Bridging the Gap: Evaluating India's Legal Response to Marine Pollution in Light of Global Environmental Standards

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Abstract

Marine pollution is a global concern, but when it comes to policy solutions, it is not a plausible idea to rely solely on international law, as the compliance is not guaranteed in most international laws. Each country has a policy concern over marine pollution and the question of balancing the needs of the community and marine health. India, with a huge coastline, has the dual challenge of falling in line with the international standards on marine protection and meeting the local developmental needs. This paper reflects on India's response to global standards and mechanisms like UNCLOS, MARPOL, the Paris Agreement, SDG, etc., in this relation. It also attempts to understand Indian initiatives like the Environment Protection Act, Coastal Regulation Zone Rules, and maritime laws, while highlighting landmark judicial interventions and constitutional mandates. It also reflects on comparative experiences from Australia, the UK, and the European Union to understand best practices and policies. On the sidelines, the paper also identifies the normative tensions between the international standards evolved out of the European experience and the Indian lived experience. The paper argues for an integration of indigenous knowledge, institutional reform, and community participation, advocating not merely legal harmonization but a reorientation in understanding the policy issues. The study highlights the need for legal response that aligns international obligations with culturally grounded and ecologically resilient frameworks.

Keywords: Marine Pollution, Environmental Law, International Environmental Standards, Indigenous Knowledge, Coastal Governance in India, Sustainable Development Goals (SDG 14)

Introduction

Marine pollution poses a profound challenge at both global and local levels, threatening ocean biodiversity, coastal livelihoods, and the very health of the planet's life support systems. The international community has increasingly recognized that protecting the oceans requires concerted legal and policy responses – a recognition embodied in global instruments like the "United Nations Convention on the Law of the Sea" (UNCLOS, 1982) and the Sustainable Development Goals (notably SDG 14: Life Below Water). India, with its 7,500 km coastline and millions of citizens dependent on the marine ecosystem, is at the frontline of this challenge (Kadian, 2023). India's legal framework for marine environmental protection has evolved significantly in response to industrialization, ecological degradation, and international commitments, but a gap often endures between global environmental standards and the domestic implementation of marine pollution laws.

This paper undertakes a doctrinal and comparative analysis to bridge the gap between India's legal response to marine pollution and emerging global standards. The paper outlines the recent global environmental standards shaping ocean governance, including developments post-UNCLOS such as the 2015 Paris Agreement (UNFCCC, 2015) and SDG 14 commitments (Alam et al., 2021). It then critically examines India's domestic legal framework – from statutes like the Environment Protection Act and Water Act to constitutional principles and judicial doctrines that inform environmental jurisprudence. A comparative perspective is added by examining how other jurisdictions (Australia, the United Kingdom, and the European Union) address marine pollution, highlighting best practices and gaps by contrast. The analysis also delves into practical implementation challenges and enforcement gaps that hamper India's marine environmental laws, and the normative tensions that arise when aligning national interests with global norms (Perumal et al., 2024; Indriyani et al., 2025). The paper aims to yield policy-relevant insights on how India might better fulfill its international obligations while contextualizing appropriate solutions. Ultimately, "bridging the gap" is about reconciling differing values, governance capacities, and visions of sustainability. This necessitates a candid reflection on whether our existing strategies truly advances the protection of the marine environment or if deeper reorientation is required to harmonize India's development trajectory with the health of its ocean ecosystems.

Global Environmental Standards for Ocean Protection

UNCLOS and Post-UNCLOS Developments

UNCLOS, 1982 often referred as the "constitution for the ocean," establishes a comprehensive legal framework for ocean use and marine environmental protection (Conrad et al., 2025). Part XII of UNCLOS imposes a general obligation on states to "protect and preserve the marine

environment," including taking measures to prevent, reduce, and control pollution of the sea from any source (Conrad et al., 2025). India, as a party to UNCLOS, is bound by these broad duties and has asserted jurisdiction over its maritime zones accordingly. Notably, under the Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976, India claims sovereign rights up to 200 nautical miles and affirms its jurisdiction to prevent and control marine pollution in these areas (TWCSEEZOMZA, 1976). This alignment of national law with UNCLOS standards signifies a doctrinal commitment to global norms. However, the evolution of international law did not stop with UNCLOS. In recent years, post-UNCLOS developments have sought to address emerging marine environmental challenges that UNCLOS only implicitly covered. One significant milestone is the International Tribunal for the Law of the Sea (ITLOS) Advisory Opinion of 2023, which interpreted UNCLOS's pollution provisions in the context of climate change. In that opinion, ITLOS recognized that greenhouse gas emissions leading to ocean warming and acidification effectively fall under the definition of marine pollution, declaring that human-induced CO_2 is a pollutant under UNCLOS Although advisory and not binding, this development presses countries to view their climate obligations (e.g. under the Paris Agreement) as intrinsically linked to their UNCLOS duties to protect the marine environment. It reflects a growing consensus that climate change's "evil twin," ocean degradation, must be tackled through existing legal tools.

Another major advance is the agreement on a new High Seas Treaty in 2023 – formally the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement (United Nations, 2023) – which builds on UNCLOS to conserve marine biodiversity in areas beyond national jurisdiction (Press Information Bureau, 2024). India has signed this treaty, signaling its support for global efforts to create marine protected areas in the high seas and regulate activities like deep-sea mining to prevent pollution and biodiversity loss. Parallel to this, negotiations are underway for a global treaty on plastic pollution under the UN Environment Assembly, recognizing that marine plastic debris is a transboundary menace requiring international cooperation. Until such a treaty is concluded, UNCLOS remains one of the few international instruments obliging states to curb land-based sources of marine debris.

