

The Challenges and Opportunities of Environmental Law Enforcement: A Systematic Review

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Abstract: - Introduction: The formation of environmental law in many countries worldwide will unavoidably be promoted and coordinated by the non-governmental environmental groups currently in the world. In addition, it will benefit some developing countries where environmental protection is not a priority, environmental laws are not well-established, and oversight is not rigorous enough. Objective of research: This paper aims to explore the challenges and opportunities of environmental law enforcement in many countries in the world. Methods: A systematic review was used in this study. Based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses, this study followed the steps of a systematic review of the literature (PRISMA). The final sample of 35 publications was analyzed, considering the year of publication, methods utilized, geographical location, the topic of challenges, and opportunities in enforcing environmental law. Responding to environmental crime is largely the responsibility of government enforcement and regulatory authorities, whether at the national, subnational, or municipal levels. Results and Discussion: The primary reaction agencies in most areas of the world are police, customs and border protection, and environmental regulatory agencies. To assist developing nations in improving environmental legal instruments and supervision; to achieve the ultimate goal of regional and even global environmental law coordination; to train relevant persons, relevant agencies, and other topics in the necessary environmental skills and knowledge; and to transfer and teach environmental knowledge and law within a specified time frame. Conclusion: Although some countries have a thorough legislative structure for environmental protection, local government independence and law enforcement must be improved. The ability of environmental law to serve a purpose is critical in determining whether the measures should be fully implemented.

Key-Words: - challenge, opportunity, environmental, systematic review, law, enforcement

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1 Introduction

The significant increase in the number of international ecological regulations between 1970 and 2000, from 52 to 215, reflects a growing global awareness of the importance of environmental protection and response to emerging ecological challenges. These developments reflect a response

to a series of increasingly pressing global environmental crises, as well as a growing understanding of the interconnections between human activities, environmental health, and economic and social well-being, [1].

Indeed, these worldwide environmental laws and the formation of global ecological law must constantly draw the substance of various nations'

environmental regulations, which is not difficult for all countries to accept and embrace. Many countries have the references and standards to improve their environmental legislation. As a result, non-official and cross-border collaboration between governments is formed through participation in international environmental treaties. Countries can exchange cutting-edge technologies, learn from one another's outstanding experiences, and use domestic environmental legislation to incorporate ecological norms into domestic environmental laws and regulations. The formation of environmental law in many countries worldwide will unavoidably be promoted and coordinated by the non-governmental environmental groups currently in the world. In addition, it will benefit some developing countries where environmental protection is not a priority, environmental laws are not well-established, and oversight is not rigorous enough, [2].

Building a culture of ecological protection and environmental law enforcement is an important element in ensuring that environmental laws have a real impact, [3]. Effective and comprehensive environmental education at all levels of society develops public awareness and appreciation of the value of the environment. This awareness should extend from schools to workplaces and communities, instilling the understanding that every individual plays a vital role in environmental protection, [4].

Furthermore, mass media and social campaigns should disseminate information about environmentally friendly practices and the consequences of actions that harm the environment. A strong culture of ecological protection also depends on the active involvement of civil society, including non-governmental organizations and community groups, in monitoring and reporting environmental violations, as well as in participation in environmental policy-making, [5].

However, ecological crimes have risen significantly in recent years. Environmental crimes are gaining global attention as more people become aware of their short- and long-term implications. Violations of environmental rules and regulations may occur locally, yet the consequences may be felt globally. As a result, crimes are recognized as a severe problem in many forms worldwide, with some ranking among the most profitable criminal operations in the world.

The most common environmental crimes involve illegally exploiting wild wildlife and flora, pollution, and garbage disposal, [6]. Environmental crime is a serious global problem, but so-called developing countries show a higher level of

vulnerability to ecological exploitation. These factors, particularly about extractive industries and government-sponsored mega infrastructure projects, clearly demonstrate their vulnerability. Extractive industries such as mining, logging, and oil and gas exploration often operate in these countries. These activities can result in severe environmental damage, including deforestation, soil erosion, water pollution, and biodiversity loss.

