

Environmental Crime and Restorative Justice in a Changing Society: A Comparative Study of Bhutan and India

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ABSTRACT

Environmental crime has become an increasingly important concern for environmental justice. This study empirically compares Bhutan and India to examine how demographic scale, technological connectivity, ecological conditions, and institutional governance shape environmental-crime risks and responses. A comparative secondary-data design is employed using internationally harmonised World Bank indicators together with official Indian and Bhutanese legal and institutional sources. The analysis identifies a substantial ecological difference between the two countries: forest area accounted for 71.6% of Bhutan's land area in 2023 compared with 24.5% in India. At the same time, Internet use reached 91% of Bhutan's population in 2024 compared with 70% in India. These findings challenge technologically deterministic explanations of environmental degradation. Instead, technology appears to have a dual character: digital connectivity may facilitate environmentally harmful activity while simultaneously strengthening surveillance, information exchange, and enforcement. The study also demonstrates that officially recorded environmental-crime statistics cannot be treated as directly comparable measures of underlying offending because differences in legal definitions, reporting, enforcement intensity, and institutional capacity affect recorded crime. Bhutan's Biodiversity Act 2022 and Biodiversity Rules and Regulations 2023 and India's extensive environmental and wildlife legislation provide contrasting institutional settings. The article proposes a restorative environmental justice framework combining criminal accountability with ecological restoration, community participation, compensation, scientific monitoring, and prevention. It concludes by proposing a harmonised India-Bhutan environmental-crime dataset for future longitudinal analysis.

Keywords: Environmental Crime, Biodiversity, Environmental Justice, Restorative Justice, Ecological Restoration

INTRODUCTION

Environmental crime presents a distinctive challenge to contemporary criminology because its consequences frequently extend beyond conventional concepts of individual victimisation. Illegal wildlife trafficking, poaching, unlawful extraction of biological resources, illegal logging, habitat destruction, pollution, and other environmentally harmful conduct can affect individuals, communities, species, and ecosystems simultaneously. The spatial and temporal separation between offending and harm can further complicate criminal investigation and adjudication.

The changing character of society has added further complexity. Population growth, urbanisation, infrastructure development, international markets, digital connectivity, transportation networks, and technological innovation can alter both the opportunities for environmental offending and the capacity of governments to detect and prevent it. Environmental crime should consequently be understood not as an isolated legal phenomenon but as an outcome emerging from interactions among social, economic, technological, ecological, and institutional variables.

The present study compares Bhutan and India because the two neighbouring countries provide an analytically valuable contrast. Bhutan is a relatively small Himalayan country characterised by exceptionally high forest coverage and a strong constitutional and policy emphasis on environmental conservation. Its biodiversity governance has also recently undergone legislative reform. The Biodiversity Act of Bhutan 2022 was followed by the Biodiversity Rules and Regulations 2023, which entered into force on February 16, 2023. India represents a noticeably different demographic and institutional environment. It has very large population, extensive industrialisation; urbanisation, infrastructure development, and highly differentiated environmental governance system create different forms of environmental pressure and enforcement complexity. India's National Green Tribunal Act 2010 establishes a specialised institution for environmental adjudication, including environmental protection, conservation of forests and natural resources, and relief and compensation for environmental damage.

The comparison does not seek to establish a simplistic hierarchy in which one country is environmentally successful and the other environmentally unsuccessful. Instead, the purpose is to examine how different structural conditions influence environmental risk and how legal institutions can respond to ecological harm. The central argument is that environmental crime in a changing society cannot be explained by demographic size or technological development alone. Institutional capacity, regulatory design, cultural and economic relationships with natural resources, and the ability to translate environmental law into measurable restoration outcomes are equally important.

Environmental restorative justice can therefore ask:

- What ecological harm occurred?
- Who was affected?
- Who should assume responsibility?
- What ecological restoration is possible?
- What compensation or community remedy is appropriate?
- How can recurrence be prevented?

For this study, restorative environmental justice is defined as an integrated approach combining **accountability, ecological restoration, community participation, compensation, monitoring, and prevention.**

THEORETICAL FRAMEWORK

The study combines green criminology, environmental justice, and restorative justice.

