

Environmental Forensic

CHALLENGES TO HANDLING POLLUTION AS CRIME

George K. Varghese ¹ and Maria Pettersson ²

¹ Department of Civil Engineering, NIT Calicut, Kerala, India

² Department of Social Sciences, Technology and Arts; Luleå University of Technology, Sweden

1. INTRODUCTION

In many jurisdictions around the world, violation of environmental statutes is treated as a criminal offense. However, very often, these offenses are regarded as “technical” crimes rather than morally reprehensible acts. Similar to minor infractions like driving slightly over the speed limit or downloading music or movies illegally, breaches of environmental laws, especially those that do not cause immediate or visible harm, often lack the strong moral stigma typically associated with conventional crimes. This perception is rooted in the invisible and delayed nature of environmental damage, where the harmful effects may not be immediately apparent and can take years, even decades, to fully become manifest. As a result, violations like minor illegal dumping, unauthorized emissions, or small-scale deforestation are frequently considered light, or sometimes even rationalized, both by offenders and by society at large. Yet, these seemingly insignificant breaches can accumulate over time, leading to severe and sometimes irreversible environmental degradation. Effective enforcement of environmental protection laws faces significant challenges due to the gap between the legal classification of environmental offenses and the public’s moral judgment. This is in addition to other challenges, including technical and procedural.

2. POLLUTION AS A CRIME

Crime is traditionally defined as a wrongful act against society, rather than just an individual. Crimes disrupt public order, harm collective well-being, and violate laws designed to protect the common good. Under this framework, pollution incidents are strong candidates to be classified as crimes because they do not merely affect a single person or a small group but inflict harm on entire communities, ecosystems, and future generations. The impact of pollution extends beyond immediate victims, affecting air quality, water sources, soil fertility, and even global climate stability, making it a societal concern that demands criminal accountability.

Unlike private disputes, where an individual seeks personal compensation, pollution-related harm is widespread, affecting people indiscriminately, often without their direct

knowledge or consent. When industries discharge toxic waste into rivers, release harmful emissions into the air, or improperly dispose of hazardous materials, the effects are felt by a large group of people. Respiratory diseases, cancer risks, biodiversity loss, and economic damages to agriculture and fisheries are just some of the consequences. Given that pollution diminishes public health, economic productivity, and environmental sustainability, treating it as a crime aligns with the principle that society as a whole suffers from the wrongdoing.

Moreover, classifying pollution as a crime ensures that those responsible—whether corporations, government entities, or individuals—are held accountable under stricter legal frameworks. Civil penalties, such as fines or compensatory damages, often fail to deter polluters, especially wealthy corporations that can absorb such costs as routine expenses. Criminal prosecution, on the other hand, carries stronger consequences, such as imprisonment for executives, business shutdowns, or heavy legal sanctions, which act as a more effective deterrent. Recognizing pollution as a crime reinforces the idea that harming the environment is not just a regulatory violation but a moral and legal offense against society, requiring serious legal action to prevent future harm.

3. CHALLENGES TO REDRESSING POLLUTION AS A CRIME

3.1 Social Challenges

One of the major challenges in redressing pollution as a crime stems from how society perceives pollution incidents. Unlike crimes such as assault or murder, which evoke strong moral condemnation due to their immediate and visible harm, pollution is often viewed differently. The effects of pollution typically unfold gradually and indirectly, making the harm less apparent to the public. As a result, society often fails to attach the same moral weight to acts of pollution as it does to violent crimes. Furthermore, because pollution is frequently a byproduct of essential economic activities like manufacturing, transportation, and energy production, it is seen less as a deliberate wrongdoing and more as an unfortunate necessity. Approaches that frame environmental damage from market activities as a market failure—characterized by negative externalities or

societal costs not borne by the polluter (Germani, 2004; Turner et al., 2010)—tend to emphasize the economic dimension of pollution, often at the expense of its moral and ethical implications. Within this framework, environmental regulation is primarily seen as a tool to internalize these costs and correct market failures. Freeman's view, which urges society to "compare what it receives from pollution control and environmental protection activities with what it gives up by using resources taken from other users" (Freeman, 1998), reflects this utilitarian logic. While economically pragmatic, such a perspective raises ethical concerns. It treats environmental protection as a resource trade-off, neglecting the intrinsic value of nature, the unequal burden on vulnerable communities, and our moral responsibilities to future generations. Reducing pollution control to an economic calculation risks commodifying ethical obligations and disregarding principles of justice and ecological stewardship.

