

Optimizing Law Enforcement Against Violations in Natural Resources Management

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Abstract

Effective law enforcement is essential to ensuring that natural resources are managed sustainably, equitably, and in accordance with environmental and constitutional principles. In Indonesia, however, natural resource management continues to face persistent violations, including illegal mining, illegal logging, environmental pollution, forest degradation, and irregularities in licensing processes. This study aims to examine the implementation of law enforcement against violations in natural resource management, identify the principal obstacles affecting its effectiveness, and formulate strategies for optimizing enforcement mechanisms. This study employs a normative juridical method using statutory and conceptual approaches. Data were obtained through a literature review of legislation, legal doctrines, academic publications, and other relevant legal sources. The findings indicate that law enforcement in natural resource management remains suboptimal due to regulatory overlap, weak interinstitutional coordination, limited supervisory capacity, inadequate law enforcement infrastructure, and weaknesses in institutional integrity. In addition, insufficient public legal awareness and limited deterrent effects of sanctions contribute to the persistence of violations. The study further finds that effective optimization requires regulatory harmonization, stronger coordination among law enforcement and regulatory institutions, improved professional capacity and integrity of officials, and the integration of digital technologies such as geographic information systems and satellite-based monitoring. Strengthening public participation and transparency is also essential to support accountability. These measures are expected to establish more effective, consistent, and sustainable natural resource governance.

1. Introduction

Natural resource management is a critical component of sustainable development because natural resources provide essential inputs for economic growth, public welfare, and environmental stability. Countries endowed with abundant forests, minerals, marine resources, and other ecological assets face a fundamental governance challenge: ensuring that resource utilization generates broad social and economic benefits without undermining ecological sustainability. Weak governance of natural resources can create excessive exploitation, environmental degradation, social conflict, revenue losses, and unequal distribution of benefits. Consequently, effective law enforcement has become an essential instrument for ensuring that natural resource utilization remains consistent with principles of sustainability, accountability, and social justice.

Indonesia provides an important context for examining this issue because its economic development is closely connected to the

utilization of natural resources. The constitutional foundation for natural resource governance is established in Article 33 of the 1945 Constitution, which requires natural resources to be controlled by the state and utilized for the greatest prosperity of the people. This constitutional mandate implies that the state has not only an administrative responsibility to regulate natural resource exploitation but also a legal responsibility to prevent activities that threaten environmental sustainability and public welfare. In practice, however, natural resource governance continues to encounter various forms of violations, including illegal mining, illegal logging, forest encroachment, environmental pollution, and irregularities in licensing and resource exploitation. These violations demonstrate that the existence of extensive legal instruments does not necessarily guarantee effective compliance or enforcement.

The problem is particularly significant because violations in natural resource

management generate consequences that extend beyond the immediate legal relationship between the state and offenders. Illegal extraction may reduce public revenues, accelerate ecological degradation, threaten biodiversity, and create long-term social and economic costs for local communities. Environmental violations can also disproportionately affect communities whose livelihoods depend directly on natural resources. Therefore, law enforcement in this sector should not be understood exclusively as a punitive mechanism. It should function simultaneously as a preventive, corrective, and restorative instrument capable of protecting environmental interests, ensuring legal certainty, and promoting equitable access to natural resource benefits.

From a legal perspective, the effectiveness of enforcement depends on the interaction between legal norms, institutional capacity, enforcement officials, infrastructure, community participation, and legal culture. Soekanto's framework emphasizes that law enforcement effectiveness is influenced by five interconnected factors: the law itself, law enforcement personnel, supporting facilities, society, and legal culture. This perspective is particularly relevant to natural resource governance because violations frequently involve multiple institutions, overlapping regulatory authorities, complex economic interests, and geographically dispersed activities. Consequently, the effectiveness of enforcement cannot be assessed solely by the existence or severity of statutory provisions. It must also be evaluated based on the capacity of institutions to implement those provisions consistently and transparently.

A further challenge concerns the fragmentation of regulatory and institutional arrangements governing natural resources. Environmental protection, forestry, mining, marine resources, land use, and licensing may involve different legal regimes and administrative institutions. Where coordination mechanisms are weak, differences in institutional mandates can create enforcement gaps, overlapping authority, or inconsistent responses to violations. Limited monitoring capacity further complicates the situation, particularly in remote areas where conventional supervision is costly and difficult to conduct continuously. At the same time, corruption, conflicts of interest, and inadequate institutional integrity may weaken the

impartiality and deterrent effect of law enforcement. These conditions create a potential gap between *law in the books* and *law in action*, in which formally comprehensive regulations are not fully translated into effective governance outcomes.

Technological development offers an additional opportunity to strengthen natural resource law enforcement. Geographic Information Systems (GIS), satellite imagery, remote sensing, digital licensing systems, and data-based monitoring can facilitate the identification of unauthorized activities and improve the accuracy and timeliness of regulatory responses. Nevertheless, technology alone cannot resolve structural weaknesses in enforcement. Digital monitoring must be supported by clear regulatory authority, institutional interoperability, competent personnel, reliable data, and mechanisms for transforming detected violations into effective legal action. Accordingly, technological innovation should be integrated into a broader governance framework rather than treated as an isolated enforcement solution.

