Strata Social and Humanities Studies, 2026, Vol. 4, No. 1, 197–211
E-ISSN: 2987-2537 | P-ISSN: 2987-3193
doi: 10.59631/sshs.v4i2.638
Advance Access publication October 31, 2026

STRATA
SOCIAL AND HUMANITIES STUDIES
journals.stratapersada.com/index.php/sshs

Legal Reconstruction of Household Waste Management in Indonesia for Regulatory Harmonization and Effectiveness

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Article History	Submitted	Revised	Accepted
	2026-10-20	2026-10-25 & 2026-10-29	2026-10-31

Abstract

Household waste management in Indonesia faces critical challenges arising from fragmented regulatory mandates across national and regional levels, despite the foundational framework of Law No. 18 of 2008 on Waste Management. Operational inconsistencies between household sorting obligations, municipal services, Extended Producer Responsibility, and supervisory mechanisms hinder effective implementation and circular-economy goals, as evidenced by gaps among Government Regulation No. 81 of 2012, Presidential Regulation No. 109 of 2025, and Ministry of Environment/BPLH Regulation No. 6 of 2026. This study aims to map the current regulatory construction of household waste management, identify structural and normative harmonization deficits, and propose a reconstructed model aligned with constitutional environmental rights and hierarchical legal principles. Employing a normative-prescriptive legal research design with statutory and conceptual approaches, the analysis examines primary legal instruments through systematic and teleological interpretation to reconstruct an auditable chain of obligations. Findings reveal that principal deficits lie not in hierarchical conflicts but in incomplete operational linkages among reduction, handling, producer responsibility, and supervision. The study advances an auditable chain-of-obligations model linking actors, specific duties, supporting services, financing, performance evidence, and corrective mechanisms, offering a practical blueprint for regulatory coherence and enhanced effectiveness in decentralized waste governance.

Keywords: Household waste, legal reconstruction, legal effectiveness, producer responsibility, regulatory harmonisation.

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INTRODUCTION

Household waste management in Indonesia represents a critical intersection between the constitutional right to a healthy environment and complex daily regulatory obligations distributed across multiple governance levels (Manika & Citrawati, 2026; Syafiudin, 2026). Decisions regarding packaging design, household sorting, collection schedules, and final residual processing currently operate under disjointed mandates across diverse stakeholders (Nurhadi et al., 2023). Law No. 18 of 2008 on Waste Management provides the foundational national framework (Fasya et al., 2025)—specifically Article 19, which bifurcates management into waste reduction and handling, and Article 20, which prescribes generation limitation, recycling, and reuse. However, these foundational provisions establish preventive and operational dimensions that are often disjointed in practice. Expanding downstream treatment capacity cannot substitute for upstream source reduction, creating a systemic imbalance in the national waste governance architecture.

The core legal difficulty stems from translating broad statutory mandates into mutually reinforcing, enforceable operational obligations. When households are mandated to segregate waste at the source, local governance frameworks often fail to guarantee segregated collection and processing infrastructure (Azizah et al., 2025; Zainal et al., 2021). Similarly, while producers face statutory Extended Producer Responsibility (EPR) mandates, these obligations remain detached from municipal waste management capacities, creating severe structural mismatches between packaging output and processing capabilities. Furthermore, advanced treatment facilities depend heavily on specific feedstock quality (Tian et al., 2026), yet current legal frameworks fail to incentivize or legally preserve the value of household-level sorting. Consequently, regulatory harmonization must be examined beyond mere text alignment to address the functional design of legal implementation and inter-agency operational linkages.

The urgency of reconstructing Indonesia's regulatory framework is heightened by escalating household waste generation (Supyan et al., 2026), national circular-economy targets demanding measurable material retention, and recent regulatory developments (Srivastava et al., 2026). Specifically, the interplay between Government Regulation No. 81 of 2012, Presidential Regulation No. 109 of 2025, and Ministry of Environment/BPLH Regulation No. 6 of 2026 reveals acute operational inconsistencies and fragmented supervisory mandates. A major research challenge in analyzing this legal landscape lies in evaluating how hierarchical norms interact with decentralized regional autonomy, where conflicting local regulations often neutralize central policy directives. Methodologically, tracing these institutional breakdowns requires navigating overlapping regulatory jurisdictions, inconsistent reporting mechanisms, and conflicting data across central and local government tiers.

