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Invasive Alien Species as an Emerging Eco-Crime: A Critical Analysis of Environmental Liability and Regulatory gaps In India

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***Abstract*—India is recognised as one of the world's megadiverse nations, housing roughly 8 per cent of global recorded species across four biodiversity hotspots despite occupying only 2.4 per cent of the Earth's land area. However, this biological richness faces severe threats from Invasive Alien Species (IAS), defined under the Convention on Biological Diversity as non-native organisms whose introduction or spread harms biological diversity, ecosystem services, agriculture, fisheries, and public health. While ecological damage from IAS is often widespread and long-lasting, legal accountability remains fragmented across separate regimes governing wildlife, biodiversity, plant quarantine, customs imports, and environmental protection. Addressing this regulatory gap, this article examines when the introduction or spread of an invasive species crosses from an ecological concern into unlawful conduct capable of attracting civil liability or criminal responsibility. Through a doctrinal and comparative legal methodology, the study pursues three objectives: situating IAS-related harm within the framework of green criminology, evaluating international instruments and Indian statutory provisions alongside foundational principles of environmental liability, and comparing India's regulatory architecture with those of the United States and Japan. Clarifying that not every biological invasion constitutes a criminal offence, the article demonstrates how establishing criminal or civil liability depends on statutory thresholds and provable human conduct, proposing targeted legal reforms to strengthen accountability.**

***Index Terms*—biodiversity law, comparative environmental law, Convention on Biological Diversity, environmental liability, green criminology, India, invasive alien species (IAS), wildlife quarantine**

I. INTRODUCTION

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Biodiversity refers to the variety of plants and animal life in the world or in a particular habitat and two major components measure the biodiversity: species richness and species evenness.[1] The term Biodiversity is popularized by the sociobiologist Edward Wilson to refer to the three kinds of diversities combined, namely genetic, species and Ecological at all levels of biological organization.[2] India is recognised as one of the world's megadiverse countries, accounting for approximately 7- 8% of the world's recorded species and encompassing four of the 34 globally recognised biodiversity hotspots.[3] India covers just 2.4 per cent of the world's land area, yet it is home to 8.1 per cent of all species found on the planet. This remarkable richness places it among the world's 12 megadiverse countries. So far, around 45,000 plant species have been recorded in the country, along with nearly twice as many animal species.[4] Being a tropical country, India has rich biodiversity because of its large coral reefs, mangroves and tropical forests. Its varied natural ecosystems add to this. They range from the cold, high Himalayan regions to sea coasts, arid deserts, different types of forest, wetlands, islands, oceans and high plateaus. Several major rivers, including the Ganges, Brahmaputra and Godavari, contribute as well.[5]

That biological richness is vulnerable to the arrival and spread of organisms beyond their natural range. The Convention on Biological Diversity[6] distinguishes an alien species from an invasive alien species: the latter is an alien species whose introduction or spread threatens biological diversity.[7] The effects may extend beyond the displacement of native species to ecosystem services, agriculture, fisheries, human health and economic activity.

The research problem addressed here is that Invasive Alien Species (IAS) related harm may be widespread and long-lasting, while legal responsibility is often considered through separate rules governing wildlife, biodiversity, plant quarantine, imports and general environmental protection. This raises a central question: when should the introduction or spread of an invasive species be treated not merely as an ecological problem, but as conduct capable of attracting environmental liability or criminal responsibility?

The article has three objectives: first, to explain the environmental problem created by IAS and its relevance to green criminology; second, to examine the international and Indian legal framework and the principles that may support liability; and third, to identify regulatory gaps through a focused comparison with the United States and Japan. The method is doctrinal and comparative.

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[1] PMF IAS, "Biodiversity of India, Biodiversity Hotspots of India," available at: https://www.pmfias.com/biodiversity-hotspots-india/ (last visited Oct. 8, 2026).

[2] National Council of Educational Research and Training, Biology, Class XII, Chapter 13, "Biodiversity and Conservation," available at: https://ncert.nic.in/textbook/pdf/lebo113.pdf (last visited Oct. 8, 2026).

