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Research Article

INTERNATIONAL LEGAL FRAMEWORKS FOR REGULATING LAND-BASED MARINE POLLUTION: A COMPARATIVE STUDY OF GLOBAL AND REGIONAL APPROACHES, DISPUTES AND SETTLEMENT MECHANISMS

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ABSTRACT

Background: Land-based sources are the primary contributors to ocean pollution, posing significant risks to marine ecosystems and human health, as exemplified by Minamata disease caused by mercury contamination. A thriving marine environment is essential for the prosperity of coastal cities. However, despite existing international legal frameworks, stronger regulations remain necessary to effectively control land-based marine pollution. Governments often hesitate to impose strict limits on land-based industries, making legal strategies that constrain state actions crucial for environmental protection. Regional agreements have emerged as potential solutions, offering regulatory approaches tailored to specific economic, social, and political contexts.

Methods: This study employs a doctrinal legal research approach to analyse the challenges in implementing global and regional legislative frameworks for land-based marine pollution. A comprehensive literature review of academic works, international legal texts, and landmark judicial cases provides insight into regulatory gaps and potential improvements. Additionally, secondary sources, including reports from civil society organisations, help contextualise the practical implications of these legal frameworks. The study also examines disputes related to land-based marine pollution and the effectiveness of dispute resolution mechanisms at both regional and global levels.

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Results and Conclusions: The findings emphasise the need to protect marine environments from land-based pollution while balancing economic growth. Regional agreements offer valuable insights into legal strategies and institutional mechanisms that could help achieve this equilibrium. However, weaknesses in how these conventions enhance international law's ability to manage land-based pollution require further analysis. A sustainable legislative framework must reconcile environmental protection with economic, social, and political priorities. Strengthening dispute settlement mechanisms and fostering international cooperation are essential for addressing these challenges. The study underscores the persistent tension between economic growth and environmental preservation in international law and highlights the need for more effective, enforceable legal frameworks to ensure the long-term sustainability of marine ecosystems.

1 INTRODUCTION

The most significant contributor to ocean pollution comes from land. Since coastal waters are areas of high biological productivity, pollution from land poses a substantial hazard to the marine environment. Contaminations in coastal waters can cause significant dangers to marine ecosystems and human health, as is commonly shown by the case of Minamata, a sickness caused by mercury poisoning via liquid waste from a plant in Japan.¹

Therefore, it is not an exaggeration to argue that a thriving marine ecosystem is crucial to the well-being of coastal communities. Discharges from land-based sources, which can be municipal, industrial, or agricultural, can enter the marine environment in a few different ways: (i) from the shore, including estuaries that release into the ocean by runoff; (ii) via canals, rivers, or other waterways; (iii) via the atmosphere; iv) sources of pollution-causing activity.²

The combination of population overcrowding, industrialisation, and the ocean's limited ability to process pollutants are the root causes of land-based marine pollution. An estimated 60% of the universal population is thought to reside within 100 kilometres of a coastline.³ As the world's population continues to grow at an alarming rate, land-based pollution may pose an even more significant threat to marine life.

¹ SM Sharifuzzaman and others, 'Heavy Metals Accumulation in Coastal Sediments' in Hiroshi Hasegawa, Ismail Md Mofizur Rahman and Mohammad Azizur Rahman (eds), *Environmental Remediation Technologies for Metal-Contaminated Soils* (Springer 2016) 21, doi:10.1007/978-4-431-55759-3_2.

² Takunda Yeukai Chitaka, Percy Chuks Onianwa and Holly Astrid Nel, 'Marine Litter Sources and Distribution Pathways' in Thomas Maes and Fiona Preston-Whyte (eds), *The African Marine Litter Outlook* (Springer 2023) 35, doi:10.1007/978-3-031-08626-7_2.

³ Christopher Small and Robert J Nicholls, 'A Global Analysis of Human Settlement in Coastal Zones' (2003) 19(3) Journal of Coastal Research 584.

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The transboundary character of the issue means that no one nation can solve the problem of pollution entering the ocean from land-based sources. Therefore, international cooperation between States is essential to halting land-based contributions to marine pollution. Additionally, to guarantee fair economic competition on a global scale, it is crucial to adopt international laws in this area. This suggests a pressing need to establish a worldwide legal framework to control marine pollution from land. The optimum way to eliminate marine pollution from land-based sources is not yet agreed upon on a global scale, although there are regional agreements that may assist.⁴

Therefore, the main purpose of this study is to identify the reasons for the continuous development of international regulations of marine pollution from land. Given the reluctance of the government to impose strict regulations on land, protecting the marine environment against pollution from land means only the use of law and limits the scope of the country's work. It is worth noting here that legal ideas and methods for controlling marine pollution from land are increasing, especially in regional meetings. These regional agreements can clarify the laws and institutions that strike a balance between protecting the marine environment from land degradation and promoting economic development. Another issue that needs to be examined is whether regional agreements could help improve international legal regulations on marine pollution from land-based industries.

This study employs a doctrinal legal research approach to examine the challenges in implementing the global and regional legislative framework. This approach allows for identifying gaps in existing knowledge, which are then addressed to generate new insights. The research methodology involves a comprehensive literature review and an analysis of academic articles, books, and legal commentaries to establish a theoretical foundation. Additionally, the study examines the relevant international legal texts, including global and regional laws on the protection of the maritime environment, as well as judicial interpretations of these laws through landmark cases. Secondary sources, such as reports from civil society organisations and international guidelines, are also reviewed to contextualise the findings and provide insights into the practical implications of the legal frameworks.

The research article is structured into four sections. Part 2 builds upon the discussion begun in Part 1, analysing the constraints imposed by the international legal framework on the regulation of land-based pollution. Part 3 explores how regional responses and legal strategies on land-based pollution have evolved through time. Special emphasis is placed on the identification of potentially dangerous compounds, the adoption of a precautionary approach, the implementation of regulatory measures, and the oversight of these processes at the international level. Part 4 provides a comprehensive summary, addressing the most substantial disputes surrounding the protection of the maritime environment from landbased pollution. Furthermore, this section discusses the mechanism of solving these disputes.

⁴ Daud Hassan, Protecting the Marine Environment from Land-Based Sources of Pollution: Towards Effective International Cooperation (Routledge 2017).

2 GLOBAL LAW'S CAPACITY TO CONTROL LAND-SOURCED MARINE POLLUTION

2.1. Analysis of the International Legal System

2.1.1. Internationally Recognised Customary Law and General Legal Principles

The law of the sea has lately embarked on addressing the unique phenomena of regulating marine pollution, mainly marine pollution that originates on land. It is hardly unexpected that there are few laws regarding maritime pollution in customary law, given the lack of State practice in this area.⁵ It is generally agreed that no nation may use or permit the use of its territory in any manner that hurts the territory of another nation. The Trail Smelter arbitration (*1938-41*) formally articulated the principle of *sic utere tuo ut alienum non laedas*, which states that one must utilise their property in a way that does not cause harm to the property of others.⁶ Though the setting is different, the International Court of Justice (*ICJ*) had already referred to "every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States" in the 1949 Corfu Channel case.⁷ The Stockholm Declaration of 1972 expounded on this guideline in Principle 21. The United Nations Conference on Environment and Development issued the Rio Declaration in 1992, and within it was a reaffirmation of Principle 21.⁸

The *sic utere tuo ut alienum non laedas* norm now reflects customary international law, which is beyond dispute. The common law basis of this norm was confirmed in both the 1997 Gabkovo-Najmaros Project case and the International Court of Justice's advisory decision on the Legality of the Threat or Use of Nuclear Weapons.⁹ In international environmental law, *sic utere tuo ut alienum non laedas* is fundamental. However, the subsequent constraints must be considered about the scope and use of this rule.

First, it is widely acknowledged that this rule requires "due diligence" to avoid cross-border harm. If a state has exercised such due diligence, it is exempt from liability for any resulting

⁵ Owen McIntyre and Thomas Mosedale, 'The precautionary principle as a norm of customary international law' (1997) 9(2) Journal of Environmental Law 221, doi:10.1093/jel/9.2.221.

⁶ Austen L Parrish, 'Trail Smelter Deja Vu: Extraterritoriality, International Environmental Law, and the Search for Solutions to Canada-US Transboundary Water Pollution Disputes' (2005) 85(2) Boston University Law Review 363.

⁷ Scott J Shackelford, Scott Russell and Andreas Kuehn, 'Unpacking the International Law on Cybersecurity Due Diligence: Lessons from the Public and Private Sectors' (2016) 17(1) Chicago Journal of International Law 1.

⁸ Rio Declaration on Environment and Development (1992) A/CONF.151/26/Vol.I.

⁹ Justine Bendel and James Harrison, 'Determining The Legal Nature and Content of EIAs in International Environmental Law: What Does the ICJ Decision in the Joined Costa Rica v Nicaragua/Nicaragua v Costa Rica Cases Tell Us?' (2017) 42 Questions of International Law 13.

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damages.¹⁰ Nonetheless, due diligence is a relatively undefined term. Its application may vary on several factors, including the level of available technology and economic resources in a given country and the efficiency of its territorial control.

Moreover, as time progresses in science and technology, what constitutes reasonable due diligence may also shift. The generic term is of little use in this context since it does not specify the actions that each State must take.¹¹ The notion of "common but differentiated responsibility," which is gaining prominence in international environmental law, may also raise questions about the relationship between due diligence and other concepts of equal importance.¹² Therefore, due diligence requires more explanation in each unique circumstance.

Second, as will be demonstrated, many different substances, sources, and individuals are involved in land-based marine contamination. More than two states in the same area may be responsible for marine contamination. As a result, identifying responsibility for ocean pollution can be a complex and ambiguous process. In such circumstances, the standard requirement of due diligence may face challenges, particularly in establishing clear accountability and enforcement mechanisms.