Prior literature provides important but fragmented insights into these challenges. Nggilu et al. (2024) highlight legislative omissions in regional waste rule-making and emphasize statutory follow-through. Wikurendra et al. (2024) examine circular-economy integration and material value retention within local settings. Budiyarto et al. (2025) demonstrate that waste-bank efficiency hinges on infrastructure and managerial capacity aligned with localized socio-economic conditions. Additionally, Adriani et al. (2026) analyze institutional and economic

instrument gaps within EPR execution. Despite these contributions, existing scholarship remains confined to isolated segments—focusing separately on regional legislation, circular economy theory, localized infrastructure, or producer responsibilities—without integrating these elements into a singular normative framework.

To address these literature limitations, this article advances a novel prescriptive reconstruction that integrates four distinct governance nodes—household obligations, municipal service delivery, producer responsibility, and institutional supervision—into a unified, auditable regulatory chain. The novelty of this study lies in synthesizing the recent supervisory architecture under Ministry of Environment/BPLH Regulation No. 6 of 2026 with Presidential Regulation No. 109 of 2025 and Government Regulation No. 81 of 2012, establishing a cohesive, verifiable chain of obligations that prior studies have neglected. By treating these legal instruments not as isolated mandates but as an interdependent normative sequence, this study introduces a fresh conceptual model for waste law harmonization in developing and decentralized economies.

The objectives of this study are threefold: (1) to map the current regulatory construction of household waste management in Indonesia across national and regional tiers; (2) to identify the structural and normative harmonization deficits undermining operational effectiveness; and (3) to propose a reconstructed regulatory model aligned with constitutional mandates and hierarchical legal principles. Ultimately, this article offers significant theoretical and practical contributions. Theoretically, it expands legal scholarship by offering an auditable "chain of obligation" framework applicable to environmental law in decentralized states. Practically, it provides policymakers and legislative drafters with a concrete blueprint to harmonize conflicting regulations, bridge institutional gaps, and enforce accountable waste management systems nationwide.

METHOD

This study employs a normative-prescriptive legal research design. The statutory approach is applied to examine the coherence and hierarchical consistency among norms governing household waste management, while the conceptual approach is used to construct analytical criteria for regulatory harmonization, producer responsibility, and normative effectiveness. The methodological exposition follows the requirements of doctrinal research by transparently describing source selection, interpretive techniques, and the generation of legal argumentation (Hutchinson & Duncan, 2012). The objective is to reconstruct an auditable chain of obligations linking household duties, local-government services, producer responsibility, and supervisory mechanisms.

Primary legal materials were selected according to their direct relevance to waste reduction, handling, financing, regulatory formation, and supervision. The core instruments comprise Law No. 18 of 2008, Government Regulation No. 81 of 2012, Presidential Regulation No. 97 of 2017, Minister of Environment and Forestry Regulation No. P.75/MENLHK/SETJEN/KUM.1/10/2019, Minister of Environment and Forestry Regulation No. 14 of 2021, Presidential Regulation No. 109 of 2025, and Ministry of Environment/BPLH Regulation No. 6 of 2026. Supporting frameworks include the law on regulatory formation, environmental protection, and regional levies. Sources were retrieved from official legal

documentation networks and scholarly publisher platforms, with a cut-off date of 20 October 2026. Policy plans reported in government news were treated solely as contextual background and not as binding norms.

Analysis proceeded by identifying the subjects bearing obligations, the specific actions required, the implementing institutions, sources of financing, evidence of performance, and corrective mechanisms. These relationships were examined through systematic and teleological interpretation. Norm conflicts were distinguished from operational regulatory gaps and risks of misaligned incentives; divergent targets or instruments were not automatically classified as hierarchical violations until their objects and legal consequences had been assessed. Effectiveness is understood as the sufficiency of the legal design to enable implementation and compliance verification. The study does not employ interviews, observation, waste-generation measurement, or empirical compliance testing; consequently, its conclusions do not claim empirical success rates of any program. The scope remains national; regional regulations are addressed only as spaces for subsequent implementing action, not as the product of a comprehensive inventory of local by laws.