[3] Convention on Biological Diversity, India – Country Profile, available at: https://www.cbd.int/countries/profile?country=in (last visited Oct. 8, 2026).

[4] Supra note 2

[5] G. S. Solanki, "Biodiversity and Protected Areas: A Need for Paradigm Shift in Biodiversity Conservation Strategy in India," Environmental Reports: An International Journal, Vol. 7, Issue 1, 2025, pp. 51–56, DOI: https://doi.org/10.51470/ER.2025.7.1.51

[6] Convention on Biological Diversity, "Invasive Alien Species," available at https://www.cbd.int/invasive (last visited October 8, 2026).

[7] International Union for Conservation of Nature, Invasive Alien Species, available at https://iucn.org/our-work/topic/invasive-alien-species (last visited Oct. 9, 2026).

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It relies on legislation, international instruments, official government material and the sources identified in the accompanying research documents. The article does not treat every ecological invasion as a criminal offence; that classification depends on the applicable law and the conduct proved.

II. INVASIVE ALIEN SPECIES: UNDERSTANDING THE ENVIRONMENTAL PROBLEM

An alien species is one found outside its natural past or present distribution. The term may include viable parts of an organism such as seeds, eggs or other propagules where they can survive and reproduce. An alien species becomes invasive when its introduction or spread threatens biological diversity.[8] Accordingly, the terms "alien" and "invasive" are not interchangeable: the former describes origin or distribution, while the latter requires a harmful or threatening impact. Invasive Alien Species (IAS) may enter a new environment through intentional activities, including trade, ornamental planting, aquaculture or other forms of use, and through accidental pathways associated with transport, imported goods or movement of organisms. Once established, some species spread rapidly and may compete with native species, alter habitats or disrupt ecological relationships. The impacts can affect ecosystem services and human livelihoods, meaning that the consequences are not limited to conservation alone.[9] Invasive species disrupt ecosystem services and biodiversity, and they also change the properties of the soil they grow in.[10]

The United Nations Environment Programme identifies IAS among the five major direct drivers of global biodiversity loss, alongside land- and sea-use change, direct exploitation of organisms, climate change and pollution.[11] Research has also indicated that future invasions may remain substantial in countries that are already heavily invaded, demonstrating that established invasions do not eliminate the risk of further introductions.[12] In India, the issue is particularly significant because ecosystems range from mountain and forest habitats to freshwater bodies, wetlands and coastal areas. A recent report states that invasive plants are expanding in ecologically sensitive areas, including the Western Ghats, the Himalayas and the north-east, and reports substantial annual loss of natural areas associated with invasive species.[13]

III. INTERNATIONAL PROVISIONS FOR THE PREVENTION, CONTROL, AND MANAGEMENT OF INVASIVE ALIEN SPECIES

[8] Convention on Biological Diversity, Convention on Biological Diversity, art. 2 (June 5, 1992), available at https://www.cbd.int/invasive/WhatareIAS (last visited Oct. 9, 2026).

[9] Supra note 7

[10] Indian Council of Forestry Research and Education, *Invasive Species: A Handbook* (ICFRE, Dehradun, 2020) [37-38], available at https://icfre.gov.in/pdf/books-file/book7.pdf (last visited 9 October 2026).

[11] United Nations Environment Programme, Invasive Alien Species: A Global Assessment, available at https://www.unep.org/resources/report/invasive-alien-species-report (last visited Oct. 9, 2026).

[12] Invasive Alien Species May Continue to Invade Wealthy and Already Highly Invaded Countries, Nature Communications, available at https://www.nature.com/articles/ncomms12485 (last visited Oct. 9, 2026).

[13] Down To Earth, India's Natural Areas Losing 15,500 Sq Km a Year to Fast-Spreading Invasive Species, available at https://www.downtoearth.org.in/wildlife-biodiversity/indias-natural-areas-losing-15500-sq-km-a-year-to-fast-spreading-invasive-species (last visited Oct. 9, 2026).

