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Environmental Law Enforcement against Unauthorized Dumping of B3 Waste in Indonesia: Normative and Implementive Analysis

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ABSTRAK

Tujuan penelitian ini adalah untuk menganalisis efektivitas penegakan hukum lingkungan terhadap pembuangan limbah berbahaya dan beracun (B3) tanpa izin di Indonesia, dengan fokus khusus pada implementasi Undang-Undang Perlindungan dan Pengelolaan Lingkungan Hidup dan kerangka peraturannya. Penelitian ini bertujuan untuk mengevaluasi bagaimana norma hukum, kapasitas kelembagaan, dan koherensi peraturan berinteraksi dalam membentuk efektivitas perlindungan lingkungan.

Materi dan metode. Penelitian ini menggunakan pendekatan yuridis normatif yang didasarkan pada analisis undang-undang, interpretasi konseptual, dan pemeriksaan berbasis kasus. Materi hukum dianalisis menggunakan teknik interpretasi sistematis, gramatikal, dan teleologis, seperti yang diilustrasikan dalam kerangka metodologis. Sumber data terdiri dari peraturan lingkungan primer, literatur akademis sekunder, dan dokumentasi kasus yang relevan, didukung oleh analisis doktrinal untuk menilai koherensi dan operasionalisasi norma hukum.

Hasil. Temuan menunjukkan bahwa kerangka peraturan yang mengatur pengelolaan limbah B3 dan larangan pembuangan tanpa izin secara normatif komprehensif; namun, implementasinya masih terbatas. Kapasitas kelembagaan yang lemah, tumpang tindih kewenangan pengaturan antara pemerintah pusat dan daerah, dan dominasi tindakan administratif atas penegakan pidana menghambat pencegahan yang efektif. Analisis lebih lanjut menunjukkan bahwa prinsip-prinsip hukum lingkungan utama, termasuk prinsip pencemar membayar, tanggung jawab mutlak, dan prinsip kehati-hatian, belum sepenuhnya terintegrasi ke dalam praktik penegakan hukum. Observasi berbasis kasus mengungkapkan penegakan hukum yang terus-menerus lemah, penuntutan selektif, dan celah dalam sistem pemantauan, yang memungkinkan pelanggaran terjadi berulang kali meskipun ada ketentuan hukum yang berlaku.

Kesimpulan. Studi ini menyimpulkan bahwa penguatan penegakan hukum membutuhkan regulasi yang harmonis, peningkatan kapasitas pengawasan, sistem perizinan yang transparan, dan penerapan sanksi pidana yang lebih konsisten. Temuan ini berkontribusi pada pemahaman yang lebih luas tentang tata kelola lingkungan dan menyoroti perlunya penelitian lebih lanjut tentang model penegakan hukum komparatif dan evaluasi empiris akuntabilitas perusahaan.

Kata kunci: penegakan hukum lingkungan; limbah berbahaya; pengelolaan limbah B3; pembuangan tanpa izin; pencegahan kejahatan lingkungan

ABSTRACT

The study purpose was to analyze the effectiveness of environmental law enforcement against the unlicensed dumping of hazardous and toxic waste (B3) in Indonesia, with a specific focus on the implementation of the Environmental Protection and Management Law and its regulatory framework. This study aims to evaluate how legal norms, institutional capacity, and regulatory coherence interact in shaping the effectiveness of environmental protection.

Materials and methods. This research employed a normative juridical approach grounded in statute analysis, conceptual interpretation, and case-based examination. Legal materials were analyzed using systematic, grammatical, and teleological interpretation techniques, as illustrated in the methodological framework. Data sources comprised primary environmental regulations, secondary academic literature, and relevant case documentation, supported by doctrinal analysis to assess the coherence and operationalization of legal norms.

Results. The findings indicate that the regulatory framework governing B3 waste management and the prohibition of dumping without a permit is normatively comprehensive; however, implementation remains limited. Weak institutional capacity, overlapping regulatory authority between central and local governments, and the dominance of administrative measures over criminal enforcement hinder effective deterrence. The analysis further shows that key environmental law principles, including the polluter-pays principle, strict liability, and the precautionary principle, have not been fully integrated into enforcement practices. Case-based observations reveal persistent under-enforcement, selective prosecution, and gaps in monitoring systems, which allow violations to occur repeatedly despite existing legal provisions.