RESULTS AND DISCUSSION

Construction of the Regulatory Framework and Measures of Harmonization

The right to a good and healthy environment under Article 28H(1) of the 1945 Constitution of the Republic of Indonesia provides the constitutional foundation for treating household waste management as a public responsibility (Angraini et al., 2026; Dwiani et al., 2025; Silam et al., 2025). This right extends beyond the final environmental condition to encompass access to services that enable citizens to fulfil their corresponding obligations. Consequently, regulation must clearly designate the service provider, define the actions that may lawfully be required of households, and establish mechanisms for addressing service failures.

Law No. 18 of 2008 operationalises this constitutional mandate by imposing dual sets of duties. Article 12 places the obligation of environmentally sound reduction and handling on every person, while Article 15 assigns producers responsibility for packaging or goods that are difficult to degrade naturally. These provisions address distinct regulatory targets. Household obligations cannot extinguish producers' upstream responsibility for product design and material choice (Chamorro et al., 2026); conversely, producer financing does not relieve citizens of the duty to use available services correctly. Government Regulation No. 81 of 2012 further elaborates the operational sequence of sorting, collection, transportation, processing, and final treatment (Kartika, 2026). Article 17 requires sorting into at least five categories—hazardous materials, readily degradable waste, reusable items, recyclable materials, and residual waste—while Articles 18–19 impose corresponding duties to provide collection facilities and segregated transport. A service design that relies solely on public education therefore fails to complete the regulatory logic established by the primary legislation.

Vertical harmonisation tests the consistency of implementing instruments with higher-ranking norms. Articles 7 and 8 of Law No. 12 of 2011, as amended by Law No. 13 of 2022, supply the criteria for distinguishing hierarchical rank and the validity of regulations lying outside the

formal hierarchy. Ministerial regulations must rest on legitimate authority or an explicit statutory command; a later instrument does not automatically displace a higher-ranking norm merely by reason of its date of enactment. Horizontal harmonisation, by contrast, examines the interlinkage of rules operating in intersecting fields—waste management, environmental protection, and service financing. Textual compatibility alone is insufficient. Two instruments that do not contradict each other on their face may still generate misaligned actions when one implementing body is evaluated by the volume of material reduced at source while another is incentivised by the volume of the same material delivered to a treatment facility. Such misalignments require coordination of performance indicators and contractual arrangements rather than the automatic repeal of one of the instruments.

Table 1 summarises the principal instruments under examination and the corresponding alignment needs identified through systematic and teleological interpretation. The column "Alignment needs" records the authors' prescriptive assessment and does not constitute a determination of invalidity.

Table 1. Legal instruments and alignment needs

Instrument	Core elements examined	Alignment needs
Law No. 18/2008	Reduction, handling, rights and obligations	Link each actor's duties to service provision and accountability mechanisms
GR No. 81/2012	Sorting, facilities, transport and processing	Ensure continuity of segregated services after source separation
PR No. 97/2017	Policy and targets for the 2017–2025 period	Separate evaluation of expired targets from the design of subsequent periods
MoEF Reg. P.75/2019	Producer road map 2020–2029	Connect producer reporting to material flows and local service systems
MoEF Reg. No. 14/2021	Management through waste banks	Clarify partnership status and secure supporting collection services
PR No. 109/2025	Conversion of urban waste into energy	Align feedstock requirements with reduction and material-recovery priorities
MoE/BPLH Reg. No. 6/2026	Environmental administrative supervision and sanctions	Define subjects, competences, evidentiary standards and appropriate follow-up

Source: Primary legal materials listed in the table; authors' analysis

The alignment needs identified in Table 1 reveal a recurring structural pattern: each instrument adequately addresses one or more of the four regulatory nodes—household obligations, local-government services, producer responsibility, and supervision—yet none systematically connects all four into a single, auditable chain. Law No. 18/2008 and Government Regulation No. 81/2012 establish the basic division of duties and the technical sequence of handling, but they leave the interface between household sorting and downstream service continuity under-specified. The producer-related instruments (MoEF Regulation P.75/2019 and,

by extension, the financing implications of Article 15 of the 2008 Law) generate reporting and reduction obligations that remain largely decoupled from local collection and treatment systems. Presidential Regulation No. 109/2025 introduces energy-recovery targets whose feedstock demands may conflict with reduction and material-recovery objectives unless explicit coordination rules are inserted. Finally, Ministry of Environment/BPLH Regulation No. 6/2026 strengthens supervisory powers, yet the evidentiary and institutional linkages required to trigger those powers across the preceding three nodes remain incomplete. These gaps do not necessarily amount to hierarchical violations; they constitute operational and incentive misalignments that the subsequent sections of this study seek to reconstruct into a coherent, verifiable obligation chain.