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The Convention on Biological Diversity provides the central international reference point. Article 8(h) calls on each contracting party, as far as possible and appropriate, to prevent the introduction of, control or eradicate alien species that threaten ecosystems, habitats or species.[14] This obligation establishes prevention and management as key components of biodiversity conservation. Its wording recognises that the measures adopted by each state may depend on its circumstances and capacity. The Conference of the Parties has addressed IAS through decisions and guidance developed under the Convention.[15]

The Kunming-Montreal Global Biodiversity Framework also includes Target 6, which focuses on reducing the introduction and establishment of priority invasive alien species and reducing their impacts through management pathways and control measures.[16] The framework reinforces the importance of identifying high-risk species, managing pathways of introduction, and prioritising prevention and control.

3.1. Unites States of America

The United States uses the injurious-wildlife provisions of the Lacey Act, including 18 U.S.C. § 42, to regulate the importation and certain transport of listed wildlife. The U.S. Fish and Wildlife Service explains that listed injurious wildlife generally cannot be imported without the required permit, and that the statutory scheme authorises restrictions directed at species harmful to people, agriculture, horticulture, forestry or wildlife resources. The approach demonstrates the value of a defined listing mechanism linked to import restrictions and enforcement. The comparison should not be overstated: the Lacey Act provision described here focuses on specified categories of wildlife and does not amount to a single rule covering every invasive plant, animal or organism.[17]

3.2. Japan

Japan adopted the Invasive Alien Species Act in 2004, which entered into force in June 2005. The Ministry of the Environment states that the Act aims to prevent adverse effects on ecosystems, human safety, agriculture, forestry and fisheries.[18] It regulates the handling of designated IAS, including importation, breeding, cultivation, storage, transport, sale, transfer and release, subject to the statutory requirements and permissions. Japan also uses categories for designated invasive alien species and certain other alien organisms, with prior notification or documentation requirements applying to relevant imports. The official guidance states that designated IAS are

[14] Convention on Biological Diversity, June 5, 1992, art. 8(h), available at https://www.cbd.int/invasive (last visited Oct. 9, 2026).

[15] Supra note 6

[16] Conference of the Parties to the Convention on Biological Diversity, Kunming-Montreal Global Biodiversity Framework, Target 6 (2022), available at https://www.cbd.int/gbf/targets/6 (last visited Oct. 10, 2026).

[17] Lacey Act, 18 U.S.C. § 42; U.S. Fish & Wildlife Service, Lacey Act, available at https://www.fws.gov/law/lacey-act (last visited Oct. 10, 2026).

[18] Ministry of the Environment, Japan, Alien Species, available at https://www.env.go.jp/en/nature/as.html (last visited Oct. 10, 2026).

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generally prohibited from being imported or handled without prior authorisation, while additional procedures apply to certain organisms not yet fully assessed.[19] This approach connects species assessment to controls across several stages of movement and possession.

IV. INVASIVE ALIEN SPECIES AND SUSTAINABLE DEVELOPMENT PRINCIPLES

The Sustainable Development Goals (SDGs) most closely connected with Invasive Alien Species (IAS) are SDG 15, SDG 14, SDG 6 and SDG 2. SDG 15 is the most directly relevant because Target 15.8 specifically addresses the prevention, control and management of invasive alien species. [20] Environmental liability concerns the legal responsibility to prevent, stop, remedy or compensate for environmental harm. In the IAS context, potential responsibility may arise where a person or entity introduces a species unlawfully, releases it deliberately, transports it in breach of a restriction, ignores a binding quarantine condition, or fails to comply with a legally enforceable control direction. The precise basis of liability depends on the applicable statute, the conduct involved and the evidence connecting that conduct to the harm.

4.1. Polluter Pays Principle

It supports placing the cost of preventing and remedying pollution on the person responsible for causing it. The Supreme Court of India has recognised the principle in environmental cases, including Indian Council for Env'l-Legal Action v. Union of India[21] and Vellore Citizens' Welfare Forum v. Union of India[22] In IAS cases, the principle offers a possible rationale for requiring a responsible party to meet reasonable costs of containment, removal, habitat restoration and compensation where the law permits such recovery. The principle does not automatically determine who is liable for an invasion. A decision-maker must still identify the relevant legal basis, the responsible conduct, the causal connection and the reasonable costs attributable to the harm. These questions can be especially difficult when a species has spread across a large area or was introduced through several pathways.