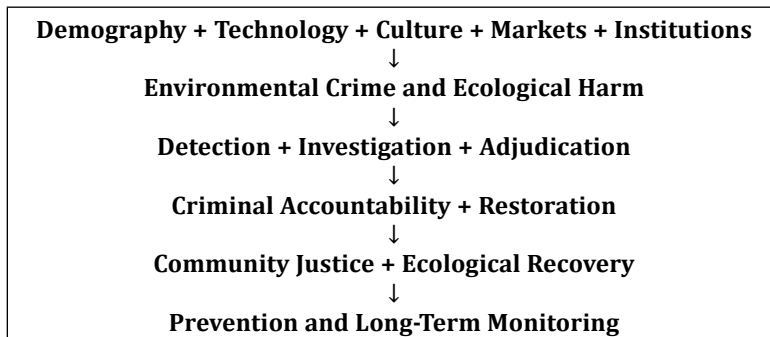


Fig. 1: Resulting Analytical Model

This model rejects the assumption that demographic or technological variables have automatic effects on environmental crime. Their effects are mediated by institutions, economic structures, legal rules, and social practices.

RESEARCH OBJECTIVES

The study has four principal objectives:

1. To compare selected demographic, ecological, and technological indicators for Bhutan and India.
2. To assess the institutional capacity of both countries to address biodiversity-related environmental crime.
3. To examine the methodological reliability of cross-national environmental-crime comparisons.
4. To develop a restorative environmental justice framework applicable to biodiversity-related offences.

RESEARCH DESIGN

The research employs a comparative empirical case-study design using secondary quantitative and qualitative data.

The quantitative component uses internationally harmonised indicators from the World Bank's World Development Indicators. The ecological data are based on internationally standardised sources, including Food and Agriculture Organization (FAO) data underlying the forest-area indicator. The World Bank reports forest area of 71.6% for Bhutan and 24.5% for India in 2023.

Technological connectivity is measured through the proportion of individuals using the Internet. Institutional evidence is derived from official Bhutanese and Indian sources.

FINDINGS

Ecological and Technological Comparison

Table 1: Selected Comparative Indicators for Bhutan and India

Indicator	Bhutan	India	Difference
Forest area (% of land area), 2023	71.6	24.5	+47.1 %
Internet use (% of population), 2024	91.0	70.0	+21.0 %
CO ₂ emissions per capita, 2024	2.0 t	2.2 t	−0.2 t %
Electricity access (% of population), 2023	100.0	99.5	+0.5 %
Safely managed sanitation (% of population), 2024	49	63	−14 %

Source: World Bank Open Data

The most substantial difference is forest coverage. Bhutan's forest area represented 71.6% of land area in 2023 compared with 24.5% in India. This constitutes a difference of 47.1 %.

The finding should not, however, be interpreted as evidence that environmental crime explains the difference. Forest coverage reflects multiple variables, including geography, historical land use, conservation policy, economic structure, settlement patterns, and ecological conditions.

Technology and Environmental Protection

The technology comparison produces an important empirical finding. Internet use reached 91% of Bhutan's population in 2024, compared with 70% in India. This means Bhutan had 21% greater Internet penetration. If digital connectivity necessarily produced greater environmental degradation, higher Internet penetration would be expected to correspond systematically with poorer ecological conditions. The Bhutan–India comparison does not support such a simple relationship. Technology is better conceptualised as a **dual-use institutional resource**.

Digital technologies can facilitate:

- communication between wildlife-trafficking participants;
- online marketing;
- digital payments;
- geographical coordination; and
- rapid access to illicit markets.

However, the same technological infrastructure can strengthen:

- satellite-based monitoring;
- GIS mapping;
- camera-trap systems;
- digital wildlife databases;
- electronic evidence;
- intelligence sharing; and
- cross-border enforcement.

Demography and Environmental Pressure

Demographic scale is an important contextual variable. India's population is vastly greater than Bhutan's, creating different aggregate levels of demand for land, infrastructure, transportation, energy, food, housing, and biological resources. However, population size should not be treated as a direct proxy for environmental crime. A large population may be associated with greater environmental pressure while simultaneously possessing stronger environmental institutions. A small population may experience significant environmental crime where high-value biological resources create commercial incentives for illegal extraction. The appropriate concept is therefore **demographic pressure**, rather than population size alone.