Although previous legal and governance perspectives have extensively discussed environmental protection, natural resource governance, and law enforcement, an important analytical gap remains concerning how these dimensions can be integrated into a comprehensive optimization framework for addressing natural resource violations in Indonesia. Much of the existing discussion tends to examine individual sectors or specific regulatory instruments, while less attention is given to the interaction between regulatory harmonization, institutional coordination, enforcement capacity, technological monitoring, public participation, and deterrent sanctions. Addressing this gap is important because the complexity of natural resource violations requires a multidimensional enforcement strategy rather than reliance on criminal sanctions alone.

This study therefore aims to analyze the implementation of law enforcement against violations in natural resource management in Indonesia, identify the principal legal and institutional obstacles that limit enforcement effectiveness, and formulate strategies for optimizing enforcement within a framework of sustainable natural resource governance. The study adopts a normative juridical approach using statutory and conceptual approaches to examine relevant legal provisions, legal

doctrines, and scholarly perspectives. The analysis is guided by law enforcement theory, environmental law and sustainable development principles, and natural resource governance perspectives.

The contribution of this study lies in developing an integrated legal perspective that connects regulatory harmonization, institutional coordination, enforcement capacity, technological monitoring, public participation, and effective sanctions as complementary components of natural resource law enforcement. By placing law enforcement within the broader framework of sustainable governance, this study seeks to demonstrate that effective protection of natural resources requires not only stronger legal rules but also institutional capacity, accountability, transparency, technological adaptation, and meaningful community participation. Such an approach is expected to strengthen the capacity of the Indonesian legal system to prevent violations, improve enforcement consistency, and ensure that natural resource utilization contributes to long-term environmental sustainability and public welfare.

2. Literature Review

1. Law Enforcement in Natural Resource Management

Law enforcement is a fundamental instrument for ensuring that natural resource management is conducted within the boundaries of legal, environmental, and social responsibility. In the context of natural resource governance, law enforcement should not be understood solely as the imposition of criminal sanctions, but as an integrated process involving preventive supervision, administrative control, civil liability, criminal prosecution, and institutional coordination. The effectiveness of enforcement is therefore determined not only by the existence of legal norms but also by the capacity of institutions to translate those norms into consistent action.

Contemporary studies indicate that Indonesia has established relatively comprehensive legal instruments for regulating natural resource exploitation and environmental protection. Nevertheless, the

existence of regulations has not automatically resulted in effective compliance. Prasetyo and Diniyanto (2021) argue that environmental and natural resource protection in Indonesia continues to face an implementation gap between legal instruments and actual environmental conditions. Similarly, research on illegal mining demonstrates that administrative and criminal sanctions have been established, but enforcement remains constrained by limited supervision, institutional problems, and insufficient deterrent effects.

This situation reflects the distinction between *law in the books* and *law in action*. A regulatory framework can provide formal certainty while failing to produce substantive compliance when monitoring institutions are weak or when enforcement is selective. Therefore, effective natural resource law enforcement requires the integration of legal certainty, institutional capacity, accountability, and public participation.

The Indonesian context is particularly complex because natural resource violations frequently involve multiple actors, including individuals, corporations, local communities, government officials, and intermediary actors. Consequently, enforcement mechanisms must be capable of addressing not only direct perpetrators but also the institutional and economic structures that facilitate violations. Abdurrachman et al. (2021), for example, identify strong political backing for corporations, overlapping investigative authorities, and difficulties in obtaining evidence as significant obstacles to environmental law enforcement in Indonesia.

Thus, law enforcement in natural resource management should be conceptualized as a multidimensional governance mechanism consisting of legal regulation, institutional enforcement, preventive monitoring, sanctions, and social control.

2. Environmental Law, Sustainable Development, and Natural Resource Protection

Natural resource management cannot be separated from the principle of sustainable development. The exploitation of minerals, forests, land, water, and marine resources generates significant economic benefits but may simultaneously produce ecological degradation, social conflict, and intergenerational inequality. Consequently, environmental law functions as a mechanism for balancing economic utilization with ecological protection and social justice.

The sustainable development perspective requires natural resources to be managed in a manner that accommodates present needs without undermining the capacity of future generations to meet their own needs. Within this framework, environmental law should operate not merely as a mechanism for punishing environmental violations but also as a preventive instrument that establishes standards for responsible resource utilization.

Recent Indonesian studies reinforce the importance of integrating environmental protection into law enforcement. Dewantara and Larasati (2022) emphasize that environmental law enforcement has a broad dimension involving administrative, civil, and criminal mechanisms. They further argue that progressive environmental law should prioritize justice and public welfare rather than relying exclusively on formalistic legal approaches.

Illegal mining provides a particularly clear illustration of the relationship between environmental protection and law enforcement. Illegal mining can generate state revenue losses, unfair competition, land degradation, water pollution, biodiversity loss, and social impacts on surrounding communities. Redi (2023) therefore argues that illegal mining requires responsive law enforcement involving prevention, education, transparency, collaboration, community participation, and proportionate sanctions.