Third, the rule of *sic utere tuo ut alienum non laedas* demonstrates State culpability after harm has already been done on the other State's territory. In other words, this regulation pertains to the State's legal responsibility for harm already done. However, it may be argued that preventing environmental harm is paramount since its effects are not always easy to reverse.¹³

Finally, it is claimed that strict adherence to this criterion may be quixotic given the frequent occurrence of different transboundary environmental problems. As Oscar Schachter pointed out, no one believes harmful actions can be eradicated via blanket legal decree.¹⁴ Thus, it is proposed that the injury must be substantial before the rule of *sic utere tuo ut alienum non laedas* may be used. Nonetheless, a precise definition of "significant or substantial harm" is difficult, if not impossible, to achieve. Consequently, deciding what constitutes "significant or substantial harm" would be an exercise in judgment. It is clear that the universal rule of *sic utere tuo ut alienum non laedas* is not enough to safeguard the oceans.

¹⁰ McIntyre and Mosedale (n 5).

¹¹ Neil McDonald, 'The Role of Due Diligence in International Law' (2019) 68(4) International & Comparative Law Quarterly 1041, doi:10.1017/S0020589319000344.

¹² Carmen G Gonzalez and Sumudu Atapattu, 'International Environmental Law, Environmental Justice, and the Global South' (2016) 26(2) Transnational Law & Contemporary Problems 229.

¹³ Angela H Arthington and others, 'The Challenge of Providing Environmental Flow Rules to Sustain River Ecosystems' (2006) 16(4) Ecological Applications 1311, doi:10.1890/1051-0761(2006)016[1311:TCOPEF]2.0.CO;2.

¹⁴ Oscar Schachter, International Law in Theory and Practice (Martinus Nijhoff 1991).

Land-based marine pollution legislation may also take responsibility for the misuse of rights.¹⁵ When one state uses its privilege to hinder another's ability to enjoy its rights or uses its privilege for an improper purpose, it is engaging in an "abuse of rights" under international law. While the notion of abuse of rights' precise legal status is still up for debate, though it is represented explicitly in the 1982 UN Convention on the Law and Sea, Article 300 states;

"States Parties shall fulfil in good faith the obligations assumed under this Convention and shall exercise the rights, jurisdiction and freedoms recognised in this Convention in a manner which would not constitute an abuse of right".¹⁶

In conclusion, it seems that the rule of *sic utere tuo ut alienum non laedas*, like the notion of exploitation of rights, can put the issues in the limelight about their application due to the abstract character of the rules.¹⁷ It is also worth noting that the guidelines do not mandate that individual states do anything to safeguard the maritime environment or control pollution from any particular source. Therefore, the treaty level has to have more stringent laws regarding land-based marine contamination.

(i) The United Nations Convention on the Law of the Sea (1982)

In force since 1994, the Convention on the Law of the Sea (hereinafter referred to as LOSC) is the first international treaty to impose universal obligations for controlling land-based pollution.¹⁸ Article 194(1) stipulates that States Parties shall adopt measures as may be necessary to prevent, reduce, and control pollution of the marine environment from any source, taking into account characteristic regional features and the state of technical knowledge and its economic feasibility at the time. This clause only applies to contamination that occurs on land.

Furthermore, Article 194 (3) (a) requires that, among other things, "the release of toxic, harmful, or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere, or by dumping" be minimised to the greatest extent possible. It is believed that the 1982 LOSC is a significant improvement against the previous Geneva Conventions that address only restricted causes of marine pollution since it provides such protections.¹⁹

¹⁵ Rehman Akhtar and others, 'An Examination of Evolving Concerns, Obstacles, and Prospects in Relation to Pollution in the Marine Environment' (2023) 3(1) Pakistan Journal of Criminal Justice 66, doi:10.62585/pjcj.v3i1.28.

¹⁶ United Nations Convention on the Law and Sea (LOSC) (10 December 1982) [1994] UNTS 1833/3, art 300.

¹⁷ Samaa Moustafa, 'The Shortcomings of Rights to Water Doctrines' (Master's thesis, American University in Cairo, School of Global Affairs and Public Policy 2011).

¹⁸ LOSC (n 16).

¹⁹ Hassan (n 4).

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In 1982, the Law of the Sea Convention (LOSC) was opened for signing; it was to the effect that rules should be made and enforced to reduce land-based pollution. Article 207(1) requires governments to adopt laws "consistent with internationally agreed rules and standards and recommended practices and procedures" to prevent, reduce and control pollution of the marine environment from land-based sources.

According to Article 207(3), states should coordinate policies to combat this problem at the regional level. To better address pollution from land-based sources, Article 207(4) calls for the establishment of global and regional institutions and the coordination of regional policy adoption. Article 207 also provides for the enforcement of laws and regulations, while Article 213 provides for the adoption of any additional measures necessary for the implementation of international norms and regulations. Article 207(2) further requires states to adopt "other measures as necessary" to avoid such pollution.²⁰

2.1.2. Creation of Non-Binding Measures

The United Nations Environment Programme (UNEP) has been at the forefront of several attempts to manage land-based pollution under a single, worldwide framework. Adopting the Montreal Guidelines for the Protection of the Marine Environment from Pollution by Land-Based Sources in 1985 was one of the first significant events.²¹ The guidelines were revolutionary in providing governments with specific advice to "prevent, reduce, and control" land-originating pollution that impacts marine ecosystems, even though they were not legally obligatory. They strongly emphasised preventative actions, including carrying out environmental impact assessments, implementing monitoring systems, promoting information sharing, and providing developing countries financial and technical assistance. The Montreal Guidelines established the foundation for an international standard on marine environmental management by urging nations to implement these measures, highlighting the crucial connection between the preservation of terrestrial and marine ecosystems.

A distinguishing feature of the Montreal Guidelines is their focus on transboundary water management.²² Recognising that rivers and streams often act as conduits for pollution from inland areas to the sea, the Guidelines call for cooperative measures among states that share waterways. Specifically, the guidelines recommend that if pollution from a shared or bordering watercourse could affect the marine environment, the concerned countries

²⁰ LOSC (n 16).

²¹ Montreal Guidelines for the Protection of the Marine Environment against Pollution from Landbased Sources (24 May 1985) https://digitallibrary.un.org/record/84661?ln=en accessed 25 November 2024; Bettina Meier-Wehren, 'The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities' (2013) 17 New Zealand Journal of Environmental Law 1.

²² Biliana Cicin-Sain, David Vanderzwaag and Miriam C Balgos (eds), *Routledge Handbook of National and Regional Ocean Policies* (Routledge 2015).

should work together to control it. This approach highlights the need to integrate marine pollution controls and the environmental management of international rivers and waterways, emphasising that marine protection efforts must extend beyond coastlines to address upstream pollution sources. Additionally, the guidelines introduced the concept of protected zones to shield vulnerable ecosystems from pollution, identifying ecologically or culturally significant regions that require special preservation measures.

Agenda 21, a worldwide action plan created at the 1992 United Nations Conference on Environment and Development (UNCED), reaffirmed the need to protect marine habitats from land-based pollution.²³ Chapter 17, devoted to the marine environment, advocates a precautionary and comprehensive strategy for mitigating marine deterioration.²⁴ It promotes policies including waste reduction, recycling programs, clean production techniques, and the construction of state-of-the-art sewage treatment plants. Furthermore, Chapter 17 emphasises how dangerous materials must be handled carefully to prevent their introduction into maritime systems. To preserve the well-being of the maritime environment, it calls for a coordinated response to pollution of the land, air, and water. Building on the Montreal Guidelines, Agenda 21 advocates the need for stronger international cooperation to promote regional, local, and global collaborations.

The adoption of the Washington Declaration and the Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-Based Activities in 1995²⁵ kept the impetus for action on land-based pollution management going.²⁶ The GPA, which was created at an international meeting in Washington, D.C., was a direct result of Agenda 21's marine preservation call and was designed to help states reduce marine pollution from land-based sources. To address the nine main causes of pollution that have been identified, it promotes preventative measures and environmental impact assessments. The GPA represented a major advancement by defining specific steps that governments may take to address these sources at the national, regional, and international levels while including science-based recommendations and the most effective techniques for marine ecosystem protection.

However, managing land-based pollution remains complex, partly due to the nature of the pollution sources. Unlike vessel-source pollution, which primarily involves oil and oily

²³ Meier-Wehren (n 21).

²⁴ Louis B Sohn, 'Stockholm Declaration on the Human Environment' (1973) 14(3) The Harvard International Law Journal 423.

²⁵ Washington Declaration on the Protection of the Marine Environment from Land-based Activities (2 November 1995) (1998) 13 Ocean Yearbook 722; UNEP, 'Global Programme of Action (GPA)' <https://www.unep.org/topics/ocean-seas-and-coasts/ecosystem-degradation-pollution/globalprogramme-action-gpa> accessed 25 November 2024; Meier-Wehren (n 21).

²⁶ David L VanderZwaag and Ann Powers, 'The Protection of the Marine Environment from Land-Based Pollution and Activities: Gauging the Tides of Global and Regional Governance' (2008) 23(3) The International Journal of Marine and Coastal Law 423.

