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## Marine Pollution & Implementation of Regulations

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### ABSTRACT

*The Global Environment Report on the Rule of Law published by UNEP, emphasizes that a significant barrier to preventing environmental degradation is the inadequate enforcement of existing environmental laws and regulations. Despite the existence of international legal frameworks to address and manage marine plastic pollution, they are frequently weakened by inconsistent enforcement and a lack of accountability. Consequently, these laws are not applied uniformly across nations, undermining their effectiveness in mitigating marine pollution. The lack of specific regional guidelines leaves countries to establish their standards, creating a disjointed and varied response to the issue. Many neighboring nations are focusing on enhancing their solid waste collection and management systems to combat marine plastic pollution. However, improving waste management infrastructure requires substantial financial investment, a considerable challenge for many low and middle-income countries. In this context, regional collaboration provides more benefits than multilateral agreements or bilateral pacts. Although global initiatives engage a broader range of stakeholders, the varying levels of commitment and capacity among countries frequently hinder prompt collective action. Conversely, while bilateral agreements are simpler to negotiate, they have a limited scope and are less effective in addressing the cross-border nature of marine plastic pollution. As a result, regional cooperation emerges as a more practical solution because it reflects shared interests, takes into account geographical and political contexts, and enables customized strategies that meet the unique needs and priorities of the region.*

**Keywords:** Plastic, Prevention, Responsibility, Contamination, Effectiveness

### INTERNATIONAL REGULATORY INITIATIVES

The United Nations Convention on the Law of the Sea (UNCLOS) of 1982, entered into force in 1994, and commonly referred to as a “Constitution for the Oceans”, constituted an unprecedented attempt at regulating “all aspects of the resources of the sea and uses of the ocean, and thus bring a stable order to mankind’s very source of life” United Nations, 1982. UNCLOS is composed of 320 articles, of which 46 (Articles 192-237, Part XII)<sup>i</sup> cover the protection and preservation of the marine environment. For example, Article 210 obliges states to develop frameworks to “prevent, reduce and control pollution of the marine environment by dumping,” while simultaneously stating that any signatory State “Dumping within the territorial sea and the exclusive economic zone or onto the continental shelf shall not be carried out without the express prior approval of the coastal State, which has the right to permit, regulate and control such dumping after due consideration of the matter with other States .” (United Nations, 1982). Hence, because ocean pollution is a transnational issue unrestrained by boundaries and the sources of marine waste, in general, and plastic debris, in particular, are often difficult to identify, the measures envisioned by UNCLOS to address the problem of plastic pollution in the ocean seem to be ineffective<sup>ii</sup>. MARPOL Convention was adopted at IMO on November 2, 1973. The 1978 Protocol was adopted due to a rise in maritime accidents involving tankers in 1976 and 1977. The Convention has regulations to prevent and reduce pollution from ships, both from accidents like oil spills and from a ship’s daily operations<sup>iii</sup>. During the third conference on the Law of the Sea, delegations from industrialized countries made an effort to change the legal regime of marine scientific research undertaken on the continental shelf in order to have complete freedom in that field. From the point of view of industrialized countries, the freedom of marine scientific research, even within the national jurisdiction, would be a blessing for mankind as a whole. For developing countries, the benefits of marine scientific research would be achieved only if the coastal state controlled all foreign research within a national jurisdiction that would include the Exclusive Economic Zone and the continental shelf. Since the new international regime of the seas recognizes specific sovereign rights of the coastal state for the exploration and exploitation of the natural resources within the limits of its national jurisdiction, the need was also felt to grant specific rights to the coastal state and to impose a new obligation upon the researcher. Following the example of the 1958 Convention on the Continental Shelf, the LOS Convention made it the duty of the coastal state to give its consent, in normal circumstances, to exploration and exploitation in the whole area under national jurisdiction. However, it recognized the right of the coastal state to withhold its consent if the project:

- a) is of direct importance for the exploration or exploitation of natural resources;
- b) implies drilling, use of explosives, or of harmful substances; or
- c) implies the construction of artificial islands or structures<sup>iv</sup>.