Accordingly, sustainable natural resource governance requires a shift from a predominantly reactive enforcement model toward a preventive and integrated model. Law

enforcement should intervene before environmental damage becomes irreversible while maintaining effective sanctions for violations that have already occurred.

3. Natural Resource Governance and Institutional Effectiveness

Natural resource governance refers to the institutional arrangements through which governments, businesses, communities, and other stakeholders determine how natural resources are accessed, utilized, monitored, and protected. Effective governance requires transparency, accountability, participation, institutional coordination, and enforcement capacity.

Institutional effectiveness is particularly important because natural resource management frequently involves overlapping authorities and sectoral regulations. Forestry, mining, environmental protection, spatial planning, marine resources, and regional government administration may involve different institutions with different mandates. Without effective coordination, regulatory fragmentation can create enforcement gaps and uncertainty.

Research on environmental crime in Indonesia indicates that overlapping institutional authority remains one of the major obstacles to effective enforcement. Abdurrachman et al. (2021) found that institutional overlap complicates investigation and contributes to difficulties in prosecuting environmental crimes, particularly when violations involve powerful corporate actors.

Similar problems can be observed in illegal mining enforcement. Wibisono and Ma'ruf (2021) report that law enforcement against illegal mining involves preventive and repressive measures, but implementation is constrained by irresponsible actors, inadequate facilities and infrastructure, and limited public legal awareness. Harinda et al. (2021) likewise emphasize the importance of coordination and integration among relevant institutions in addressing illegal mining.

From a governance perspective, these findings indicate that stronger regulations

alone are insufficient. Institutional arrangements must establish clear authority, information-sharing mechanisms, coordinated investigations, transparent licensing procedures, and effective accountability mechanisms. Therefore, the optimization of law enforcement requires institutional reform alongside regulatory strengthening.

4. Technology, Monitoring, and Evidence-Based Environmental Enforcement

The increasing complexity and geographical scale of natural resource exploitation require law enforcement agencies to adopt technological approaches. Conventional field inspections alone may be insufficient for detecting illegal logging, unauthorized mining, forest encroachment, land conversion, and other violations occurring across large or remote areas.

Geographic Information Systems (GIS), satellite imagery, remote sensing, digital licensing systems, drones, and other forms of environmental monitoring can strengthen the preventive and investigative dimensions of law enforcement. Technology can provide more timely information regarding changes in land cover, mining activities, forest loss, and environmental degradation, thereby enabling authorities to prioritize high-risk locations.

Evidence from international research demonstrates the potential of technology-based monitoring. Assunção et al. (2023) examined Brazil's DETER satellite monitoring system, which generates near-real-time deforestation alerts to support environmental enforcement. Their findings show that targeted monitoring and enforcement can significantly reduce deforestation, demonstrating that technological monitoring can increase the effectiveness of environmental enforcement when it is connected to institutional response mechanisms.

The implication for Indonesia is that technological innovation should not be viewed merely as an additional monitoring facility. Rather, it should become part of an integrated enforcement architecture in which data generated by satellite imagery, GIS, digital

licensing, and field inspections are connected to investigation, verification, and sanctioning processes.

However, technology alone cannot resolve institutional weaknesses. Digital monitoring is effective only when authorities possess the capacity, resources, legal authority, and institutional commitment to respond to detected violations. Consequently, technology should complement—not replace—professional law enforcement, institutional coordination, and community participation.

5. Deterrence, Compliance, and Community Participation

The effectiveness of natural resource law enforcement can ultimately be assessed through its ability to prevent violations and encourage voluntary compliance. Sanctions are important because they establish consequences for unlawful behavior, but deterrence depends on the perceived certainty, consistency, and proportionality of enforcement rather than on the severity of punishment alone.

In natural resource sectors, weak enforcement can create economic incentives for illegal exploitation. When the expected benefits of illegal activities exceed the perceived probability and cost of detection and punishment, actors may continue violating regulations. Therefore, an effective enforcement system must increase the certainty of detection and prosecution while ensuring that sanctions are proportionate to the environmental, economic, and social consequences of violations.

Recent studies of illegal mining in Indonesia demonstrate that the existence of criminal provisions does not necessarily produce sufficient deterrence. Research on illegal rock mining, for example, identifies weak regulatory implementation, limited local regulation, low community awareness, and insufficient deterrent effects as continuing problems. This suggests that sanction-oriented enforcement must be accompanied by preventive mechanisms, legal education, and community-based monitoring.

Community participation is particularly relevant because local communities are often the actors closest to natural resource areas. Public access to environmental information, complaint mechanisms, participatory monitoring, and protection for whistleblowers can strengthen social control over resource exploitation. Responsive enforcement should therefore position communities not merely as recipients of government policy but as active participants in natural resource governance. Redi (2023) emphasizes that collaboration between government, communities, and other stakeholders is necessary to address illegal mining and promote sustainable development.

6. Research Gap and Conceptual Synthesis

Previous studies have examined natural resource law enforcement from several perspectives, including illegal mining, environmental crime, administrative enforcement, institutional constraints, and progressive environmental law. However, the existing literature tends to examine these dimensions separately. Studies of illegal mining frequently focus on regulatory provisions and sanctions, while research on environmental law enforcement emphasizes institutional or procedural obstacles. Other studies highlight technological monitoring without fully integrating it into a broader institutional enforcement framework.