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substances, land-based pollution encompasses a broad range of contaminants that vary widely in their chemical composition, sources, and environmental impacts. Pollution from land includes not only continuous sources like factories and agricultural runoff but also episodic events, such as pollutants washed into the ocean during heavy rains. This complexity requires a nuanced regulatory framework that can adapt to diverse pollution types and their fluctuating impact on marine ecosystems. Furthermore, because land-based pollutants are often localised, their effects can vary depending on geographic and oceanographic factors like coastal currents, shallow waters, and semi-enclosed seas, where the consequences of pollution can be more severe.²⁷

Moreover, significant disparities between developed and developing nations affect the global approach to managing land-based pollution. Many developing countries lack the financial and technological resources necessary for effective pollution control, making it challenging for them to implement comprehensive marine protection measures. The 1995 Washington Declaration acknowledged that poverty reduction is essential for advancing marine protection, as limited economic resources in impoverished regions can hinder efforts to curb pollution at the source. The Montreal Declaration on the Protection of the Marine Environment 2001²⁸ further highlighted this, noting that poverty often leads to inadequate sanitation systems that contribute to marine pollution.²⁹ To address these disparities, international efforts to control land-based pollution should take into account the varying capacities of countries and provide support to those most in need.

In conclusion, while global efforts have led to significant progress in addressing land-based marine pollution, a standardised approach that applies uniformly across all nations is challenging due to the world's diverse economic, geographic, and technological landscape. Instead, regional agreements tailored to specific areas may offer a more practical solution, as they can more effectively accommodate local needs and conditions than broad international treaties. The reliance on regional accords for managing marine pollution highlights the importance of adaptable policies that can address each region's unique environmental and socioeconomic factors. The next step for international law on marine pollution will likely involve further strengthening these regional agreements while fostering collaboration between countries to enhance global marine ecosystem protection.

²⁷ Brenda M Soler-Figueroa and others, 'Characteristics of Global Port Phytoplankton and Implications for Current Ballast Water Regulations' (2020) 155 Marine Pollution Bulletin 111165, doi:10.1016/j.marpolbul.2020.111165.

²⁸ Montreal Declaration on the Protection of Marine Environment (2001) 17 Ocean Yearbook 962.

²⁹ Yoshifumi Tanaka, 'Regulation of Land-Based Marine Pollution in International Law: A Comparative Analysis Between Global and Regional Legal Frameworks' (2006) 66 Zeitschrift für ausländisches öffentliches Recht und Völkerrecht 535.

3 REGIONAL ACCORDS ON THE CONTROL OF LAND-BASED POLLUTION: AN ANALYTICAL STUDY

3.1. Insights Across the Board

Increasingly, regional agreements are being reached to control marine pollution, including land contamination. In this regard, separate protocols on marine pollution from land-based sources have been established for the Baltic Sea, Black Sea, Mediterranean Sea, Northeast Atlantic, Kuwait Region, Southeast Pacific, and Greater Caribbean.³⁰ However, it must be stressed that the Northeast Pacific Ocean, Northwest Pacific Ocean, South Asian Sea, Southwest Atlantic, and Arctic Ocean are omitted.

It is also essential to recognise that the customary applicability covers internal waters in relation to these agreements. Measures to control marine pollution from the land would not be successful unless internal waterway contamination were controlled.³¹ Given that prior agreements on marine protection did not typically encompass interior waters, managing pollution in internal waterways is a crucial step toward ensuring the success of broader regulatory measures.

Additionally, all preceding documents treat atmospheric pollution as land-based marine pollution—except for the 1982 LOSC, which, under Article 212, distinguishes between airborne and land-based pollution.³² Among regional conventions dealing with this topic, the following documents are of particular interest for this study:

- *i. "The 1980 Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based sources (hereafter the Athens Protocol)*³³
- *ii.* The 1983 Protocol for the Protection of the South-East Pacific Against Pollution from Land-Based Sources (hereafter the 1983 Quito Protocol)³⁴
- iii. The 1990 Protocol to the Kuwait Regional Convention for the Protection of the Marine Environment Against Pollution from Land-Based Sources (hereafter the 1990 Kuwait Protocol)³⁵

³⁰ Hassan (n 4).

³¹ Juergen Geist and Stephen J Hawkins, 'Habitat Recovery and Restoration in Aquatic Ecosystems: Current Progress and Future Challenges' (2016) 26(5) Aquatic Conservation Marine and Freshwater Ecosystems 942, doi:10.1002/aqc.2702.

³² LOSC (n 16).

³³ Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (with annexes) (Athens Protocol, 17 May 1980) [1983] UNTS 1328/120.

³⁴ Protocol for the Protection of the South-East Pacific against Pollution from Land-Based Sources (with annexes) (Quito, 23 July 1983) [2000] UNTS 1648/73.

³⁵ Protocol for the Protection of the Marine Environment against Pollution from Land-Based Sources (with annexes) (Kuwait, 21 February 1990) [2006] UNTS 2399/3.

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- *iv.* The 1992 Protocol on Protection of the Black Sea Marine Environment Against Pollution from Land-Based Sources (hereafter the 1992 Bucharest Protocol)³⁶
- v. The 1992 Convention on the Protection of the Marine Environment of the Baltic Sea (hereafter the 1992 Helsinki Convention)³⁷
- *vi.* The 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (hereafter the 1992 OSPAR Convention)³⁸
- vii. The 1996 Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources and Activities (hereafter the 1996 Syracuse Protocol)"³⁹

3.1.1. From Black Lists to a Common System for Identifying Dangerous Substances

(i) The Issues with the Black/Grey Lists Method

The initial stage in addressing land-based marine pollution is the identification of deleterious substances. Treaties regulating terrestrial pollution have employed black and grey lists. Within this approach, hazardous substances are classified as either acute or chronic. In most instances, parties must eradicate contamination by prohibited substances. Chemical pollution classified as grey-listed must be controlled by states using "reasonable measures." The 1974 Paris Convention, 1974 Helsinki Convention, 1980 Athens Protocol, 1983 Quito Protocol, and 1992 Bucharest Protocol employ a black-and-grey list methodology to mitigate marine pollution originating from terrestrial sources.⁴⁰

This Convention's Contracting Parties' duties vary by hazardous chemical type.⁴¹ Since contamination by Part I of Annex 'A' chemicals required immediate action, the Contracting Parties must remove marine pollution "if necessary by stages" from land-based sources. The Contract Parties must "for the elimination, as a matter of urgency, of pollution of the maritime area from land-based sources by substances listed in Part I of Annex A".⁴²

³⁶ Protocol on Protection of the Black Sea Marine Environment Against Pollution from Land-Based Sources (Bucharest, 21 April 1992) http://www.blacksea-commission.org/Official%20Documents/The%20Convention/full%20text> accessed 25 November 2024.

³⁷ Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention, 1992) [1994] OJ L 73/20.

³⁸ Convention for the Protection of the Marine Environment of the North-East Atlantic (with annexes, appendices and final declaration) (OSPAR Convention, Paris, 22 September 1992) [2006] UNTS 2354/67.

³⁹ Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources [1983] OJ L 67/3; Amendments to the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources [1999] OJ L 322/20.

⁴⁰ Tullio Treves, 'Regional Approaches to the Protection of the Marine Environment' in Myron H Nordquist, John Norton Moore and Said Mahmoudi (eds), *The Stockholm Declaration and Law of the Marine Environment* (Center for Oceans Law and Policy 7, Brill 2003) 137, doi:10.1163/ 9789004481589_016.

⁴¹ Kristine Sigurjónsson, 'International and Regional Instruments on the Prevention and Elimination of Marine Pollution from Land-based Sources' (Master's thesis, School of Social Sciences 2012).

⁴² Athens Protocol (n 33).

Contracting Parties must only "strictly limit" maritime chemical contamination by Part II of Annex A. The Contracting Parties must implement programs "for the reduction or, as appropriate, elimination of pollution of the maritime area" by substances in Part II of Annex A under Article 4 (2) (b). However, this provision states that these items cannot be discarded without the consent of the relevant authorities in each contracting state.⁴³ Thus, Part II compounds can be discharged after authorisation.

The classification and discharge of hazardous chemical substances under international conventions and protocols are complicated, as even "black list" substances can be permitted if admittance limits are respected. For instance, the 1980 Athens Protocol, 1983 Quito Protocol, and 1992 Bucharest Protocol allow limited discharges of some "black list" or "grey list" compounds under joint-party limitations or relevant permits. This flexibility allows blacklist substances to be discharged, making pollution control enforcement difficult and defeating the purpose of strict pollution regulations.

In addition, toxic substance categorisation has shown inconsistencies from convention to convention, meaning similar chemicals needing regulation would receive different treatments. While most protocols list mercury and cadmium as black, the 1974 Helsinki Convention lists them as grey. The 1980 Athens and 1983 Quito Protocols list radioactive materials as blacklisted, but the Helsinki Convention bans them. Despite grey list obligations, the black/grey list system of categorisation and discharge can eliminate marine pollution.⁴⁴

(ii) Creation of a "Uniform Strategy"

In light of the disputes in the classification of hazardous substances, agreements like the 1992 OSPAR Convention have, in recent years, shifted towards a more integrated method of controlling harmful land-based pollutants, irrespective of their differences. As the OSPAR Convention follows the 1974 Paris Convention,⁴⁵ specific control measures must be implemented to reduce pollution from land-based sources based on a list of controlled substances and their associated prioritisation criteria. Under Article 14 of Annex I of the OSPAR Commission, any marine point source discharge that may affect the maritime area must be strictly controlled.⁴⁶ In this way, community obligations are fulfilled under the supervision of the OSPAR Commission. This movement away from the traditional

⁴³ Iwan Ball, 'Port Waste Reception Facilities in UK Ports Iwan Ball' (1999) 23(4-5) Marine Policy 307, doi:10.1016/S0308-597X(98)00057-8.

⁴⁴ Judith Schäli, 'The Protection of the Marine Environment from Land-based Sources of Plastic Pollution in International Law' in Judith Schäli, *The Mitigation of Marine Plastic Pollution in International Law* (World Trade Institute Advanced Studies 8, Brill 2022) 107, doi:10.1163/ 9789004508613.