Continuity of Sorting Obligations and Local-Government Services

The normative effectiveness of household waste management begins with the functional continuity between source sorting and local-government services (Basyar et al., 2026; Septiningsih et al., 2026). Sorting is designed to preserve the identifiable characteristics of materials so that they can be reused, recycled, or processed appropriately. When collection systems fail to maintain that segregation, the practical utility of the household obligation is partially nullified. This observation concerns the logical interrelation of successive management stages rather than an empirical assertion that all transport operations in Indonesia re-mix waste.

A coherent regulatory construction therefore requires paired obligations. Households must sort according to the prescribed categories, while the service operator must supply clear information on service type, collection schedules, handover points, and the intended processing destination. Operational rules must also address recurrent contingencies that general formulations often omit: non-arrival of collection services, facilities operating beyond capacity, or temporary disruptions in transport. The presence of concrete corrective mechanisms converts the right to service into a claimable entitlement and simultaneously supplies the evidentiary basis for supervisory action under the later regulatory instruments.

Regional variation in infrastructure and geography does not authorise departure from the minimum sorting categories established by Government Regulation No. 81 of 2012. Adaptation may legitimately occur in the modality of service delivery—different collection frequencies or dedicated drop-off points, for example—provided the legal categories themselves, particularly those concerning hazardous materials, remain intact. Educational simplification of terminology for public communication cannot be treated as a substantive amendment of the binding legal classification.

Waste banks, regulated under Minister of Environment and Forestry Regulation No. 14 of 2021 (which repealed the earlier guidelines in Minister of Environment Regulation No. 13 of 2012), may form part of this service relationship. As Budiyarto et al. (2025) emphasise, their effectiveness depends on support calibrated to local conditions. From a normative standpoint, any partnership arrangement must therefore specify the division of tasks, the provision of supporting facilities, material-recording obligations, and residual responsibility for materials that the bank cannot accept. The mere existence of waste banks does not demonstrate that the full spectrum of household waste streams is adequately served.

Community organisations, including women's groups such as PKK, can usefully support education and settlement-level recording. However, the assignment of functions must remain attentive to willingness, capacity, and available support. Public-service obligations cannot lawfully be converted into an unbounded voluntary burden. Where community actors perform defined service functions, written cooperation agreements are required so that the forms of support, occupational safety arrangements, and the precise relationship with governmental operators can be verified and, when necessary, corrected. These requirements illustrate a recurring harmonisation deficit: the current instruments adequately articulate household duties and, to a lesser extent, local service duties, yet they leave the operational interface between the two nodes under-specified and insufficiently auditable.

Alignment of Waste Reduction and Energy-Recovery Processing

Presidential Regulation No. 109 of 2025 updates the policy framework for urban waste treatment through conversion into renewable energy. Article 32 repeals Presidential Regulation No. 35 of 2018, while Article 31 supplies transitional provisions for processes already under way. Interpretation of the new instrument must therefore take account of existing project status and previously established legal relationships; repeal does not automatically terminate every prior agreement.

For the operation of waste-to-energy facilities (Pengolah Sampah menjadi Energi Listrik, or PSEL), Article 4(1) of Presidential Regulation No. 109 of 2025 establishes a minimum feedstock-availability criterion of 1,000 tonnes per day throughout the operational period. The same provision links regional readiness to budgetary allocations for collection and transport, land availability, and a commitment to retribution arrangements. This threshold functions solely as a facility-siting and operational criterion under the regulation; it neither imposes a duty on households to generate waste nor constitutes a performance standard applicable to every treatment installation.

Read systematically with the reduction obligations contained in Law No. 18 of 2008, the feedstock requirement does not automatically conflict with source-reduction duties. Energy recovery may legitimately utilise residual material that cannot be recovered through higher-value routes, provided technical specifications are met. Design risk arises, however, when implementing documents lock supply volumes without incorporating scenarios of successful source reduction. In such a hypothetical configuration, implementing actors may face misaligned incentives: one set of obligations rewards reduction while another rewards the delivery of the same material stream. The present analysis identifies this structural risk; it does not assert that the conflict has materialised in every existing PSEL contract.