SDG 14 (Life Below Water)

In 2015, the world's nations adopted the SDGs, including SDG 14: "Conserve and sustainably use the oceans, seas and marine resources for sustainable development." SDG 14 provides a set of targets that function as global environmental standards and benchmarks for national action. Particularly relevant is Target 14.1, which calls for preventing and significantly reducing marine pollution of all kinds by 2025, with a focus on land-based activities (such as plastic debris and nutrient pollution). This target reminds us the urgency and urgency of addressing the fact that an estimated 75% to 80% of marine pollution originates from land-based sources. On the other hand SDG 14 targets protecting marine and coastal ecosystems (14.2), minimizing ocean acidification (14.3), regulating overfishing and destructive fishing practices (14.4), and conserving at least 10% of coastal and marine areas (14.5). These targets have resulted in countries to strengthen

their legal frameworks. For instance, SDG 14 has pushed India and other nations to tackle the scourge of marine plastic waste through policies like single-use plastic bans and improved waste management.The studies rank India among the top global contributors to ocean plastic pollution, discharging an estimated 126,000 metric tons of plastic waste into oceans annually, second only to the Philippines. But it should also be noted that the size and population of the country should also be taken into consideration while taking up these facts and figures. Otherwise it will be a huge miscalculation to compare these absolute figures of countries with more than 1.4 billion with a country less than half a billion population. Figure 1 below illustrates the contribution of major countries to plastic marine debris, with India prominently among the highest polluters. SDG 14's emphasis on pollution reduction directly speaks to such statistics, pressing national authorities to translate these aspirations into enforceable law and measurable outcomes (Sivadas et al., 2021; Nøklebye et al., 2023; Vierros et al., 2024)..

Figure 1: Highest Ocean Plastic Waste Polluters in the World (annual estimates in metric tons). India is also a contributor of mismanaged plastic waste flowing into the oceans, highlighting the critical need for strengthened legal and policy measures to meet SDG 14. Targets like 14.1 call for significant reductions in such pollution by 2025 (Chauhan, 2023).

Source: Chauhan, K. (2023, March 6). *Plastic waste – Winning strategies to overcome pollution*. Defence Research and Studies. https://dras.in/plastic-waste-winning-strategies-to-overcome-pollution/

Beyond pollution, SDG 14.5 (marine protected areas) and related targets have normative influence on national policies like India's commitment to expand its Marine Protected Areas network. While the SDGs are not legally binding in themselves, they represent a global policy consensus that increasingly guides treaty commitments, funding priorities, and domestic legislation. Thus, SDG 14 serves as both a measuring stick and a motivational framework, against which India's legal response to marine degradation can be evaluated in this paper.

The Paris Agreement and the Ocean-Climate Nexus

The Paris Agreement (2015), a landmark international treaty under the UN Framework Convention on Climate Change, primarily addresses greenhouse gas mitigation and climate adaptation. At first glance, it may seem peripheral to marine pollution. However, the ocean-climate nexus has brought the Paris Agreement into the conversation on marine environmental standards. Oceans have absorbed roughly 40% of anthropogenic CO_2 emissions, leading to warmer and more acidic seas. Climate change contributes to coral bleaching, sea-level rise, and stronger cyclones, all of which degrade marine ecosystems. Conversely, healthier oceans (through conservation of "blue carbon" ecosystems like mangroves and seagrasses) can sequester carbon and mitigate climate change. Reflecting this interdependence, the Paris Agreement's long-term goals for limiting temperature increase implicitly require protecting ocean sinks and resilience. In implementation, countries' Nationally Determined Contributions (NDCs) are increasingly including ocean-based actions (such as coastal habitat restoration or climate-smart fisheries management). Furthermore, as noted above, legal interpretations are evolving to treat failure to reduce emissions as a breach of obligations to prevent marine pollution. In essence, global climate standards reinforce the duty to prevent harm to the marine environment. For India, which is highly vulnerable to climate impacts on its long coastline, fulfilling its Paris pledges (e.g. transitioning to renewable energy, enhancing carbon sinks) is part and parcel of safeguarding its coastal communities and marine biodiversity. In summary, recent global environmental standards – from UNCLOS and its progeny to SDG 14 and the Paris framework – set clear expectations for nations to combat marine pollution and protect ocean health. They provide not only legal obligations but also normative guidance and specific targets. The next section examines how India's domestic legal response measures up to these standards, and whether India's laws exhibit the foresight and rigor that these global benchmarks demand (Lagamappagol & Devaraju, 2023; Techera, 2023; Vishwanathan et al., 2021).

India's Domestic Legal Framework on Marine Pollution

Statutory Framework and Regulations

India has developed an extensive web of environmental legislation that, collectively, addresses various facets of marine pollution and coastal protection. The key statutes and regulations include:

- "The Water (Prevention and Control of Pollution) Act, 1974" (Water Act) – India's earliest major environmental law, aimed at preventing and controlling water pollution. It created the Central and State Pollution Control Boards (CPCB and SPCBs) and empowers them to set effluent standards for discharges into water bodies, including rivers and the sea (The Water (Prevention and Control of Pollution) Act, 1974). The Water Act thus extends to marine environments insofar as industrial or municipal effluents eventually flow into the ocean. It provides a basis for action against land-based sources of marine pollution by regulating what enters India's internal waters and beyond. However, enforcement under this Act has historically focused on inland waters, and its potential to curb coastal water contamination depends on robust implementation by pollution control boards (Singh et al., 2025).