⁴⁵ Elizabeth Kirk, 'Science and the International Regulation of Marine Pollution' in Donald Rothwell and others (eds), *The Oxford Research Handbook on the Law of the Sea* (OUP 2015) 516, doi:10.1093/ law/9780198715481.003.0023.

⁴⁶ OSPAR Convention (n 38), opened for signature September 22, 1992, entered into force March 25, 1998.

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characteristics of regulation comprising the black and grey list enhances the ability of Members of this Agreement to take effective measures toward protecting the environment in the Northeast Atlantic.

The Helsinki Convention and its 1992 successor also moved towards a more generic method of land-based pollution control without differentiating between the black and grey lists, instead constructing circumstances that make it impossible to pollute the environment anew.⁴⁷ Article I of Annex I of the 1992 Helsinki Agreement sought out substances from the 1974 Grey List to be banned to remove all of them.⁴⁸ Further control based on a permit enables better management control over emissions and data sharing on the internet.

3.2. The Precautionary Method

3.2.1. The Precautionary Method as Enshrined in Regional Treaties

The precautionary concept or method is another novel strategy in this area. The precautionary approach/principle is increasingly significant in environmental protection and the maritime environment.⁴⁹ Different documents may use somewhat different terminology to describe the precautionary approach. However, they all agree on the core idea that insufficient proof of the effect of significant or irreversible dangers should not be used to justify inaction in protecting the environment.⁵⁰ Some regional agreements obligate the precautionary approach to managing pollution from land-based sources. For instance, the OSPAR Convention requires its Contracting Parties to implement the following in Article 2 (2) (a):

"the precautionary principle, by which preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects."⁵¹

The OSPAR Convention's negative wording explains that scientific uncertainty should not postpone preventive measures. However, positive language forces governments to adopt

⁴⁷ Tafsir Johansson and Patrick Donner, *The Shipping Industry, Ocean Governance and Environmental Law in the Paradigm Shift: In Search of a Pragmatic Balance for the Arctic* (Springer 2014).

⁴⁸ Helsinki Convention (n 37) Annex I, opened for signature 9 April 1992, entered into force 17 January 2000.

⁴⁹ Andrea J Reid and others, 'Emerging Threats and Persistent Conservation Challenges for Freshwater Biodiversity' (2019) 94(3) Biological Reviews 849, doi:10.1111/brv.12480.

⁵⁰ Klaus Peter Rippe and Ariane Willemsen, 'The Idea of Precaution: Ethical Requirements for the Regulation of New Biotechnologies in the Environmental Field' (2018) 9 Frontiers in Plant Science 1868, doi:10.3389/fpls.2018.01868.

⁵¹ *OSPAR Convention* (*n* 38) art 2 (2) (a).

precautionary measures when there is a reasonable concern about dangers.⁵² The "precautionary principle" should apply to all forms of pollution, not only in the air or water, since it is a moral imperative.

3.2.2. Constraints on Precautionary Thinking

However, precautionary environmental preservation seems to have little legal impact. Many employ this method since it addresses environmental challenges in international courts and tribunals. Under the "precautionary principle" in 1995, amended in paragraph 63 of a court ruling, New Zealand claimed that France must prove its underground nuclear experiments would not discharge such contaminants into the environment. New Zealand also called for the inclusion of the precautionary principle in environmental policy, requiring governments to establish that potentially dangerous operations would not pollute. The ICJ, however, rejected New Zealand's request, as its 1974 verdict only pertained to atmospheric nuclear tests, and the court had no jurisdiction over underground nuclear tests.⁵³ The Court did not address whether the precautionary principle applied to this instance.

In 1997, Hungary claimed that the precautionary principle in the Gabkovo-Nagymaros Project had become a standard rule to avert injury. Hungary's "state of ecological necessity" explanation for stopping the 1977 Treaty-mandated operations validated its actions.⁵⁴ However, the ICJ held that Hungary could not invoke this defence, as it failed to establish that a "serious" and "imminent" danger existed in 1989 or that its acts were the sole appropriate response.⁵⁵ According to the ICJ, "a state of necessity could not exist without a 'peril' duly established at the relevant point in time; the mere apprehension of a possible 'peril' could not suffice in that respect".⁵⁶ Additionally, the Court argued that "imminence" exceeds "possibility" in breadth. The Court found Hungary's warning to be erroneous, asserting that Hungary had other means to address the potential threats. The ICJ's verdict did not directly address precaution. The Court may have ignored the

⁵² Arie Trouwborst, 'Prevention, Precaution, Logic and Law-The Relationship between the Precautionary Principle and the Preventative Principle in International Law and Associated Questions' (2009) 2(2) Erasmus Law Review 105.

⁵³ Stephen M Tokarz, 'A Golden Opportunity Dismissed: The New Zealand v France Nuclear Test Case' (1997) 26(4) Denver Journal of International Law & Policy 745.

⁵⁴ Gabriel Eckstein and Yoram Eckstein, 'International Water Law, Groundwater Resources and the Danube Dam Case' (Gambling with Groundwater: Physical, Chemical and Biological Aspects of Aquifer-stream Relations : Proceedings of the Joint Meeting of the XXVIII Congress of the International Association of Hydrogeologists and the Annual Meeting of the American Institute of Hydrologists, Las Vegas, Nevada, USA, 28 September - 2 October 1998) 892.

⁵⁵ Boldizsár Nagy, 'The ICJ Judgment in the Gabčíkovo-Nagymaros Project Case and Its Aftermath: Success or Failure?' in Helene Ruiz Fabri and others (eds), *A Bridge over Troubled Waters: Dispute Resolution in the Law of International Watercourses and the Law of the Sea* (Brill 2020) 21, doi:10.1163/9789004434950_003.

⁵⁶ Avidan K Kent and Alexandra R Harrington, 'A State of Necessity: International Legal Obligations in Times of Crises' (2012) 42(1) Canadian Review of American Studies 65, doi:10.3138/cras.42.1.65.

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precautionary principle or determined that the environmental threats were so certain they did not need it. The Court's restricted risk reading may suggest that the ICJ was right to take a preventative position.

The International Tribunal for the Law of the Sea (ITLOS) also expressed judicial reluctance. In the 2001 MOX Plants litigation between Ireland and the UK, Ireland argued that the precautionary principle should apply as customary international law, given that emissions from the MOX fuel at Sellafield would always pose a threat to the Irish Sea. Radiation could reach the ocean via air transport and direct discharge. Ireland requested provisional remedies from the ITLOS, but the issue was deemed not urgent enough before the Annex VII arbitral tribunal was formed.⁵⁷ The ITLOS required Ireland and the UK to share information on MOX Plant dangers and build mitigation strategies, but the precautionary principle was not mentioned. Some may claim that the judiciary's hesitation is justified.

The first difficulty is identifying major or irreversible risks that require measures. This issue demands a careful approach due to the possible hazards involved. However, some risks are poorly understood or beyond present scientific understanding, making it difficult to assess their severity.⁵⁸ Scientific understanding of oceans and marine ecosystems remains incomplete, and ongoing scientific and technological advancement may change estimations of severe harm risk. Additionally, the lack of a mandated dispute resolution system would make international law unstable due to the hazy concept of hazards, as exemplified by the MOX plant dispute.⁵⁹

Second, the cautious approach may cause certain nations to cut economic and industrial activity. Thus, environmental and economic considerations must be balanced. Thus, the precautionary approach must include scientific, economic, social, and political aspects. Efficiency and cost-effectiveness in implementing the cautious approach are crucial. These factors' national security value is best assessed by politicians, lawyers, and scientists. The cautious approach may have been limited by the courts. Thus, the Conference of the Parties or other international bodies should decide whether to utilise the preventative method. Thus, formalising a cautious approach to decision-making may be discounted.

⁵⁷ Donald R Rothwell, 'The Contribution of ITLOS to Oceans Governance through Environmental Dispute Resolution' in Tafsir Malick Ndiaye and Rüdiger Wolfrum (eds), *Law of the Sea, Environmental Law and Settlement of Disputes: Liber Amicorum Judge Thomas A Mensah* (Brill 2007) 1007, doi:10.1163/9789004467668_016.

⁵⁸ Reid and others (n 49).

⁵⁹ Daniel Bodansky, 'The Legitimacy of International Governance: A Coming Challenge for International Environmental Law?' (1999) 93(3) American Journal of International Law 596, doi:10.2307/2555262.

Ed.daran D, Zia-ud-Din M, Al Ajlani R and Elhajraoui FE, 'International Legal Frameworks for Regulating Land-Based Marine Pollution: A Comparative Study of Global and Regional Approaches, Disputes and Settlement Mechanisms' (2025) 8(2) Access to Justice in Eastern Europe 254-93 < https://doi.org/10.33327/AJEE-18-8.2-r000111 >

3.2.3. Using State-of-the-Art Methods and Eco-Friendly Procedures

Regional agreements frequently mandate that contractual parties use "all appropriate measures" to mitigate land-based pollution.⁶⁰ To this end, many conventions employ Best Available Techniques (BAT) and Best Environmental Practice (BEP). Article 2(3)(b) of the 1992 OSPAR Convention mandates Contracting Parties to assess BAT and BEP. The utilisation of BAT and BEP is permitted according to Article 6 (1) of the 1992 Helsinki Convention. Consequently, the 1992 Helsinki Convention and the OSPAR Convention delineate BAT and BEP in a comparable manner.⁶¹ Like the OSPAR Convention, the 1992 Helsinki Convention enumerates issues for implementing BAT and BEP. The precautionary principle is used in developing BAT and BEP in the 1992 Helsinki Convention but not in the OSPAR Convention. The 1996 Syracuse Protocol's Article 5(4) requires Parties to consider the BAT when creating and carrying out action plans, programs, and projects.