Table 2: Demographic Mechanisms Relevant to Environmental Crime

Mechanism	Potential environmental effect
Population growth	Greater aggregate resource demand
Urbanisation	Habitat conversion and infrastructure pressure
Migration	Changing patterns of resource use
Transport expansion	Greater accessibility of protected areas
Consumption growth	Increased demand for wildlife products
Employment insecurity	Potential incentive for illegal extraction
Market expansion	Commercialisation of biological resources

Source: World Bank Open Data

Demographic pressure matters, but its effects are mediated by governance, markets, technology, and land-use institutions.

Environmental Crime as an Empirical Measurement Problem

One of the most important findings of the research is methodological rather than numerical.

Environmental-crime statistics are generated through institutional processes. A recorded offence depends upon:

Underlying Offending - Detection Probability - Reporting Probability - Institutional Recording

Consequently, an increase in recorded environmental crime may reflect:

- increased offending;
- improved surveillance;
- increased reporting;
- stronger enforcement;
- institutional reform; or
- improved statistical recording.

Likewise, a decrease may indicate reduced offending or weaker detection.

Table 3: Interpretation of Recorded Environmental-Crime Data

Recorded pattern	Possible interpretation
More recorded offences	More offending
More recorded offences	Better detection
More recorded offences	Improved reporting
Fewer recorded offences	Less offending
Fewer recorded offences	Reduced enforcement
Zero recorded offences	No detected cases, not necessarily no crime
Higher crime rate	More offending or stronger detection
Lower crime rate	Less offending or weaker detection

This problem is especially important for comparing Bhutan and India. A country with stronger enforcement may record more offences precisely because its institutions are more capable of detecting them. Therefore, the number of recorded environmental offences cannot independently establish the prevalence of environmental crime.

Bhutan: Environmental Crime and Biodiversity Governance

Bhutan's legal and institutional framework provides a particularly important case for examining environmental governance. The Biodiversity Act of Bhutan 2022 represents a significant legislative development. The Act was passed during the seventh session of the third Parliament and received Royal Assent on July 15, 2022. The Biodiversity Rules and Regulations 2023 subsequently came into force on February 16, 2023 and were expressly developed to implement the Biodiversity Act 2022. The National Biodiversity Centre has also undertaken awareness and institutional capacity-building programmes involving multiple agencies, including the Department of Revenue and Customs, Department of Immigration, Department of Forests and Park Services, aviation authorities, and other relevant organisations. This multi-agency dimension is important because environmental crime frequently crosses administrative boundaries. The Bhutanese approach therefore illustrates a broader principle: **Biodiversity crime cannot be effectively addressed by environmental agencies alone.** Customs, immigration, police, forestry, biodiversity authorities, transport agencies, prosecutors, and courts may all contribute to detection and enforcement.

India: Environmental Crime and Environmental Adjudication

India's environmental governance system contains multiple layers of legislation and institutional enforcement. Important legal instruments include:

- The Wild Life (Protection) Act 1972
- The Environment (Protection) Act 1986
- The Biological Diversity Act 2002
- The National Green Tribunal Act 2010

The National Green Tribunal Act is particularly relevant to restorative environmental justice. Its stated purpose includes environmental protection, conservation of forests and other natural resources, enforcement of environmental rights, and relief and compensation for environmental damage. This statutory structure illustrates a significant movement beyond punishment. Environmental law may require:

- prevention
- compensation
- remediation
- restoration
- continuing compliance

The Wildlife Crime Control Bureau further demonstrates India's recognition of wildlife crime as a specialised enforcement problem. However, the scale and institutional complexity of India also create difficulties in coordinating enforcement among national, state, district, forest, police, customs, and judicial authorities.

Comparative Institutional Analysis

Table 4: Comparison of Environmental-Crime Governance

Dimension	Bhutan	India
Biodiversity legislation	Biodiversity Act 2022	Biological Diversity Act and subsequent legal framework
Biodiversity rules	Biodiversity Rules and Regulations 2023	Multiple regulations and rules
Wildlife protection	National biodiversity/forest framework	Wild Life (Protection) Act 1972
Environmental regulation	Biodiversity and forest institutions	Multi-level environmental regulatory system
Specialised environmental adjudication	Conventional judicial/administrative mechanisms	National Green Tribunal
Wildlife enforcement	Forestry/biodiversity and related agencies	Wildlife Crime Control Bureau and other agencies
Cross-agency coordination	Increasingly formalised	Highly multi-level
Environmental compensation/restoration	Available through relevant legal mechanisms	Explicitly embedded in environmental adjudication

Source: World Bank Open Data

The comparison indicates two distinct institutional models.

