

Optimization of Environmental Crimes as a Criminal Law Instrument in Disaster Risk Reduction

Agus Adhitama, Fitri Rafianti, Henry Aspan

Abstract

Environmental degradation caused by unlawful human activities has increasingly contributed to disaster risks in Indonesia. Environmental crimes such as illegal logging, land burning, illegal mining, and industrial pollution have weakened ecological resilience and intensified floods, landslides, forest fires, and other environmental disasters. This study examines two main issues: the optimization of environmental criminal law as an instrument for disaster risk reduction and the factors hindering effective environmental law enforcement in Indonesia. The research employs a normative juridical method using statutory, conceptual, and case approaches supported by legislation, peer-reviewed journals, official reports, and legal doctrines. The findings reveal that environmental criminal law possesses strategic potential in disaster mitigation through preventive and repressive legal mechanisms, particularly through stricter sanctions, stronger corporate criminal liability, and integrated environmental governance. However, law enforcement remains ineffective due to institutional overlap, limited law enforcement capacity, difficulties in proving environmental crimes, socio-economic pressures, and political influence. The study further finds that vulnerable communities are disproportionately affected by environmental destruction and disasters, requiring a more humanistic and justice-oriented legal approach. Therefore, this study recommends strengthening institutional coordination, enhancing environmental law enforcement capacity, integrating disaster mitigation policies with criminal law enforcement, and promoting community participation and environmental justice to achieve sustainable environmental governance in Indonesia.

Keywords: *Environmental Crime, Criminal Law, Disaster Risk Reduction, Environmental Justice, Environmental Governance.*

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Introduction

Environmental degradation in Indonesia has increasingly demonstrated a direct correlation with the escalation of disaster risks, both in frequency and intensity. This phenomenon is not merely a natural occurrence but is significantly influenced by anthropogenic activities, particularly those that violate environmental laws. Practices such as illegal logging, land burning, mining without permits, and improper waste disposal have contributed to ecological imbalance, ultimately exacerbating disasters such as floods, landslides, and forest fires. In this context, environmental crimes should not only be viewed as regulatory violations but also as acts that systematically increase disaster vulnerability.

Data published by Indonesia's National Disaster Management Authority (BNPB) indicates that throughout 2023, Indonesia experienced more than 3,500 disaster events, with floods accounting for the majority of cases, followed by landslides and forest fires [1]. Many of these disasters were linked to environmental mismanagement, including deforestation and land-use change. For instance, extensive flooding in several regions of Sumatra and Kalimantan has been associated with the conversion of forest areas into plantations and mining zones, which disrupt natural water absorption systems [2]. These findings suggest that environmental degradation caused by unlawful activities significantly contributes to disaster risk escalation.

From a legal perspective, Indonesia has established a framework through Law Number 32 of 2009 on Environmental Protection and Management, which incorporates criminal sanctions as a means of enforcing environmental norms. However, the effectiveness of environmental criminal law enforcement remains questionable. Empirical studies reveal that enforcement is often inconsistent, with limited prosecution of corporate actors and relatively lenient sanctions imposed on offenders [3]. This condition reflects a gap between normative legal provisions and their practical implementation, thereby weakening the deterrent effect of criminal law.

Moreover, environmental crimes are frequently treated as administrative violations rather than serious criminal offenses, despite their substantial social and ecological impacts. This paradigm undermines the preventive and repressive functions of criminal law. In disaster-prone regions, weak law enforcement allows environmentally destructive practices to persist, increasing the likelihood of catastrophic events. For example, recurrent forest and peatland fires in Indonesia have been linked to illegal land-clearing practices, which continue due to insufficient legal accountability [4].

The urgency of optimizing environmental criminal law lies in its potential to function as an instrument for disaster risk reduction. Criminal law, when effectively enforced, can serve as both a deterrent and a corrective mechanism, ensuring that individuals and corporations comply with environmental standards. The concept of "penal policy" emphasizes that criminal law should be strategically utilized to address socially harmful behaviors, including environmental destruction that leads to disasters [5].