This creates a research gap concerning the development of an integrated model for optimizing natural resource law enforcement that simultaneously connects regulatory quality, institutional coordination, enforcement capacity, technological monitoring, deterrent sanctions, and community participation.

The present study addresses this gap by conceptualizing law enforcement effectiveness as the outcome of interaction among five major dimensions: (1) regulatory strengthening, (2) institutional coordination and enforcement capacity, (3) technology-based monitoring, (4) consistent and proportionate sanctions, and (5) community participation and legal awareness. These dimensions are expected to strengthen preventive, corrective, and

repressive enforcement mechanisms and ultimately support sustainable natural resource governance.

Based on the reviewed literature, the conceptual relationship can be formulated as follows:

3. Research Methodology

1. Research Design

This study employs a normative juridical research design to examine the optimization of law enforcement against violations in natural resource management in Indonesia. The normative juridical approach was selected because the study primarily analyzes legal norms, regulatory frameworks, legal principles, institutional arrangements, and the relationship between existing legal provisions and their implementation in natural resource governance. Rather than measuring law enforcement through statistical indicators, the study evaluates the adequacy, consistency, and effectiveness of the existing legal framework in addressing violations involving natural resources.

The analysis is structured around three interconnected dimensions: (1) the existing legal framework governing natural resource management and environmental protection, (2) institutional and practical constraints affecting law enforcement, and (3) strategies for strengthening law enforcement to support sustainable natural resource governance. This design enables the study to identify gaps between *law in the books* and *law in action* and subsequently formulate a more integrated enforcement framework.

2. Legal Approaches

Three complementary legal approaches are employed. First, the statutory approach (*statute approach*) is used to examine the hierarchy, substance, scope, and consistency of legislation governing natural resource management and environmental protection. The analysis primarily considers the 1945 Constitution of the Republic of Indonesia, particularly Article 33, as well as legislation concerning environmental protection, forestry,

mining, natural resource utilization, and related administrative and criminal sanctions.

Second, the conceptual approach (*conceptual approach*) is applied to examine legal concepts and theoretical perspectives relevant to law enforcement, environmental protection, sustainable development, good governance, and natural resource governance. This approach is used to construct an analytical framework for assessing the effectiveness of law enforcement beyond a purely punitive perspective.

Third, the case-oriented approach (*case approach*) is used selectively to examine documented patterns of natural resource violations and law enforcement practices reported in judicial decisions, official government documents, institutional reports, and relevant scholarly publications. The case-oriented analysis is intended to identify recurring enforcement problems, including regulatory overlap, weak institutional coordination, inadequate supervision, limited enforcement capacity, and insufficient deterrent effects.

3. Sources of Legal Materials

The study uses three categories of legal and supporting materials. Primary legal materials consist of the 1945 Constitution of the Republic of Indonesia, national legislation, implementing regulations, and relevant judicial decisions concerning natural resource management, environmental protection, forestry, mining, and related violations.

Secondary legal materials include peer-reviewed journal articles, academic books, legal commentaries, research reports, and scholarly studies addressing environmental law enforcement, natural resource governance, sustainable development, institutional effectiveness, and environmental compliance. Particular emphasis is placed on recent scholarly literature published during 2020–2026 to ensure that the analysis reflects contemporary developments in environmental governance and law enforcement.

Tertiary materials are used to clarify legal terminology, concepts, and references where

necessary. These materials include legal dictionaries, legal encyclopedias, and authoritative reference sources.

4. Data Collection Procedure

Legal materials were collected through systematic library research. Relevant legislation, judicial decisions, academic publications, institutional reports, and other authoritative documents were identified based on their relevance to natural resource violations and law enforcement. The literature search focused on keywords including *natural resource management, environmental law enforcement, illegal mining, illegal logging, environmental violations, natural resource governance, institutional coordination, environmental compliance, and sustainable development*.

The collected materials were subsequently classified according to their legal and analytical relevance. Primary legal materials were organized according to their regulatory hierarchy and substantive areas, while secondary materials were grouped according to major analytical themes, including regulatory effectiveness, institutional capacity, enforcement mechanisms, technological monitoring, sanctions, and community participation.

5. Data Analysis

The collected legal materials were analyzed using qualitative juridical analysis. The analysis was conducted through several stages. First, relevant legal norms and provisions were identified and interpreted according to their legal context. Second, the consistency between different regulatory instruments was examined to identify potential overlaps, gaps, or conflicts. Third, the implementation challenges identified in scholarly literature and documented cases were compared with the existing legal framework.

The analysis then applied the five-factor framework of law enforcement effectiveness, consisting of legal substance, law enforcement institutions and personnel,

supporting facilities, community factors, and legal culture. This framework was integrated with the principles of sustainable development and natural resource governance to evaluate whether existing enforcement mechanisms are capable of simultaneously achieving legal certainty, justice, environmental protection, and public welfare.

