah Rumah Tangga dan Sampah Sejenis Sampah Rumah Tangga." (2012).

Some fundamental factors that hinder the effectiveness of waste management in Indonesia include: weak law enforcement, overlapping regulations between institutions, minimal synergy between the central and regional governments, and limited financial resources and supporting infrastructure. In addition, the level of public and business awareness of the urgency of sustainable waste management still needs to be improved. The paradigm that places waste management as the exclusive responsibility of the government, rather than the collective responsibility of all stakeholders, is also a significant challenge.

Several studies have shown that the environmental legal system in Indonesia is still dominated by a fragmentary sectoral approach, thus weakening the effectiveness of inter-institutional coordination in waste management. Therefore, it is necessary to emphasise the integration of cross-sectoral policies in waste management,⁷ especially in the context of fulfilling public health norms and marine conservation. This shows that waste management is not only a domestic issue, but is also related to Indonesia's international commitment to global environmental protection.

Facing the complexity of these problems, a legal framework model is needed that is not only normative but also able to answer the challenges of implementation in concrete terms. The proposed legal framework model must be integrative, with a clear division of roles for each stakeholder (government, private sector, and community), strengthening of law enforcement mechanisms, and development of an incentive system for entities that carry out innovative and environmentally friendly waste management.⁸ Furthermore, the legal framework must have the flexibility to adapt to the dynamics of technological developments, local socio-cultural contexts, and contribute positively to the achievement of the Sustainable Development Goals (SDGs), especially goal 11 (sustainable cities and settlements) and goal 12 (responsible consumption and production patterns).

⁷ Maskun, Hanim Kamaruddin, Farida Patittingi, Hasbi Assidiq, Siti Nurhaliza Bachril, dan Nurul Habib Al Mukarramah, "Legal Aspect of Plastic Waste Management in Indonesia and Malaysia: Addressing Marine Plastic Debris," *Jurnal Sustainability* 14, no. 12 (2022), <https://doi.org/10.3390/su14126985>.

⁸ Suryani M., *Pengelolaan Sampah dan Lingkungan Hidup* (Bandung: Penerbit Alam Sejahtera, 2019).

In this context, *fiqh al-bi'ah* (Islamic environmental jurisprudence) provides an ethically grounded and normatively rich perspective that can complement and strengthen the existing legal framework. Principles such as *lā ḍarar wa lā ḍirār* (prohibition of harm), *maṣlahah 'āmmah* (public welfare), and *ḥifẓ al-bi'ah* (environmental protection as part of the *maqāṣid al-sharī'ah*) emphasise collective responsibility, ecological stewardship, and harm prevention—values that resonate strongly with Indonesia's Muslim-majority context. By embedding these principles into statutory law and policy design, waste governance can gain both legal legitimacy and broader public acceptance.

In the author's previous research, it was explained that regulatory challenges in waste management, both liquid and solid waste, often arise due to the lack of synchronisation of central and regional policies. This study recommends regulatory reformulation that combines the principles of caution, risk-based, and participatory approaches in the legislative and implementation processes.⁹ This further strengthens the argument that the legal framework for solid waste management is no longer oriented solely to control, but also to prevention and strengthening institutional capacity.

To strengthen the normative and ethical dimensions of waste management—currently governed by Law No. 18 of 2008 on Waste Management and Government Regulation No. 81 of 2012, yet still beset by implementation challenges—the contemporary Islamic legal approach,¹⁰ particularly the branch of *fiqh al-bi'ah* (environmental jurisprudence), holds strategic relevance.¹¹ Principles such as *lā ḍarar wa lā ḍirār* (the

⁹ Maskun, Rasyikah Mohamad Khalid, Ratnawati, Muhammad Mutawalli Mukhlis, Wira Anggara, Rafika Nurul Ramadhani Ramli, “Strengthening Indonesia's Waste Management Laws: Compliance with Public Health and Marine Conservation Norms,” *Jurnal Substantive Justice International* 7, no. 2 (2025), <https://doi.org/10.56087/substantivejustice.v7i2.298>.

¹⁰ M Subli et al., “Green Investment in Contemporary Islamic Perspective: A Maqasid al-Syari'ah Analysis of the Mining Industry in Morowali,” *MILRev: Metro Islamic Law Review* 4, no. 1 (2025): 156–183, <https://doi.org/10.32332/milrev.v4i1.10269>.

¹¹ C Rois, N Jannani, and M H Mufid, “Islamic Law Paradigm Responding Conflicts of Interest of Economic Development and Ecological Conservation Hifdz Al-Bi'ah Perspective,” *Al-Istinbath: Jurnal Hukum Islam* 9, no. 1 (2024): 193–210, <https://doi.org/10.29240/jhi.v9i1.8660>.

prohibition of harm), *maslahah 'āmmah* (public welfare),¹² and *ḥifẓ al-bi'ah* (environmental protection as part of the *maqāṣid al-syarī'ah*) provide an ethical-religious foundation that bolsters the existing positive legal framework.¹³ This integration not only enhances the legitimacy of environmental policy but also promotes the participation of the Muslim community in the practice of the 3Rs (reduce, reuse, recycle) and in the prevention of ecological degradation.¹⁴

Accordingly, the objective of this research is twofold: first, to critically assess the limitations of Indonesia's current legal and institutional framework for solid waste management; and second, to propose a holistic model that harmonises statutory law with contemporary *fiqh al-bi'ah*, thereby offering an innovative, faith-based pathway towards sustainable and equitable environmental governance.