Countries in the global south often have weak environmental regulations or inadequate law enforcement, making them vulnerable to irresponsible exploitation of natural resources. In addition, government-sponsored mega-infrastructure projects, such as the construction of large dams, highways, and large-scale agricultural development, are often undertaken without sufficient consideration of environmental impacts. These projects can cause major changes to local ecosystems, including displacement of communities, habitat destruction, and environmental pollution. Economic policies that emphasize rapid growth often override environmental protection, causing long-term damage that is difficult to reverse, [7]. In developing countries, environmental harm frequently follows fast industrialization.

Previous research, [8], has carried out a qualitative research method with a juridical-normative legal approach. The researchers used the qualitative method to examine concepts and issues related to environmental law enforcement in Indonesia and employed the juridical-normative legal approach to understand the relevant positive law in the context of environmental law enforcement.

The research highlights the complexity of environmental law enforcement in Indonesia, which covers various dimensions, including material harm, state administration, and criminal law. However, the emergence of an ever-evolving variety of motives and perpetrators of environmental crimes poses the main challenge. This research proposes that one solution to overcome this challenge is to apply progressive law. Progressive law supports the principles of justice and the interests of society. Legal actors in the context of law enforcement are expected to prioritize values such as honesty, sincerity, empathy, and attention to the suffering experienced by the community.

Furthermore, another study, [9] also uses a qualitative method with an approach that examines concepts related to ideal law enforcement for the future (*ius constituendum*) in the context of environmental law enforcement in Indonesia. The findings of this study reveal a paradox in

environmental law enforcement in Indonesia, where corporations that collectively exploit natural resources have caused serious environmental disasters but are rarely prosecuted firmly.

There are three main obstacles to law enforcement in Indonesia, namely the difficulty of dealing with corporations that have strong political support, overlapping authorities in the criminal investigation process, and the difficulties faced by law enforcement officers in collecting evidence, [10]. As a solution, this research proposes a model of legal protection for victims of environmental pollution and/or damage using the principle of restorative justice. In this model, judges can act as state-appointed facilitators in the early stages of case handling, with a focus on compensating victims of perpetrators rather than just punishing perpetrators, [11].

Finally, the study, also analyzed environmental law enforcement, especially in the context of environmental damage. This research uses a qualitative method with an approach that includes several important elements.

Although bringing environmental damage cases to court means prioritizing the principle of *primum remedium* through retribution justice or criminal justice, unfortunately, this can create various problems, including the practice of corruption, collusion, and nepotism. Therefore, this research proposes that law enforcement officials should understand and apply the concept of restorative justice in handling environmental crimes, which means prioritizing the *ultimum remedium* principle through community participation education, [12].

2 Methods

The data were chosen in two stages, [13]: the first involved a title and abstract analysis, and the second involved an introduction and conclusion analysis. In the first step, an initial selection was made based on titles and abstracts that reasonably satisfied the selection criteria, [14]. The process was carried out in pairs to eliminate any bias, and the researchers worked individually on the inclusion or exclusion of the documents before comparing the spreadsheets. When there was a disagreement and no consensus could be reached, a third researcher was consulted. If the divergence persisted, the document was added to the list, [15]. In the second step, documents that partially met the selection criteria based on reading the introductions and conclusions were chosen. In the event of divergences outlined in the first stage,

the process was also managed in pairs using the same technique.

2.1 Research Criteria

The first stage in a systematic review is determining which studies should be evaluated and which should be rejected. Furthermore, the review must provide a clear scope of the areas to be explored from the start of the study. As a result, pre-specified criteria for selecting research for inclusion in this review were proposed, [16]. A transparent strategy was employed, and certain databases and years were chosen to ensure the data's veracity. The following are the criteria for this research study:

1. This review covers publications, abstracts, and citations but excludes books, research reports, and other non-formal literature as journal indexed by Scopus, [17], is a reputable bibliographic database that greatly aids academics in their search for existing literature, particularly works produced after 1995. For these reasons, a structured keyword search in Google Scholar was employed in the study.
2. The chosen papers should be peer-reviewed and written papers on the circular economy in English.
3. To ensure that the most recent data is used in this study, the work should be published between 2012 and 2022.
4. The criteria in the databases Google Scholar were that the papers should be reviewed, articles in the press, or editorial material. The keywords "environmental law," "enforcement," "challenges," and "opportunities" were searched for Article title, abstract, and keywords in the papers, which are named as 'topic' in that database, [18].