Adding to this complexity is the fact that polluting industries often play vital roles within communities by providing employment, goods, and services. Historical incidents, such as the counter-demonstrations by employees of Chisso Corporation during the Minamata mercury poisoning crisis, illustrate how deeply economic dependence on polluting industries can shape public opinion (Allchin, 2002). For much of history, pollution was not recognized as a crime largely because environmental harm was poorly understood. Traditional industries operated with little to no environmental regulation, and pollution was even viewed as a marker of industrial progress and national prosperity (Fenger, 2009). In such a context, framing pollution as a criminal act clashes with long-standing societal narratives about economic growth and modernity.

Moreover, pollution presents a unique problem of shared responsibility, further complicating efforts to assign moral or legal blame. Unlike individual acts of crime, pollution is often the cumulative result of actions by multiple parties—factories, governments, consumers, and businesses—making it difficult to pinpoint a single culprit. This diffusion of responsibility allows both individuals and corporations to downplay their contributions and moral accountability. Additionally, many polluting industries wield considerable political and economic influence, often shaping public perception through lobbying, advertising, and public relations campaigns that minimize the perceived severity of environmental damage. As a result, pollution is frequently framed as a regulatory or technical issue rather than as a severe moral or criminal failure, hindering the efforts to treat it with the seriousness it deserves.

This societal tendency to treat pollution crimes lightly has influenced statutory frameworks as well. For instance, while violations of environmental statutes in India are technically criminal offenses, they are classified as non-cognizable even when the prescribed punishment includes imprisonment for three years or more (normally, criminal offenses for which punishment exceeds three years are considered cognizable offences in India where the police can arrest an accused without a warrant and can initiate an investigation without prior permission from the court). This designation is due to explicit provisions in the statutes (Pri-

ya et al., 2024). This phenomenon reflects an underlying hesitancy to equate environmental harm with more traditional forms of criminality.

3.2 Technical challenges

Redressing pollution as a crime presents significant technical challenges, primarily due to the complexities involved in proving causality. Establishing that a particular emission or discharge directly caused specific damage, including loss of life or property, is an arduous task—particularly under the criminal standard of proof, which demands that guilt be established beyond reasonable doubt. Pollution-related harm often manifests gradually over time, rather than as an immediate and obvious consequence, making it difficult to trace the harm back to a single event or polluter. The problem of delayed effects compounds the difficulty of building a compelling, scientifically rigorous case. It is because of these evidentiary hurdles, strong ex-ante regulation and its effective implementation are widely regarded as preferable approaches to managing pollution. Ex-ante measures are especially valuable when harm is diffuse (Shavell, 2018), when identifying the polluter is difficult, or when the actual harm of an activity is uncertain or unfolds over time. Although lower administrative costs are often cited in support of ex post regulation—where action is taken only after harm has occurred—the potential severity and uncertainty of pollution-related harm argue strongly for preventive regulation. Ex-ante regulatory frameworks allow authorities to intervene before damage occurs, thereby reducing reliance on complex and costly litigation while enhancing environmental and public health protection. However, when harm does occur, despite preventive efforts, it must still be addressed and remedied. Notwithstanding the difficulties, there have been important advances in attribution. A notable example is the case of Ella Kissi-Debrah in the United Kingdom, where a coroner concluded that air pollution was a significant contributing factor to her death (Dyer, 2020), offering hope that more precise attribution of pollution-related harm is possible.

Another major technical hurdle arises from the complexity of the scientific and technical issues involved in pollution cases. Trials often require deliberations on intricate environmental, chemical, and health data that extend well beyond the general expertise of the judiciary. Judges and juries are tasked with making legal decisions based on highly specialized information, raising concerns about the adequacy of fact-finding and the risk of misunderstanding or oversimplification. To address this, certain jurisdictions have adopted mechanisms such as the Daubert guidelines, which set standards for the admissibility of expert scientific testimony in courts (Gatowsky et al., 2001). While not a complete solution, such frameworks help ensure that technical evidence presented during trials meets standards of relevance and reliability, partially mitigating the challenges of scientific complexity in pollution litigation.

To effectively communicate the complex scientific details involved in environmental crimes to the court, techniques similar to those used in traditional criminal investigations—such as crime scene reconstruction—can be adapted. Environmental crime scene reconstruction

involves piecing together scientific, geographic, and temporal data to create a clear narrative of how the pollution occurred, its sources, the pathways it followed, and the resulting harm (Achathuparambil Gopalakrishnan et al., 2025). By visualizing the sequence of events—using maps, models, expert testimony, and simulations—such reconstructions can help judges better understand causality and the extent of damage, making technical evidence easier to handle by courts.