METHOD

This study adopts a systematic review methodology complemented by a descriptive-qualitative approach to elucidate the complex legal, normative, and socio-political dimensions of solid waste management in Indonesia. Initially, a comprehensive inventory and classification of legal instruments was undertaken, encompassing national statutes (notably Law No. 18 of 2008 on Waste Management and Government Regulation No. 81 of 2012), as well as relevant Presidential, Ministerial, and Regional regulations. Parallel to this legal mapping, a structured literature review was conducted, drawing on peer-reviewed journals, annual reports from government ministries, white papers issued by environmental non-governmental organisations, and publications from international

¹² S N Fitriana and I Nur, "Regulation of Foreign Workers Based on Job Creation Act of Maslahah Perspective," *Juris: Jurnal Ilmiah Syariah* 20, no. 2 (2021): 179-188, <https://doi.org/10.31958/juris.v20i2.4274>.

¹³ S Maysaroh, A Rokhim, and D Isnaeni, "Implementation of Regional Regulation Number 4 of 2018 by the Bangkalan Regency Government in an Effort to Reduce Flood Intensity in Arosbaya District Reviewed from Islamic Law," *Jurnal Ilmiah Mizani* 12, no. 1 (2025): 86-113, <https://doi.org/10.29300/mzn.v12i1.7148>.

¹⁴ M W Humaidi and M Azizah, "Green Philanthropy: Islamic Activism on Indonesia's Environmental Democracy," *Ijtihad: Jurnal Wacana Hukum Islam Dan Kemanusiaan* 24, no. 2 (2024): 167-191, <https://doi.org/10.18326/IJTIHAD.V24I2.167-191>.

bodies such as UNEP, UN-Habitat, and the World Bank. Each source was systematically coded for its provenance, typology (normative/legal, empirical, or case-based), and thematic contribution to the study.

The systematic review followed PRISMA guidelines. Data were collected from Scopus, Web of Science, Google Scholar, and national repositories such as Garuda and Neliti. The search strings included combinations of “solid waste management,” “Indonesia,” “*fiqh al-bi’ah*,” “Islamic environmental law,” and “sustainable governance.”¹⁵ The inclusion criteria were: (1) peer-reviewed articles, legal documents, or reports published between 2008 and 2024; (2) relevance to waste management law and/or Islamic environmental ethics; and (3) availability in English or Bahasa Indonesia. Exclusion criteria were: (1) duplicate entries, (2) purely technical/engineering studies with no legal or ethical dimension, and (3) opinion-based sources lacking methodological grounding. Out of 356 initial records, 112 were retained after screening and full-text review.

The legal inventory covered statutory instruments, including Law No. 18 of 2008, Government Regulation No. 81 of 2012, regional bylaws on waste, and ministerial decrees. Selection criteria emphasised relevance to governance, fiscal allocation, and environmental sustainability. The mapping classified sources into three categories: (1) normative/legal (laws, regulations, fatwas), (2) empirical (policy reports, budget data), and (3) case-based (municipal waste programs). This classification was operationalised through a coding scheme that tracked regulatory scope, enforcement mechanisms, and fiscal provisions.

The doctrinal-normative analysis relied on *uṣūl al-fiqh* and *qawā’id fihiyyah*. Principles such as *lā ḍarar wa lā ḍirār* (prohibition of harm), *maṣlaḥah ‘āmmah* (public welfare), and *ḥifẓ al-bi’ah* (environmental preservation) were contextualised within the Indonesian legal system through interpretive methods. Classical texts were assessed based

¹⁵ Nita Triana and Farah Nuril Izza, “The Perspective of Islamic Law on The Application of The Polluter Pays Principle in Indonesian Environmental Law,” *Al’Adalah* 17, no. 2 (2020), <https://doi.org/10.24042/adalah.v17i2.8223>.

on their authority (e.g., al-Qarāfī, al-Shāṭibī) and contemporary relevance, with validity ensured by triangulating interpretations across multiple *fiqh* schools.

Three municipal case studies—Surabaya, Banyumas, and Jakarta—were chosen based on criteria of innovation (community-based 3R programs in Surabaya), effectiveness (institutionalised eco-sanitation in Banyumas), and geographical diversity (Jakarta as a megacity with systemic challenges). Each case provided empirical grounding for evaluating how Islamic legal principles can be integrated into practical governance models. The analysis applied iterative qualitative content analysis with three coding cycles: (1) open coding of legal texts and literature, (2) axial coding to identify patterns across categories, and (3) selective coding to construct thematic models. To enhance validity, dual coding was conducted by two independent reviewers—one specialising in environmental law, the other in Islamic jurisprudence—who cross-validated interpretations to reduce subjectivity. Triangulation was achieved by combining statutory sources, scholarly literature, and field-based case studies.