Circular-economy reasoning reinforces the need to protect material recovery. Wikurendra et al. (2024) position the retention of material value as a core element of circular systems. Within the normative framework of this study, that principle supports the proposition that energy-recovery capacity planning should be preceded by a material-balance assessment that accounts for feasible reduction, reuse, and recycling. Article 21 of Government Regulation No. 81 of 2012 already enumerates several forms of processing, including material and energy recovery, yet it does not elaborate a detailed hierarchy of priority. The sequencing proposed here therefore constitutes a

prescriptive strengthening of the existing regulatory logic rather than a claim that the hierarchy is already fully articulated.

Consequently, regulatory reconstruction must reach both planning documents and cooperation contracts. Such instruments should incorporate explicit assumptions concerning waste composition, the basis of supply projections, scenarios of reduction success, review procedures, and a mutually agreed allocation of risk. These recommendations do not authorise unilateral amendment of existing agreements; their purpose is to ensure that project design does not treat successful source reduction as a ground for relaxing upstream legal obligations.

A separate temporal issue arises from Presidential Regulation No. 97 of 2017. Articles 2(2) and 5 establish a 2017–2025 policy period with targets of 30 per cent reduction and 70 per cent handling by 2025. Expiry of the target period is not equivalent to repeal of the regulation. The figures therefore cannot be presented as renewed targets for 2026 without a competent new instrument, accompanied by clear linkages to regional plans and transparent calculation bases. An official communication issued by the Ministry of Environment/BPLH on 8 September 2026 referring to the preparation of a national waste-management policy and the updating of producer responsibility indicates the direction of contemporaneous policy discussion, yet it remains contextual information and does not substitute for promulgated law (KLH/BPLH, 2026). Distinguishing the normative status of sources is essential if the analysis is to avoid equating draft policy, communicative targets, and positive law. Taken together, these observations reveal a further harmonisation deficit within the four-node chain: the reduction and energy-recovery nodes are inadequately coordinated, leaving the overall regulatory design insufficiently robust against incentive misalignment.

Producer Responsibility and Financing Certainty

Extended producer responsibility (EPR) allocates responsibility for products beyond the point of consumer use (Cai & Choi, 2021). The OECD (2024) characterises the approach as a policy instrument operating across the product life cycle. In the Indonesian context, any application of the concept must proceed from applicable national law. Corporate social-responsibility activities do not, by themselves, constitute fulfilment of legal obligations concerning the management of product and packaging waste.

Minister of Environment and Forestry Regulation No. P.75/MENLHK/SETJEN/KUM.1/10/2019 establishes the producer waste-reduction roadmap for the period 2020–2029. Articles 16–17 already provide mechanisms for reporting and verification. The regulatory deficit is therefore not the complete absence of reporting duties, but the weak evidentiary linkage among materials placed on the market, materials collected, subsequent processing, and the achievement claims advanced by each actor. Adriani et al. (2026) similarly identify institutional clarity and the design of economic instruments as persistent challenges in the development of EPR arrangements.

Reconstruction can usefully incorporate evidentiary standards that prevent double-counting. If one tonne of material is recorded successively by a waste bank, a transporter, and a recycler, the successive records do not signify three tonnes of reduction. For reporting purposes,

transaction identity and management stage must be distinguished. The example is illustrative rather than empirical. The governing principle is material-flow traceability calibrated to a proportionate administrative burden, especially for small enterprises and community actors.

The establishment of collective producer-responsibility organisations may be considered, provided the regulatory design clarifies institutional status, participation requirements, supervisory arrangements, and the relationship with local government. Collective implementation must not sever the underlying responsibility of individual producers. Where financing schemes involve mandatory levies, the legal basis and the nature of the charge must be established in advance by competent authority; implementing regulations cannot create public levies that exceed the powers conferred by statute.

On the public-service side, Article 24 of Law No. 18 of 2008 imposes financing obligations on both central and local government. This provision must be read together with the retribution framework in Law No. 1 of 2022 and the cleanliness-service provisions in Article 27(1)(b) and Article 29 of Government Regulation No. 35 of 2023. The combination of public finance, producer contributions, and user payments requires a clear separation of cost objects. Without such separation it becomes difficult to determine whether payments finance distinct services or repeatedly charge the same cost components.