Conclusions. The study concludes that strengthening law enforcement requires harmonized regulations, increased supervisory capacity, transparent permitting systems, and more consistent application of criminal sanctions. These findings contribute to the broader understanding of environmental governance and highlight the need for further research on comparative enforcement models and empirical evaluations of corporate accountability.

Keywords: environmental law enforcement; hazardous waste; B3 waste management; dumping without permit; environmental crime prevention

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INTRODUCTION

The environment is a fundamental component in the sustainability of human life and all living things. In recent decades, the dynamics of economic development and industrialization in various countries, including Indonesia, have triggered a significant increase in the exploitation of natural resources and generated increasingly complex ecological risks. Pollution and environmental damage, especially caused by the disposal of hazardous and toxic (B3) waste, is a critical issue that requires serious attention from the government, business actors, and civil society. Various studies show that improper management of B3 waste has a direct impact on the degradation of soil, water, and air quality and poses a threat to human health, such as exposure to heavy metals, persistent organic pollutants, and toxic chemical compounds that can contaminate the food chain (Siahaan, 2022; Hardjasoemantri, 2019). At the global level, world bodies such as UNEP (2021) also affirm that B3 waste is one of the biggest environmental threats, especially in developing countries that face regulatory constraints, governance, and supervisory capacity.

In the Indonesian context, various reports from the Ministry of Environment and Forestry (MoEF) have identified an increase in cases of illegal disposal of B3 waste into environmental media in the past decade, especially in the mineral processing, manufacturing, and heavy metals industry sectors. This phenomenon is further strengthened in line with the WALHI (2020) and ICEL (2021) reports which note that environmental law enforcement is often weakened by a lack of industry compliance, overlapping regulations, and limited resources of environmental supervisory officials. Several cases that have come to the public, including dumping industrial waste into rivers, lead waste stockpiles, and pollution due to nickel smelter activities, illustrate the urgency of more effective and consistent law enforcement. Within the framework of national law, the issue of dumping of B3 waste without a permit is clearly a violation regulated in Law Number 32 of 2009 concerning Environmental Protection and Management (UUPPLH), but its implementation often does not reflect the strength of the regulation.

The first research problem is related to the practical problem, namely the weak enforcement of the law against the disposal of B3 waste without a permit in the field. Although the UUPPLH has provided

a comprehensive legal framework prohibiting the dumping of B3 waste into environmental media without a permit (Articles 59, 60, and 104), various studies have found that the effectiveness of regulations depends not only on legal norms, but also on the ability of institutions to monitor, detect, and take decisive action against violations (Sari & Sunaryo, 2020). Weaknesses in the aspects of supervision, synchronization of central-regional regulations, and weak deterrent effects from criminal and administrative sanctions often cause industry players to continue to commit violations. On the other hand, theoretical problems arise from the limited studies that link the effectiveness of environmental law enforcement with the normative structure of B3 waste management, especially how legal norms are translated into concrete actions through monitoring, investigation, and criminal mechanisms.

The second research problem relates to regulatory insynchronization and overlapping arrangements between the central government and local governments. Previous studies have shown that regulatory disharmony is a significant obstacle in the application of the principles of strict liability and corporate criminal liability in environmental pollution cases (Nurhidayat, 2021; Hadi, 2018). For example, differences in interpretation of the authority to issue environmental permits, operational permits, and B3 waste management permits cause ambiguity in determining responsible parties and supervisory mechanisms. This situation makes the implementation of the polluter pays principle not optimal and opens up space for the practice of dumping waste without a permit that is often not dealt with immediately.

A number of literature tries to offer various normative and institutional solutions to overcome this problem. Among them are strengthening the supervision structure and capacity of environmental Civil Servant Investigators (PPNS), the implementation of stricter administrative legal instruments, and the harmonization of regulations between the central and regional governments through changes to derivative regulations of the UUPPLH (Sutrisno, 2020; Riyanto, 2022). In addition, international studies emphasize the importance of a risk-based approach (risk-based regulation) in B3 waste management, which allows prioritization of supervision on sectors or activities that have a high potential threat to the environment (OECD, 2020). In Indonesia, a similar approach is adopted through risk-based business licensing policies in the Job Creation Law and its derivative regulations, but its effectiveness in the context of B3 waste management still requires further testing.