State parties may possess diminished flexibility to regulate discharges, pollutants, and waste under the BAT and BEP. Establishing a "due diligence" criterion through the BAT and BEP may be feasible.⁶² This obligation may improve terrestrial pollution regulations. The use of BAT and BEP presents many challenges. Technological innovation, economic and social obstacles, and scientific knowledge and experience fluctuate, rendering the definition of BAT and BEP unattainable. Occasionally, Contracting Parties possess considerable autonomy, complicating the assessment of BAT and BEP. Owing to the political, economic, ecological, and technical disparities among States and regions, a benchmark may not represent the BAT in another context.⁶³

Secondly, reconciling BAT, BEP, and economic interests is a significant concern. The technology's economic viability may be significant in this context. Governments may forgo more costly and efficacious marine pollution mitigation techniques for immediate economic considerations. These criteria may aid governments in reconciling environmental preservation with adopting optimal technology and practices.⁶⁴ Thirdly, pollution and environmental degradation may arise even when using BAT. Article 3 (3) of the 1992 Helsinki Convention stipulates that further measures are required if the BAT

⁶⁰ Vu Hai Dang, Marine Protected Areas Network in the South China Sea: Charting a Course for Future Cooperation (Legal Aspects of Sustainable Development 18, Martinus Nijhoff 2014) doi:10.1163/9789004266353.

⁶¹ OSPAR Convention (n 38).

⁶² Nikolaos Giannopoulos, 'Global Environmental Regulation of Offshore Energy Production: Searching for Legal Standards in Ocean Governance' (2019) 28(3) Review of European, Comparative & International Environmental Law 289, doi:10.1111/reel.12296.

⁶³ Tiberio Daddi and others, 'Transferring the Integrated Pollution Prevention and Control (IPPC) Approach and Best Available Techniques (BAT) Concepts to Egypt, Tunisia and Morocco' (2013) 5(7) Sustainability 2944, doi:10.3390/su5072944.

⁶⁴ Stephan Schmidheiny, *Changing Course: A Global Business Perspective on Development and the Environment*, vol 1 (MIT Press 1992).

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or BEP does not yield ecologically acceptable outcomes.⁶⁵ Annex IV (B) (4) of the 1996 Syracuse Protocol has an identical clause.

Ultimately, the technological disparities between developed and developing nations must be acknowledged. Undeveloped governments have challenges utilising BAT and BEP due to technological constraints. Increased technical and financial assistance is required for developing nations to implement BAT and BEP to combat land-based marine pollution. The 1995 Washington Declaration urged "particularly for developing countries, especially the least developed countries, countries with economies in transition, and small island developing States" ("countries in need of assistance") to formulate and execute national action plans. The Declaration also called on states and the European Commission to assist developing countries in obtaining cleaner technology, knowledge, and skills to mitigate land-based marine pollution.

Article 202 of the 1982 UN Convention on the Law of the Sea mandates that governments promote scientific, educational, technical, and other assistance initiatives for developing countries to safeguard the marine environment and restrict maritime activities. Article 266 (2) of the 1982 LOSC has the same provision. Additionally, Article 10 of the Syracuse Protocol 1996 mandates regional technical assistance for impoverished states. We must evaluate institutional structures that ensure assistance to such regimes.

3.2.4. Evaluation and Tracking of Environmental Effects

The successful implementation of relevant regulations limiting discharges of hazardous substances from land-based sources requires an evaluation of the effects of planned activities on the marine environment and the efficacy of regulatory mechanisms. Environmental Impact Assessments (EIA) are crucial for monitoring in this context. An EIA is explained as "an examination, analysis, and assessment of planned activities to ensure environmentally sound and sustainable development" in the United Nations Environment Programme's (UNEP) "Goals and Principles of Environmental Impact Assessment" established in 1987⁶⁶—Article 206 of the LOSC from 1982 mandates EIA to protect the maritime environment. Article VII (2) of the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) 1999, hereinafter referred to as the Aruba Protocol, reflects this approach.⁶⁷ The Kuwait Protocol 1990 has a comparable provision in Article VIII (1).

⁶⁵ Helsinki Convention (n 37).

⁶⁶ UNEP Goals and Principles of Environmental Impact Assessment: Preliminary Note (16 January 1987) <https://digitallibrary.un.org/record/42521?ln=en> accessed 25 November 2024.

⁶⁷ Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) (1999) https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources/factsheet/protocol-concerning-pollution-land-based-sourcesand-activities-lbs-protocol-accessed 25">https://www.unep.org/cep/resources-accessed 25"/

International collaboration on EIAs is crucial, as marine pollution affects countries distant from its origin. Consequently, the 1992 Helsinki Convention mandates EIAs and collaboration. Article 7 (1) of the Helsinki Convention 1992 mandates EIAs in the Baltic Sea Area. Section 3 further stipulates: "When two or more Contracting Parties share transboundary waters in the Baltic Sea catchment area, these Parties shall collaborate to thoroughly investigate potential impacts on the marine environment of the Baltic Sea Area within the environmental impact assessment mentioned in paragraph 1 of this Article."⁶⁸

Article 6 (a) of the 1992 OSPAR Convention mandates Contracting Parties to "conduct and disseminate periodic joint evaluations of the quality status of the marine environment and its evolution, for the maritime area or its regions or sub-regions." Article 6 (b) delineates the priorities for action and facilitates the evaluation of current and prospective marine environmental protection measures.⁶⁹ The OSPAR Commission must assess quality status in collaboration with regional bodies and other knowledgeable international organisations, as stipulated in Annex IV Article 3 (d).

A maritime environment monitoring system is necessary because environmental impact evaluations typically occur during project implementation. Article 204 of the 1982 LOSC mandates comprehensive monitoring of marine pollution and its impacts. Certain regional agreements govern terrestrial marine contamination with analogous stipulations. Agreements can be classified into two groups. Numerous regional agreements require oversight of limits. For instance, the 1980 Athens Protocol mandates Parties to "evaluate, to the extent feasible, the pollution levels along their coastlines, specifically concerning the substances or sources enumerated in Annexes I, and to periodically furnish information regarding this matter" through monitoring. This criterion pertains exclusively to the coastal zone and associated compounds or sources in the appendix. Nonetheless, the coastal dimensions remain ambiguous.

A key question arises: should the monitoring efforts outlined in Article 8(b) encompass the whole Protocol region to assess the impact of actions implemented under this Protocol aimed at mitigating maritime environmental pollution? Certain treaties mandate Contracting Parties to conduct monitoring operations, exemplified by Article VI of the Aruba Protocol, which obligates each Party to establish and execute monitoring programs.⁷⁰ These initiatives can evaluate the implementation of the Protocol and monitor alterations in environmental quality within the Convention area.

The obligation to establish monitoring programs extends beyond the coastal zone and acknowledges hazardous chemicals. The 1983 and 1990 Protocols to the Convention on Biological Diversity have similarly comprehensive monitoring obligations in Articles 8 and 7. This concise study indicates that regional agreements limiting land-based marine pollution

⁶⁸ Helsinki Convention (n 37).

⁶⁹ OSPAR Convention (n 38).

⁷⁰ LBS Protocol (*n* 67), adopted in Aruba, 1999, under the Cartagena Convention.

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progressively integrate EIAs and monitoring mechanisms. If a country's activities result in substantial land-based marine pollution, it may struggle to address uncertainty if the evaluation does not comply with these agreements.⁷¹ This indicates that the EIA may restrict the environmental policy flexibility of States Parties, underscoring the necessity to eliminate pollution at its origin. Understanding the relationship between EIA and precaution is essential. The prudent approach complicates the identification of dangers. This suggests that the EIA, in conjunction with monitoring, may evaluate the probability of hazards necessitating this concept. Consequently, the EIA and other monitoring systems may encourage precautionary measurements.⁷²

4 COMPLIANCE WITH APPLICABLE INTERNATIONAL REGULATIONS SUBJECT TO INTERNATIONAL OVERSIGHT

4.1. System for Reporting

International institutions are increasingly overseeing treaty compliance. One definition of international control is the employment of multilateral international institutions to enforce treaty commitments. State-party reporting, verification, decisions, and recommendations are elements of the international control system's approach to treaty compliance. International human rights legislation has established such a framework for oversight. Environmental accords are comparable.⁷³ International oversight also helps manage landbased marine pollution.

The reporting mechanism might be used to monitor Parties' convention compliance. Reporting is used in several regional conventions on land-based marine pollution. Article 13 (1) of the 1996 Syracuse Protocol requires the Contracting Parties to report on their efforts, results, and, if required, impediments at biannual meetings. It is further highlighted that such reports should include permission granted, monitoring findings, pollutant discharge volumes from their jurisdiction, and Articles 5, 7, and 15 response plans, programs, and activities. Meetings must review Parties' Reports under Article 14 (2) (f). Article 12 (1) of the 1999 Aruba Protocol requires Contracting Parties to report their activities, outcomes, and obstacles during implementation to the organisation. The Meeting of the Contracting Parties decides what data to include, how to collect it, how to present it, and when to provide it, per Article 12 (1). Reporting or exchanging information is required

⁷¹ Rebecca Tsosie, 'Indigenous People and Environmental Justice: The Impact of Climate Change' (2007) 78(4) University of Colorado Law Review 1625.

⁷² Theocharis Tsoutsos, Niki Frantzeskaki and Vassilis Gekas, 'Environmental Impacts from the Solar Energy Technologies' (2005) 33(3) Energy Policy 289, doi:10.1016/S0301-4215(03)00241-6.