Financing choices must also take account of affordability (Bashir et al., 2023; Ofori et al., 2026). Any proposal to link tariffs to waste volume presupposes accurate measurement, reliable service availability, and protective measures for households requiring support. This study does not prescribe specific tariff levels or new levy schemes. Reconstruction is directed instead toward a duty to disclose the cost basis and the quality of service delivered, so that any subsequent tariff adjustment can be assessed against the benefits actually received by the public. These requirements expose a further harmonisation deficit within the four-node chain: the producer-responsibility node remains insufficiently connected, both evidentially and financially, to local-government services and to the supervisory mechanisms needed to verify compliance.

Supervision and the Limits of Sanctioning Authority

Any renewal of supervisory arrangements must proceed from the current statutory framework, namely Law No. 32 of 2009 on Environmental Protection and Management as amended by Law No. 6 of 2023, together with Government Regulation No. 22 of 2021. Ministry of Environment/BPLH Regulation No. 6 of 2026 on Environmental Administrative Supervision and Sanctions, which entered into force on 15 June 2026 according to JDIH BPK metadata, constitutes the principal implementing instrument. Article 84 of that regulation repeals Minister of Environment and Forestry Regulation No. 14 of 2024. These instruments are relevant whenever household-waste management is conducted by a person in charge of a business or activity that falls within the scope of environmental supervision.

The provisions cannot be applied uniformly to every household without prior examination of the legal subject, the specific obligation alleged to have been breached, and the competence of the official empowered to act. Enforcement against treatment operators, area managers, producers, and individual citizens may rest on distinct legal bases. Regulatory reconstruction

must therefore preserve these distinctions. A formally more stringent sanction regime achieves little if the imposing official lacks authority or if the constitutive elements of the violation cannot be established by admissible evidence.

Supervision itself should assess the conformity of concrete actions with particular legal duties, and may even need to go beyond mere formal or administrative compliance (Yuliantari, 2026). The mere number of facilities constructed does not demonstrate that services are actually operating; the number of participants in outreach activities does not demonstrate sustained sorting practice. Administrative indicators remain useful only when they are linked to performance evidence. Accordingly, supervisory attention can usefully be directed toward material-receipt records, collection schedules, compliance with environmental requirements, and the follow-up of complaints, each examined within the scope of the relevant authority's competence.

With respect to individual citizens, the availability of service and the clarity of information supplied constitute relevant circumstances in any assessment of the proportionality of enforcement measures. This approach neither extinguishes existing legal obligations nor furnishes a justification for prohibited dumping. Its purpose is to prevent the consequences of service failure from being shifted entirely onto users. Where an activity poses a serious environmental threat, immediate action continues to be governed by the applicable legal bases; the ordinary sequence of guidance and warning may not be invoked to delay steps that the law itself requires. These requirements complete the examination of the four-node chain by showing that the supervisory node remains only partially connected to the preceding nodes of household obligation, local-government service, and producer responsibility. The resulting gaps in evidentiary standards, competence boundaries, and corrective linkages constitute the final set of harmonisation deficits that the proposed reconstruction seeks to address.

Reconstruction through an Auditable Chain of Obligations

The reconstruction proposed in this study responds directly to the title by advancing an auditable chain-of-obligations model. The model is built upon six elements that must remain traceable throughout the regulatory system: the actor, the specific obligation, the supporting service, the financing arrangement, the evidence of performance, and the corrective follow-up. These six elements constitute an analytical construct developed for the present inquiry; they are not presented as categories already codified as a single model in existing legislation. Their principal value lies in making visible the breakpoints between normative formulation and the concrete actions required for implementation and verification.

At the national level, strengthening of Government Regulation No. 81 of 2012 can be directed toward ensuring continuity of segregated services and enabling structured data exchange among actors. Subsequent national policy instruments should establish targets for the next period that distinguish reduction indicators from handling indicators (Haryana, 2022). Technical regulations may then elaborate operational requirements within the scope of their delegated authority, while regional regulations organise local delivery within constitutional competence. Amendment of primary legislation is warranted only when a policy choice demands new authority, a public levy,

or a liability regime that presently lacks an adequate statutory foundation; not every operational shortcoming requires new primary law.