Bhutan's framework operates within a smaller administrative environment and has recently consolidated biodiversity regulation through the 2022 Act and 2023 Rules. India's system is considerably larger and more legally differentiated, with specialised environmental adjudication and dedicated wildlife-crime enforcement. Neither model should automatically be considered superior. The relevant issue is whether institutional arrangements generate effective detection, accountability, restoration, and prevention.

Environmental Jurisprudence and Restorative Justice in India

Indian environmental jurisprudence provides significant support for restorative approaches.

In *Vellore Citizens' Welfare Forum v. Union of India*, 5 SCC 647 (1996), the Supreme Court recognised the precautionary principle and polluter-pays principle as important components of environmental law. The case concerned pollution from tanneries and industrial activities affecting land and water resources. The Court's approach linked environmental responsibility with compensation and regulatory intervention. The polluter-pays principle has direct restorative implications because liability extends beyond merely declaring conduct unlawful.

In *Indian Council for Enviro-Legal Action v. Union of India*, 3 SCC 212 (1996), the Supreme Court reinforced the principle that those responsible for environmental pollution could be required to bear remediation costs. The continuing *T. N. Godavarman Thirumulpad v. Union of India* litigation has also played a major role in judicial oversight of forest conservation.

In *Sansar Chand v. State of Rajasthan*, 10 SCC 604 (2010), the Supreme Court emphasised the seriousness of wildlife crime.

Restorative Environmental Justice

The central normative contribution of the study is the integration of restorative justice with environmental criminal law. Conventional criminal justice generally asks: **Who committed the offence and what punishment should follow?** Restorative environmental justice asks a broader series of questions: **What ecological harm occurred? Who was affected? Who should bear responsibility?**