- "The Environment (Protection) Act, 1986" (EPA) – Enacted in the wake of the Bhopal disaster, the EPA is a comprehensive umbrella legislation empowering the central government to take all necessary measures to protect and improve the environment (covering air, water, and land). Crucially, it authorizes the government to make rules and notifications targeting specific issues. Under Section 3 of the EPA, the Coastal Regulation Zone (CRZ) Notifications have been issued to regulate activities in the coastal stretches. The EPA also envisaged specialized environmental adjudication (e.g., establishing environment tribunals) to handle violations. Over the years, a series of CRZ Notifications (1991, 2011, and a revised 2019 notification) have zoned India's coastline into different categories (CRZ-I to IV) with graded restrictions on construction, industrial activity, and waste disposal. The aim is to prevent ecological damage to sensitive areas like mangroves, coral reefs, and sand dunes, and to control pollution in estuaries and coastal waters (The Environment (Protection) Act, 1986). For example, heavy industries or large hotels are prohibited in ecologically fragile zones, and there are norms for treatment of sewage before discharge into the sea. Despite this clear framework, violations of CRZ norms have been common, prompting courts to intervene (as discussed later) (Ali, 2024).

- TWCSEEZOMZA (TWCSEEZOMZA, 1976) (Maritime Zones Act) – This law delineates India's maritime boundaries and sovereign rights, and significantly affirms the government's authority to protect the marine environment and prevent pollution in these zones. Under this Act, India can make rules to implement international obligations in the Exclusive Economic Zone (EEZ). For instance, rules under this Act could cover oil and gas exploration impacts or deep-sea mining pollution controls (TWCSEEZOMZA, 1976). The Act provides the jurisdictional basis for applying environmental regulations (like the EPA or specific marine pollution rules) to offshore areas up to 200 nm from the coast. It

also contains penal provisions for violations in these maritime zones and requires central government sanction for prosecutions, reflecting the sovereignty concerns in ocean governance (Gabriel, 2023).

- "The Wildlife Protection Act, 1972" and Biodiversity Laws – Although primarily a conservation law, the Wildlife Act enables the creation of Marine Protected Areas (MPAs) such as marine national parks and sanctuaries (e.g., Gulf of Mannar Marine National Park). By restricting activities in these protected areas, this law indirectly controls certain forms of marine pollution (for example, prohibiting industrial effluent discharge or fishing in those zones) (The Wildlife Protection Act, 1972). Additionally, India's Biological Diversity Act, 2002 promotes the conservation of marine biodiversity, which can drive measures against habitat destruction and pollution (like controlling bioprospecting or invasive species introduction) (Biological Diversity Act, 2002). These laws align with global targets (SDG 14.5 on protected areas) but are not pollution-control statutes per se; rather, they complement the pollution laws by addressing biodiversity and habitat health (Mohite, 2022).

- Sectoral Regulations (Shipping and Fisheries) – Marine pollution is also tackled through sector-specific laws. The Merchant Shipping Act, 1958, as amended, incorporates provisions of the MARPOL Convention (International Convention for Prevention of Pollution from Ships). India, being a party to MARPOL, has under this Act detailed regulations on oil pollution, noxious substances, garbage disposal and ship-generated waste management at ports ("The Merchant Shipping Act, 1958"). The Director-General of Shipping and the Indian Coast Guard enforce these norms, including requiring ships to have pollution preparedness plans and penalizing oil spills. Likewise, the Indian Ports Act, 1908 (The Indian Ports Act, 1908) and the Major Port Authorities Act, 2021 (The Major Port Authorities Act, 2021) empower port authorities to prevent pollution in port areas (by providing waste reception facilities, etc.). On the living resources side, the "Indian Fisheries Act, 1897" (a colonial-era law) and state-level marine fishing regulations aim to prevent destructive practices (such as use of explosives or poisons for fishing) that can degrade marine environments (The Indian Fisheries Act, 1897). While these laws are not primarily pollution-oriented, they are part of the broader legal matrix that influences marine environmental quality (Dardi & Shanthakumar, 2023).

- Coastal Zone Regulations and State-level Laws – In addition to central laws, states have regulations for specific coastal issues. For example, states like Maharashtra and Gujarat have their own laws on beach protection and sand mining control, which help reduce coastal erosion and habitat loss. The EPA's framework allows states to constitute Coastal Zone Management Authorities, which issue orders and recommendations tailored to local conditions (such as managing Mumbai's coastal pollution or the backwaters of Kerala). Furthermore, laws on municipal solid waste and plastic waste management (e.g., the Plastic Waste Management Rules, 2016 under EPA) and hazardous waste handling play a

vital role in curbing land-based pollutants that would otherwise wash into the sea (Plastic Waste Management Rules, 2016). Effective implementation of these regulations – for instance, treating urban sewage and industrial wastewater before it reaches rivers and coasts – is critical to reducing marine pollution at its source(Somaraj, 2025).

Taken together, these statutes and regulations exhibit a formally robust legal framework. On paper, India has aligned itself with many international standards: discharge norms reflecting MARPOL, coastal land-use planning reflecting integrated coastal zone management principles, and provisions that echo the precautionary approach. The doctrinal commitment is evident; however, the efficacy of this framework depends on interpretation, enforcement, and the interplay with India's constitutional mandates, which we explore next.

Constitutional Mandates and Judicial Doctrines

Beyond statutory law, India's constitution and higher judiciary have been instrumental in shaping an environmental rule of law that extends to marine and coastal protection. The Constitution of India, though not originally containing explicit environmental rights, was amended in 1976 to include Article 48A, a Directive Principle urging the State to protect and improve the environment, and Article 51A(g), a fundamental duty of every citizen to protect the natural environment including forests, lakes, rivers, and wildlife. While directive principles are not justiciable, they inform the interpretation of fundamental rights. The Indian Supreme Court famously read the right to a healthy environment into the fundamental right to life under Article 21 (Constitution of India, 1950). This expansive interpretation means that a citizen can approach the courts when marine pollution or ecological harm threatens life and livelihood – for example, fishermen communities affected by an oil spill or industrial discharge into the sea can claim a violation of their right to life and livelihood.