RESULTS AND DISCUSSION

Weak Law Enforcement on Waste Management and Community Participation in Solid Waste Management

Waste management in Indonesia continues to face regulatory weaknesses, despite the existence of Law No. 18/2008 on Waste Management, Government Regulation No. 81/2012, and Law No. 32/2009 on Environmental Protection and Management. Enforcement remains inconsistent, as violations by industries, SMEs, and the informal sector—such as open dumping and burning—are rarely followed by legal proceedings.¹⁶ These practices have caused serious environmental degradation, including soil and water contamination, public health problems, and ecological disasters such as floods and

¹⁶ Joko, D., & Fitriani, T, “Pengaruh Kebijakan Pemerintah terhadap Pengelolaan Limbah Plastik di Indonesia,” *Jurnal Ekonomi dan Lingkungan* 22, no. 1 (2021): 100–114.

landslides. Weak enforcement fosters a culture of impunity that undermines both government authority and community compliance.¹⁷

According to the Ministry of Environment and Forestry (KLHK, 2023 Annual Report), most regional governments allocate only 0.6–1% of their APBD to waste management—far below the recommended 3% threshold. Surabaya, in contrast, allocated about 2% in 2019, enabling programs such as waste banks and community-based 3R initiatives (Surabaya City Performance Report, 2019). This fiscal insufficiency directly hampers service delivery, including waste collection coverage, recycling infrastructure, and public education campaigns.

Table 1. Regional APBD Allocation for Waste Management

No.	Indicator	Value	Source
1	Avg. APBD allocation for waste management	0.6 % – 1 % of total APBD	KLHK data & Antara/Kompas report
2	Recommended minimum allocation	3 % of the total APBD	KLHK statement at national conference
3	Surabaya City's allocation for waste (2019)	~ 2 % of total APBD	Local government performance report

Source: Surabaya City Performance Report

Regional Environmental Agencies (DLH) often lack sufficient human resources, budgets, and technological infrastructure to operate modern, data-based monitoring systems. As a result, supervision is largely reactive, relying on incidental inspections without risk mapping or structured public reporting. Although the law provides sanctions ranging from administrative fines to criminal penalties, implementation is inconsistent. Many cases

¹⁷ Adi, R., & Handayani, N, “Peran Pemerintah dan Masyarakat dalam Pengelolaan Sampah di Daerah Perkotaan,” *Jurnal Ekologi Sosial* 9, no. 2 (2021): 143–157.

are resolved only through verbal warnings or administrative mediation, reinforcing impunity and eroding trust in environmental law enforcement.

Weak coordination between central and regional institutions exacerbates systemic gaps. The Ministry of Environment and Forestry faces challenges in aligning national policies with local implementation, while local governments often prioritise other agendas due to bureaucratic and political dynamics. The absence of an integrated system between DLH, licensing offices, and law enforcement agencies, coupled with the lack of a national violations database, results in slow and ineffective case handling.¹⁸

Strengthening solid waste governance requires embedding the principles of Good Environmental Governance—participation, transparency, accountability, and decentralisation—into regulation and practice.¹⁹ Applying these principles can improve policy integration across governance levels and enhance legitimacy through meaningful stakeholder involvement.²⁰ Waste management is often perceived as a financial burden by business actors due to weak enforcement and limited incentives. Indonesia lacks fiscal instruments such as tax breaks for companies using recycled materials or subsidies for green technology development.²¹ Comparative experiences demonstrate potential alternatives, such as Malaysia's *Green Technology Financing Scheme* and South Korea's *Volume-Based Waste Fee System*, which successfully mobilise private sector participation.

¹⁸ Indra, M., & Rahmad, M, "Pengelolaan Limbah Organik di Indonesia: Potensi dan Tantangan," *Jurnal Biodegradasi dan Lingkungan* 8, no. 1 (t.t.): 54–69.

¹⁹ Yonani Hasyim and Serlika Aprita, "The Aspects Of Environmental Law Enforcement In Indonesia And The Implementation Of International Agreements In The Environmental Field In Indonesia," *Nurani* 21, no. 2 (2021), <https://doi.org/10.19109/nurani.v21i2.8958>.

²⁰ Heryanto, A., & Kurniawati, I., "Tantangan Pengelolaan Sampah Plastik di Indonesia," 16 1 (2019): 54–68.

²¹ Reza Darma Al Fariz, Ramdiana Muis, Nani Anggraini, ndriyani Rachman, dan Toru Matsumoto, "Good Environmental Governance Roles in Sustainable Solid Waste Management in Indonesia: A Review," *Journal of Community Based Environmental Engineering and Management* 8, no. 1 (2024): 45–56, <https://doi.org/10.23969/jcbeem.v8i1.12035>.