2.2 Evaluation of Articles and Inclusion

The keywords applied in the search engines were: "environmental law," "enforcement," "challenges," and "opportunities." When search keywords were used, 137 publications from Scopus and 12 from Web of Science identified 149 publications when both engines were used. All selected documents were evaluated for methodological quality during the extraction stage, but the results were not used to narrow the selection. One hundred forty-nine papers were collected at the end of the second stage. All articles were reviewed to ensure that the paper under consideration fit the topic's focus. Any piece that did not engage with the theme or played a minor role was disqualified. On the other hand, articles in which the issue appeared as a key sub-theme were included. Following this stage, 114 articles were

discarded, leaving a final sample of 35 articles to be considered.

3 Results

A final sample of several publications is analyzed in this section, taking into account the year of publication, methods used, geographical location, topic challenges, and opportunities in environmental law enforcement.

3.1 Distribution of Identity and Main Findings of Articles

Table 1 below shows the distribution of articles by years, methodology, geographical context, as well as their main findings.

Table 1. Distribution of articles by years, research methodology, geographical context, and main findings of the paper

No.	Article Information
1	<p>Origin: Bangladesh, Asia Methodology: A case study in Bangladesh Title of article: Law-Enforcement Challenges, Responses and Collaborations Concerning Environmental Crimes and Harms in Bangladesh. Main findings: This study has offered environmental crimes and harms in Bangladesh, as well as the activity of the responding police and other agencies. As previously stated, Bangladesh has enacted several laws, policies, and national strategies to combat threats to safeguard biodiversity, many of which have been updated in the last decade to strengthen enforcement efforts and authorities. Environmental laws and policies are not usually adequately defined or well enforced. [19].</p>
2	<p>Authors: Origin: China, Asia Methodology: Literature Review of the Environmental Protection Law (EPL) China Title of article: A New Environmental Protection Law, Many Old Problems? Challenges to Environmental Governance in China. Main findings: Many of the difficulties noted in the previous Environmental Protection Law (EPL), particularly the barriers to its application, have yet to be addressed and remedied. Environmental legislation and implementation mechanisms, accountability systems, and institutional arrangements are required for effective environmental governance. Raising the EPLs and the broader ecological protection apparatus's standing is the first step toward solving China's environmental concerns. More enforcement and implementation efforts will lead to a cleaner future in China. [20].</p>
3	<p>Origin: Indonesia, Asia Methodology: A literature review of challenges of</p>

No.	Article Information
	<p>environmental law enforcement in Indonesia (Number 32/2009) Title of article: The Challenges of Environmental Law Enforcement to Implement SDGs in Indonesia Main findings: Environmental law enforcement in Indonesia is preventive and repressive regarding environmental protection and management. Administrative, civil, and criminal law are the three recognized legal instruments in environmental law enforcement. Environmental law enforcement and SDG implementation are intertwined in Indonesia. [21].</p>
4	<p>Origin: China, Asia Methodology: Quantitative study with a survey in 12 district-level at the Guangzhou Environmental Protection Bureau (GZEPB). Title of article: Beyond deterrent enforcement styles: Behavioural Intuitions of Chinese Environmental Law Enforcement Agents in a context of challenging inspections. Main findings: Investigate regulatory enforcement on three levels. First, it distinguishes between enforcement and sanction decision-making styles during inspections, resulting in a more realistic measurement. Second, it focuses on how these factors function in a system where deterrence is difficult to establish. Third, it examines how agents perceive the success of style element pairings in such a situation, [22].</p>
5	<p>Origin: Indonesia, Asia Methodology: Normative juridical research. Title of article: Law Enforcement of Illegal Logging in Indonesia: Problems and Challenges in Present and the Future Main findings: Illegal logging has not been adequately addressed by criminal law enforcement in the interest of environmental protection. The government is aggressively battling illegal logging while the courts are eager to release him. The underlying causes of environmental crimes are intractable. Growth follows technological advancements in the number and quality of increasingly sophisticated criminality that frequently influences the international, regional, and national levels, [23].</p>
6	<p>Origin: Indonesia, Asia Methodology: A literature review using books on environmental law. Title of article: Implementing Progressive Law in Enforcement of Environmental Law in Indonesia: The Current Problems and Future Challenges. Main findings: The goal of progressive law-based environmental law is actually to provide two legal offers: one side wants to clarify the substantive law on environmental law, and the other side wants to have a progressive application following the fundamental values of the constitution as stated in Article 28H of the 1945 Constitution (1). Environmental law based on progressive law teaches awareness that preserving the environment is the primary concern of all formal legalities that harm</p>