3.3 Procedural challenges

One of the primary procedural challenges in redressing pollution as a crime arises from the high standard of proof required in criminal cases. Proving guilt beyond reasonable doubt makes the chances of failure much greater compared to when pollution is treated as a civil wrong, where the balance of probabilities suffices. Moreover, the law of limitation can obstruct the institution of criminal proceedings, especially since many pollution-related harms, such as diseases like asbestosis, have long latency periods—often taking many decades to manifest (Bianchi et al., 1997). This delay complicates timely legal action. Another significant difficulty lies in fulfilling the two essential elements for a criminal conviction: the guilty act (*actus reus*) and the guilty mind (*mens rea*). While it is relatively straightforward to demonstrate the occurrence of the harmful act, establishing the polluter's intent or knowledge of wrongdoing is far more challenging. To address this, many jurisdictions have introduced principles of strict liability for environmental crimes, eliminating the requirement to prove *mens rea* and thereby facilitating the prosecution of pollution offenses (Kidd, 2002).

In addition to the above hurdles, the structure of criminal proceedings presents some specific difficulties in the prosecution of environmental crimes. Generally in criminal cases, the prosecution is undertaken by the state on behalf of the victims, which can lead to problems such as poor follow-up, lack of specialized environmental prosecutors, or even corruption and collusion between prosecution and defense. The involvement of powerful corporate defendants exacerbates these challenges, as their access to superior legal resources and influence often overwhelms the prosecution's capabilities. The complexity and technicality of environmental crimes demand skilled and committed prosecution teams, without which the legal redressal process risks becoming ineffective. Thus, procedural and legal barriers hinder the effective criminalization and prosecution of pollution offenses.

4. CHANGE IN SOCIETAL PERCEPTION: THE KEY TO TACKLING THE CHALLENGES

The various challenges in redressing pollution as a crime discussed above highlight the critical need for a shift in public perception regarding environmental offenses. In democratic societies, where public opinion significantly influences policymaking and governance, changing how people view environmental harm can have far-reaching effects. When the public begins to treat environmental crimes with the same seriousness as other criminal acts, it

creates pressure for governments to enact more effective legislation, including stricter laws, proper enforcement, and strengthened legal redress mechanisms. Moreover, heightened public awareness and concern can lead to increased investments in scientific research and technological innovation, which are essential for accurately identifying polluters and proving their responsibility in court. Ultimately, public perception serves as a powerful driver in transforming environmental protection from a procedural formality into a robust system of criminal accountability.

And there are compelling reasons why the public should view pollution as a serious and moral offense. Foremost among them is the undeniable harm pollution causes to human health—ranging from respiratory illnesses to cancer and even premature death. It infringes upon the fundamental human right to clean air, safe water, and a healthy living environment, all of which are essential for dignity and well-being. Beyond health consequences, pollution is deeply unjust: it disproportionately affects marginalized and low-income communities who often lack the political voice or resources to resist environmental degradation in their neighborhoods.

Another important reason is the long-term consequences of pollution that extend far beyond the current generation. The damage caused today can persist for decades or be irreversible, compromising the quality of life for future generations and threatening the planet's sustainability. At its core, pollution reflects societal greed and irresponsibility, prioritizing short-term economic gains over long-term environmental and human welfare. Pollution is largely avoidable. With responsible behavior, sound policies, and sustainable practices, much of the environmental harm can be prevented. Recognizing pollution as a serious offense is not only a moral imperative but also a practical necessity for ensuring justice, equity, and sustainability.

Starting from a young age, inculcating the idea that pollution is not just a minor, albeit regulated, crime, but a serious moral wrong can be a powerful remedy against future environmental crimes. Early education in environmental ethics should go beyond facts and figures to instill a deep sense of responsibility and care for the natural world. When children are taught to see pollution as a harmful act—one that endangers human health, degrades ecosystems, and undermines the rights of others—they are more likely to grow into adults who view environmental harm as unacceptable. Practical engagement from an early age, such as participation in waste-picking, clean-up drives, recycling programs, or school-based sustainability projects, reinforces this understanding by turning values into action (Gutberlet et al., 2020; Sholanke & Gutberlet, 2020). Equally important is helping young people recognize the social dimensions of pollution: teaching them that environmental damage often disproportionately affects vulnerable and marginalized communities builds empathy and a strong sense of social justice. This approach fosters not only environmental awareness but also civic responsibility, equipping future generations to advocate for stronger environmental protections, uphold laws, and challenge practices that harm the planet and its people.

5. CONCLUDING REMARKS

Although there are numerous challenges to addressing pollution as a crime—ranging from technical and procedural barriers to legal loopholes and institutional weaknesses—the most fundamental and prominent obstacle is the lack of seriousness with which society views pollution crimes. This widespread indifference undermines enforcement, weakens legal accountability, and allows polluting behaviors to persist without moral or social condemnation. Therefore, the most powerful remedy lies in transforming public perception. A genuine change in mindset—where pollution is seen not as an unfortunate byproduct of progress but as a morally and legally unacceptable act—is essential for meaningful change. This shift must begin early, through education that instills environmental ethics, social responsibility, and a deep respect for the rights of others and the planet.

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