## MARINE LITTER GLOBAL PROBLEM

Marine litter refers to any solid material that has been deliberately discarded or unintentionally blown or washed into the ocean and litter includes any persistent, manufactured or processed material. Marine litter originates from various ocean and land-based sources and generally reflects our production and consumption patterns globally. Marine litter includes plastic, metal, wood, rubber, glass and paper. Plastic litter is the most pervasive worldwide and can comprise the upwards litter collected on beaches and shorelines<sup>v</sup>. Most plastics are durable and persist in the marine environment. Plastics can deteriorate and fragment through sunlight or photo-degradation, compounding the problem by producing many smaller particles and by releasing or accumulating toxins. These smaller particles are called micro-plastics. There are also “primary” micro-plastics, being small particles deliberately manufactured for applications such as industrial abrasives or cosmetics. Marine litter threatens human health and the survival of many marine organisms as well as being aesthetically a problem on beaches, shorelines, lagoons and estuaries<sup>vi</sup>. Entanglement or ingestion by wildlife will often be fatal. Ingestion of micro-plastics by fish may also be a pathway for transport of harmful chemicals into the food web and eventually humans. Marine litter is everyone’s responsibility from our individual actions in consumer choice and then how we dispose of waste through to those businesses importing various consumer items and to the responsibilities of major corporations in designing, manufacturing, promoting and selling various products<sup>vii</sup>. To confuse the issue, some plastics are listed as biodegradable to influence product preferences for purchase. The majority of these products only biodegrade under constant temperature and humidity as found in landfill and industrial composting systems. Within the marine environment even these so-called “biodegradable plastics” persist, smothering the ocean’s benthos, catching on coral reefs or choking the gut of fish, turtles and birds<sup>viii</sup>.

## ABOUT CARIBBEAN ENVIRONMENT PROGRAMME (CEP) DOING

In 2005, UNEP-CAR/RCU and its Regional Activity Centres for the Land Based Sources of Marine Pollution Protocol and Oil Spills Protocols with support from UNEP Regional Seas began the development of a Regional Action Plan on Marine Litter in the Wider Caribbean. The objective of this activity was to assist in the environmental protection and sustainable management and development of the WCR through the development of a Regional Action Plan on Marine Litter in the Wider Caribbean Sea<sup>ix</sup>.

A series of region wide surveys, literature reviews and ICC data were compiled by marine litter researcher and Caribbean Regional Consultant. This assessment was followed by a regional workshop of experts in Aruba in February 2007 which ultimately led to the development of the Caribbean’s first Regional Action Plan for the Sustainable Management of Marine Litter (RAPMaLi) in 2007<sup>x</sup>. The RAPMaLi was designed to address the complex and interconnected nature of the marine litter problem and outlines several actions at the National and Regional Level within five thematic areas:

1. Legislation, policies and enforcement
2. Institutional framework and stakeholder engagement
3. Monitoring programmes and research
4. Education and outreach
5. Solid waste management strategies

## THREAT TO CORAL REEFS

Coral reefs are threatened by both local and global threats, including overfishing; sediment, nutrient and marine pollution; and increasing ocean warming and acidification.

Overfishing is the most pervasive local threat to coral reefs. It can alter the ecological balance on the reef through removing herbivorous fish that control the macroalgae growing on coral. Sedimentation from land clearing also poses a major threat, as sediments within the water column can bury the corals and reduce the amount of sunlight that reaches the zooxanthellae, therefore limiting their access to nutrients from photosynthesis. Additionally, nutrient pollution from agriculture and sewage can increase nutrient levels that promote algal cover at the expense of corals. Ships can damage reefs with anchors or chains, discharge pollutants or introduce invasive species that can disrupt the ecosystem. Globally, ocean warming due to climate change is a rapidly growing threat. The zooxanthellae within corals’ tissues are sensitive to ocean temperature, and ocean warming can cause the corals to expel their colorful algae a process known as “coral bleaching.” This leaves behind the appearance of a bright white skeleton and deprives the polyps of an important source of nutrition. The corals eventually die if the symbiotic algae don’t return, if there is inadequate time between bleaching for corals to recover or if other threats impede their recovery. On top of that, increasing carbon dioxide in sea water is slowly causing oceans to become more acidic. This decreases the availability of aragonite, a mineral which corals need to build their skeletons. A lack of aragonite slows coral growth and results in less dense, weaker structures that are more prone to erosion and damage. Aragonite saturation levels have consistently decreased in the last century, and this trend is projected to continue over the next century under current CO<sub>2</sub> emissions.