⁷³ Louis J Kotzé and Duncan French, 'A Critique of the Global Pact for the Environment: A Stillborn Initiative or the Foundation for Lex Anthropocenae?' (2018) 18(6) International Environmental Agreements: Politics, Law and Economics 811, doi:10.1007/s10784-018-9417-x.

under Articles 13 of the 1980 Athens Protocol, 9 of the 1983 Quito Protocol, 7 of the 1992 Bucharest Protocol, and 12 of the 1990 Kuwait Protocol.

The system's effectiveness depends heavily on the reporting authorities' thoroughness and accuracy, which is difficult because many nations, especially developing ones, do not report or submit the bare minimum to international authorities. Some treaties strengthen the reporting responsibility by requiring Contracting Parties or commissions to provide more detailed information or by setting out the content of such reports. For example, the 1992 Helsinki Convention requires parties to report on their implementation efforts, including their efficacy and problems, under Article 16(1).⁷⁴ Report land pollution prevention and cleanup under this provision. Parties must submit emission permits, emission data, and environmental quality data whenever another Party or the Committee asks under Article 16 (2) of the Helsinki Convention. Industrial facility managers must apply to and share information with national authorities under Annex III. Background information, present and prospective activities, alternatives, and environmental, financial, and safety consequences must be included in the application.75 According to Contracting Party reports, the Baltic Marine Environment Protection Commission must monitor Convention compliance. The relevant Commission will implement these accords. The relevant Commission will implement these accords, aligning with the 1992 OSPAR Convention's Article 22 requirement for periodic reporting by Contracting Parties on specified topics.⁷⁶ These comprehensive reporting systems may help States Parties comply with their reporting requirement and provide accurate information to the appropriate international bodies.

4.1.1. The Role of Treaty Commissions in Oversight

The supervision of the treaty-based Commission is crucial, as is the reporting system. The 1992 OSPAR Convention provides a legal framework for the regulation of land-based marine pollution. Article 3 of Annex I mandates OSPAR to formulate (a) a strategy for the reduction and eradication of toxic and persistent pollutants, along with bioaccumulative substances originating from terrestrial sources and (b) initiatives and measures focused on diminishing nutrient inflows from urban municipal, industrial, agricultural, and other sources.

The extent and intricacy of a party's responsibilities regarding the disposal of these substances will be dictated, as anticipated, by the nature of these schemes and the legal documents provided by the Commission.⁷⁷ Article 10 of the Convention requires the OSPAR Committee to (a) monitor the implementation of the Convention and (b) assess the

⁷⁴ Helsinki Convention (n 37).

⁷⁵ Philippe Sands and others, Principles of International Environmental Law (3rd ed, CUP 2012).

⁷⁶ OSPAR Convention (n 38).

⁷⁷ Javier de Cendra, 'Can Emissions Trading Schemes be Coupled with Border Tax Adjustments? An Analysis vis-à-vis WTO Law' (2006) 15(2) Review of European Community & International Environmental Law 131, doi:10.1111/j.1467-9388.2006.00518.x.

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current state of the marine environment, the effectiveness of existing solutions, and the necessity for new or alternative solutions. According to the periodic reports mentioned in Article 22 and any additional reports provided by the Parties, the Committee will (a) assess the compliance of the Parties with the Convention and the decisions and recommendations established under it, and (b) determine and, if necessary, advocate for measures to ensure full compliance and to advance the decisions made under the Convention.

This clause may enhance the Commission's authority to oversee and regulate operations. The expression "to assist a Contracting Party" is found in Article 23, which warrants emphasis. Furthermore, the term "measures" remains undefined, potentially encompassing administrative, technical, and scientific assistance. The OSPAR Commission oversees compliance with the OSPAR Convention and its related regulations, including those addressing land-based marine pollution.⁷⁸

Nonetheless, the OSPAR Commission does not possess implied authority over a Contracting Party for enforcement purposes. Article 13 stipulates that all decisions and recommendations require unanimous approval from all Contracting Parties. The Contracting Party, facing allegations of violating the Convention, is unlikely to endorse a resolution that contradicts its interests. Additionally, decisions or recommendations made by the Committee require a three-quarters majority to be binding on the parties that supported them and did not retract their votes within 200 days of adoption, contingent upon achieving the three-quarters threshold. A Contracting Party that votes against a decision is not obligated to comply. Notwithstanding these limitations, it is important to recognise that international organisations possessing supervisory and regulatory functions have developed in marine environmental preservation, particularly in regulating pollution from terrestrial sources.

4.2. Substantial Disputes regarding Marine Pollution arising from Terrestrial Sources

Several prominent global and regional disputes have arisen over the protection of the maritime environment due to land-based marine pollution. These conflicts often involve transboundary issues, where pollution from one country affects the marine ecosystems of another, leading to diplomatic tensions and legal challenges.

One example is the Sulu-Sulawesi Sea, a biodiversity hotspot shared by the Philippines, Indonesia, and Malaysia, which has faced significant degradation due to land-based marine

⁷⁸ Meagan Wong and Niccolò Lanzoni, 'Land-Based Sources of Marine Pollution and Dumping at Sea' In Simone Borg, Felicity G Attard and Patricia M Vella de Fremeaux (eds), Research Handbook on Ocean Governance Law (Edward Elgar 2023) 109, doi:10.4337/9781839107696.00020.

pollution.⁷⁹ Agricultural runoff, industrial waste, and untreated sewage from coastal communities in the Philippines and Indonesia have contributed to the problem. The Philippines has accused Indonesia of inadequate waste management practices, while Indonesia has pointed to the Philippines' rapid industrialisation as a key source of pollution.⁸⁰ Despite parties to the United Nations Convention on the Law of the Sea (UNCLOS) and regional agreements like the Coral Triangle Initiative, enforcement and cooperation have been weak, highlighting the need for stronger dispute resolution mechanisms.

Another case involves the Tijuana River, which flows from Mexico into the United States and carries untreated sewage, industrial waste, and urban runoff into the Pacific Ocean, affecting the coastal waters of Southern California.⁸¹ This has led to beach closures, environmental degradation, and public health concerns in the U.S. Both countries are bound by the 1944 U.S.-Mexico Water Treaty and the La Paz Agreement, which address transboundary environmental issues.⁸² However, disputes over responsibility and funding for infrastructure improvements have persisted, underscoring the challenges of addressing land-based marine pollution in shared waterways.

The Mekong River, which flows through China, Myanmar, Laos, Thailand, Cambodia, and Vietnam, is a critical waterway for the region's ecosystems and economies.⁸³ However, upstream dam construction and industrial pollution in China have reduced water flow and increased contamination downstream, affecting fisheries and livelihoods in Southeast Asian countries. While the Mekong River Commission (MRC) provides a platform for cooperation, disputes over China's lack of transparency and accountability in managing the river's resources have strained regional relations.⁸⁴

The issue of transboundary pollution is also evident in the Baltic Sea, shared by nine EU countries and Russia. The sea suffers from severe eutrophication caused by nutrient pollution from agricultural runoff and wastewater discharge. Despite the Helsinki

⁷⁹ Lyndon DeVantier, Angel Alcala and Clive Wilkinson, 'The Sulu-Sulawesi Sea: Environmental and socioeconomic Status, Future Prognosis and Ameliorative Policy Options' (2004) 33(1) AMBIO: A Journal of the Human Environment 88.

⁸⁰ Veronica P Migo and others, 'Industrial Water Use and the Associated Pollution and Disposal Problems in the Philippines' in Agnes C Rola, Juan M Pulhin and Rosalie Arcala Hall (eds), Water Policy in the Philippines: Issues, Initiatives, and Prospects (2018) 87, doi:10.1007/978-3-319-70969-7_5.

⁸¹ Marissa Ann Venn, 'Mitigation of Contaminated Transboundary Flows in the Tijuana River: Public Health Considerations for Remediation Strategies' (Master's thesis, San Diego State University 2021).

⁸² Peter Smith, 'The Watershed Economy: Legal Challenges Facing the Tijuana River' (2008) 11(2) University of Denver Criminal Law Review 337.

⁸³ Kenneth Ray Olson and Wadslin Frenelus, 'Environmental and Human Impacts of Lancang-Mekong Mainstem and Tributary Dams on China, Laos, Thailand, Myanmar, Cambodia, and Vietnam' (2024) 14(10) Open Journal of Soil Science 555, doi:10.4236/ojss.2024.1410029.

⁸⁴ Lauren Isabelle Caffe, 'The Mekong River: Regional Planning, Sustainable Development, and Transboundary Cooperation in Southeast Asia' (2023) 16(2) Cornell International Affairs Review 124, doi:10.37513/ciar.v16i2.731.

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Convention and the EU's Water Framework Directive, which aims to protect the marine environment, disputes have arisen over the equitable distribution of responsibility and the implementation of measures to reduce pollution.⁸⁵ Countries like Poland and Germany have faced criticism for failing to meet reduction targets, leading to regional tensions.

Another region facing significant land-based pollution disputes is the Ganges River, which flows from India into Bangladesh. It is heavily polluted by industrial discharge, agricultural runoff, and untreated sewage. This pollution affects the Bay of Bengal's marine ecosystem and the livelihoods of millions of people in both countries. While the two nations have agreements like the Ganges Water Sharing Treaty, disputes over pollution control and resource management disputes have hindered effective cooperation.⁸⁶ Bangladesh has repeatedly raised concerns about India's failure to address upstream pollution, leading to diplomatic friction.

Similarly, Australia has been criticised by Pacific Island nations for its contribution to plastic waste pollution in the Pacific Ocean.⁸⁷ Despite regional agreements like the Noumea Convention and global initiatives such as the UN Clean Seas Campaign, Australia's high per capita plastic consumption and inadequate waste management practices have led to significant marine pollution. Pacific Island nations, which rely heavily on healthy marine ecosystems for tourism and fisheries, have called for stronger action and accountability from Australia.