This situation creates the perception that waste management is not a priority that requires serious handling.²² In many cases, business actors view waste management as a financial burden that has no economic value, and with weak supervision and minimal sanctions, they tend to choose shortcuts. In fact, from a sustainable development perspective, waste management has the potential to be a promising economic opportunity if supported by clear and consistent regulations and law enforcement. Another challenge that is no less crucial is the lack of incentives that encourage active participation of business actors in creating environmental solutions.²³ Until now, there has been no concrete mechanism that provides awards or benefits for companies that innovate in waste management. For example, there is no tax reduction system for companies that use recycled materials, no subsidies for the development of green technology, and there are also not many public awards that can improve a company's reputation based on its environmental commitment.²⁴

Community participation remains low both in scale and substance. Despite years of campaigns, most households still dispose of mixed waste without sorting. Evaluations of environmental education programs such as *Adiwiyata* (KLHK, 2021) show that initiatives are often ceremonial, lacking continuity and practical impact. Infrastructure gaps further limit participation, as waste banks, TPS-3R, and segregated transport services are rarely available in suburban and rural areas. Without systemic support, individual efforts are perceived as futile, leading to apathy. This situation is compounded by the absence of role models from leaders or institutions and the lack of dialogic approaches that respect local wisdom, such as *gotong royong* practices.²⁵

²² Maskun, Hanim Kamaruddin, Farida Patittingi, Hasbi Assidiq, Siti Nurhaliza Bachril, dan Nurul Habib Al Mukarramah, "Plastic Waste Management in Indonesia: Current Legal Approaches and Future Perspectives," *Jurnal Hasanuddin Law Review* 9, no. 1 (2023), <http://dx.doi.org/10.20956/halrev.v9i1.3683>.

²³ Maskun, Hanim Kamaruddin, Farida Patittingi, Hasbi Assidiq, Siti Nurhaliza Bachril, dan Nurul Habib Al Mukarramah.

²⁴ Faisal, I., & Widodo, T., "Studi Komparasi Pengelolaan Sampah di Kota-Kota Besar Indonesia," *Jurnal Pembangunan Berkelanjutan* 16, no. 3 (2020): 140-153.

²⁵ Dewi, S., & Setiawan, A., "Tantangan Pengelolaan Limbah di Indonesia: Peran Pemerintah dan Masyarakat," *Jurnal Pembangunan Berkelanjutan* 13, no. 2 (2019): 105-120.

A transition from top-down regulation to participatory, community-based approaches is essential. Leveraging *gotong royong*, engaging religious leaders, youth groups, and NGOs, and utilising creative social media campaigns can catalyse behavioural change. Campaigns such as waste-sorting challenges and eco-influencer narratives can effectively raise awareness among millennials and Generation Z.

Low community participation is also inseparable from the inequality of access to information and facilities. In many areas, especially in suburban and rural areas, the availability of waste management infrastructure is very limited. The community may be aware of sorting and managing waste, but does not have access to facilities such as waste banks, TPS 3R (Reduce, Reuse, Recycle Waste Processing Places), or sorted transportation services that are often only available in certain areas. This situation creates apathy in the community. When an adequate system does not support individual efforts, the perception will arise that participation is in vain. The lack of role models from community leaders or community leaders exacerbates this condition. If government institutions themselves do not demonstrate environmentally friendly practices or if many public facilities are still poorly maintained, the community will find it difficult to believe that waste management is a priority issue.²⁶ In addition, community participation cannot be measured only from attendance at socialisation programs or clean-up activities. Substantial participation is created when the community has a sense of ownership of the waste management program. They participate not because of mobilisation or instructions, but because of the awareness that a clean environment is a shared interest and responsibility. To achieve this, a dialogic approach is needed and respect for local wisdom, such as the use of customary practices or cooperation systems that can be a foundation for building environmental awareness.

Multi-stakeholder collaboration is also key, where the government can partner with religious leaders, local community leaders, youth communities, and community organisations to disseminate waste management messages. With a relevant approach and in line with the target audience's lifestyle, environmental messages will be easier to

²⁶ Hadi S, *Prinsip dan Praktik Pengelolaan Sampah Berkelanjutan* (Jakarta: Penerbit Ekologika, 2018).

internalise and implement. Creative campaigns through social media, such as short videos, waste sorting challenges, or inspirational narratives from environmental activists, can catalyse participation, especially from millennials and Generation Z.

Law enforcement against waste management violations in Indonesia has been regulated in various national laws and regulations that also adopt international principles. Domestically, Law Number 18 of 2008 concerning Waste Management and Law Number 32 of 2009 concerning Environmental Protection and Management are the main legal bases that provide administrative and criminal sanctions for violators. These sanctions can be in the form of written warnings, fines, revocation of permits, or even imprisonment, depending on the severity of the violation. For example, the practice of open waste disposal can be subject to criminal sanctions of 1-3 years in prison based on Article 47 of Law 18/2008, which is in line with the United Nations Environment Programme (UNEP) guidelines on sustainable waste management.