The final analytical stage involved legal argumentation and prescriptive analysis. Based on the identified regulatory and institutional gaps, the study formulates strategies for optimizing natural resource law enforcement. These strategies include regulatory harmonization, strengthening institutional coordination, improving the professional capacity and integrity of enforcement officials, expanding technology-based monitoring, strengthening proportionate sanctions, and increasing community participation.

6. Analytical Framework

The analytical framework of this study positions effective law enforcement as the central mechanism connecting natural resource regulation with sustainable governance. The framework consists of five principal dimensions: regulatory strengthening, institutional capacity and coordination, technology-based monitoring, effective sanctions, and community participation.

These dimensions are analyzed in relation to three principal stages of enforcement: preventive enforcement, corrective enforcement, and repressive enforcement. Preventive enforcement emphasizes supervision, licensing control, information disclosure, and public participation. Corrective enforcement focuses on investigation, administrative correction, environmental restoration, and civil liability. Repressive enforcement concerns criminal investigation, prosecution, adjudication, and the imposition of proportionate sanctions.

7. Validity of Legal Analysis

To maintain the reliability and academic rigor of the analysis, legal materials

were subjected to source verification, normative consistency analysis, and cross-source comparison. Primary legal materials were prioritized over secondary interpretations when determining the content and scope of legal obligations. Scholarly interpretations and empirical findings were subsequently used to contextualize the implementation of those legal norms.

Triangulation was conducted by comparing statutory provisions, judicial decisions, scholarly literature, and official institutional documents. This procedure reduces dependence on a single source and strengthens the validity of the legal arguments developed in the study. The conclusions were formulated only after the relevant legal norms and supporting evidence had been systematically compared and interpreted.

8. Ethical Considerations

As a normative juridical study based primarily on publicly accessible legal and scholarly materials, the research does not involve human participants, interviews, or personally identifiable information. Nevertheless, academic integrity was maintained through accurate attribution of legal sources, scholarly publications, judicial decisions, and institutional documents. Interpretations and normative recommendations are presented transparently to distinguish existing legal provisions from the authors' analytical arguments.

4. Results and Discussion

1. Implementation of Law Enforcement in Natural Resource Management

The normative analysis indicates that Indonesia has established a relatively comprehensive legal framework for regulating the utilization and protection of natural resources. Law enforcement is supported by administrative, civil, and criminal mechanisms, including regulations governing environmental protection, forestry, mining, and other natural resource sectors. The legal framework provides a formal basis for controlling exploitation, preventing environmental

degradation, and imposing sanctions against actors who violate applicable provisions. The 1945 Constitution also establishes a fundamental constitutional basis by requiring natural resources to be managed for the greatest prosperity of the people.

However, the existence of a comprehensive regulatory framework does not necessarily guarantee effective enforcement. The findings indicate a persistent gap between *law in the books* and *law in action*. Various violations, including illegal mining, illegal logging, forest-area destruction, environmental pollution, and misuse of business permits, continue to constitute significant challenges. This indicates that the central problem is not merely the absence of legal norms but the limited capacity to translate those norms into consistent and effective enforcement.

From the perspective of law enforcement theory, this finding confirms that legal effectiveness depends on the interaction of several factors rather than on the quality of legislation alone. The five factors identified by Soekanto—legal substance, law enforcement officials, facilities, society, and legal culture—provide an appropriate analytical framework for understanding the implementation gap. The current regulatory structure may provide formal legal certainty, but its effectiveness is weakened when enforcement institutions lack sufficient resources, coordination, integrity, and technological support.

The findings further indicate that natural resource violations cannot be addressed exclusively through criminal prosecution. Administrative enforcement is important in the early stages of violation, particularly through licensing control, environmental supervision, compliance orders, suspension or revocation of permits, and other corrective measures. Civil mechanisms are also important when environmental damage creates obligations for restoration or compensation. Criminal law should function as a final and strong enforcement instrument when violations cause serious environmental, economic, or social consequences.

This integrated approach is important because natural resource violations often generate multidimensional impacts. Illegal exploitation can simultaneously cause state losses, environmental degradation, social conflict, and unfair competition between compliant and non-compliant businesses. Therefore, an effective enforcement system should connect administrative supervision, civil liability, and criminal enforcement rather than treating them as isolated mechanisms.

The findings consequently demonstrate that the effectiveness of natural resource law enforcement should be assessed through three interconnected dimensions: preventive enforcement, corrective enforcement, and repressive enforcement. Preventive enforcement seeks to prevent violations through licensing, monitoring, information disclosure, and public participation. Corrective enforcement seeks to stop ongoing violations and restore damaged environmental conditions. Repressive enforcement seeks to impose appropriate sanctions on perpetrators and establish a credible deterrent effect.

2. Regulatory and Institutional Constraints

The study identifies regulatory fragmentation and institutional coordination as two of the most significant constraints on effective natural resource law enforcement. Natural resource management involves multiple sectors and government institutions, each possessing different regulatory mandates and enforcement responsibilities. When authority is distributed without sufficiently clear coordination mechanisms, overlapping jurisdiction and inconsistent implementation may occur.