A further example of land-based pollution disputes can be found in the Mediterranean Sea, bordered by 21 countries, which faces severe pollution from land-based sources, including industrial discharge, agricultural runoff, and urban waste. Countries like Italy, Spain, and Egypt have been accused of failing to meet their obligations under the Barcelona Convention, which aims to protect the Mediterranean marine environment.⁸⁸ Disputes over enforcement, funding, and the equitable distribution of responsibilities have complicated efforts to address the issue. These disputes highlight the complex challenges of addressing land-based marine pollution in shared maritime environments. They underscore the need for robust global and regional frameworks, effective dispute-resolution mechanisms, and stronger cooperation among nations. By prioritising sustainable practices, equitable responsibility, and collaborative solutions, the international community can better protect marine ecosystems and ensure the long-term health of our oceans.

⁸⁵ Suvi-Tuuli Puharinen, 'Normative Environmental Quality as a Regulatory Strategy in EU Environmental Law: Legal Implications of Water Status Objectives' (Doctoral thesis, University of Eastern Finland 2024).

⁸⁶ Sajid Karim, 'Transboundary Water Cooperation Between Bangladesh and India in the Ganges River Basin: Exploring a Benefit-Sharing Approach' (Master's thesis, Department of Earth Sciences, Uppsala University 2020).

⁸⁷ Margaret Jolly, 'Blue Pacific, Polluted Ocean' (2021) 13(3) International Journal of Society Systems Science 241, doi:10.1504/IJSSS.2021.10041426.

⁸⁸ Dimitrios Christoloukas, 'International Maritime Law in the Mediterranean Sea; Challenges & Special Cases' (Master's thesis, School of Economics, Business and International Studies 2023).

Ed.daran D, Zia-ud-Din M, Al Ajlani R and Elhajraoui FE, 'International Legal Frameworks for Regulating Land-Based Marine Pollution: A Comparative Study of Global and Regional Approaches, Disputes and Settlement Mechanisms' (2025) 8(2) Access to Justice in Eastern Europe 254-93 < https://doi.org/10.33327/AJEE-18-8.2-r000111 >

In such global and regional disputes, a robust dispute settlement mechanism is essential to resolve conflicts and ensure compliance with environmental obligations. An effective mechanism would include clear negotiation, mediation, and arbitration procedures, allowing parties to resolve disputes collaboratively before escalating to formal legal proceedings.⁸⁹ Such mechanisms would address immediate conflicts and build trust and cooperation among states, ensuring the long-term protection of shared marine environments. By integrating dispute resolution into global and regional frameworks, states can better balance environmental protection with economic development, promoting sustainable practices and accountability.⁹⁰ Considering the above-mentioned disputes, the following is the dispute settlement mechanism to protect the maritime environment.

4.3. Legal Frameworks and Mechanisms for Environmental Dispute Resolution

Dispute resolution within global and regional legal frameworks for environmental protection is a complex process that seeks to balance environmental and economic objectives, which often conflict. At the international level, Multilateral Environmental Agreements (MEAs) such as the Paris Agreement, the Convention on Biological Diversity (CBD), and the Basel Convention provide foundational frameworks for addressing environmental challenges.⁹¹ These agreements often include dispute resolution mechanisms, such as negotiation, mediation, and arbitration, to resolve conflicts between parties. Additionally, many MEAs establish compliance committees or bodies that focus on fostering dialogue and cooperation to address non-compliance issues rather than relying on adversarial proceedings. This collaborative approach helps maintain the integrity of environmental agreements while encouraging states to meet their obligations.

At the regional level, legal frameworks and institutions contribute to environmental dispute resolution. Regional courts, such as the European Court of Justice (ECJ) and the African Court on Human and Peoples' Rights (AfCHPR), adjudicate environmental disputes within their jurisdictions.⁹² Regional agreements, like the North American Agreement on Environmental Cooperation (NAAEC) under the USMCA, establish mechanisms for

⁸⁹ Moustafa Elmetwaly Kandeel, Alaa Abouahmed and Aliaa Zakaria, 'The Premature Expiration of Arbitration Litigation in Investment Disputes' (2023) 5(1) Corporate Law & Governance Review 17, doi:10.22495/clgrv5i1p2.

⁹⁰ John C Dernbach, 'Achieving Sustainable Development: The Centrality and Multiple Facets of Integrated Decisionmaking' (2003) 10(1) Global Legal Studies 247, doi:10.2979/gls.2003.10.1.247.

⁹¹ Kati Kulovesi and others, *Multilateral Environmental Agreements Negotiator's Handbook* (3rd edn, CCEEL, UEF Law School, UNEP 2024).

⁹² Adamantia Rachovitsa, 'On New "Judicial Animals": The Curious Case of an African Court with Material Jurisdiction of a Global Scope' (2019) 19(2) Human Rights Law Review 255, doi:10.1093/hrlr/ngz010; Driss Ed.daran, Fatima Ezzohra Elhajraoui, Riad Al Ajlani and Malik Zia-ud-Din, 'Global responsibility for marine biodiversity: going beyond national jurisdiction' (2024) 8(3) Journal of Wildlife and Biodiversity 419, doi:10.5281/zenodo.12659904.

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addressing environmental issues in regional trade.⁹³ These regional frameworks often complement global efforts by providing tailored solutions to local environmental challenges while fostering cooperation among neighbouring states.

International courts and tribunals also play a significant role in resolving environmental disputes. The International Court of Justice (ICJ) adjudicates disputes between states, though its jurisdiction is limited to cases where states have consented to its authority. Similarly, the International Tribunal for the Law of the Sea (ITLOS) handles disputes related to the United Nations Convention on the Law of the Sea (UNCLOS), including marine environmental protection issues.⁹⁴ On the economic front, the World Trade Organisation (WTO) addresses trade-related environmental disputes through its Dispute Settlement Body (DSB), which seeks to balance trade liberalisation with environmental protection.⁹⁵ These judicial bodies provide formal avenues for resolving conflicts, but their effectiveness often depends on the willingness of states to comply with their rulings.

Additionally, alternative dispute resolution (ADR) mechanisms, such as mediation, conciliation, and arbitration, are increasingly used to resolve environmental conflicts.⁹⁶ Mediation and conciliation involve neutral third parties facilitating mutually acceptable solutions, offering a less adversarial and more collaborative approach than traditional litigation.⁹⁷ Arbitration, on the other hand, provides a binding resolution that is often faster and more flexible than court proceedings. These mechanisms are particularly useful in addressing complex environmental disputes, including those involving transboundary issues or investor-state conflicts.

Balancing environmental and economic objectives is a central challenge in dispute resolution. The principle of sustainable development is key to this balance, emphasising the need to meet present needs without compromising the ability of future generations to meet their own. The precautionary principle allows for preventive action in the face of scientific uncertainty to avoid potential environmental harm, even when economic interests are at stake.⁹⁸ Similarly, the polluter pays principle ensures that those

⁹³ Elizabeth Trujillo, 'The USMCA and the Environment: Setting Trends for Global and Regional Trade' in David A Gantz and Tony Payan (eds), *The Future of Trade: A North American Perspective* (Edward Elgar 2023) 96, doi:10.4337/9781035315420.00012.

⁹⁴ John E Noyes, 'The International Tribunal for the Law of the Sea' (1999) 32(1) Cornell International Law Journal 109.

⁹⁵ Kati Kulovesi, *The WTO Dispute Settlement System: Challenges of the Environment, Legitimacy and Fragmentation* (Kluwer Law International 2011).

⁹⁶ Abdul Haseeb Ansari, Muhamad Hassan Bin Ahmad and Sodiq Omoola, 'Alternative Dispute Resolution in Environmental and Natural Resource Disputes' (2017) 59(1) Journal of the Indian Law Institute 26.

⁹⁷ Catherine McGuinness, *Alternative Dispute Resolution: Mediation and Conciliation* (Law Reform Commission 2016).

⁹⁸ David Kriebel and others, 'The Precautionary Principle in Environmental Science' (2001) 109(9) Environmental Health Perspectives 871, doi:10.1289/ehp.01109871.

responsible for pollution bear the costs of managing it, thereby integrating environmental costs into economic decision-making.⁹⁹ Together, these principles guide dispute resolution processes, helping to reconcile competing interests and promote long-term environmental and economic well-being.

Public participation and access to justice are critical aspects of environmental dispute resolution. The Aarhus Convention, for example, grants the public rights to access information, participate in decision-making, and seek justice in environmental matters.¹⁰⁰ This empowers individuals and non-governmental organisations (NGOs) to challenge environmental decisions and hold governments and corporations accountable. EIAs further support public participation by including consultation processes that allow stakeholders to voice concerns and influence outcomes.¹⁰¹ These mechanisms ensure that environmental decision-making is transparent, inclusive, and responsive to the needs of affected communities.

Transboundary environmental issues, such as air or water pollution, require cooperative approaches to dispute resolution. Shared natural resources, like rivers, lakes, and forests, often necessitate joint management frameworks and dispute-resolution mechanisms to ensure equitable and sustainable use.¹⁰² Bilateral agreements and joint commissions are commonly used to address cross-border environmental disputes, fostering collaboration between states to mitigate conflicts and protect shared ecosystems.

Corporate accountability and investor-state disputes are other important dimensions of environmental dispute resolution. Investor-state dispute settlement (ISDS) mechanisms, often included in bilateral investment treaties (BITs) and free trade agreements (FTAs), allow investors to sue states for regulatory changes that affect their investments.¹⁰³ This has led to tensions between protecting investor rights and enforcing environmental regulations. At the same time, corporate social responsibility (CSR) initiatives and legal frameworks increasingly hold corporations accountable for their environmental impacts, encouraging sustainable practices and reducing conflicts.