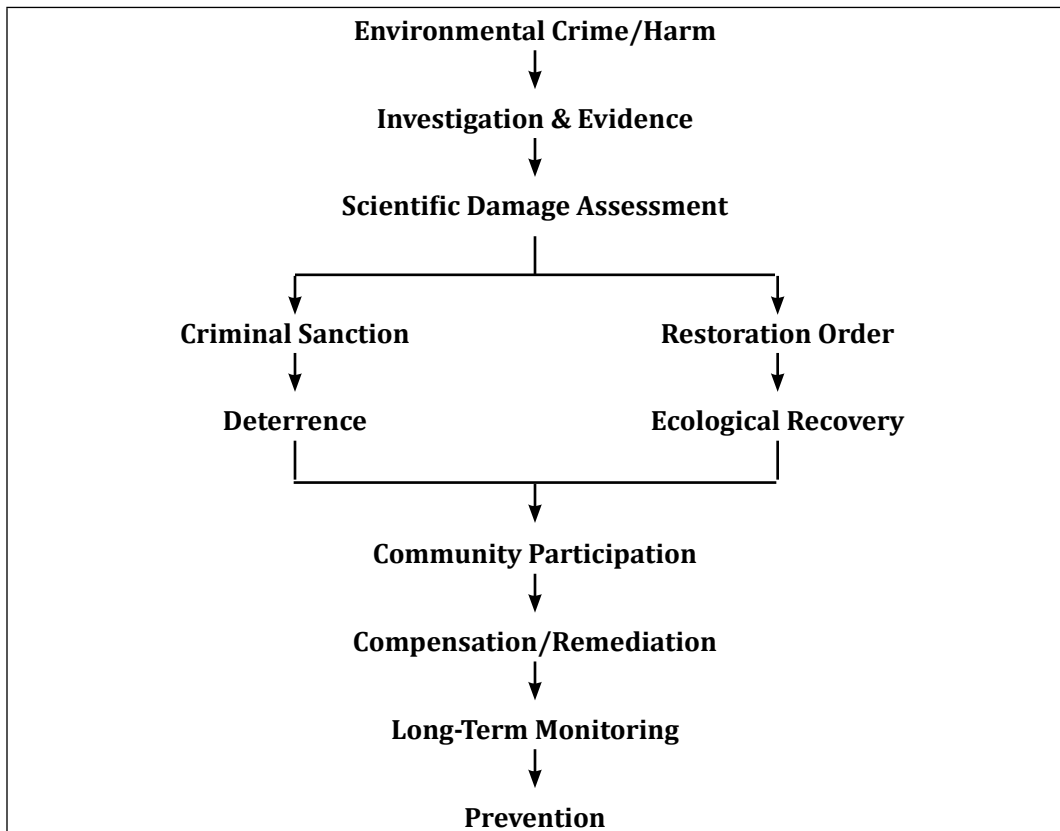


Fig. 2: Restorative Environmental Justice Framework

Author-developed conceptual model integrating green criminology, environmental justice, and restorative justice. The model is proposed for empirical testing and does not represent an existing statutory procedure in either country. Restoration should not replace punishment in serious environmental offences. Organised wildlife trafficking, repeated commercial offending, deliberate large-scale habitat destruction, and other serious offences may require imprisonment, financial penalties, confiscation, and other criminal sanctions. Restorative mechanisms should complement such sanctions.

Proposed India–Bhutan Environmental-Crime Dataset

A major empirical gap identified by this research is the absence of a sufficiently harmonised bilateral environmental-crime dataset.

Table 5: Proposed India–Bhutan Environmental-Crime Dataset

Variable	Proposed coding
Country	Bhutan/India
Year	Calendar year
Location	District/state/protected area
Offence category	Standardised classification
Species	Scientific/common name
Protected status	National/international
Quantity	Number/weight/volume
Offender type	Individual/group/organisation
Motivation	Subsistence/commercial/unknown
Digital involvement	Yes/No/Unknown
Detection method	Patrol/intelligence/digital/other
Cross-border component	Yes/No
Arrest	Number
Prosecution	Yes/No/status
Judicial outcome	Conviction/acquittal/other
Sentence	Type and duration
Financial penalty	Amount
Ecological damage	Scientific assessment
Community harm	Recorded impact
Restoration order	Yes/No
Restoration completed	Yes/No
Monitoring outcome	Ecological indicator

This dataset would allow future researchers to distinguish the stages of environmental criminal justice:

Offending → Detection → Arrest → Prosecution → Adjudication → Punishment → Restoration → Ecological Recovery

This sequence is methodologically superior to comparing arrest or offence totals alone.

Environmental Justice Indicators

Table 6: Proposed Outcome Measures for Restorative Environmental Justice

Justice dimension	Empirical indicator
Accountability	Conviction/proportionate sanction
Ecological restoration	Habitat/species recovery
Community justice	Community participation
Economic justice	Compensation/recovered losses
Procedural justice	Timeliness of adjudication
Technological capacity	Use of monitoring technologies
Cross-border justice	Joint investigations
Prevention	Repeat-offence reduction
Intergenerational justice	Long-term ecological condition

These indicators transform the definition of environmental enforcement success. A case should not be regarded as completely successful merely because an offender has been convicted. The more comprehensive questions are:

- Was ecological harm repaired?
- Were affected communities compensated?
- Was the offending network disrupted?
- Did the species or habitat recover?
- Was recurrence prevented?

Cross-Border Environmental Crime

Environmental crime can involve multiple jurisdictions. A wildlife product may be:

1. obtained illegally
2. transported through another jurisdiction
3. marketed digitally
4. transferred through financial systems
5. sold to an international consumer

This creates particular significance for India–Bhutan environmental cooperation. The countries should strengthen:

- information sharing
- intelligence cooperation
- customs coordination
- species identification
- digital evidence preservation
- financial investigation
- joint training
- border surveillance
- ecological restoration

Bhutan's biodiversity enforcement activities already demonstrate the involvement of multiple agencies, including customs, immigration, forestry, transport, and other institutions. This institutional foundation could support deeper bilateral cooperation.

DISCUSSION

The empirical comparison produces four principal findings.