Thus, the central issues that arise are, first, how environmental criminal law can be optimized as an instrument to reduce disaster risks, and second, what factors hinder the effective enforcement of environmental criminal provisions in Indonesia. Addressing these issues requires not only normative legal analysis but also a contextual understanding of enforcement challenges, including institutional capacity, regulatory overlap, and socio-economic pressures.

A humanistic approach to environmental law enforcement is also essential. Communities affected by environmental crimes often suffer long-term consequences, including loss of livelihood, displacement, and health risks. Therefore, optimizing environmental criminal law should not merely focus on punishment but also on protecting vulnerable populations and ensuring environmental justice. In this regard, strengthening criminal enforcement mechanisms, enhancing inter-agency coordination, and increasing public participation are crucial steps toward reducing disaster risks and achieving sustainable environmental governance.

Literature Review

1. Environmental Crime as a Structural Cause of Disaster Risk

Environmental crime is increasingly recognized not merely as a legal violation but as a structural driver of ecological vulnerability and disaster risk. Within the framework of environmental criminology, harmful environmental practices such as illegal logging, unlawful mining, and land burning are categorized as forms of “green crime,” which produce both direct and indirect harm to ecosystems and communities. These harms often accumulate over time, leading to environmental degradation that weakens natural resilience against disasters [6].

The relationship between environmental crime and disaster risk can be understood through the lens of ecological imbalance. When forests are cleared illegally or wetlands are converted into industrial land, the natural capacity of ecosystems to regulate water, stabilize soil, and absorb carbon emissions is significantly reduced. As a result, disasters such as floods and landslides become more frequent and severe. Research has shown that deforestation and environmental exploitation are closely linked to increased disaster exposure, particularly in developing countries where regulatory enforcement remains weak [7].

From a humanistic perspective, the consequences of environmental crime extend beyond environmental damage. Communities living in vulnerable areas often bear the greatest burden, experiencing loss of homes, livelihoods, and even lives. This underscores the need to reposition environmental crime as a serious threat to human security, rather than a peripheral regulatory issue.

2. The Role of Criminal Law in Environmental Protection

Criminal law serves as a critical instrument in environmental protection by providing sanctions that aim to deter harmful conduct and ensure accountability. Theoretically, the function of criminal law in this context can be explained through the concept of deterrence, which posits that the threat of punishment can prevent individuals and corporations from engaging in illegal activities. However, deterrence is only effective when enforcement is consistent, sanctions are proportionate, and legal institutions operate effectively [8].

In environmental law, criminal sanctions are often considered a last resort (*ultimum remedium*), used when administrative and civil measures fail. However, in cases where environmental harm leads to significant public risk, including disasters, the application of criminal law should shift toward a more proactive and central role. Scholars argue that environmental crimes with large-scale impacts require stronger penal intervention to reflect the gravity of harm caused [9].

Furthermore, the concept of corporate criminal liability is particularly relevant in environmental cases, as many environmentally destructive activities are conducted by corporate entities. The challenge lies in ensuring that corporations, not just individuals, are held accountable. Effective criminal law enforcement must therefore incorporate mechanisms to investigate, prosecute, and sanction corporate actors, including through fines, asset seizure, and operational restrictions [10].

3. Penal Policy and the Optimization of Environmental Criminal Law

Penal policy refers to the strategic use of criminal law to achieve broader social objectives, including environmental sustainability and disaster risk reduction. According to this perspective, criminal law should not only punish wrongdoing but also contribute to the prevention of harm by shaping behavior and reinforcing societal norms [11].

The optimization of environmental criminal law involves several dimensions. First, it requires clear and comprehensive legal norms that define environmental crimes and their corresponding sanctions. Second, it necessitates effective enforcement mechanisms, including well-trained law enforcement officers, specialized environmental courts, and adequate resources for investigation and prosecution. Third, it involves coordination among various institutions, such as environmental agencies, police, and prosecutors, to ensure a unified approach [12].