## SRI LANKA & INDIA’S STAKE ON MARINE POLLUTION

In particular, countries of the South Asian Seas region struggle with the management of the increasing amounts of waste. There is a pressing need to curb marine pollution in the ecosystems of the Lakshadweep Sea shared by Maldives, Sri Lanka and India. Low per capita income, high population densities and a high dependency on natural resources makes these areas highly vulnerable to the impacts of marine pollution

The principle of territorial sovereignty finds its limitations where its exercise touches upon the territorial sovereignty and integrity exercise touches upon the territorial sovereignty and integrity of another State. • The scope for discretionary action arising from the principle of The scope for discretionary action arising from the principle of sovereignty is determined by such principles and adages as ‘good neighbourliness’ and sic utere tuo ut alienum non laedas (you should use your property in such a way as not to cause injury to your neighbour’s) and by the principle of State responsibility for actions causing trans-boundary damage. The prohibition of the abuse by a State of the rights enjoyed by it by virtue of international law Indian Coast Guard (ICG) and Sri Lanka Coast Guard (SLCG) conducted the 7<sup>th</sup> Annual High Level Meeting in Colombo on November 11, 2024. A four-member ICG delegation led by

Director General DG S Paramesh and SLCG delegation headed by Director General Rear Admiral YR Serasinghe participated in the meeting which marked a significant milestone in the collaborative efforts between the two Coast Guards. The meeting underscores the commitment of both the Coast Guards to jointly address maritime challenges while focusing on a range of regional maritime contemporary issues, including drug trafficking, marine pollution, safety of mariners, adoption of best practices, capacity-building programs and other collaborative arrangements. The outcome of the meeting reiterated enhancing mutual cooperation in addressing these challenges, thereby strengthening the maritime safety and security framework in the region. This annual meeting follows the institutionalised mechanism as outlined in the MoU signed between both the maritime agencies in May 2018.

### **RECENT MV X-PRESS PEARL DISASTER**

This illustrates the significant risk the country is currently facing. In response, MEPA will collaborate with CLS to launch an innovative project aimed at preventing, monitoring, and managing marine environmental pollution caused by Sri Lanka. The OSDS project (Oil Spill Detection Sri Lanka) will operate a marine oil spill detection service offering the capability to identify potential polluters for the Sri Lankan authorities, notably MEPA. It aims to demonstrate the effectiveness of satellite technologies in reducing marine pollution incidents and mitigating their environmental impact. The pilot project will mark the first step toward developing a sovereign local capability to meet the challenges that lie ahead. The OSDS initiative is aligned with the United Nations Sustainable Development Goals (SDG), in particular SDG 14 relating to life below water. CLS is a mission-driven company and a signatory to the UN Global Pact since 2016, and it has been majorly contributing towards the 17 SDGs set by the United Nations. By helping to protect Sri Lanka's marine ecosystems and enabling better coordination in the event of accidents, this project will preserve the country's natural resources. *France* is funding this project as part of its commitment to taking concrete action to reduce threats to the oceans. Benefitting from the proven expertise of CLS in the field of satellite observation, this project aims to reduce marine pollution and improve maritime safety by detecting and reducing oil discharges from ships and will contribute to the development of Sri Lanka as one of the main maritime centers in the Indian Ocean as well as to the preservation of its unique marine biodiversity. The project is funded through a grant from the French Ministry of Economy, Finance, and Industrial and Digital Sovereignty, with strong support from the French Embassy in Sri Lanka and close cooperation with its Department of Treasury and Economic Affairs.