First, Demographic Scale is Important but Insufficient

India's population creates a different magnitude of aggregate environmental demand from Bhutan's. However, population does not directly translate into environmental crime. Economic incentives, land-use systems, regulatory institutions, and enforcement determine how demographic pressure is converted into environmental harm.

Second, Technology does not have a Predetermined Environmental Effect

Bhutan's 91% Internet-use rate compared with India's 70% demonstrates that high digital connectivity can coexist with extensive forest coverage. Technology therefore has a dual role. The same technological infrastructure can enable illicit activity while improving environmental enforcement.

Third, Institutions are Central

Bhutan's recent biodiversity legislation and multi-agency implementation framework demonstrate institutional adaptation to contemporary biodiversity risks. India's extensive statutory and judicial architecture provides another model, particularly through specialised environmental adjudication.

Fourth, Environmental Crime Requires a Broader Conception of Justice

Punishment is necessary but not sufficient. An imprisoned offender does not automatically restore a damaged ecosystem. This is why restorative environmental justice should become a complementary component of environmental criminal justice.

Policy Recommendations

Harmonise Environmental-Crime Definitions: India and Bhutan should develop common categories for wildlife trafficking, illegal extraction, habitat destruction, and other major environmental offences.

Establish a Bilateral Environmental-Crime Observatory

A joint database could collect annual information on offences, species, seizures, routes, prosecutions, judicial outcomes, and ecological consequences.

Strengthen Digital Enforcement

Authorities should expand lawful use of GIS, satellite imagery, digital databases, electronic evidence, and other technologies for prevention and investigation.

Trace the Money

Wildlife crime should be investigated as an economic activity. **Authorities should trace the money to identify the people who organise and profit from the crime, rather than focusing only on those at the bottom of the network.**

Integrate Ecological Restoration

Where scientifically feasible, judicial and administrative responses should include measurable restoration requirements.

Institutionalise Community Participation

Communities affected by environmental crime or conservation restrictions should have meaningful opportunities to participate in restoration and decision-making.

Measure Outcomes Longitudinally

Environmental justice should be evaluated after the conclusion of criminal proceedings through ecological and social indicators.

CONCLUSION

Environmental crime in a changing society cannot be adequately explained through demographic size or technological development alone. The empirical comparison of

Bhutan and India demonstrates this clearly. Bhutan has a dramatically smaller population than India and considerably greater forest coverage. In 2023, forests accounted for 71.6% of Bhutan's land area compared with India's 24.5%. At the same time, Bhutan had substantially higher Internet circulation. Internet use reached 91% in Bhutan in 2024 compared with 70% in India.

These findings challenge simplistic assumptions that technological modernisation necessarily produces environmental degradation. Technology is better understood as an institutional resource capable of facilitating both environmental crime and environmental protection.

The research also establishes that environmental-crime statistics should be interpreted cautiously. Recorded offences reflect not only underlying criminal behaviour but also detection, reporting, enforcement, legal classification, and institutional recording. The study identifies the development of a harmonised India–Bhutan environmental-crime dataset as an important priority for future empirical research.

The legal comparison further demonstrates the potential for restorative environmental justice. Bhutan's Biodiversity Act 2022 and Biodiversity Rules and Regulations 2023 provide a contemporary biodiversity governance framework. India's environmental framework combines wildlife protection, environmental regulation, specialised adjudication, and judicial principles concerning environmental liability and restoration. The National Green Tribunal Act expressly includes relief and compensation for environmental damage within its statutory purpose. The significance of restorative environmental justice lies in expanding the central question of environmental criminal law. The question should not simply be: **Who should be punished?** Rather, it supplements punishment with ecological repair, community participation, compensation, scientific monitoring, and prevention. The appropriate model is therefore:

Accountability + Restoration + Participation + Prevention

Such an approach is particularly relevant to biodiversity crime because the ultimate victim may not be an individual human being but a species, ecosystem, or community. The comparative experience of Bhutan and India demonstrates that environmental justice in the twenty-first century requires the convergence of **criminology, environmental law, biodiversity science, technology, and restorative practice**. Environmental criminal justice should ultimately be judged not merely by the number of arrests or convictions but by whether biodiversity is protected, ecological damage is repaired, communities are treated fairly, and future environmental harm is prevented.

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SECTION II

Sustainable Agriculture, Circular Economy and Rural Transformation