Importantly, penal policy must also consider proportionality and justice. Excessive reliance on punitive measures without addressing underlying socio-economic factors may lead to ineffective outcomes. Therefore, a balanced approach that combines criminal sanctions with preventive measures, such as environmental education and community engagement, is essential.

4. Challenges in the Enforcement of Environmental Criminal Law

Despite the existence of legal frameworks, the enforcement of environmental criminal law often faces significant challenges. One of the primary obstacles is the complexity of environmental cases, which require scientific evidence and technical expertise. This complexity can hinder the investigation and prosecution process, leading to low conviction rates [13].

Another challenge is institutional fragmentation. In many jurisdictions, environmental governance involves multiple agencies with overlapping responsibilities, resulting in coordination difficulties. This fragmentation can create gaps in enforcement, allowing environmental crimes to go unpunished. Additionally, corruption and political interference may further weaken the integrity of law enforcement processes [14].

Socio-economic factors also play a role in shaping enforcement outcomes. In some cases, local communities depend on environmentally harmful activities for their livelihoods, making strict enforcement politically and socially sensitive. As a result, authorities may be reluctant to impose severe sanctions, thereby reducing the effectiveness of criminal law as a deterrent [15].

5. Humanistic Approach to Environmental Justice and Disaster Risk Reduction

A humanistic approach to environmental law emphasizes the protection of human dignity, well-being, and social justice. In the context of environmental crime and disaster risk, this approach recognizes that vulnerable communities are disproportionately affected by environmental degradation. Therefore, legal responses should prioritize the protection of these communities and ensure that their rights are upheld [16].

Environmental justice theory highlights the need for equitable distribution of environmental benefits and burdens. It also calls for meaningful participation of affected communities in decision-making processes. Integrating this perspective into criminal law enforcement can enhance its legitimacy and effectiveness, as it aligns legal measures with the lived realities of those most impacted [17].

In addition, restorative justice principles can complement traditional punitive approaches by focusing on repairing harm and restoring relationships between offenders, victims, and communities. In environmental cases, this may involve ecological restoration, compensation for affected populations, and commitments to sustainable practices. Such measures can contribute to long-term disaster risk reduction by addressing both the causes and consequences of environmental harm.

Research Methodology

This research employs a normative juridical method to examine the optimization of environmental criminal law as an instrument for disaster risk reduction in Indonesia. The normative juridical approach is used because this study focuses on legal norms, legal principles, doctrines, and regulations related to environmental protection, criminal law enforcement, and disaster management. Through this method, the research analyzes the adequacy of existing legal frameworks in responding to environmental crimes that contribute to ecological degradation and disaster vulnerability. The approach is considered relevant because environmental destruction is not only a technical environmental issue but also a legal and social problem requiring comprehensive legal analysis [18].

The research applies several approaches simultaneously, namely the statutory approach, conceptual approach, and case approach. The statutory approach is conducted by analyzing regulations concerning environmental protection, criminal law, corporate liability, and disaster

mitigation policies in Indonesia. This approach is important to evaluate whether current legal provisions provide adequate mechanisms for preventing environmental crimes and reducing disaster risks. The conceptual approach is used to examine doctrines and legal theories relating to environmental crime, penal policy, environmental justice, and sustainable development. Through this approach, the research seeks to understand the philosophical and theoretical foundations underlying the use of criminal law in environmental governance [19]. Meanwhile, the case approach is carried out by examining environmental disaster cases published through official government reports, judicial decisions, and national media publications that demonstrate the relationship between environmental crimes and disaster occurrences.

The legal materials used in this research consist of primary, secondary, and tertiary legal materials. Primary legal materials include statutory regulations, judicial decisions, and official state documents relating to environmental protection and disaster management. Secondary legal materials include peer-reviewed scientific journals, legal textbooks, research reports, and academic publications discussing environmental criminal law and environmental governance. Tertiary legal materials consist of legal dictionaries, encyclopedias, and supporting references used to clarify legal terminology and concepts. The use of these legal materials aims to provide a comprehensive understanding of the legal and institutional dimensions of environmental crime enforcement [20].