No.	Article Information
	environmental society, [24].
7	<p>Origin: Poland, Europe and Russia, Asia Methodology: Review of environmental criminal law provisions in Poland and Russia. Title of article: Environmental Criminal Enforcement in Poland and Russia: Meeting Current Challenges. Main findings: Environmental criminal law in Poland and Russia has been drastically altered due to Directive 2008/99/EC. Environmental crimes are recognized as major criminal wrongdoings in both countries based on the penalties established by criminal law. Another issue is the lack of corporate criminal culpability or its inadequate enforcement, [25].</p>
8	<p>Origin: Greece, Europe Methodology: A case study in Greece Title of article: Reconciling Remote Sensing Technologies with Personal Data and Privacy Protection in the European Union: Recent Developments in Greek Legislation and Application Perspectives in Environmental Law. Main findings: Remote sensing technologies provide data collection capabilities that are particularly valuable for providing a high degree of environmental protection and improving environmental quality. At the same time, they pose new severe concerns, such as their interference with privacy and personal data rights, both of which are protected fundamental rights, [26].</p>
9	<p>Origin: England, Europe Methodology: A qualitative study with semi-structured interviews Title of article: Accountability and offsetting in environmental law enforcement Main findings: Most of these tasks also entail the offender donating to charitable environmental causes to better the environment. A more open enforcement approach might solve some of the findings' accountability issues, demonstrating that community benefits function as an offset mechanism rather than a restorative enforcement mechanism, [27].</p>

Figure 1 below visually organizes information on environmental law enforcement. It includes columns for 'Country', 'Main Challenges', and 'Key Solutions', representing different countries and their respective environmental enforcement challenges and solutions.



Fig. 1: Environmental Law Enforcement, [28].

3.2 Distribution Topics of Challenges and opportunities

Table 2 presents the challenges and opportunities in enforcing environmental law.

Table 2. The challenges and opportunities of environmental law enforcement

No.	Challenges and Opportunities According to Various Research
1	<p>Challenge [19].</p> <ul style="list-style-type: none"> ● Insufficient institutional capacity. ● Lack of collaboration among many agencies. ● Gaps in policy and information. ● Ineffective enforcement. ● A mismanaged and flawed system of protected areas. ● Corruption. ● Insufficient political commitment. ● Lack of knowledge. ● Changes in climate and biophysics. ● In vulnerable environments, a lack of alternative livelihoods. <p>Opportunity</p> <ul style="list-style-type: none"> ● Coordination of environmental law enforcement government at the national, subnational, or local level, especially forest rangers
2	<p>Challenge, [20].</p> <ul style="list-style-type: none"> ● EPL's status is insufficiently high. ● The new law does not fundamentally alter a fragmented and overlapping environmental governance framework. ● Environmental law enforcement is vulnerable to interference. ● Pollution is becoming very severe. ● Penalty authority is not delegated correctly.