The judiciary has also developed and applied several key environmental doctrines with direct relevance to marine pollution:

- Public Trust Doctrine: Indian courts have embraced the principle that the State holds certain common resources in trust for the public and future generations. In M.C. Mehta v. Kamal Nath (1997) and subsequent cases, the Supreme Court applied this doctrine, which implies that coastal areas, beaches, and the ocean are not to be treated as owned property at the disposal of the government or private parties, but rather must be protected for public use and ecological purposes (Subhash Kumar v. State of Bihar, 1991). This doctrine has been invoked to prevent privatization of shorelines and to require restoration of damaged coastal ecosystems, reinforcing that government authorities have a fiduciary duty to prevent pollution and ecological degradation in these trust resources.

- Precautionary Principle: Since the landmark Vellore Citizens' Welfare Forum v. Union of India (1996) case, Indian jurisprudence formally recognizes the precautionary principle – that lack of full scientific certainty should not be a reason to postpone measures to

prevent environmental harm (Vellore Citizens Welfare Forum v. Union of India, 1996). The Supreme Court in that case, dealing with industrial water pollution, directed authorities to implement the precautionary and "polluter pays" principles. In the marine context, this principle requires erring on the side of caution in activities that might irreversibly harm the marine environment (such as permitting a new coastal pollutant source without thorough risk assessment). It shifts the burden of proof onto the developer or polluter to show that their action is environmentally benign. The precautionary principle has been cited in decisions imposing bans or strict conditions on potentially harmful coastal activities – for instance, the Supreme Court halted unregulated shrimp aquaculture in ecologically sensitive coastal zones, noting that such activity was *"bound to degrade the marine ecology"* (Vellore Citizens Welfare Forum v. Union of India, 1996).

- Polluter Pays Principle: Indian law has adopted polluter-pays as a fundamental guiding concept, meaning that those who cause pollution or environmental damage are responsible for bearing the costs of mitigation and compensation. Courts have ordered industries to pay for restoration of mangrove areas or contribute to environmental funds after coastal pollution incidents. This principle is now also embedded in statutes (the National Green Tribunal Act, 2010 explicitly directs the NGT to apply polluter pays). It serves both as a deterrent and a means of ensuring victims of pollution (like coastal villagers losing fisheries to an oil slick) can be compensated. However, enforcement remains inconsistent – in some cases, polluters (including state agencies) have escaped full accountability due to legal delays or difficulties in quantifying damage.

- Sustainable Development and Balancing: The judiciary often emphasizes that environmental protection and developmental activities must be balanced in line with the principle of sustainable development (derived from the Brundtland Commission and Rio Declaration). In practice, this has led to the use of tools like Environmental Impact Assessments (EIA) for projects, including ports, coastal industrial plants, and tourism infrastructure. Courts have struck down clearances for projects that violate coastal norms or threaten ecological hotspots, but have also allowed projects to proceed with additional safeguards when convinced that the balance is acceptable. The Supreme Court has reiterated that environmental protection is the paramount objective of India's laws and that decision-makers must give environmental concerns priority in close cases. This approach aims to ensure that short-term economic benefits do not trump the long-term public interest in a healthy environment.

- Judicial Oversight and Continuing Mandamus: Particularly relevant to India's enforcement gap is the judiciary's tendency to exercise ongoing oversight in environmental matters. In Indian Council for Enviro-Legal Action v. Union of India (1996), a case addressing failures to implement Coastal Zone Management Plans, the Supreme Court lambasted authorities for "[e]nactment of a law, but tolerating its

infringement, is worse than not enacting a law at all" (Indian Council for Enviro-Legal Action v. Union of India, 1996). The Court directed central and state governments to finalize the plans and set up necessary institutions (like coastal zone authorities) to enforce the CRZ Notification. Similarly, in S. Jagannath v. Union of India (1997), concerning unregulated shrimp farms in coastal areas, the Supreme Court ordered the closure of intensive prawn farms in the CRZ and mandated the creation of an Aquaculture Authority to regulate coastal aquaculture (S. Jagannath v. Union of India, 1996). These cases illustrate how judicial intervention has filled gaps left by regulatory inertia, and established that continuous monitoring (through reports to the court or specialized tribunals) may be required for compliance.

Finally, the establishment of the National Green Tribunal (NGT) in 2010 has provided a specialized forum for environmental litigation, including marine pollution cases (National Green Tribunal, 2010.). The NGT has dealt with matters of coastal zone violations, ship-breaking yard pollution, oil spill liability, and mangrove destruction.

Comparative Perspectives: Australia, United Kingdom, and European Union

A comparative look at other jurisdictions provides insight into how India's marine pollution policies. Countries like Australia and the United Kingdom, as well as the supranational framework of the European Union (EU), have well-developed legal regimes for marine environmental protection. Let's reflect on these regimes to reflect on instructive contrasts to the Indian experience.

Australia: Integrated Ocean Management and Strict Liability

Australia, with its vast coastline and the Great Barrier Reef, has a strong impetus for marine conservation and has accordingly built a rigorous legal architecture to combat marine pollution. At the federal level, the Environment Protection and Biodiversity Conservation Act 1999 (Australian Government, 1999) serves as the cornerstone environmental legislation, covering marine areas and species as matters of national environmental significance. Despite some criticisms that the EPBC Act needs strengthening, it has been instrumental in conditioning or blocking projects that threaten sensitive marine habitats.