⁹⁹ Martin O'Connor, 'The Internalisation of Environmental Costs: Implementing the Polluter Pays Principle in the European Union' (1997) 7(4) International Journal of Environment and Pollution 450, doi:10.1504/IJEP.1997.028314.

¹⁰⁰ Áine Ryall, 'The Aarhus Convention: Standards for Access to Justice in Environmental Matters' in Stephen J Turner and others (eds), *Environmental Rights: The Development of Standards* (CUP 2019) 116, doi:10.1017/9781108612500.006.

¹⁰¹ Ciaran O'Faircheallaigh, 'Public Participation and Environmental Impact Assessment: Purposes, Implications, and Lessons for Public Policy Making' (2010) 30(1) Environmental Impact Assessment Review 19, doi:10.1016/j.eiar.2009.05.001.

¹⁰² Simo Kyllönen and others, 'Conflict Management as a Means to the Sustainable Use of Natural Resources' (2006) 40(4) Silva Fennica 323, doi:10.14214/sf.323.

¹⁰³ Jerry L Lai, 'A Tale of Two Treaties: A Study of NAFTA and the USMCA's Investor-State Dispute Settlement Mechanisms' (2021) 35(2) Emory International Law Review 259.

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Scientific and technical expertise is essential in resolving environmental disputes as expert panels and advisory bodies provide the evidence and analysis needed to inform decisions, particularly in cases involving complex scientific issues like climate change or biodiversity loss.¹⁰⁴ Dispute resolution mechanisms must also address scientific uncertainty and risk assessment, ensuring that decisions are based on the best available evidence while accounting for potential environmental threats.¹⁰⁵

Finally, enforcement and compliance are critical to the success of environmental dispute resolution. Effective enforcement mechanisms, including sanctions and penalties, ensure parties adhere to environmental regulations and decisions. Capacity-building efforts are also vital, particularly for developing countries, to enable their effective participation in international environmental agreements and dispute-resolution processes. By addressing these challenges, global and regional frameworks can better balance environmental and economic objectives, fostering sustainable development and protecting the planet for future generations.

5 CONCLUSION

The study revealed significant challenges and advancements in addressing marine pollution from land-based sources, highlighting a persistent inadequacy in worldwide regulation. Efforts to create a universal legal framework have faced obstacles due to four critical factors: the urgent need for economic growth, the complex array of substances and stakeholders involved, and the widening ecological and economic divide between developed and developing nations. Consequently, regional agreements have emerged as the primary mechanism to control land-based marine pollution, often codifying innovative legal strategies.

Notably, these regional agreements have incorporated progressive approaches, such as replacing black/grey list systems with uniform frameworks, employing BAT alongside BEP, implementing EIAs, and formalising global rules to enhance enforcement. These strategies aim to increase control over land-based marine pollution, emphasising comprehensive management and preventive measures. While the precautionary approach urges states to act preemptively against potential contamination, adopting BAT and BEP provides a blueprint for necessary regulatory actions. Similarly, mandatory EIAs and monitoring systems reduce state discretion in environmental policy, ensuring greater accountability and adherence to treaty obligations.

¹⁰⁴ Driss Ed.daran, Riad Al Ajlani, Malik Zia-ud-Din and Fatima Ezzohra Elhajraoui, 'Management of Biodiversity in Pakistan Protected Areas and its Legal Implications' (2023) 7(s) Journal of Wildlife and Biodiversity 1, doi:10.5281/zenodo.14273594.

¹⁰⁵ National Research Council (US) Committee on Improving Risk Analysis Approaches Used by the US EPA, *Science and Decisions: Advancing Risk Assessment* (National Academies Press 2009).

However, the study underscores that economic, political, and social factors significantly influence the practical implementation of these legal measures. For instance, the viability of the precautionary approach and the adoption of BAT and BEP depend on a technology's economic feasibility and a state's resources. Moreover, contracting states' thoroughness of reporting is often shaped by their economic and political capacities, suggesting that commitments to controlling marine pollution are not uniformly upheld.

The growth and implementation of regional agreements are inconsistent across different regions. Many areas, such as East Asia, the Red Sea and Gulf of Aden, and the Arctic, lack specific protocols addressing land-based marine pollution. The normative frameworks of existing agreements also vary. Advanced conventions like the 1992 OSPAR Convention, the 1992 Helsinki Convention, and the 1996 Syracuse Protocol adopt harmonised approaches and explicitly support precautionary measures, contrasting with older frameworks like the 1983 Quito Protocol and 1992 Bucharest Protocol, which still rely on black/grey list methods.

The study highlights that a region's economic, social, and political climate significantly influences the normative strength of its agreements. For instance, the OSPAR Convention showcases advanced regulatory methods, partly because its signatories are economically and politically aligned democratic states, many of which are EU members committed to high environmental standards. The European Union's foundational obligation to enhance environmental quality further reinforces this alignment, as evidenced by the political commitment made during the International North Sea Conference (INSC).

Prominent disputes over maritime protection from land-based pollution, such as those in the Sulu-Sulawesi Sea between the Philippines and Indonesia, the Tijuana River conflict between the U.S. and Mexico, and the Mekong River tensions involving China and Southeast Asia, illustrate the urgent need for effective dispute settlement mechanisms. These conflicts often arise from transboundary pollution, where one country's actions significantly impact another's marine environment. In such cases, robust dispute resolution frameworks are essential to mediate conflicts, allocate responsibilities, and enforce compliance with international and regional agreements. Mechanisms like negotiation, mediation, arbitration, and adjudication through international tribunals or regional bodies can provide structured pathways to resolve disputes. For example, the International Tribunal for the Law of the Sea (ITLOS) and regional frameworks like ASEAN's dispute resolution mechanisms could play pivotal roles in addressing these conflicts. Additionally, joint commissions or task forces composed of scientific and legal experts could facilitate evidence-based solutions and foster cooperation among disputing parties.

Ultimately, the findings emphasise the inherent tension between economic growth and environmental preservation in international law governing land-based marine pollution. While regional conventions provide tools to regulate state actions, their effectiveness depends on accommodating each state's unique economic, social, and political



circumstances. Achieving an appropriate and effective legal framework requires a balanced approach that reconciles the demands of environmental protection with the imperatives of economic, social, and political development. Strengthening dispute settlement mechanisms and fostering greater international cooperation will be critical to addressing the complex challenges of land-based marine pollution and ensuring the sustainable protection of our shared maritime environments.

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АНОТАЦІЯ УКРАЇНСЬКОЮ МОВОЮ

Дослідницька стаття

МІЖНАРОДНО-ПРАВОВА БАЗА ДЛЯ РЕГУЛЮВАННЯ ЗАБРУДНЕННЯ МОРСЬКОГО СЕРЕДОВИЩА З СУШІ: ПОРІВНЯЛЬНЕ ДОСЛІДЖЕННЯ ГЛОБАЛЬНИХ ТА РЕГІОНАЛЬНИХ ПІДХОДІВ, СПОРІВ ТА МЕХАНІЗМІВ ВРЕГУЛЮВАННЯ

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АНОТАЦІЯ

Вступ. Наземні джерела є основними джерелами забруднення океану, які створюють значні ризики для морських екосистем і здоров'я людини, прикладом чого є хвороба Мінамата, спричинена забрудненням ртуттю. Захищене морське середовище має важливе значення для розвитку прибережних міст. Однак, незважаючи на чинну міжнародну правову базу, для ефективного контролю над забрудненням моря з суші все ще потрібні більш жорсткі правила. Уряди часто не наважуються встановлювати суворі обмеження для наземних галузей промисловості, що робить правове регулювання, яке обмежує дії держави, вирішальними щодо захисту довкілля. Регіональні угоди з'явилися як потенційні рішення, пропонуючи регулятивні підходи, адаптовані до конкретних економічних, соціальних і політичних контекстів.

Методи. У цій статті використовується підхід доктринального правового дослідження для аналізу проблем із запровадженням глобальних і регіональних законодавчих меж щодо забруднення моря з суші. Комплексний огляд літератури, присвячений науковим роботам, міжнародним правовим текстам і визначним судовим справам, дає змогу зрозуміти нормативні прогалини та покращення, які можуть бути потенційно впроваджені. Крім того, вторинні джерела, зокрема звіти організацій громадянського суспільства, допомагають контекстуалізувати практичні наслідки цих правових заходів. Дослідження також розглядає спори, пов'язані із забрудненням моря з суші, та ефективність механізмів вирішення спорів як на регіональному, так і на глобальному рівнях.

Результати та висновки. Результати дослідження підкреслюють необхідність захисту морського середовища від забруднення з суші, що водночас пов'язано зі збалансованим економічним зростанням. Регіональні угоди пропонують цінну інформацію про правові стратегії та інституційні механізми, які можуть допомогти досягти цієї рівноваги. Однак недоліки, що полягають у тому, як ці конвенції підвищуватимуть здатність міжнародного права керувати наземним забрудненням, потребують подальшого аналізу. Стабільна законодавча база повинна узгоджувати захист навколишнього середовища з економічними, соціальними та політичними пріоритетами. Зміцнення механізмів врегулювання спорів і сприяння міжнародній



співпраці є важливими для вирішення цих проблем. У дослідженні було наголошено на постійному протиріччі в міжнародному праві між економічним зростанням і збереженням довкілля, а також на потребі в більш ефективних правових заходах, щоб забезпечити довгострокову стійкість морських екосистем.

Ключові слова: міжнародно-правова база, забруднення морського середовища з суші, забруднення, глобальне та регіональне порівняння, механізм вирішення спорів.