The analysis shows that regulatory overlap can create uncertainty regarding institutional authority and enforcement procedures. This situation may produce delays in investigation, inconsistent responses to violations, and opportunities for actors to exploit gaps between different regulatory regimes. Therefore, regulatory harmonization should not merely seek to reduce the number of regulations but should clarify the

relationship between legal norms, institutional authority, licensing mechanisms, supervision, and sanctions.

Institutional coordination is equally important. The enforcement of natural resource regulations may involve the police, prosecutors, ministries or sectoral agencies, environmental authorities, local governments, and other institutions. The effectiveness of the enforcement process therefore depends on the ability of these institutions to exchange information, coordinate investigations, determine institutional responsibilities, and follow up on violations through an integrated process.

The findings support the proposition that institutional fragmentation can weaken enforcement even where substantive regulations are relatively strong. In other words, a strong legal framework can become ineffective when institutions responsible for implementing it operate in isolation. This finding reinforces the relevance of the natural resource governance perspective, which emphasizes transparency, accountability, institutional coordination, and participation as essential elements of effective governance.

A more effective institutional arrangement therefore requires clear division of responsibilities combined with mechanisms for coordination. A coordinated enforcement model could include joint monitoring, integrated databases, shared information systems, coordinated investigations, and institutional mechanisms for resolving jurisdictional disputes. Such arrangements would reduce duplication and ensure that violations are followed through from detection to enforcement and, where necessary, environmental recovery.

3. Capacity, Integrity, and Professionalism of Law Enforcement Officials

Another major finding concerns the capacity and integrity of law enforcement officials. Natural resource violations often involve technically complex activities, geographically dispersed locations, specialized licensing arrangements, and substantial

economic interests. Consequently, conventional enforcement capacity may be insufficient when officials lack specialized knowledge, investigative skills, technological capabilities, or adequate operational resources.

The analysis indicates that strengthening human resources should therefore become an essential component of natural resource law enforcement. Law enforcement officials need multidisciplinary competencies covering environmental law, mining and forestry regulations, environmental impact assessment, financial investigation, digital evidence, spatial analysis, and environmental damage assessment.

Professional capacity, however, must be accompanied by institutional integrity. The findings indicate that corruption and conflicts of interest may undermine enforcement, particularly in licensing and natural resource utilization. Where enforcement decisions can be influenced by economic or political interests, the credibility of legal institutions is weakened and the deterrent effect of sanctions becomes limited.

This problem has implications beyond individual cases. Selective or inconsistent enforcement may create the perception that legal compliance is less beneficial than illegal exploitation. Such a situation can encourage strategic non-compliance, particularly when economic gains from violations are substantial and the probability of detection or punishment is perceived as low.

Therefore, optimization requires not only additional personnel and training but also stronger integrity mechanisms. These may include transparent licensing procedures, conflict-of-interest controls, internal supervision, accountability mechanisms, digital records of enforcement actions, and independent oversight. Institutional integrity should be treated as an integral element of environmental governance rather than as a separate administrative concern.

4. Limitations of Conventional Monitoring and the Role of Technology

The findings further demonstrate that limitations in monitoring facilities contribute

to weak enforcement. Natural resource violations frequently occur in large, remote, or difficult-to-access areas. Reliance exclusively on conventional field inspections makes continuous monitoring difficult and may delay the detection of illegal activities.

Technology-based monitoring provides an opportunity to strengthen the preventive dimension of enforcement. Geographic Information Systems (GIS), satellite imagery, remote sensing, drones, digital licensing systems, and integrated monitoring platforms can assist authorities in identifying changes in land use, forest cover, mining activities, and other potentially unlawful activities.

However, technology should not be understood as an independent solution. Digital monitoring produces useful information only when institutions possess the capacity to verify alerts, conduct investigations, and initiate appropriate legal responses. The effectiveness of technology therefore depends on the existence of an institutional chain connecting detection, verification, investigation, enforcement, and environmental recovery.

The study consequently proposes an integrated technology-based enforcement model. Under this model, spatial and environmental data are continuously monitored, potential violations are automatically identified or reported, field officers verify the findings, and verified violations are transferred to the appropriate enforcement institution. The resulting legal process should then be documented in an integrated system so that enforcement outcomes can be evaluated.

Such an approach could improve transparency and accountability because enforcement decisions would be supported by documented evidence. It could also enable authorities to move from predominantly reactive enforcement toward risk-based preventive monitoring. Areas with high environmental vulnerability or a history of violations could receive greater monitoring intensity and institutional attention.

5. Community Participation and Legal Culture

The findings also demonstrate that law enforcement cannot be separated from community factors and legal culture. Communities living in or around natural resource areas are often directly affected by resource exploitation. They may therefore function as important sources of information regarding illegal activities, environmental damage, and conflicts associated with resource utilization.

Nevertheless, community participation requires meaningful institutional mechanisms. Public involvement should not be limited to general consultation but should include access to environmental information, reporting mechanisms, participatory monitoring, and appropriate protection for individuals who report violations.

From the perspective of Soekanto's framework, community awareness and legal culture influence the extent to which legal norms are accepted and followed. Where violations become socially normalized because of economic dependence, limited legal awareness, or weak government presence, formal regulation may have limited practical impact.