4.2. Precautionary and Preventive Principle

It supports preventive action where there is a credible risk of serious environmental harm, even if scientific knowledge is incomplete. The Prevention Principle focuses on avoiding foreseeable harm before it occurs.[23] Both are relevant to IAS because eradication may become more difficult after a species becomes established. In practice, they support risk assessment, import screening, monitoring, early reporting and timely control measures. They do not dispense with the need for lawful authority or evidence when penalties are imposed.

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[19] *Ibid.*

[20] United Nations, Transforming Our World: The 2030 Agenda for Sustainable Development, U.N. Doc. A/RES/70/1 (Sept. 25, 2015), Goal 15, Target 15.8, available at https://sdgs.un.org/goals/goal15 (last visited Oct. 10, 2026).

[21] Indian Council for Env'l-Legal Action v. Union of India, (1996) 3 SCC 212.

[22] Vellore Citizens' Welfare Forum v. Union of India, (1996) 5 SCC 647.

[23] *Ibid.*

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4.3. Public Trust Doctrine and Absolute liability

The Public Trust Doctrine recognises the state's responsibility to protect resources held for public use and ecological benefit.[24] In an IAS context, it supports the argument that authorities should not treat invasive-species control as a matter of private preference where important ecosystems and common resources are threatened. The doctrine may inform the interpretation of public duties, subject to the governing law and facts.

The absolute-liability principle associated with M.C. Mehta v. Union of India arose in the context of hazardous industries and cannot simply be applied to every IAS event without legal analysis.[25] Its broader significance is that Indian environmental jurisprudence has developed strong approaches to responsibility for certain categories of environmental harm. Whether a comparable liability rule applies to an IAS-related incident must be determined with reference to the nature of the activity, the governing legal principles and the facts.

4.4. Criminal Liability and Invasive Alien Species

IAS-related conduct may be considered an environmental crime when it fulfils the requirements of an offence established by law. The seriousness of ecological damage alone does not automatically establish criminal liability; the applicable legal provisions and their essential elements must be satisfied.[26] The Wild Life (Protection) Act, 1972 empowers the Central Government under Section 62A to regulate or prohibit the import, trade, possession or proliferation of invasive alien species that threaten wildlife or habitats in India.[27] The Plant Quarantine (Regulation of Import into India) Order, 2003 also provides controls on the import of plants and plant products to prevent the entry of quarantine pests and noxious weeds.[28] Accordingly, deliberate introduction, unlawful importation or non-compliance with applicable restrictions may attract legal consequences where the relevant statutory provisions are violated.[29]

V. INVASIVE ALIEN SPECIES AND INDIA

Globally, 6,075 plant species are known to be invasive in different parts of the world. Studies in India indicate that about 8.5% of the country's plant species are alien. These currently include at least 756 cultivated aliens, 1,388 other alien species and 25 cryptogenic species. The 1,388 alien

[24] M.C. Mehta v. Kamal Nath, (1997) 1 SCC 388.
[25] M.C. Mehta v. Union of India, (1987) 1 SCC 395.
[26] The Environment (Protection) Act, 1986, s. 15, 15A–15F, available at: https://indiacode.ecourtsindia.com/rules/environment-protection-act-1986-4730ea1a/ (last visited Oct. 11, 2026).
[27] The Wild Life (Protection) Act, 1972, s. 62A, available at: https://indiacode.ecourtsindia.com/wild-life-protection-act-1972/section/62A/ (last visited Oct. 11, 2026).
[28] Plant Quarantine (Regulation of Import into India) Order, 2003, cls. 8, 10, available at: https://www.geacindia.gov.in/resource-documents/biosafety-regulations/acts-and-rules/PlantQuarantine_order_2003.pdf (last visited Oct. 11, 2026).
[29] The Destructive Insects and Pests Act, 1914, § 3, available at: https://www.indiacode.nic.in/ (last visited Oct. 11, 2026)