Australia also has specific statutes targeting marine pollution sources, closely aligned with international law:

- "The Protection of the Sea (Prevention of Pollution from Ships) Act 1983" implements the MARPOL Convention. Under this law and related regulations, any discharge of oil, noxious liquids, garbage, or sewage from ships in Australian waters is strictly controlled and violations attract heavy penalties. The Australian Maritime Safety Authority (AMSA) actively monitors compliance and has a robust incident reporting and response systemamsa.gov.auamsa.gov.au. Ships must report pollution incidents immediately, and

Australia has not hesitated to prosecute offenders (including foreign vessels) that pollute its seas.

- "The Protection of the Sea (Civil Liability) Act" and related instruments implement the International Oil Pollution Compensation regime, ensuring that in events of oil spills, ship owners are strictly liable (up to certain limits) and victims can receive prompt compensation from insurance or international funds.
- "The Environment Protection (Sea Dumping) Act 1981" implements the London Convention on ocean dumping, regulating and licensing any deliberate disposal of wastes at sea to prevent harmful materials from being dumped in Australian waters.
- State and Territory laws: Australian states (e.g., New South Wales, Queensland) have their own laws complementing the federal regime, such as the "New South Wales Marine Pollution Act 2012" which deals with ship-sourced pollution in state waters (New South Wales Government, 2012). States also manage coastal water quality and estuaries through laws on water management and runoff control. This multi-layered federal-state approach ensures that there are no significant legal gaps – virtually every coastal activity from land-based discharge to vessel-source pollution falls under regulation.

A hallmark of the Australian system is strict enforcement and clear responsibility. Agencies like AMSA and state environment departments have better resources and monitoring capabilities. Domestically, Australia's approach embodies the polluter-pays principle not just in theory but in practice; for instance, ship owners responsible for oil spills in the Great Barrier Reef Marine Park have been sued to recover cleanup and reef restoration costs. Additionally, Australia invests in scientific research and monitoring (e.g., through CSIRO) to inform policy on marine pollution (Mohite, 2022; Konkes et al., 2021; Bright et al., 2023).

In summary, Australia's experience highlights the benefits of:

1. Directly incorporating international standards into domestic law (MARPOL, London Convention, etc., are effectively enforced through dedicated statutes).
2. Strong institutional mechanisms for enforcement, including marine authorities and environmental agencies with clear mandates.
3. Public accountability – information on marine pollution incidents and enforcement actions is often made public, creating pressure for compliance.
4. Regional and global cooperation – Australia participates actively in regional seas programs and supports global initiatives (for example, pushing for an ambitious global plastics treaty), aligning its domestic efforts with worldwide goals.

United Kingdom: Evolving Framework with Emphasis on Good Status

The United Kingdom has long been at the forefront of marine environmental governance, historically through EU frameworks and now continuing its own path after Brexit. Key UK laws include:

- "The Merchant Shipping Act 1995" (and regulations under it) which address marine pollution from ships, encompassing oil spills, waste dumping, and air emissions from vessels. The UK enforces MARPOL through this Act, and its Maritime and Coastguard Agency regularly inspects ships and can detain or prosecute vessels that violate anti-pollution rules.

- "The Marine and Coastal Access Act 2009", a comprehensive law that established the Marine Management Organisation (MMO) and provides a framework for marine spatial planning and creation of Marine Conservation Zones. This Act addresses marine licensing (regulating activities like depositing substances or constructing in the sea that could cause pollution or habitat damage) and ensures sustainable use of marine resources.

- Environmental legislation and targets: "The Environmental Protection Act 1990" and more recently the "Environment Act 2021" include provisions that indirectly benefit the marine environment (for example, the Environment Act introduces long-term targets for waste reduction and water quality, which will reduce pollution reaching coasts).

One distinctive feature of the UK's approach (carried over from EU membership) is the focus on achieving "Good Environmental Status (GES)" for its marine waters (Galgani et al., 2024). Under the UK Marine Strategy Regulations (which transposed the EU Marine Strategy Framework Directive), the UK assesses a set of indicators – from contaminant levels and eutrophication to marine litter and biodiversity – to gauge the health of its seas and sets targets for improvement. Updated monitoring programs and measures are periodically published to move towards these GES targets (Khedr et al., 2023). For example, if plastic litter on beaches or chemical levels in seafood are above defined thresholds, specific measures (like stricter waste management rules or cleanup programs) are triggered. The UK also has high-level policy commitments such as the 25 Year Environment Plan (2018) and its 2023 revision (Environmental Improvement Plan), which include goals to significantly reduce marine plastic pollution and improve coastal water quality Measures flowing from these commitments include banning certain single-use plastics, improving sewer overflow controls, and partnerships like the UK Plastics Pact – a voluntary agreement with industry aiming for 100% reusable or recyclable packaging and eliminating problematic single-use plastics by 2025(WRAP, 2018; Keller & Wyles, 2021).

Another strength of the UK system is the use of economic instruments and accountability. Water companies can be heavily fined for sewage spills that pollute rivers and coasts, pushing them to invest in better treatment infrastructure. There is also strong civil society engagement – e.g., NGOs conduct annual beach litter surveys and press for policy changes based on the data. This

participatory approach helps keep marine pollution in the public eye and builds pressure for compliance.

In comparison to India, the UK's framework demonstrates the effectiveness of:

- Clear, measurable targets (like GES descriptors or plastic reduction goals) which drive focused action and allow performance tracking.
- Dedicated agencies (Environment Agency, MMO) with robust enforcement powers and independent oversight (the newly established Office for Environmental Protection keeps the government accountable on environmental law).
- Regular policy updates in line with scientific findings (the iterative cycle of the marine strategy ensures policies adapt every few years).
- Embedding marine protection into broader environmental governance – rather than treating it as an isolated sector, it's linked with water management, waste policy, and climate efforts.