Data collection in this research is conducted through library research by systematically identifying, classifying, and analyzing relevant legal documents and academic sources. The collected materials are then analyzed qualitatively using descriptive-analytical techniques. The descriptive method is employed to explain the legal framework governing environmental crimes and disaster risk reduction, while the analytical method is used to evaluate the effectiveness of environmental criminal law enforcement and identify factors hindering its implementation. Qualitative analysis enables the research to interpret legal norms contextually and examine the relationship between environmental destruction, social vulnerability, and disaster risks [21].

This study also adopts a humanistic legal perspective in analyzing environmental criminal law enforcement. The humanistic approach emphasizes that environmental protection is closely connected to the protection of human dignity, social welfare, and the rights of future generations. Environmental crimes often create disproportionate impacts on vulnerable communities living near forests, rivers, coastal areas, and industrial zones. Therefore, this research does not merely examine legal sanctions from a punitive perspective but also evaluates how criminal law can function as a protective instrument for communities affected by ecological destruction [22].

Furthermore, this research considers environmental justice principles as part of the analytical framework. Environmental justice emphasizes fair treatment and meaningful participation of all communities in environmental decision-making processes. Through this perspective, environmental criminal law is analyzed not only as a mechanism to punish offenders but also as an instrument to ensure accountability, ecological restoration, and social recovery for communities affected by environmental harm. This approach is important because disaster risks caused by environmental crimes frequently burden marginalized groups who possess limited social and economic resilience [23].

The final stage of the research involves drawing legal conclusions through deductive reasoning by connecting legal principles, empirical conditions, and theoretical perspectives related to environmental criminal law and disaster risk reduction. The conclusions are expected to contribute academically to the development of environmental criminal law studies and practically to improving environmental governance and disaster mitigation policies in Indonesia.[24]

Results

1. Optimization of Environmental Criminal Law as an Instrument for Disaster Risk Reduction

Environmental criminal law has an important strategic position in reducing disaster risks caused by ecological destruction. The increasing occurrence of floods, forest fires, landslides, and environmental pollution in Indonesia demonstrates that environmental degradation is closely related to unlawful human activities. In this context, criminal law should not merely function as a punitive instrument but also as a preventive mechanism capable of protecting ecosystems and vulnerable communities from environmental harm.

The optimization of environmental criminal law can be carried out through stronger and more consistent law enforcement against activities that contribute directly to environmental degradation. Illegal logging, land burning, and illegal mining are examples of environmental crimes that significantly increase ecological vulnerability. Weak supervision and lenient sanctions have caused many environmental offenders to continue destructive practices without significant legal consequences. Therefore, criminal sanctions must be implemented proportionally and consistently to create effective deterrent effects [25].

In addition, optimization requires strengthening corporate criminal liability because many large-scale environmental crimes involve corporations exploiting natural resources irresponsibly. Corporate actors frequently possess stronger economic and political influence than local communities, creating unequal legal protection. Consequently, environmental criminal law should impose not only administrative sanctions but also criminal penalties such as substantial fines, license revocation, compensation obligations, and environmental restoration responsibilities [26].

The integration between environmental law enforcement and disaster mitigation policies is also essential. Environmental criminal law should support sustainable environmental governance through preventive approaches, including environmental supervision, ecological restoration, and public participation. Communities living in disaster-prone areas should be actively involved in environmental monitoring because they directly experience the impacts of environmental destruction. Through community participation, environmental protection becomes more responsive and socially oriented [27].

A humanistic approach in environmental criminal law enforcement is necessary because environmental crimes often create long-term suffering for affected communities. Floods and forest fires not only damage ecosystems but also threaten livelihoods, public health, social stability, and the future of younger generations. Therefore, environmental criminal law should prioritize environmental justice and social protection in addition to punishment [28].