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species comprise 220 invasive alien species, 237 naturalized species and 931 casual alien species.[30] A review discussed by India Water Portal identifies several fish reported as invasive in Indian freshwater ecosystems, including Nile tilapia, Mozambique tilapia, common carp, bighead carp and sailfin catfish. It describes concerns that some of these fish may compete with or displace native species.[31] Invasive Alien plant species includes Lantana (Lantana camara)[32], Water Hyacinth (Eichhornia crassipes)[33], Congress Grass / Santa Maria Feverfew (Parthenium hysterophorus),[34] Mesquite / Vilayati Kikar (Neltuma juliflora / Prosopis juliflora),[35] Siam Weed (Chromolaena odorata)[36], Yellow Oleander / Singapore Daisy (Sphagneticola trilobata) etc. Invasive Alien animal species includes African Catfish (Clarias gariepinus), Nile Tilapia (Oreochromis niloticus), ed-eared Slider (Trachemys scripta elegans), Giant African Snail (Achatina fulica), Alligator Gar (Atractosteus spatula) etc.[37] All these alien species slowly showing adverse impact on ecosystem.

VI. INVASIVE ALIEN SPECIES AND INDIAN LEGAL FRAMEWORK IN INDIA

6.1. Wildlife (Protection) Act, 1972

The Wild Life (Protection) Act, 1972 is a central statute for the protection of wild animals, birds and plants and the conservation of habitats.[3816] Its relevance to IAS lies in the protection of native wildlife and ecological areas and in the powers and restrictions that may apply to particular species or protected places. The Act's practical application to a specific invasive species must be assessed by examining the relevant statutory definitions, schedules, permissions and prohibitions. It should not be assumed that every IAS is automatically covered by every protection or prohibition under the Act.

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[30] Tamil Nadu State Land Use Research Board, State Planning Commission, *International Workshop on Management of Forest Invasive Species in Tamil Nadu* (Government of Tamil Nadu, September 2023) 3, available at https://spc.tn.gov.in/wp-content/uploads/Forest_species.pdf (last visited 12 October 2026).

[31] India Water Portal, Tilapia to Catfish: India's Freshwater Ecosystems Are Losing Native Fish to Invasive Species, available at https://www.indiawaterportal.org/environment/tilapia-to-catfish-indias-freshwater-ecosystems-are-losing-native-fish-to-invasive-species (last visited Oct. 11, 2026).

[32] Drishti IAS, "Invasive Alien Species," Daily Updates, Aug. 26, 2025, available at: https://www.drishtiias.com/daily-updates/daily-news-analysis/invasive-alien-species-3 (last visited Oct. 11, 2026).

[33] Pugdundee Safaris, "Invasive Plant Species in India," Pugdundee Safaris, available at: https://www.pugdundeesafaris.com/blog/invasive-plant-species-in-india/ (last visited Oct. 11, 2026).

[34] C. Sudhakar Reddy, "Catalogue of Invasive Alien Flora of India," Life Science Journal, Vol. 5, No. 2, pp. 84–89, 2008, available at: https://www.researchgate.net/publication/235767173_Catalogue_of_Invasive_Alien_Flora_of_India (last visited Oct. 11, 2026).

[35] Supra note 33

[36] Abhishek Singh, "Invasive Species Crisis in India, Causes, Impacts, Govt Initiatives," Vajiram & Ravi, June 2, 2026, available at: https://vajiramandravi.com/current-affairs/invasive-species-crisis-in-india/ (last visited Oct. 11, 2026).

[37] *Ibid.*

[38] The Wild Life (Protection) Act, No. 53 of 1972, s. 62A (India), available at https://www.indiacode.nic.in/bitstream/123456789/1726/1/a1972-53.pdf (last visited Oct. 11, 2026).