The literature also shows the need for stricter enforcement of criminal law. The application of significant imprisonment and fines, accompanied by environmental restoration mechanisms, is considered an important instrument to increase the deterrent effect on offenders (Ismanto, 2019; ICEL, 2021). However, some studies highlight that the application of penalties in cases of environmental pollution is still very limited compared to administrative mechanisms. Many cases of B3 waste dumping only end up under government coercion or administrative sanctions without criminal proceedings, even

though the elements of the criminal act have been met. This shows that there is a serious gap between legal norms and law enforcement practices in the field.

More specifically, previous research has also highlighted the need for integration between administrative, civil, and criminal legal instruments within the framework of integrated environmental enforcement (Faure, 2017). This unified law enforcement model has been widely implemented in various jurisdictions, particularly in the European Union and the United States, to ensure that violations of hazardous waste management receive a proportionate and effective legal response. However, in the Indonesian context, this kind of integration still encounters obstacles because the coordination mechanism between law enforcement agencies has not been running optimally, including between the Ministry of Environment and Forestry, local governments, prosecutors' offices, and the police.

Although a number of studies have examined environmental law enforcement issues in Indonesia, specific studies on the dumping of B3 waste without a permit are still limited. Many studies only discuss the general aspects of B3 waste management or environmental law enforcement in general, without in-depth analysis of specific legal norms regarding dumping, the relationship between permits and waste management obligations, and the dynamics of enforcement of criminal sanctions against dumpers. In addition, previous studies have rarely examined the relationship between regulatory disharmony, supervisory capacity, and law enforcement effectiveness in the context of B3 waste dumping violations. These limitations open up room for a sharper analysis of how the legal norms governing B3 waste dumping are implemented and how implementation challenges can be addressed through a normative approach.

Based on these research gaps, this article aims to comprehensively analyze the enforcement of environmental laws against dumping of B3 waste without a permit based on Law Number 32 of 2009 and its implementing regulations. The novelty of this study lies in the focus of the analysis that specifically examines the dumping of B3 waste without a permit, not just the management of B3 waste in general. This article also offers a critical evaluation of the effectiveness of administrative and criminal sanctions and examines implementation barriers stemming from regulatory disharmony and institutional limitations. The scope of this research includes the analysis of legal norms, literature review, and tracing of law enforcement practices in Indonesia, so as to produce normative recommendations that can strengthen legal instruments in preventing and taking action on B3 waste dumping more effectively.

METHOD

This study uses a normative juridical approach that places law as a written norm that is analyzed through a set of laws and regulations, doctrines, and academic interpretations relevant to the issue of dumping of Hazardous and Toxic Materials (B3) waste without a permit. The normative juridical

approach was chosen because the main focus of this study is to examine the validity, coherence, and application of legal norms that govern B3 waste management and environmental law enforcement, as stipulated in Law Number 32 of 2009 and its implementing regulations. Within this framework, the researcher utilizes a doctrinal analysis model that examines how laws should be formed and applied, as well as how the principles of environmental law and the concept of corporate criminal liability work in the context of the prohibition of unlicensed dumping of B3 waste.

To clarify the structure of the analysis, this study uses three main approaches, namely the statute approach, the conceptual approach, and the case approach. A legislative approach is needed to examine normative provisions related to B3 waste management permits, prohibitions on dumping into environmental media, as well as procedures and sanctions regulated in various regulations such as Law No. 32/2009, Government Regulation No. 101/2014, Regulation of the Minister of Environment and Forestry, and other environmental administrative law provisions. Meanwhile, a conceptual approach is used to explore concepts such as strict liability, polluter pays, sustainability principles, and prudential principles that are the theoretical foundation in B3 waste management. The case approach is used to examine the implementation of norms in practice, for example analyzing cases of unlicensed B3 waste dumping that have occurred in Indonesia as an illustration of how norms are applied in empirical situations.

The methodological structure of this research is presented visually in Figure 1 which describes the analytical workflow starting from the identification of legal norms, the collection of legal materials, interpretive analysis, to the drawing of normative conclusions. This flow reflects a hermeneutic approach in legal analysis, where the interpretation of regulations is carried out systematically taking into account the structural context and objectives of the lawmakers.