European Union: Comprehensive Regional Standards and Enforcement

The European Union (EU) has developed some of the most advanced and stringent marine environmental standards, which have significantly influenced its member states' laws. The EU's approach is relevant both as a benchmark for best practices and as an example of how supra-national oversight can drive national improvements – somewhat analogous to how global standards influence countries like India.

Key EU legal instruments include:

- "The Marine Strategy Framework Directive (2008)", which obligates EU members to achieve Good Environmental Status in their marine waters by setting targets and measures across various descriptors (biodiversity, pollution, litter, etc.) (Oceana Europe, 2008). While the 2020 initial deadline was missed and efforts are ongoing (United Nations, 2017), this directive has led to comprehensive marine strategies in each country and a structure for regional cooperation.
- "The Water Framework Directive (2000)", covering coastal waters up to 1 nautical mile, which requires EU states to achieve "good status" for all waters. This has driven reductions in pollution inputs from rivers and estuaries (Boezeman et al., 2020).
- Other pivotal directives address specific sources of marine pollution: for instance, the Urban Waste Water Treatment Directive and Nitrates Directive of 1991 address sewage treatment and agricultural runoff, significantly reducing major sources of coastal water pollution in Europe. The Port Reception Facilities Directive compels EU ports to provide

waste reception and discourages any dumping at sea (through a "no special fee" system), effectively implementing MARPOL and reducing vessel waste discharges.

- The EU has also adopted several product and waste directives targeting marine litter, such as the Single-Use Plastics Directive (2019) which bans or restricts common litter items (plastic bags, cutlery, straws, etc.) and requires extended producer responsibility for fishing gear. Furthermore, EU regulations on chemicals (like REACH) and industrial emissions reduce the toxic load entering marine environments.

Enforcement in the EU is ensured both by national authorities and oversight by the European Commission. The Commission can initiate legal action (infringement proceedings) against member states that fail to implement these directives or meet environmental quality standards. For example, EU enforcement of sewage treatment deadlines prodded faster compliance and yielded cleaner coastal waters. The EU's regional approach also recognizes the transboundary nature of marine pollution: through Regional Sea Conventions (e.g., OSPAR in the North-East Atlantic, HELCOM in the Baltic), EU states coordinate with neighbors on pollution reduction. These frameworks facilitate best-practice sharing (Cooper & Hiscock, 2022).

Comparatively, the EU demonstrates:

- The value of binding regional goals and external oversight that push nations to higher standards than they might adopt on their own.
- A comprehensive approach, tackling marine pollution from multiple angles (source reduction, end-of-pipe controls, habitat protection).
- Integration of marine considerations into general environmental policy (water, waste, and chemical regulations all incorporate marine impacts).
- The use of data and science: extensive monitoring and public reporting on marine indicators create accountability and enable adaptive management.

For India, which lacks a similar regional enforcement mechanism, the EU's experience suggests that setting clear targets (nationally) and ensuring independent review can simulate some of that impetus. While India cannot replicate a supranational authority, it can emulate the practice of committing to measurable outcomes (e.g., percentage of sewage treated or plastic reduced) and rigorously tracking progress, as well as cooperating with neighbors in South Asia on issues like marine litter in the shared Indian Ocean region (Keerthiraj & Sekiyama, 2023).

Normative Tensions in Aligning with Global Standards

Underlying the practical gaps are deeper normative tensions in how environmental protection is conceived and prioritized in India vis-à-vis global standards. These tensions are philosophical and cultural, influencing the trajectory of law and policy:

- Development Paradigm vs. Environmental Ethic: Global environmental standards advocate a model of sustainable development where economic growth and environmental protection go hand in hand. In practice, however, India often faces a difficult trade-off: alleviate poverty and industrialize now, or impose strict environmental controls that might slow some short-term growth. International agreements (like Paris or the SDGs) presume that sustainability can complement development, but this presumption is tested when a developing country struggles to provide basic amenities to millions. The normative question becomes how to value long-term ecological well-being against urgent economic needs. Unexamined assumptions – such as the idea that environmental damage can be remedied later once sufficient wealth is generated – sometimes underlie policy decisions. The Sagarmala project is emblematic: it envisions economic gains from oceans (shipping, energy, fisheries) while India simultaneously commits under SDG 14 to protect ocean ecosystems. Law and courts attempt to mediate these aims (through EIAs, conditions, etc.), but often the deeper question of *what model of development is pursued* remains insufficiently debated (Boora & Karakunnel, 2024).

- Global Frameworks vs. Local Contexts: Many of India's environmental laws are modeled on international templates or legislation from industrialized nations. For example, CRZ rules mirror principles of integrated coastal zone management advocated globally; pollution standards often borrow from WHO or EU guidelines. Yet, the effectiveness of these models in India's socio-economic context is not always critically examined. One size may not fit all: laws transplanted without adapting to local realities can flounder. A case in point is the ban on single-use plastics – a policy aligned with global calls to curb plastic pollution. India announced a ban on certain single-use plastics in 2021, but implementation has been challenging because inexpensive plastic products are deeply integrated into the economy and livelihoods. Here, the tension is between the normative appeal of the global norm ("eliminate problematic plastics") and on-ground practicalities (Misra & Keerthiraj, 2025). A critical perspective asks: are there culturally rooted solutions to the same problem (for instance, reviving traditional packaging like cloth bags or clay cups)? And how can global norms be introduced in phases that allow society to adjust, rather than by fiat? The broader point is that India must interpret and apply global standards in a way that fits its own social fabric, or risk having well-meaning laws that are widely ignored (Nøklebye et al., 2023; Sivadas et al., 2021).