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6.2. Biological Diversity Act, 2002

The Biological Diversity Act, 2002 provides an institutional framework for conservation of biological diversity, sustainable use and fair and equitable sharing of benefits. The National Biodiversity Authority, State Biodiversity Boards and Biodiversity Management Committees perform roles within that framework. These institutions can contribute scientific information, local knowledge and coordinated biodiversity management relevant to IAS. The National Biodiversity Authority confirms that the Biological Diversity Rules, 2024 replaced the 2004 Rules following the 2023 amendments; the 2024 Rules subsequently came into force in December 2024, and the Authority also records a further rules amendment in 2025.[39] The Act is relevant to biodiversity governance, but its precise application to a particular IAS-related act must be established from the provisions in force. The existence of biodiversity institutions does not, by itself, create a complete system for listing all IAS, responding rapidly to new invasions or recovering restoration costs from a responsible party.

6.3. Environment (Protection) Act, 1986

It provides broad powers for the protection and improvement of the environment and for regulating activities that may harm environmental quality.[40] Such broad powers may support governmental action where an IAS problem falls within the Act's scope and a valid measure is made under it. Nevertheless, the Act should not be treated as a substitute for a dedicated IAS regime: species identification, pathways of introduction, control procedures and the allocation of long-term management duties may require more specific provisions.

6.4. Plant Quarantine (Regulation of Import into India) Order, 2003

It was made under the Destructive Insects and Pests Act, 1914[41]. It regulates the import of specified agricultural articles and seeks to prevent the entry of exotic pests, diseases and weeds. Import permits and phytosanitary requirements apply to relevant commodities and risks. This framework is important for prevention at the border, particularly where plant material or agricultural goods may carry harmful organisms.

A quarantine system, however, primarily addresses regulated imports and phytosanitary risks. Its effectiveness against IAS depends on species coverage, inspection, compliance, information-sharing and the capacity to detect organisms that were not identified at the time of import. Once a species becomes established outside the border-control setting, long-term containment and eradication may require additional powers and coordinated action.[42]

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[39] Biological Diversity Rules, 2024, Ministry of Environment, Forest and Climate Change, Government of India; National Biodiversity Authority, FAQs, available at https://nbaindia.nic.in/about-us/faqs (last visited Oct. 12, 2026).

[40] The Environment (Protection) Act, No. 29 of 1986, ss. 3, 5 (India), available at https://www.indiacode.nic.in/ (last visited Oct. 12, 2026).

[41] Plant Quarantine (Regulation of Import into India) Order, 2003, available at https://www.ippc.int/en/countries/india/reportingobligation/2012/12/plant-quarantine-regulation-of-import-into-india-order-2003/ (last visited Oct. 12, 2026).

[42] Ibid.

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6.5. Destructive Insects and Pests Act, 1914

It provides a statutory basis for measures directed at destructive insects and pests and supports the plant-quarantine framework.[43] Its contribution to IAS prevention is therefore particularly relevant to agricultural pests and the movement of regulated plant material. Its age and sector-specific focus also mean that it cannot alone be assumed to provide a comprehensive response to invasive plants, animals and aquatic organisms across all ecosystems.

6.6. Other related legislations

Forest-related matters may be addressed under the Indian Forest Act, 1927, the Wild Life (Protection) Act, 1972, and the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980.[44] The Customs Act, 1962 may also be relevant to the import of prohibited or restricted goods. Fisheries and aquaculture may be subject to applicable fisheries legislation and state-level rules. Although these laws address different aspects of environmental protection, biodiversity conservation, and the movement of potentially harmful organisms, they do not necessarily constitute a single, coordinated framework covering IAS risk assessment, early detection, rapid response, control, ecological restoration, and liability.

VII. INDIAN JUDICIARY AND INVASIVE ALIEN SPECIES

The National Green Tribunal can play an important role in environmental disputes by examining evidence, applying relevant environmental principles and issuing directions within its statutory jurisdiction. In March 2026, the Ministry of Environment, Forest and Climate Change reported that the National Biodiversity Authority had constituted an Expert Committee on IAS in pursuance of directions in NGT suo motu proceedings, O.A. No. 162 of 2023[45]

This development is significant because it connects adjudicatory oversight with scientific assessment and administrative coordination. A tribunal or court can require authorities to consider credible risks, comply with statutory duties and take reasoned action. However, the legal basis for each direction must be identified from the relevant order; the existence of proceedings should not be treated as a final judicial finding on every scientific or liability question.