At the international level, Indonesia also refers to a number of global conventions in enforcing environmental law. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal regulates the prohibition of illegal imports of B3 waste, which in national law is implemented through criminal sanctions and heavy fines in accordance with Article 104 of Law 32/2009. Meanwhile, the Stockholm Convention on Persistent Organic Pollutants (POPs) is the legal basis for prosecuting perpetrators of indiscriminate waste burning that produces dioxin. The "polluter pays" principle of the Organisation for Economic Cooperation and Development (OECD) has also been adopted in the Indonesian legal system, especially in environmental civil lawsuits that require polluters to be responsible for environmental restoration costs.²⁷

The role of the central and regional governments in the governance of waste management regulations is a crucial aspect in building an effective and sustainable system.

²⁷ Maskun, Hanim Kamaruddin, Rasyikah Md Khalid, Muhammad Anugerah, Wiranti, Siti Nurhaliza Bachril, "Regulatory Challenges in Wastewater Management and its Impacts on Environmental Sustainability," *Jurnal Hasanuddin Law Review* 10, no. 3 (t.t.), <http://dx.doi.org/10.20956/halrev.v10i3.5560>.

Although Law Number 18 of 2008 concerning Waste Management has provided a national legal framework, many regions have not implemented the mandate in regional regulations that are in accordance with regional characteristics. This regulatory gap creates a gap between national norms and implementation in the field. The absence of Standard Operating Procedures (SOPs), technical guidelines, performance indicators, and contextual evaluation mechanisms causes waste management to develop informally and without standardisation, thus reducing the efficiency and sustainability of the system. The mismatch between the policies designed and the socio-geographical conditions of the region also worsens the situation.²⁸

The absence of regulations that support innovation has hampered technological development. Meanwhile, institutions have not developed significantly. Without the support of good legal implementation, innovations such as waste-to-energy or digitalisation of waste monitoring are difficult to implement. As a result, the waste management system has not developed and is still conventional. Furthermore, the lack of collaboration between stakeholders weakens the effectiveness of waste management. Without a clear incentive framework, the private sector is reluctant to invest, and community participation is still low due to the lack of education and socialisation.²⁹ This fragmentation hampers the integration of resources and competencies. Efforts to address these challenges will have a direct impact on increasing the effectiveness and sustainability of the system.³⁰ Therefore, the urgency of reformulating waste management regulations in an integrated and contextual manner is increasingly clear. The central government needs to set flexible national standards for local governments to adapt to local conditions. The involvement of various stakeholders in the formulation of regulations is important to ensure a holistic and implementable framework.

²⁸ Fitria R, *Pengelolaan Sampah di Perkotaan Indonesia* (Yogyakarta: Pustaka Alam, 2017).

²⁹ Utami P & Oktaviani R, "Analisis Pengelolaan Limbah di Industri Manufaktur Indonesia," *Jurnal Industri dan Lingkungan* 12, no. 4 (2020): 211–224.

³⁰ Wiranti, "Juridical Analysis: Online Single Submission (OSS) System for Dynamic Risk-Based Business Licensing," *Jurnal Jurisprudencie* 10, no. 1 (2023), <https://doi.org/10.24252/jurisprudencie.v10i1.38561>.

The division of authority between the centre and regions must be carried out proportionally. The central government is tasked with determining macro policies and supervision, while the regions carry out field operations and technical matters. This division of authority must be accompanied by structured and routine coordination. Transformation of the regulatory approach from prescriptive to risk-based and performance-based is also needed. This flexibility allows regions to adjust management strategies to regional capacity and risks, while still meeting national targets. The central government needs to provide a clear evaluation framework with an incentive system that supports optimisation.

Model Legal Framework for Solid Waste Management Using Integration of 3R Principles and Extended Producer Responsibility

The evolution of the solid waste management system in Indonesia has reached a critical point that requires a paradigm shift from the conventional “end of pipe” approach to a recirculating resource-based system. An integrative legal framework model that combines the 3R principles (Reduce, Reuse, Recycle) and Extended Producer Responsibility (EPR) offers a comprehensive legal architecture to realise sustainable waste management.³¹ However, in practice, regional disparities—such as differences in fiscal capacity between cities like Surabaya and smaller regencies such as Banyumas—have led to uneven adoption of 3R initiatives, indicating that legal design alone is insufficient without addressing governance and resource asymmetries.

The integration of these two conceptual frameworks into the national legal structure is a manifestation of the legal commitment to the transformation of waste management from a linear model to a circular model, while distributing responsibility proportionally to producers as entities that produce products. The synergy between the 3R principle that emphasises the hierarchy of waste management and EPR that establishes

³¹ Ayuningtyas, R. A., “Penerapan Prinsip 3R (Reduce, Reuse, Recycle) Dalam Pengelolaan Sampah Di Restoran Cepat Saji Kfc Yogyakarta Dalam Era Go-Food (Studi Kasus Restoran Cepat Saji Kfc Sudirman). Penerapan Prinsip 3r (Reduce, Reuse, Recycle) Dalam Pengelolaan Sampah Di Restoran Cepat Saji Kfc Yogyakarta Dalam Era Go-Food (Studi Kasus Restoran Cepat Saji Kfc Sudirman),” 2019, 1-11.

producer responsibility for the product life cycle creates a regulatory ecosystem that drives fundamental changes in the entire production-consumption value chain.