- Western Science vs. Traditional Knowledge: International environmental law is grounded in modern science and regulatory regimes, often implemented in a top-down manner. However, India has a rich heritage of community-based and traditional practices that contributed to sustainability – from sacred groves to customary fishing restrictions. There is tension when formal law overlooks these practices. For example, traditional fisherfolk in many coastal regions observe seasonal fishing bans (to allow fish populations to regenerate), a practice now mirrored by official fishing ban periods in some states.

Recognizing and integrating such indigenous knowledge can enhance compliance and effectiveness, because communities feel a sense of ownership over measures that originate from their own values. A purely technocratic approach might impose marine protected areas or gear restrictions without consulting local communities, causing resentment or non-compliance. Bridging this gap involves moving away from the assumption that only scientific expertise matters, and toward a view that sees local communities as *partners* with valuable knowledge in protecting marine resources. Globally, too, the value of indigenous knowledge in conservation is being acknowledged; aligning Indian law with this trend could reduce normative dissonance (Tynsong et al., 2020).

- Legal Universality vs. Cultural Specificity: Many global standards carry implicit cultural values – for example, viewing nature as having rights or intrinsic value is a concept gaining traction internationally. Different cultures conceptualize human-nature relationships differently. India's cultural and religious ethos often personifies elements of nature (rivers as goddesses, the ocean as a divine body) which could be a powerful motivator for protection. Yet, our legal discourse on marine environment remains largely utilitarian and technical. One might ask, could concepts like the public trust doctrine or intergenerational equity be framed in terms of Indian philosophical concepts of duty (dharma) and trusteeship? Doing so might create a stronger internal narrative for why protecting the ocean is not just a compliance issue, but a moral imperative resonant with India's identity. Currently, much of our environmental law and policy language is borrowed from international jargon, which may not inspire the public. Bridging this normative gap means making environmental protection part of the national self-conception – an area where leaders and courts could invoke cultural heritage to reinforce modern laws (Karn, 2024).

- Sovereignty and Collective Responsibility: There is also a tension between the assertion of national sovereignty and the need for collective global action for the oceans (which are interconnected commons). At times, developing countries like India are cautious that stringent global environmental standards could become a pretext for trade barriers or external interference in domestic affairs. For example, if international law or foreign courts start holding countries accountable for marine pollution (as in the emerging climate litigation trend), some may view it as impinging on sovereignty. India has traditionally championed the principle of common but differentiated responsibilities, insisting that while it will do its part, the primary onus should be on developed countries with historical responsibility and greater resources. This perspective occasionally creates normative tension in global fora – ensuring commitments are equitable is a key concern. Domestically, however, this should not detract from India's own interest in protecting its marine environment. Balancing sovereignty with global responsibility means India should actively shape international norms (which it is doing by participating in

negotiations) so that they are fair, while also voluntarily aligning with those norms out of self-interest (for instance, reducing marine litter is in India's interest regardless of what others do). The normative challenge is cultivating a mindset that global standards are not merely external impositions, but shared benchmarks that India has had a hand in creating and stands to benefit from by adhering to (Challa et al., 2023).

Addressing these tensions requires more than legal tools; it needs dialogue between development planners, environmentalists, cultural thinkers, and communities. An approach mindful of encouraging questioning deep assumptions – for example, asking not only "How do we enforce this international norm?" but also "Why do we embrace this norm, and how does it resonate with our own civilizational ethos?" Such reflection can lead to innovative ways of meeting global objectives that are more attuned to India's context, ensuring that global standards are implemented in spirit, not just in letter.

Bridging the Gap: Towards Convergence of Standards and Practice

Closing the gap between India's marine environmental laws and global standards is both a practical governance project and a normative realignment. Based on the analysis above, several key steps and insights emerge:

1. Strengthening Implementation Mechanisms: India needs to invest heavily in the nuts and bolts of environmental governance. This includes expanding the capacity of pollution control agencies (more personnel, laboratories, and patrol vessels for coastal monitoring), developing better inter-agency coordination frameworks (perhaps a unified National Marine Environment Authority that brings together representatives from environment, shipping, fisheries, and coastal states to oversee marine pollution control holistically), and leveraging technology. Modern tools like satellite imagery, drones for coastline surveillance, and remote sensors can help monitor large areas effectively – e.g., satellite data can detect algal blooms or sediment plumes from dredging in near real-time, prompting quicker enforcement action. The government's recent moves to use satellite monitoring for detecting violations in coastal regulation zones are promising. Additionally, creating publicly accessible data portals on coastal water quality and pollution sources (akin to the air quality index for cities) can improve transparency and accountability (Singh et al., 2023).

2. Policy Coherence and Integrated Planning: Adopting an integrated marine spatial planning approach can reconcile developmental needs with conservation. If every coastal state develops a Marine Spatial Plan (MSP) that designates zones for strict protection, sustainable use, and intensive use, based on scientific and socio-economic inputs, it can guide decisions so that, for example, industrial facilities are sited away from ecologically critical areas and cumulative pollution loads in each area are kept within carrying capacity. Such planning forces different departments to coordinate and agree on trade-offs openly rather than in silos. Countries like Australia and the UK already employ MSP; India has initiated pilot projects (e.g., in

Lakshadweep and Puducherry). Scaling this up with legal backing would institutionalize preventive thinking – development projects would be conceived within an overall plan that safeguards environmental thresholds, reducing conflicts and need for ex-post facto corrections (Tailor et al., 2021).