This suggests that legal enforcement should be complemented by legal education and community empowerment. Communities should understand the legal consequences of illegal exploitation as well as the environmental and social consequences of resource degradation. At the same time, the government should ensure that legal compliance does not impose disproportionate economic burdens on vulnerable communities.

Community participation therefore serves two functions. First, it strengthens social monitoring and increases the probability that violations will be detected. Second, it strengthens the legitimacy of natural resource governance by providing affected communities with opportunities to participate in decisions concerning resources that directly affect their livelihoods.

6. Deterrent Effect and the Consistency of Sanctions

One of the central findings is that existing enforcement has not generated a sufficiently strong deterrent effect. The problem does not necessarily arise from the absence of sanctions but from their inconsistent application and the perceived uncertainty of detection and punishment.

An effective deterrence system requires sanctions that are certain, timely, proportionate, and consistently applied. Excessively severe sanctions that are rarely imposed may have less practical deterrent value than proportionate sanctions that are consistently enforced. Consequently, optimization should prioritize the certainty and consistency of enforcement while maintaining proportionality according to the seriousness of the violation and the magnitude of environmental and social harm.

Sanctions should also be linked to environmental restoration. In cases involving environmental damage, punishment alone may not restore ecological functions. Enforcement should therefore incorporate restoration obligations, compensation, remediation, and recovery of environmental losses where legally appropriate.

This approach reflects the broader principle of sustainable development. The purpose of environmental law enforcement is not merely to punish perpetrators but also to prevent further damage, restore affected environments, protect communities, and ensure that natural resources remain available for future generations.

7. Optimization Strategy for Natural Resource Law Enforcement

Based on the preceding findings, the optimization of natural resource law enforcement requires an integrated strategy rather than a single institutional or regulatory intervention. Five strategic priorities emerge from the normative analysis.

First, regulatory harmonization is required to reduce inconsistencies and clarify institutional authority. Relevant regulations should be reviewed systematically to identify overlapping provisions, contradictory

requirements, and enforcement gaps. Harmonization should strengthen legal certainty while maintaining the environmental protection objectives of natural resource regulation.

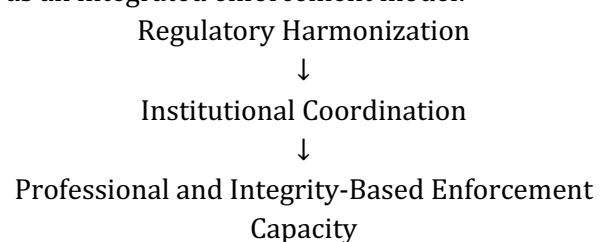
Second, institutional integration should be strengthened through formal coordination mechanisms. Enforcement institutions should develop shared information systems, coordinated monitoring procedures, and mechanisms for joint action against violations involving multiple sectors. This is particularly important for cases where environmental, mining, forestry, licensing, and criminal law issues overlap.

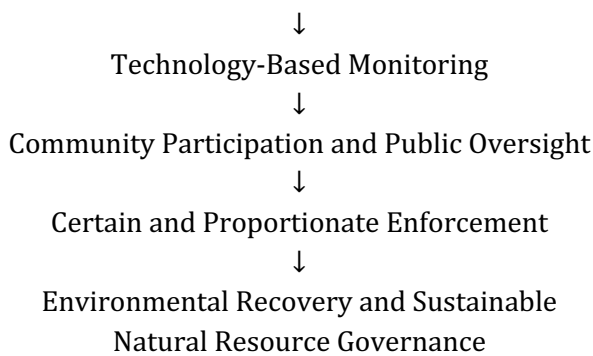
Third, professional and integrity-based capacity building should be prioritized. Law enforcement officials require specialized environmental and natural resource competencies, supported by adequate facilities and continuous professional development. At the same time, institutional integrity should be reinforced through transparency, accountability, conflict-of-interest controls, and effective internal and external oversight.

Fourth, technology-based monitoring should be incorporated into the enforcement system. GIS, satellite imagery, remote sensing, drones, and digital licensing platforms can strengthen early detection and evidence gathering. However, these technologies should be integrated with institutional response mechanisms so that detected violations result in timely verification and enforcement.

Fifth, community participation and public accountability should be strengthened. Public access to environmental information, complaint mechanisms, participatory monitoring, and legal education can increase social oversight and improve the legitimacy of natural resource governance.

These five strategies can be represented as an integrated enforcement model:





The model indicates that optimization is a systemic process. Strengthening only one component—for example, increasing sanctions without improving monitoring—may not substantially improve enforcement effectiveness. Similarly, adopting advanced monitoring technology without institutional coordination may produce information without effective legal action.

8. Integrated Discussion: From Reactive Enforcement to Sustainable Governance

The overall findings indicate that the central challenge of natural resource law enforcement in Indonesia is the transformation of a predominantly reactive enforcement model into an integrated governance-based model. The current legal framework provides a substantial normative foundation, but implementation remains constrained by regulatory fragmentation, institutional coordination problems, limited capacity, inadequate monitoring, integrity risks, and weak community participation.