This model not only addresses downstream issues through proper waste management but also systematically deconstructs upstream issues through responsible product redesign and waste minimisation at source. Implementation of this integrative model requires a coherent institutional architecture, structured incentive mechanisms, and multidimensional policy instruments that encompass economic, administrative, and participatory aspects to accommodate the complexity of solid waste management challenges in Indonesia.³² However, the institutional mechanisms envisioned remain constrained by fragmented authority across central and regional governments. For example, under Law No. 23/2014, some municipalities lack trained personnel or adequate budgets to enforce EPR obligations, creating a gap between policy design and enforcement. Moreover, licensing and certification schemes intended to standardise recycling often create additional barriers for SMEs, who are vital actors in local waste recovery but lack the administrative capacity to comply.

Analysis of these institutional mechanisms shows the complexity of cross-sectoral and cross-jurisdictional coordination. Law Number 23 of 2014 concerning Regional Government stipulates waste management as one of the shared affairs that is decentralised to regional governments. As a result, the implementation of the 3R principle must accommodate variations in institutional capacity, demographic characteristics, and geographic conditions of the regions. This decentralisation poses significant challenges in maintaining the coherence of national policies while still accommodating regional needs.

The modern waste management legal framework emphasises the importance of collaboration between government, the private sector, and communities in implementing the 3R principles. Various regulatory instruments have been developed to facilitate private sector involvement, including through Corporate Social Responsibility (CSR) mechanisms

³² Sabel, C. F., & Zeitlin, J, "Learning from difference: The new architecture of experimentalist governance in the EU," *European Law Journal* 14, no. 3 (2008): 271–327.

and public-private partnerships. However, the implementation of this collaboration is often hampered by the lack of adequate incentives and a clear framework for cooperation.³³

The integration of the Reduce, Reuse, and Recycle (3R) principles into the national legal framework is realised through various operational policy instruments that cover economic, administrative, and socio-educational dimensions. This multidimensional approach reflects the diversification of the strategy for implementing the 3R principles in various sectors and demonstrates the government's commitment to building a sustainable waste management system.

In the economic dimension, national regulations have accommodated the development of various instruments to encourage the implementation of the 3R principle. Government Regulation Number 46 of 2017 concerning Environmental Economic Instruments, for example, provides a basis for the implementation of mechanisms such as environmental taxes, subsidies, and deposit-refund systems. However, the implementation of these instruments is still limited and has not been optimal in creating incentives that are strong enough to change the behaviour of producers and consumers. Meanwhile, in the administrative aspect, the implementation of the 3R principle is supported through licensing, certification, and standardisation mechanisms. For example, Regulation of the Minister of Environment Number 13 of 2012 regulates the requirements for the establishment and management of waste banks. In addition, standardisation of recycling processes and products has also been developed to ensure the quality and safety of recycled products. However, complex administrative procedures are still a major obstacle, especially for small and medium-sized business actors in adopting 3R practices.

Empirical reports show that environmental taxes and subsidies introduced under Government Regulation No. 46/2017 have had limited uptake, with minimal behavioural impact on producers. Similarly, licensing and certification systems—though intended to

³³ Marín-González, F., Moganadas, S. R., Paredes-Chacín, A. J., Yeo, S. F & Subramaniam, S, “Sustainable local development: consolidated framework for cross-sectoral cooperation via a systematic approach,” *Jurnal Sustainability* 14, no. 11 (2022): 6601.

ensure compliance—have in some cases discouraged SMEs from formalising their waste management practices, thereby pushing them back into informal operations that evade monitoring. This highlights contradictions between economic incentives and administrative burdens that weaken overall system effectiveness.

In the education and participation dimension, the policy focuses on increasing community awareness and involvement in 3R-based waste management. Several local governments have set socialisation and education obligations, such as through the Adiwiyata program for educational institutions and Proklim for community groups. Although these efforts are important, the sustainability and consistency of the program are often hampered by limited resources. One important breakthrough in strengthening the implementation of the 3R principle is the implementation of Extended Producer Responsibility (EPR). This approach shifts the burden of waste management costs from the government and consumers to producers. Through EPR, producers are required to be responsible for their product and packaging waste, both directly by collecting and recycling, and indirectly through payments to authorised third parties.

Nevertheless, Indonesia's EPR rollout has been hindered by weak monitoring capacity and limited enforcement. Unlike Germany's Dual System, which relies on a robust Producer Responsibility Organisation (PRO) network, Indonesia still faces gaps in institutional coordination and data reliability. Many producers continue to rely on informal waste pickers, whose contributions remain undervalued and unregulated, creating tension between formal EPR requirements and the realities of Indonesia's waste economy.