No.	Challenges and Opportunities According to Various Research
	<p>Opportunity</p> <ul style="list-style-type: none"> Expanding the scope and content of the law based only on command-and-control law.
3	<p>Challenge, [21].</p> <ul style="list-style-type: none"> Enforcement of environmental law is repressive, causing violations and environmental pollution. Corporations are responsible for numerous environmental crimes, and their damage is mainly ecological devastation and widespread contamination. Several environmental degradations and illegal logging instances devastate the ecosystem. <p>Opportunity</p> <ul style="list-style-type: none"> Raising awareness among the general public through outreach initiatives, information sharing, and formal and informal education.
4	<p>Challenge, [22].</p> <ul style="list-style-type: none"> The number of staff law enforcement officers is limited when conducting company inspections. The rampant non-compliance with the application of environmental law. Businesses have frequently impeded or even sabotaged inspection operations (for example, switching on pollution control installations only during inspections or tampering with automated discharge monitoring equipment). Enforcement officers may be unmotivated to carry out formalistic enforcement. Individual officials must also have legal expertise due to the formality of the legislation. <p>Opportunity</p> <ul style="list-style-type: none"> Law enforcement officers can develop subtle and proper behavior intuitions through regular job experiences. The fundamental basis of regulatory formalism must exist and be clear so that it is easily referred to as a legal follow-up.
5	<p>Challenge, [23].</p> <ul style="list-style-type: none"> Inadequate legislation Ineffective law enforcement Aspects of People's Cultures Issues relating to supply and demand Inadequately qualified human resources Corruption, collusion, and nepotism <p>Opportunity</p> <ul style="list-style-type: none"> Law enforcement must be repressive to create a deterrent effect. Improvement of government services against environmental damage.
6	<p>Challenge, [24].</p> <ul style="list-style-type: none"> The current law does not solve the stagnation of environmental violations. Environmental criminals are becoming more numerous, but little legal action is being taken against them.

No.	Challenges and Opportunities According to Various Research
	<p>Opportunity</p> <ul style="list-style-type: none"> Regulate the values of protecting the carrying capacity of ecosystems and the environment in statutory regulations, including provisions governing waste or emission quality standards.
7	<p>Challenge, [25].</p> <ul style="list-style-type: none"> Using a European criminal procedure model with identical requirements for evidence collection and preliminary proceedings. It is impossible to make a precise financial evaluation for some types of environmental harm, including soil or water pollution. Law enforcement personnel can establish and show partial damage suffered by the culprit using a monetary-based assessment technique. In environmental prosecutions, a prominent line of defense is a lack of complete awareness and criminal intent. <p>Opportunity</p> <ul style="list-style-type: none"> Legal entities should be prosecuted for grave environmental crimes committed for their profit by any natural person that result in human deaths, substantial health problems, and severe, long-lasting environmental damage.
8	<p>Challenge, [26].</p> <ul style="list-style-type: none"> Interference with privacy and personal data rights when tracking environmental crimes occur. <p>Opportunity</p> <ul style="list-style-type: none"> Remote sensing technologies that aid in environmental law enforcement, combat environmental crime, and collect environmental monitoring data will unavoidably result in a unified regulatory framework.
9	<p>Challenge, [27]</p> <ul style="list-style-type: none"> The statutory regime does not necessarily explicitly mention offsetting functions in environmental crime. Lack of accountability and transparency in the enforcement process. <p>Opportunity</p> <ul style="list-style-type: none"> Establish open lines of communication to allow for collaboration between the community benefit provider and the environmental agency in enforcing environmental laws.

Figure 2 below shows the challenges and opportunities in enforcing the environmental law.



Fig. 2: Challenges and Opportunities of Environmental Law Enforcement, [29].

4 Discussion

Through analyzing articles that focus on challenges and opportunities in environmental law enforcement in different countries, we can identify several key themes and discussion outcomes. First, the biggest challenges in environmental law enforcement appear to be institutional and structural. Many countries, such as Bangladesh, China, and Indonesia, face difficulties in the effective implementation and enforcement of environmental laws. This is often attributed to inadequate institutional capacity, insufficient inter-agency cooperation, and a lack of political commitment.

In addition, issues of corruption, collusion, and nepotism are also significant barriers, as seen in the case of illegal logging in Indonesia. Second, ineffective or inadequate laws and policies are a major challenge. For example, in China, despite changes in the Environmental Protection Law, there are still many barriers to its application. In Poland and Russia, despite major changes in environmental criminal law, there are still problems in its application, especially about the assessment of environmental losses.

Issues of privacy and personal data in the use of technology for environmental law enforcement are of particular concern, as discussed in the EU context. The use of remote monitoring technologies, while providing benefits in environmental surveillance, also raises concerns about the protection of personal data. On the other hand, there are significant opportunities to improve

environmental law enforcement. Better coordination at the government level, both national and local, can help overcome many institutional and structural challenges. Furthermore, increasing public awareness and education is crucial, particularly in garnering public support for stronger environmental laws, [30].