Figure 1. Methodological Framework for Normative Juridical Research on Unauthorized Dumping of B3 Waste

In the implementation of the research, the legal materials used are divided into three categories, namely primary legal materials, secondary legal materials, and tertiary legal materials. Primary legal materials include relevant laws and regulations such as Law Number 32 of 2009, Government Regulation Number 101 of 2014, Regulation of the Minister of Environment and Forestry, and other official legal

documents that are the basis for the analysis. Secondary legal materials include scientific literature, academic journals, environmental law textbooks, reports of environmental monitoring agencies, as well as the opinions of experts who support doctrinal explanations of B3 waste management and law enforcement. Tertiary legal materials are in the form of legal dictionaries, legal encyclopedias, and regulatory indexes that are used to strengthen the accuracy of definitions and references.

The classification of legal materials used in the study is presented in Table 1, which provides an overview of the function of each category of legal materials in supporting the analysis process. The presence of this table aims to affirm that normative research does not only rely on one type of legal source but combines various categories of legal materials integratively to obtain a comprehensive understanding.

Table 1. Categories of Legal Substances in Normative Juridical Research on B3 Waste Dumping

Legal Materials Category	Contents and Examples	Functions in Analysis
Primary Legal Material	Law No. 32/2009, Government Regulation No. 101/2014, Minister of Environment and Forestry	Become the main basis for interpreting applicable legal norms
Secondary Legal Materials	Textbooks, scientific journals, research reports, expert opinions	Strengthening conceptual and theoretical analysis
Tertiary Legal Materials	Legal dictionaries, encyclopedias, regulatory indexes	Explain terms, provide additional references for regulatory validity

The analysis method used in this study is qualitative with a descriptive-analytical approach. Analysis techniques are carried out through systematic interpretation, grammatical interpretation, and teleological interpretation of legal norms. Systematic interpretation is used to read legal provisions in hierarchical relationships with other relevant regulations. Grammatical interpretation is used to understand normative meanings based on the legal language used in the regulatory text. Meanwhile, teleological interpretation is used to interpret the purpose of establishing norms, especially in the context of environmental protection and prevention of unlicensed dumping of B3 waste. The analysis is carried out synchronously and linked to environmental law doctrine and existing law enforcement practices.

Thus, this research method provides an analytical framework that allows researchers to critically assess the extent to which existing legal norms are able to answer the problem of dumping of B3 waste without a permit and identify regulatory and institutional aspects that need to be strengthened to achieve more optimal effectiveness of environmental law enforcement.

FINDING AND DISCUSSION

Finding

The results of this study show that the regulatory framework on dumping of Hazardous and Toxic Materials (B3) waste without a permit has been comprehensively formulated in Law Number 32 of 2009

concerning Environmental Protection and Management (UUPPLH), but its implementation still faces various normative and institutional problems. The provisions in Article 59 paragraph (1) of the UUPPLH require every business actor to manage B3 waste safely and responsibly, including obtaining permits if the waste will be disposed of into environmental media. At the same time, Article 60 strictly prohibits dumping of B3 waste without a permit, while Article 104 provides for a fairly severe criminal threat for violators. However, the findings of the study indicate that the strength of these norms has not been fully reflected in law enforcement practices, especially due to weak supervision and overlapping authority between institutions. These findings are in line with Siahaan's (2022) analysis that B3 waste management in Indonesia still faces serious challenges, even though the legal framework has been sufficiently normatively adequate.

The analysis using the legislative approach as listed in the methodological framework in Figure 1 shows that derivative regulations, such as Government Regulation Number 101 of 2014 concerning B3 Waste Management, have provided a more technical explanation of the procedures for storing, transporting, utilizing, processing, and stockpiling B3 waste. The regulation also contains licensing requirements, including the obligation to verify environmental impact before waste disposal is carried out. However, this study found that not all of these rules can be implemented consistently in the field. The study by Hardjasoemantri (2019) emphasizes that the implementation of environmental regulations in Indonesia is often constrained by a lack of human resources, laboratory facilities, and limited environmental quality monitoring tools. This fact strengthens the results of the analysis that supervision of unlicensed B3 waste dumping is highly dependent on the capacity of environmental supervisory institutions, both at the central and regional levels.