Furthermore, the EPR system encourages manufacturers to adopt sustainable product designs (eco-design), such as packaging that can be recycled, repaired, or reused. To support the efficiency of its implementation, manufacturers can form or join a collective system such as the Producer Responsibility Organisation (PRO), as implemented in the Dual System in Germany or the Packback initiative in Indonesia. In addition, the

imposition of eco-fees also serves as a source of funding for waste collection, recycling, and processing infrastructure, even to support social programs such as waste banks.³⁴

The government also strengthens the EPR legal framework through regulations that require producers to have waste reduction and recycling targets. For example, Regulation of the Minister of Environment and Forestry No. 75 of 2019 regulates the Roadmap for Waste Reduction by Producers, including the obligation to recycle at least 30% of plastic packaging, as well as sanctions for producers who do not comply. The implementation of EPR provides significant benefits, including in terms of redistribution of responsibility, public cost efficiency, and encouraging the growth of a circular economy. On the other hand, EPR also opens up opportunities for recyclers and scavengers by creating economic incentives in the waste management chain.³⁵

As a policy instrument, EPR can be operationalised through a variety of modalities. One is a take-back program, which requires producers to collect post-consumer products for recycling. Other schemes include cash-back systems, where consumers pay a deposit when they buy a product and receive it back when they return it. There are also advanced recycling fee schemes, which are upfront fees to finance future product recycling systems. A product stewardship approach is also used, which is a multi-stakeholder collaboration between government, producers, distributors, and consumers to collectively and sustainably manage the environmental impacts of products.

Integrating Contemporary *Fiqh al-bi'ah* into Indonesia's Sustainable Solid Waste Management Framework

The chronic underfunding of waste management—evident in most regions allocating only 0.6–1% of the APBD, significantly below the 3% benchmark—reflects not just fiscal neglect but a profound disconnect with contemporary *fiqh al-bi'ah* (Islamic

³⁴ Maitre-Ekern, E., “Re-thinking producer responsibility for a sustainable circular economy from extended producer responsibility to pre-market producer responsibility,” *Journal of Cleaner Production* 286, no. 125454 (2021).

³⁵ Alfi Maryati, *Revolusi Biru: Kebijakan Publik Sektor Maritim di Indonesia* (Indonesia Emas Group, 2025).

environmental jurisprudence). This modern branch of Islamic law, grounded in the *Maqāṣid al-sharī'ah*, underscores concepts like *maslahah 'āmmah* (public welfare), *lā ḍarar wa lā ḍirār* (no harm), and *ḥifẓ al-bi'ah* (environmental protection) as divine mandates to proactively care for the Earth³⁶. As a form of stewardship (*ri'āyah al-bi'ah*) and human vicegerency (*istikhlāf*), it provides robust normative justification for prioritising sustainable waste governance in line with the environmental ethics embedded in the Qur'an and Hadith—as affirmed in recent scholarship highlighting the ethical obligations to prevent harm and maintain ecological balance.³⁷

Table 2. *Fiqh al-bi'ah* Analysis in Sustainable Waste Management

<i>Fiqh Principle</i>	<i>Meaning & Usūlī Foundation</i>	<i>Empirical Evidence / Case Study</i>	<i>Policy Gap</i>	<i>Recommended Instrument</i>
<i>Lā ḍarar wa lā ḍirār</i>	Prohibition of causing harm; based on QS al-Baqarah: 195 and the legal maxim <i>dar' al-mafāsid muqaddam 'alā jalb al-maṣāliḥ</i> (avoiding harm takes precedence over acquiring benefit)	Regional budgets allocate only 0.6–1% of APBD, indicating weak preventive investment.	No stable fund for early warning systems or risk mitigation	Mandate APBD allocation ≥ 3% to strengthen risk monitoring systems
<i>Maslahah 'āmmah</i>	Public welfare is a core objective of the Sharia, grounded in the principle of <i>jalb al-maṣāliḥ</i> (promotion of benefit)	Surabaya allocates ~2% of APBD, resulting in improved waste sorting and recycling rates.	Lack of incentives for 3R (reduce, reuse, recycle) programs in other regions	Sharia-based fiscal incentives (Green Zakat, Eco-Waqf) to support 3R initiatives
<i>Ḥifẓ al-Bi'ah</i>	Environmental protection as part of <i>maqāṣid al-sharī'ah</i> ; rooted in QS al-An'ām: 141	RDF facility in Jakarta reduced 12% of landfill waste (target: 2,500 tons/day)	Regulations do not mandate ecological buffer zones or green investment safeguards.	Legally require ecological buffer zones & incentivise green investment via waqf.
<i>Istikhlāf</i>	Human vicegerency on Earth (khalīfah) implies collective responsibility for environmental care.	Communal initiatives in Banyumas succeeded in managing organic waste	Not yet integrated into village SOPs; local governments lack sustainable funding mechanisms	Establish Green Village Funds through zakat and waqf-based mechanisms

³⁶ Moh Mufid, “Fikih Konservasi Laut: Relevansi Fiqh al-Bi'ah Di Wilayah Pesisir Lamongan,” *Al-Manahij: Jurnal Kajian Hukum Islam* 12, no. 1 (2018), <https://doi.org/10.24090/mnh.v12i1.1356>.

³⁷ Muslimah Hayati, Saritua Silitonga, Zaenal Arifin, Amanda Amanda Anis Mashdurohatun, “The Conserving Agrarian Land for Future Generations: A Policy Blueprint for Indonesia,” *Jurnal Hukum Unissula* 41, no. 1 (March 2025): 1–18.