In addition, advances in technology, such as remote sensors, provide new opportunities for more effective monitoring and enforcement. While these pose privacy challenges, there is potential to create regulatory frameworks that can balance the need for environmental protection with the protection of human rights. So environmental law enforcement faces a complex and diverse range of challenges but also provides significant opportunities for improvement. Increased cooperation, utilization of technology, and improved awareness and education can lead to substantial progress in ensuring more effective and sustainable environmental protection.

Responding to environmental crime is largely the responsibility of government enforcement and regulatory authorities, whether at the national, subnational, or municipal levels. The primary reaction agencies in most areas of the world are police, customs and border protection, and environmental regulatory agencies. The 'three fundamental agencies' of environmental law enforcement are as follows. Organizationally, this can generate both possibilities and challenges. In Bangladesh, the police are under the control of the Ministry of Home Affairs, which gives a defined mandate and line of accountability in most law, order, and security problems. The topics of environmental policing and environmental justice are wide, but as Pink and White illustrate, they are addressed by a variety of relevant groups. Because of the prominence of two additional agencies, a parallel and, to some extent, competitive system is introduced. The Department of Environment, and the Bangladesh Forest Department, both fall under the authority of the Ministry of Environment, Forest and Climate Change, [30]

Through the analysis of articles discussing challenges and opportunities in environmental law enforcement in various countries, we can conclude that several key themes and discussion outcomes are important to consider. the biggest challenges in environmental law enforcement are institutional and structural.

Countries such as Bangladesh, China, and Indonesia face difficulties in effective implementation and enforcement of environmental laws, which are often attributed to inadequate institutional capacity, a lack of inter-agency

cooperation, and a lack of political commitment. Issues of corruption, collusion, and nepotism are also significant obstacles, as seen in the case of illegal logging in Indonesia. Ineffective or inadequate laws and policies are a major challenge.

In China, for example, despite changes in the Environmental Protection Law, there are still many barriers to its application. In Poland and Russia, despite major changes in environmental criminal law, there are still problems in its application, especially about the assessment of environmental damage. Privacy and personal data issues in the use of technology for environmental law enforcement are of particular concern, as discussed in the EU context. The use of remote monitoring technologies, while providing benefits in environmental surveillance, also raises concerns about the protection of personal data.

The contribution of this paper is to inform and assist developing nations in improving environmental legal instruments and supervision. It also contributes to achieving the ultimate goal of regional and even global environmental law coordination; to train relevant persons, relevant agencies, and other topics in the necessary environmental skills and knowledge; and to transfer and teach environmental knowledge and law within a specified time frame.

5 Conclusion

On one hand, there are significant opportunities to improve environmental law enforcement. Better coordination at the government level, both national and local, can help overcome many institutional and structural challenges. In addition, increased public awareness and education are critical, especially in building community support for stronger environmental laws. Advances in technology, such as remote sensors, provide new opportunities for more effective monitoring and enforcement.

On the other hand, this poses privacy challenges. There is potential to create regulatory frameworks that can balance the need for environmental protection with the protection of human rights. Responding to environmental crimes is largely the responsibility of government law enforcement and regulatory authorities, whether at the national, subnational, or municipal level. The main agents in environmental law enforcement in most parts of the world are police forces, customs and border protection agencies, and environmental regulatory agencies. These organizations can create both opportunities and challenges.

In conclusion, environmental law enforcement faces complex and diverse challenges but also provides significant opportunities for improvement. Increased cooperation, utilization of technology, and improved awareness and education can ensure more effective and sustainable environmental protection. In addition, a coordinated and integrated approach among various government and non-government agencies, as well as increased capacity and expertise in the field of environmental law, will be key to achieving this goal.

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- Rusdin Alauddin: Proposing the original idea of the paper, provided materials for the research, and wrote the draft introduction
- Jamal H. Arsad: Wrote the methods and selected research data.
- Abdul Azis Dp: Analyzed the data, and provided description in the discussion and conclusion.
- Faisal Faisal: Analyzed the data, and provided a description in the discussion and conclusion.
- Muliani Ratnaningsih: Edited the draft, and reviewed the paper.
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