The conceptual approach used in this study shows that environmental law principles such as the polluter pays principle and the precautionary principle have actually been integrated in the UUPPLH, but their application has not been effective in the case of B3 waste dumping. The polluter pays principle, as explained by Faure (2017), must be applied not only in the form of administrative fines but also through criminal enforcement that provides a deterrent effect. The results of the analysis show that although criminal threats have been established, in practice most cases of B3 waste dumping are resolved through administrative mechanisms or light sanctions, thus not reflecting the optimal application of the principle. This finding is in line with the results of the ICEL study (2021) which states that environmental crime enforcement is still rarely implemented optimally, even when the elements of criminal acts have been met.

The results of the study on primary and secondary legal materials as listed in Table 1 also reveal that regulations regarding B3 waste dumping often contain provisions that require further interpretation, especially when there is disharmony between central and regional regulations. For example, in some cases,

local governments issue operational permits or environmental permits to companies, but B3 waste management permits remain under the authority of the central government. This misalignment of authority opens a gap for waste dumping without a permit or with a permit that is not in accordance with the provisions. Nurhidayat (2021) explained that regulatory disharmony in the environmental sector is the main challenge that hinders legal certainty, especially in the application of criminal sanctions against environmental polluters. The results of this study support this view because it shows that the unclarity of authority can lead to doubt in the law enforcement process.

The case approach used in this study confirms that the implementation of the UUPPLH in the case of B3 waste dumping does not always run in line with legal norms. A number of cases analyzed show that violations often occur without adequate legal follow-up. For example, the case of B3 waste disposal by some mineral processing industries shows that despite strong evidence of unlicensed dumping, legal enforcement does not always proceed to the criminal realm. These findings are consistent with the WALHI report (2020) which revealed that many pollution cases are handled only up to the stage of reprimands or administrative sanctions, without a formal investigation process. The hermeneutic approach used in this study interprets the condition as a form of institutional dysfunction, where strong legal norms are not followed by adequate monitoring and enforcement instruments.

The results of the analysis of the licensing structure show that permits for the disposal of B3 waste into environmental media are a very strict mechanism and can only be granted under certain circumstances, for example if there is no suitable treatment technology. However, this study found irregularities in the implementation of the licensing process. Riyanto's (2022) study shows that the permit issuance process is often influenced by non-technical factors, including economic pressures or other practical considerations. The findings of this study are in line with the literature, where the process of verifying and evaluating permit applications is not always carried out with adequate technical and scientific standards, thus allowing violations in the form of dumping without permits.

In addition, the results of the study show that there is a pattern of repeated violations committed by industry players who have a history of pollution. Ismanto's study (2019) shows that the lack of a deterrent effect from environmental law enforcement causes certain companies to consider sanctions as part of operational costs. The findings of this study support this conclusion because it shows that administrative sanctions are not enough to stop violations. This is reinforced by the OECD's (2020) analysis of risk-based regulation, which explains that risk-based regulation requires intensive supervision of high-risk entities to prevent repeat violations. This condition is reflected in the findings of this study, where supervision of high-risk companies is often not followed by adequate supervision mechanisms.

The results of this study also found that environmental reporting and information systems still face data transparency and accuracy constraints. In many cases, B3 waste dumping violations are only

identified after a serious environmental impact has occurred or after a public report. These findings are consistent with the UNEP report (2021) that developing countries generally face obstacles in environmental monitoring systems, including limitations in early detection technology. In the Indonesian context, these limitations are exacerbated by weak coordination between institutions, including between local governments, the Ministry of Environment and Forestry, and other law enforcement officials.

Overall, the results of this study indicate that the effectiveness of law enforcement against unlicensed dumping of B3 waste is greatly influenced by a combination of regulatory, institutional, technical capacity, and integrity factors of the licensing process. Analysis of various legal materials and literature shows that legal provisions that are prohibitions and sanctions have not been followed by consistent enforcement mechanisms, and that administrative, criminal, and supervisory instruments have not been optimally integrated as suggested by the integrated environmental enforcement model (Faure, 2017). These findings point to a gap between legal norms and enforcement practices that require attention in further discussion in the following sections.