Indian environmental jurisprudence has recognised principles such as precaution and polluter pays principle in various cases. Judicial intervention can also bring attention to gaps in monitoring and

[43] The Destructive Insects and Pests Act, No. 2 of 1914 (India), available at https://www.indiacode.nic.in/ (last visited Oct. 12, 2026).

[44] The Indian Forest Act, 1927; The Wild Life (Protection) Act, 1972; The Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980.

[45] Ministry of Environment, Forest and Climate Change, Government of India, National Biodiversity Authority Constitutes Expert Committee on Invasive Alien Species, Press Information Bureau (Mar. 21, 2026), available at https://www.pib.gov.in/PressReleasePage.aspx?PRID=2243236&lang=1&reg=3 (last visited Oct. 12, 2026).

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coordination, but lasting results depend on implementation by competent authorities, scientific follow-up and adequate resources.

VIII.LEGAL AND INSTITUTIONAL CHALLENGES IN THE GOVERNANCE OF INVASIVE ALIEN SPECIES IN INDIA

i. Fragmented Legal framework and absence of a dedicated legislation

Different authorities may deal with wildlife, biodiversity, plant quarantine, agriculture, fisheries, customs and forests. This division can complicate responsibility when an invasion crosses sectoral or administrative boundaries. Effective management requires clear allocation of duties and routine information-sharing. The Indian framework contains several relevant laws but does not centre on one comprehensive statute devoted to the full life cycle of IAS management. As a result, preventive controls, post-border monitoring, rapid response, eradication and liability may be dealt with through different legal routes.

ii. Unclear Procedure for Listing and Delisting Invasive Alien Species

A transparent procedure should explain how species are assessed, prioritised, listed, reviewed and, where justified, delisted. Clear scientific criteria and periodic review can improve consistency while allowing decisions to respond to new evidence.

iii. Lack of Clear Liability for Ecological Damage

Where the applicable law does not clearly specify responsibility for IAS-related restoration and compensation, it may be difficult to recover control costs from those responsible. The problem is particularly acute where harm results from several acts or pathways.

iv. Difficulty in Establishing Causation

Scientific uncertainty, delayed effects and the spread across multiple locations can make it difficult to connect a particular person or activity to the eventual ecological damage. A sound system needs transparent evidentiary standards and scientific capacity.

v. Limited Public Awareness

Public awareness can reduce intentional releases and improve reporting of unfamiliar species. Information should explain why release, transport or trade restrictions matter and how members of the public can report a suspected invasion.

IX. CONCLUSION

Invasive alien species pose a serious environmental challenge because they can alter ecosystems, threaten native biodiversity and cause economic and social harm. International instruments, particularly the Convention on Biological Diversity and the Kunming-Montreal Global Biodiversity Framework, emphasise prevention, control and management. Domestic laws on

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wildlife, biodiversity, environmental protection and plant quarantine address important parts of the problem, but they operate across different sectors. IAS-related conduct may be examined as an emerging eco-crime through green criminology, but the term must be used carefully. Ecological damage alone does not establish a criminal offence. Criminal liability requires an applicable legal prohibition and proof of its elements. Environmental liability, including restoration costs and compensation, similarly requires a clear legal basis, a defensible assessment of harm and evidence connecting the harm to responsible conduct.

The constitution of an Expert Committee on IAS (2026) following NGT proceedings is a relevant institutional development. It highlights the need for consolidated scientific evidence and coordinated national attention. The comparative experience of the United States and Japan further demonstrates the practical importance of risk-based listing, import controls, restrictions on handling and release, and enforceable control measures. A more coherent Indian approach would address the gaps identified in this article while preserving scientific rigour, legal certainty and proportionate accountability.