2. Factors Hindering the Effective Enforcement of Environmental Criminal Law in Indonesia

The enforcement of environmental criminal law in Indonesia still faces various structural, institutional, and socio-economic obstacles. One of the primary challenges is weak coordination among law enforcement institutions. Environmental cases generally involve multiple agencies, including environmental authorities, police institutions, prosecutors, and regional governments. Overlapping authority frequently creates inefficiency and delays in handling environmental crime cases [29].

Another obstacle is the complexity of proving environmental crimes. Environmental destruction often requires scientific and technical evidence to establish causal relationships between unlawful conduct and environmental impacts. In practice, law enforcement officers frequently experience difficulties in obtaining expert testimony, ecological data, and environmental impact evidence. This condition weakens prosecution processes and reduces the effectiveness of criminal sanctions [30].

Limited institutional capacity also affects environmental law enforcement. Many investigators and prosecutors still lack specialized expertise in handling environmental crime cases. Environmental crimes are often treated similarly to conventional crimes despite their

multidimensional ecological and social impacts. As a result, investigations tend to be less comprehensive and fail to address broader environmental consequences [31].

In addition, economic and political interests frequently influence environmental law enforcement. Certain corporations involved in environmental destruction possess strong financial and political connections that may interfere with legal processes. This situation creates legal inequality because vulnerable communities affected by environmental disasters often have limited access to justice and legal protection [32].

Socio-economic factors also contribute to environmental crimes. Poverty and lack of sustainable economic opportunities encourage some communities to engage in environmentally harmful activities such as illegal logging and land burning. Therefore, environmental law enforcement should not rely exclusively on punitive measures but must also be accompanied by social empowerment and sustainable development policies [33].

Thus, improving the effectiveness of environmental criminal law enforcement requires strengthening institutional integrity, enhancing inter-agency coordination, increasing environmental law expertise among law enforcement officers, and promoting community participation in environmental governance. Through these efforts, environmental criminal law can function more effectively as an instrument for disaster risk reduction and environmental justice.

Conclusion

Environmental crimes have proven to be one of the significant factors contributing to the increasing disaster risks in Indonesia. Illegal logging, land burning, illegal mining, and various forms of environmental pollution have weakened ecological resilience and intensified the occurrence of floods, landslides, forest fires, and other environmental disasters. In this context, environmental criminal law possesses an important strategic function not only as a punitive mechanism but also as an instrument for disaster risk reduction and environmental protection. The optimization of environmental criminal law can be achieved through consistent law enforcement, stronger corporate criminal liability, stricter sanctions against environmental offenders, and the integration of criminal law policies with sustainable environmental governance and disaster mitigation strategies. Effective criminal law enforcement is capable of creating deterrent effects while simultaneously encouraging greater responsibility toward environmental preservation.

However, the implementation of environmental criminal law in Indonesia still faces various obstacles that reduce its effectiveness. Weak institutional coordination, overlapping authority among agencies, limited expertise of law enforcement officers, difficulties in proving environmental crimes scientifically, and the influence of economic and political interests continue to hinder effective enforcement. In addition, socio-economic pressures experienced by vulnerable communities often contribute to environmentally harmful activities, demonstrating that environmental protection cannot rely solely on punitive approaches. Therefore, environmental criminal law enforcement must also be accompanied by preventive and humanistic policies, including community empowerment, environmental education, ecological restoration, and broader public participation in environmental governance.

Ultimately, the optimization of environmental criminal law should prioritize environmental justice and the protection of communities most affected by ecological destruction and disasters. Environmental law enforcement should not merely focus on imposing punishment but also on safeguarding human dignity, ensuring social welfare, and preserving environmental sustainability for future generations. Through a balanced approach between legal enforcement, institutional reform, and social protection, environmental criminal law can function more effectively as an instrument for reducing disaster risks and supporting sustainable development in Indonesia.

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