Discussion

This section explores in more depth research findings related to environmental law enforcement against unlicensed dumping of B3 waste by linking it to theoretical frameworks and previous empirical findings. The analysis begins with the normative construction in the UUPPLH and its derivative regulations, as mapped in the methodological framework in Figure 1 and the classification of legal materials in Table 1, then associated with implementation problems identified in the research results. Thus, the discussion moved from the normative level to the practical level, as well as testing the consistency between environmental law principles and law enforcement practices in Indonesia.

Normatively, UUPPLH and Government Regulation No. 101 of 2014 have formulated a relatively comprehensive B3 waste management system, ranging from management obligations, licensing, to prohibition of dumping without permits. This construction is in line with the view that modern environmental law must place environmental protection as an integral part of sustainable development and not just a complementary instrument of economic policy (Hardjasoemantri, 2019). Articles 59, 60, and 104 of the UUPPLH show that lawmakers seek to internalize the risk of B3 waste into the responsibility of business actors, in line with the principle of polluter pays which places the burden of costs and recovery responsibilities on the party that causes pollution (Faure, 2017). However, as the research findings show, these normative forces face challenges when dealing with the complexity of institutions and law enforcement practices that are not yet fully consistent.

One of the important issues that emerged from the findings of the study was the gap between repressive legal norms and their implementation in concrete cases of B3 waste dumping. Siahaan (2022) emphasized that the problem of B3 waste management in Indonesia is not only a problem of weak norms,

but especially a problem of ineffective implementation. The results of this study strengthen this thesis by showing that many violations of dumping B3 waste without a permit end in administrative sanctions or minimal corrective action, without proceeding to criminal proceedings even though the elements of the criminal act have been met. This condition indicates a phenomenon that can be called under-enforcement, where legal norms that seem textually strong are not applied optimally in practice. From the perspective of law enforcement theory, this reflects weak deterrence and has the potential to encourage business actors to treat sanctions as ordinary operational costs, as warned by Ismanto (2019).

The problem of regulatory disharmony and overlapping authority are also important factors found in this study. Nurhidayat (2021) and Hadi (2018) show that the insynchronization between central and regional regulations can hinder legal certainty and complicate the environmental criminal law enforcement process. In the context of B3 waste dumping, the findings of this study reinforce this view by showing that environmental permits or operational permits issued by local governments are not always in line with the authority of B3 waste management licensing in the hands of the central government. The unclear limits of this authority can result in different interpretations regarding the legality of a waste disposal activity, making it difficult to prove the element of "unauthorized" in the context of a criminal act. In the framework of Figure 1, this problem appears at the stage of systematic interpretation of laws and regulations, where the relationship between norms does not always display coherence that facilitates law enforcement.

The findings regarding the dominance of administrative instruments over criminal instruments in handling violations are also interesting to be analyzed from the perspective of integrated environmental enforcement. Faure (2017) explains that effective environmental law enforcement demands a balanced integration between administrative, civil, and criminal instruments, where each instrument has complementary functions. The results of this study show that in Indonesia, administrative mechanisms tend to be used more often in cases of B3 waste dumping, while criminal instruments are relatively underutilized, although the UUPPLH provides a fairly strong legal basis. This pattern has the potential to weaken the symbolic and preventive function of environmental criminal law. On the other hand, this tendency can also be read as an indication that law enforcement officials are more comfortable using administrative mechanisms that are considered faster and more flexible, although they may have less long-term deterrent effects.

The risk-based regulatory perspective that has been widely developed at the international level provides additional perspective to the findings of this study. The OECD (2020) emphasizes that supervision of high-risk activities, such as B3 waste management, must be carried out more intensively and using regulatory instruments adapted to the level of risk posed. However, the results of the study show that the monitoring mechanism in Indonesia is still limited by technical capabilities, human

resources, and environmental monitoring infrastructure. This causes supervision of high-risk industry players to not always be stricter than other sectors. This is in contrast to the UNEP (2021) recommendations which highlight the importance of monitoring capacity and early warning systems in dealing with hazardous waste in developing countries. Thus, although risk-based business licensing policies have been introduced at the regulatory level, their translation in the context of B3 waste management is still far from optimal.