The findings are consistent with the five-factor theory of law enforcement because the identified problems are distributed across legal substance, law enforcement institutions, facilities, society, and legal culture. However, the analysis also demonstrates that these factors are interconnected. Regulatory uncertainty can weaken institutional coordination; weak coordination can reduce enforcement certainty; inadequate facilities can limit monitoring; and low public participation can reduce the detection of violations.

The sustainable development perspective further expands the objective of

enforcement. Law enforcement should not be evaluated solely according to the number of investigations, prosecutions, or sanctions imposed. Its effectiveness should also be assessed according to whether it reduces environmental harm, improves compliance, protects community interests, restores damaged ecosystems, and ensures equitable and sustainable utilization of natural resources.

Therefore, the optimization of law enforcement requires a shift from a sanction-centered approach toward a compliance- and governance-centered approach. Sanctions remain necessary, particularly for serious and deliberate violations, but they should operate within a broader system of prevention, monitoring, institutional coordination, public participation, and environmental restoration.

In this context, effective natural resource law enforcement can be conceptualized as the outcome of the interaction between strong legal norms, capable and accountable institutions, adequate enforcement infrastructure, technological monitoring, community participation, and consistent sanctions. Such an integrated approach is more consistent with the constitutional objective of utilizing natural resources for public prosperity while maintaining environmental sustainability.

Overall, the study finds that optimizing law enforcement is not primarily a matter of producing additional regulations. It requires improving the capacity of the legal system to convert existing norms into consistent institutional action. The central policy implication is therefore the development of an integrated enforcement architecture that connects regulation, institutional coordination, technology, sanctions, public participation, and environmental recovery within a single sustainable natural resource governance framework.

5. Conclusion

1. Conclusions

This study concludes that law enforcement against violations in natural

resource management in Indonesia has not yet achieved optimal effectiveness. Although Indonesia possesses a relatively comprehensive legal framework covering environmental protection, forestry, mining, and other natural resource sectors, the implementation of these legal norms continues to face significant challenges. The persistent occurrence of illegal mining, illegal logging, environmental pollution, forest-area destruction, and licensing violations demonstrates a continuing gap between *law in the books* and *law in action*. The findings indicate that effective enforcement depends not only on the availability of legal regulations but also on institutional capacity, enforcement infrastructure, public participation, and legal culture.

2. Regulatory and Institutional Implications

The study identifies regulatory fragmentation and weak inter-institutional coordination as major factors limiting enforcement effectiveness. Multiple institutions with overlapping responsibilities may create uncertainty concerning authority, information exchange, investigation, and follow-up actions. Therefore, regulatory harmonization and clearer institutional mandates are required to establish a more coherent enforcement system. Institutional coordination should be strengthened through integrated monitoring, information sharing, joint enforcement mechanisms, and transparent accountability procedures. These measures are essential to ensure that natural resource violations can be addressed consistently from detection through investigation, prosecution, sanctioning, and environmental recovery.

3. Policy and Enforcement Recommendations

The optimization of law enforcement requires a shift from a predominantly reactive and sanction-oriented model toward an integrated preventive, corrective, and repressive enforcement system. First, regulatory harmonization should be undertaken to minimize normative conflicts

and enforcement gaps. Second, the capacity, professionalism, and integrity of law enforcement officials should be strengthened through specialized training, adequate facilities, and stronger accountability mechanisms. Third, sanctions should be applied with greater certainty, consistency, proportionality, and timeliness to strengthen their deterrent effect. Enforcement should also incorporate environmental restoration and compensation mechanisms where natural resource violations cause ecological or social harm.

4. Technological and Community-Based Governance

Technology and community participation should become integral components of natural resource law enforcement. Geographic Information Systems, satellite imagery, remote sensing, drones, and digital licensing and monitoring systems can improve the early detection and documentation of potential violations, particularly in geographically extensive and difficult-to-monitor areas. Nevertheless, technological monitoring will only be effective when supported by institutional capacity and timely legal responses. At the same time, community participation should be strengthened through access to environmental information, reporting mechanisms, participatory monitoring, legal education, and public oversight. Combining technological capacity with community-based monitoring can increase transparency, accountability, and the probability of detecting violations at an early stage.

5. Limitations and Future Research

This study is subject to several limitations. As a normative juridical study, its analysis primarily relies on legislation, legal principles, scholarly literature, and documented enforcement practices rather than primary empirical data collected through interviews, surveys, or direct field observations. Consequently, the study provides a normative and conceptual assessment of law

enforcement but does not quantitatively measure the effectiveness of individual enforcement institutions or specific enforcement programs.

Future research should therefore complement normative legal analysis with empirical and comparative approaches. Field-based studies could examine the implementation of natural resource law enforcement at the provincial and district levels, including the experiences of law enforcement officials, local governments, communities, and affected businesses. Quantitative research could further assess the relationship between monitoring capacity, enforcement certainty, sanctions, and compliance outcomes. Comparative studies across natural resource sectors or jurisdictions could also identify institutional models that are more effective in preventing violations and promoting sustainable resource governance. Such research would strengthen the empirical foundation for developing an integrated, accountable, technology-enabled, and sustainable natural resource law enforcement system.

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