<i>Fiqh</i> Principle	Meaning & <i>Usūlī</i> Foundation	Empirical Evidence / Case Study	Policy Gap	Recommended Instrument
<i>Tashjī'</i>	Moral encouragement to pursue virtuous actions; implemented via non-coercive instruments	Eco-Waqf pilot programs in pesantren show ~60% participation	No formal <i>tashjī'</i> mechanisms (e.g., awards, subsidies) in place	Develop Islamic award schemes and sharia-compliant subsidies for waste innovation actors

Source: Author Interpretation

Surabaya's near-2% APBD allocation for community-driven 3R and waste bank initiatives exemplifies how these *fiqh* values can gain practical expressions at the municipal level. This model of local empowerment mirrors Islamic principles of collective responsibility and public benefit, aligning strongly with SDG 11 (sustainable cities) and SDG 12 (responsible consumption). Nevertheless, the absence of faith-based fiscal instruments—such as Green Zakat, *Eco-Waqf*, and Sharia-compliant tax incentives—reveals a critical gap in translating *fiqh* theory into structured policy tools.³⁸

Increasingly, *fiqh al-bi'ah* literature advocates for green financing through waqf and zakat as vehicles for environmental stewardship; models from Indonesia and Malaysia illustrate how *Eco-Waqf* and *Green Waqf* can support ecosystem preservation, waste management infrastructure, and community education. Such instruments operationalise the *fiqh* principle of *tashjī'* (encouragement), offering both ethical legitimacy and practical means to mobilise public participation in sustainability initiatives.

Moreover, integrating Islamic institutions—mosques, pesantren, and NGOs—into public education and monitoring systems can weave *fiqh* norms into grassroots behaviour, enhancing ownership and compliance. Studies have demonstrated that Islamic environmental teachings and local cultural practices foster ecological awareness and communal responsibility.

³⁸ A P Supriyadi and D Fidhayanti, "Green Sukuk In Indonesia: Unraveling Legal Frameworks for Sustainable Islamic Bonds," *El-Mashlahah* 13, no. 2 (2023): 151–180, <https://doi.org/10.23971/el-mashlahah.v13i2.7372>.

Consequently, the following policy pathway emerges: mandate a 3% APBD minimum for sustainable waste management; scale Surabaya's *fiqh*-informed governance model nationwide; institutionalise Green Zakat/*Eco-Waqf* funds for environmental programs; and strengthen partnerships with religious networks to embed sustainability within Islamic moral frameworks. By merging statutory rigour, *fiqh al-bi'ah* ethics, and SDG alignment, Indonesia can transform its fragmented waste management system into a coherent, faith-grounded, sustainable governance model that reflects both spiritual values and global environmental goals.

CONCLUSION

Waste management in Indonesia is hindered not only by technical deficiencies but also by structural governance problems rooted in fragmented authority, overlapping mandates, and vested interests that exploit regulatory loopholes. Despite the legal foundation provided by Law No. 18/2008 and Law No. 32/2009, weak enforcement and fiscal neglect persist, with 60% of municipalities allocating less than 1% of their APBD to waste management—far below the 3% benchmark (KLHK, 2023)—reflecting political economy constraints that prioritise infrastructure and patronage over environmental stewardship. This trajectory undermines *maqāṣid al-sharī'ah* principles in *fiqh al-bi'ah*, such as *lā ḍarar wa lā ḍirār* (prohibition of harm), *ḥifẓ al-bi'ah* (environmental stewardship), and *maṣlaḥah 'āmmah* (public welfare), which could instead guide institutional reforms through transparency in budgeting, accountability mechanisms, and recognition of environmental protection as a public trust (*amānah istikhlāf*). Reform thus requires politically feasible strategies, including phased budget increases with central government incentives and the exploration of complementary financing through Green Zakat and *Eco-Waqf*, supported by pilot projects and stronger ecological awareness among religious leaders. Ultimately, aligning Indonesia's waste governance with both the SDGs and Islamic environmental law depends on transforming ethical imperatives into enforceable public policy through multi-stakeholder collaboration, where religious values provide not only legitimacy but also measurable standards of compliance, fiscal accountability, and institutional innovation, enabling a shift toward a sustainable and ethically grounded system. For future research,

studies could focus on comparative analyses of Islamic environmental jurisprudence across different countries, empirical assessments of the effectiveness of Green Zakat and *Eco-Waqf* pilot programs, and policy experiments that integrate Islamic ethical principles with fiscal and institutional reforms in waste governance.

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AUTHOR CONTRIBUTIONS STATEMENT

Maskun conceived the research idea and led the legal framework design. Ratnawati conducted the doctrinal-normative analysis and performed content analysis of *fiqh* sources. Wiranti carried out the data collection from legal documents, regional APBD budgets, and waste-management case studies. Asriyani integrated the *fiqh al-bi'ah* principles and compiled the literature review on Islamic environmental ethics. Jamal Aslan provided critical comparative insights, formatted the tables, and finalised the manuscript. All authors have read and approved the final version of the manuscript.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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