3. Community Involvement and Decentralization: Empowering coastal communities as partners in marine protection is crucial. Legal provisions could give coastal panchayats and urban local bodies a formal role in monitoring compliance with environmental conditions of local projects and managing coastal resources. For example, community-based coastal monitoring committees could be recognized, with training to conduct beach patrols or report illegal activities (like mangrove cutting or waste dumping). Such bottom-up surveillance would supplement official enforcement and create local stewardship. Success stories – like the community-driven protection of turtle nesting sites in Odisha, or local fishermen in Tamil Nadu voluntarily refraining from fishing during breeding season – show that when communities have ownership, compliance with environmental measures improves. Strengthening the voice of these stakeholders in policy (through public hearings, representation in coastal zone management authorities, etc.) can ensure that rules are realistic and supported by those most affected.

4. Adapting Global Best Practices: India can learn from comparative experiences. From Australia, the notion of strict and swift liability for polluters can be applied more rigorously – for instance, empowering regulators to levy hefty fines or administrative penalties on the spot for clear violations, rather than relying solely on protracted criminal trials. By staying dynamic, the legal framework can respond to emerging issues like microplastics or pharmaceutical residues in the marine environment (Narra et al., 2021).

5. Normative Reorientation and Education: Bridging the gap is not only about enforcement but also about aligning values. Environmental education campaigns that draw on cultural values – e.g., highlighting teachings from Indian traditions about living in harmony with nature – could resonate more deeply than purely scientific messaging. The goal is to make pollution socially unacceptable. For instance, swachh bharat (clean India) campaigns successfully mobilized citizens on sanitation; a similar mass campaign focusing on “clean coasts, clear seas” could change mindsets about littering or polluting coastal waters. Involving schools, religious leaders (many of whom are already engaged in river clean-ups), and media in spreading an ethic of ocean care will underpin the effectiveness of laws. When societal norms evolve to view polluting the ocean as an egregious wrongdoing, compliance will improve organically, reducing the burden on enforcement agencies.

6. International Cooperation and Leadership: India can leverage international cooperation to support its domestic efforts. Active participation in the upcoming global plastic pollution treaty could bring in technical and financial assistance for waste management and innovation in alternatives to plastics, directly aiding SDG 14.1 goals. Similarly, by collaborating with neighboring countries in South Asia on initiatives like a regional action plan for the Indian

Ocean (perhaps under UNEP's Global Programme of Action for land-based pollution), India can address issues like marine debris and oil spills that cross boundaries. This not only helps share best practices but can also ease political tensions by solving common problems collaboratively (Keerthiraj, 2019). Moreover, India should continue to take leadership roles in global forums (as it did with the International Solar Alliance for clean energy) to ensure that international standards developed are realistic and equitable. Leading by example – for instance, significantly reducing its own marine pollution – would give India moral authority to demand similar action from others and ensure its coastline benefits from overall healthier oceans (Khadanga et al., 2022; Keerthiraj et al., 2025; Toan et al., 2023).

7. Legal and Institutional Reform: On the legal front, periodically updating and consolidating legislation can close gaps. India could consider enacting a dedicated Oceans Act – a comprehensive law that consolidates principles and provisions related to marine environmental protection, clarifies agency jurisdictions, and explicitly incorporates newer global norms (like marine litter control or climate adaptation for coastal zones). Short of a new Act, amendments to existing laws (EPA, Water Act) could introduce specific rules for emerging issues (e.g., regulating noise pollution in the marine environment which affects marine life, or managing coastal sediment mining). Strengthening institutions like the NGT by expanding their mandate to proactively address marine pollution (allowing suo motu cases based on news reports or research findings) and ensuring their orders are executed through supervisory committees can also improve implementation. Finally, better inter-ministerial coordination at the Union government level – perhaps through a revived National Coastal Zone Management Authority with real decision-making power – would align policies (for example, port development and coastal zone protection) under a common vision (Baroth et al., 2022).

In implementing all these steps, it is crucial to remain conscious of the philosophical underpinnings. The best practices must be indigenized – made to work in India's administrative culture and social milieu. Similarly, while learning from the world, India should contribute its own insights – such as the value of public interest litigation or community spiritual connections to nature – to the global arena. Bridging the gap is not about Westernizing India's environmental management, but about modernizing it in an Indian way that meets global benchmarks.

Conclusion

India stands at a crossroads where its legal commitments to the global environmental community and the needs of its people for a healthy, productive marine environment must converge. The journey to bridge this gap can benefit from questioning whether we are merely imitating global norms or truly understanding and assimilating the principles behind them. An approach that is analytically rigorous and culturally rooted can yield innovative solutions. In light of global environmental standards such as SDG 14 and the Paris Agreement, India's trajectory will be closely watched. Success in reducing marine pollution and improving ocean health will not only fulfill international expectations but directly enhance the well-being of millions of Indians. The

comparative analysis shows that solutions are available as other jurisdictions have forged paths that India can adapt. India's own legal system, especially its higher judiciary, has shown vision in aligning law with ecological imperatives. Now, a concerted push is needed to implement and internalize those ideals at all levels of governance and society. Ultimately, "bridging the gap" is not a one-time project but a continuous process of evaluation, learning, and commitment, where aws must evolve, policies must respond to feedback, and values must shift toward sustainability. By doing so, India can transform its image from a country struggling with ocean pollution to a beacon of how a large, diverse democracy can meet the global challenge of marine conservation. In the spirit of critical inquiry and constructive action, India can indeed reconcile its development aspirations with the sanctuary that is the ocean, ensuring that its legal response to marine pollution not only meets the letter of global standards but embodies their life-affirming spirit for generations to come.

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