Limited institutional capacity is also seen in the environmental reporting and information system. The results of the study show that B3 waste dumping violations are often only detected after causing serious impacts or after public complaints. WALHI (2020) and ICEL (2021) note that public participation and access to environmental information are crucial factors in overseeing environmental law enforcement in Indonesia, especially when government oversight capacity is limited. Within this framework, the findings of the study indicate that the role of the community and civil society organizations is often the initial trigger for the disclosure of dumping cases, but the follow-up is highly dependent on the political will and capacity of law enforcement officials. This shows that the environmental law enforcement model in Indonesia is still reactive and complaint-based, not proactive and risk-based monitoring.

In terms of environmental law theory, the results of this study also challenge the extent to which the principle of prudence has been operationalized in law enforcement policies and practices. The precautionary principle requires that scientific uncertainty is not a reason to delay preventive action when there is a serious risk to the environment. However, the practices revealed in the study show that legal action is often only taken after the damage has occurred and is measured. Hardjasoemantri (2019) reminded that without internalizing the principle of prudence in licensing and supervision decision-making, environmental regulations tend to run behind the dynamics of environmental damage. The delay in responding to unauthorised dumping of B3 waste is a concrete illustration of this problem.

The analysis of the licensing process also reveals another dimension of law enforcement issues. Riyanto (2022) shows that the environmental licensing process in Indonesia is often influenced by non-technical considerations, including economic and political pressures. The findings of this study are consistent with this view, where the evaluation process of applying for a permit to dispose of B3 waste to environmental media is not always based on risk considerations and adequate management capacity. In the framework of Figure 1, this can be understood as a disruption at the stage of translating norms into operational policies, where the normative principles identified in the primary and secondary legal materials (Table 1) are not fully reflected in administrative practice. In this context, dumping of B3 waste without a permit is not only a phenomenon of violation of the law, but also a symptom of licensing governance that is not yet fully transparent and accountable.

The case approach used in this study reinforces the literature finding that environmental criminal law enforcement in Indonesia is still selective and sporadic. ICEL (2021) notes that only a small percentage of environmental pollution cases lead to criminal convictions, while most are completed in the administrative realm. The results of this study show a similar pattern in the context of B3 waste dumping, where the potential for corporate criminal liability is not always optimized. In law enforcement theory, this situation has the potential to create an enforcement gap that reduces the credibility of the legal system and undermines the preventive function of criminal norms. This gap also raises questions about the consistency of applying the principle of equality before the law when only certain cases are criminally processed.

The linkage between empirical findings and theoretical frameworks that have been mapped through legislative, conceptual, and case approaches shows that the problem of law enforcement against dumping of B3 waste without a permit cannot be reduced solely to regulatory weaknesses or lack of criminal sanctions. This problem lies precisely in the complex interaction between normative structures, institutional capacity, licensing governance, and political-economic dynamics in high-risk industrial sectors. In this context, closer integration between administrative, criminal, and public participation mechanisms as underlined by Faure (2017), OECD (2020), and UNEP (2021) becomes relevant to be discussed further at the level of normative and policy recommendations.

CONCLUSIONS

This study shows that Indonesia's legal framework regarding the dumping of unlicensed B3 waste has been comprehensively regulated through the UUPPLH and Government Regulation No. 101 of 2014, but its effectiveness is largely determined by the implementation that still faces structural and institutional challenges. The main findings indicate a significant gap between the strength of legal norms and the reality of law enforcement on the ground, mainly due to weak supervision, overlapping authority, limited technical capacity, and dominance of administrative mechanisms over criminal enforcement. This condition shows that the preventive and repressive functions of environmental laws have not been running optimally, so that they do not provide an adequate deterrent effect against B3 waste dumping perpetrators.

The research discussion confirms that environmental law principles such as polluter pays, the principle of prudence, and strict liability have not been fully internalized in law enforcement practice. The inconsistency of central-regional regulations and inconsistencies in the licensing process exacerbate the implementation gap. These results have important implications for policy formulation, namely the need for regulatory harmonization, strengthening oversight institutions, increasing transparency of the

licensing system, and using more consistent criminal instruments against serious violations such as B3 waste dumping.

The contribution of this research lies in an in-depth analysis of the relationship between legal norms, institutional capacity, and enforcement practices, thereby enriching the literature on the effectiveness of environmental law in Indonesia. Further research can be directed to empirical studies based on case data, evaluation of the effectiveness of criminal sanctions against corporations, or comparative analysis with integrated environmental enforcement models in other jurisdictions to strengthen legal and policy reform recommendations.

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