Table 2 sets out normative indicators that can be used to test the readiness of any regulatory design. The indicators are analytical tools, not results of field measurement.

Table 2. Normative indicators for testing implementation readiness

Dimension	Test question	Evidence required
Clarity of obligation	Are the actor, the required action and the limits of responsibility specified?	Provisions and task allocation
Service continuity	Does sorted material have a corresponding service pathway?	Standards, schedules and processing destinations
Financing	Can funding sources and cost objects be distinguished?	Cost plans and payment bases
Producer responsibility	Can achievement claims be traced through to processing?	Material records and verification outcomes
Accountability	Do inspection and correction rest with competent officials?	Supervisory reports and follow-up actions
Public access	Can citizens use information and complaint channels?	Service information and complaint-resolution records

Source: Authors' analytical construction based on primary legal materials and the literature reviewed

The indicators in Table 2 operationalise the six-element chain. Clarity of obligation and service continuity address the household and local-government nodes; financing and producer-responsibility indicators secure the upstream and midstream linkages; accountability and public-access indicators complete the supervisory node. When any cell in the table cannot be answered with identifiable evidence, a breakpoint in the chain is exposed. The table therefore functions both as a diagnostic instrument for the existing framework and as a design checklist for the reconstructed model.

By way of illustrative drafting direction, implementing provisions could require service operators to publish standards that specify material categories, collection schedules, handover points, processing destinations, and procedures applicable when service is disrupted. Parallel norms could mandate material-flow recording that distinguishes source reduction, material recovery, energy recovery, and residual disposal. These formulations remain policy proposals that would still require calibration to the appropriate regulatory level and delegation; they are not quotations from positive law.

Implementation can proceed in sequenced stages: first, an inventory of existing obligations and the designation of responsible institutions; second, the alignment of service documents with budgetary allocations; third, the establishment of verification mechanisms that draw on shared data where the objects of regulation coincide, without erasing institutional competence; and finally, limited regional testing to assess administrative burden, facility adequacy, and behavioural response. This sequence maintains a clear relationship between normative strengthening and subsequent empirical validation.

Two foreseeable objections may be addressed within the model itself. The first concerns administrative burden. The response is not the multiplication of forms, but the simplification of recording to the evidence actually required to demonstrate compliance, with the level of detail scaled to the capacity and risk profile of each actor. The second concerns infrastructure cost. For that reason, the setting of service standards must be accompanied by lawful financing plans and phased delivery schedules. Operational flexibility remains bounded by environmental-protection requirements and by provisions that the legal order treats as non-derogable. In this form, the auditable chain-of-obligations model supplies the concrete reconstruction that the title of the study announces: a regulatory design in which the four nodes—household duty, local-government service, producer responsibility, and supervision—are linked by traceable, verifiable, and correctable obligations.

CONCLUSION

The regulatory construction of household waste management in Indonesia already supplies the essential elements of reduction, handling, producer responsibility, and supervision. The principal harmonisation deficits identified through normative analysis lie not primarily in hierarchical conflict but in the incomplete operational linkages among these elements—specifically the continuity between household sorting and local services, the coordination of reduction targets with energy-recovery feedstock requirements, the evidentiary connection of producer claims to actual material flows, and the alignment of supervisory competence with verifiable performance evidence. In response to the third research objective, this study advances an auditable chain-of-obligations model that systematically connects six traceable elements: the actor, the specific obligation, the supporting service, the financing arrangement, the evidence of performance, and the corrective follow-up. Theoretically, the model refines the concepts of regulatory harmonisation and normative effectiveness by treating effectiveness as the sufficiency of legal design for implementation and compliance verification rather than as observed behavioural outcomes. Practically, it offers regulators and regional governments a diagnostic and design checklist for ensuring that each regulatory node remains functionally linked, prioritising continuous segregated services, non-duplicative material-flow reporting, measurable producer responsibility, and authority-based enforcement.

As a normative-prescriptive inquiry confined to the national legal framework, the study does not test implementation empirically, measure compliance rates, or inventory regional regulations. These limitations define the boundary of its claims. Future research should therefore subject the auditable chain-of-obligations model to empirical examination across diverse regional settings, assessing whether the reconstructed design improves service continuity, reduces double-counting in reporting, strengthens producer accountability, and ultimately lowers environmental impact under varying administrative and infrastructural conditions.

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