### **INDIA COAST GUARD & COUNTER POLLUTION**

NATPOLREX VIII aims at validating the procedures and guidelines as contained in the National Oil Spill Disaster Contingency Plan (NOSDCP) at the national and regional levels under the aegis of SACEP MoU to which India is a member State. During the exercise, various components of NOSDCP were invoked to validate and improve the contingency plans and to evaluate preparedness of the resource agencies as well as the stake to respond back to any marine spill emergency at sea. The two-day exercise programme included a table-top exercise, a pollution response workshop on marine Oil and HNS spill followed by exercise at sea, which was reviewed by the Chairman of NOSDCP in front of national and international observers.

During the sea exercise, 13 ships and 10 aircraft from the Indian Coast Guard and one aircraft from IAF (C-131), two ships from SACEP members states Sri Lankan Coast Guard and Bangladesh Coast Guard -- and one OSV from ONGC, assets from SCI and tugs from Mormugao Port Trust demonstrated containment cum marine spill recovery by side sweeping arms, deployment of booms and skimmers, streaming of single ship operated containment cum recovery system, fire fighting drill, rescue operation, and demonstration of surface and air oil spill dispersant systems. The Ministry is currently executing a centrally sponsored initiative called the National Plan for Conservation of Aquatic Ecosystems (NPCA), aimed at preserving and protecting aquatic ecosystems and management of wetlands in the country on cost sharing basis between Central Government and respective State/UT Governments. The scheme encompasses a wide range of activities, including the interception, diversion, and treatment of wastewater; shoreline protection; lakefront development; in-situ cleaning such as desilting and removal of invasive species; stormwater management; bio-remediation; catchment area restoration; lake beautification; surveys and boundary marking; bio-fencing; development of fisheries; weed management; biodiversity conservation; educational initiatives; awareness programs; and community involvement, among others.

### **MAJOR MARITIME MISS HAPPENINGS WHICH LED TO DEVELOPMENTS OF INTERNATIONAL REGULATIONS**

- i. On April 14, 1912, the Titanic sank on its maiden voyage from Southampton to New York after striking an iceberg. The disaster resulted in the deaths of over 1,500 of the 2,224 people on board, making it one of the most catastrophic peacetime maritime tragedies in history.
- ii. The Titanic complied with the standards of its time, but several significant safety deficiencies contributed greatly to the tragedy.
- iii. The watertight bulkheads did not extend to the main deck, permitting water to spill over from one compartment to another.
- iv. The ship had only 20 lifeboats, with a total capacity of 1,178 people—far too few for the more than 3,300 passengers it could carry. The watertight bulkheads did not extend to the main deck, permitting water to spill over from one compartment to another.
- v. Iceberg warnings were ignored or dismissed, and speed was not reduced despite falling sea temperatures.
- vi. Only one of six iceberg warning messages was passed to the captain.
- vii. Recognition of red rockets as indications of distress.
- viii. A delayed alarm, class-based evacuation procedures, and lifeboats that were only partially filled further reduced the chances of survival.

The ship had modern Marconi radiotelegraph equipment, but radio operators prioritized passenger telegrams over navigational warnings.

Consequently, the first International Convention for the Safety of Life at Sea (SOLAS) was established in 1914, outlining:

- i. International Ice Patrol (still active today).
- ii. Enhanced hull structure, mandated lifeboat configurations, and revised emergency protocols.
- iii. Required radio equipment and constant radio monitoring.
- iv. Recognition of red rockets as indications of distress.

Although the 1914 treaty was not put into effect due to World War I, SOLAS was later amended in 1929, 1948, and 1960. It received a major update in 1974, which introduced a faster amendment process to keep pace with developments in maritime technology.

## **ERIKA OIL SPILL (1999) AND EU MARITIME SAFETY LAWS**

The Erika oil spill on December 12, 1999, off the coast of France, released over 10,000 tonnes of oil into the sea due to the ship's poor maintenance. Spill contaminated around four hundred kilometres of coast, which is resulting in both environmental harm and economic losses.

In response, the European Union implemented the Erika first, second & third legislative packages, which improved ship inspection protocols, sped up the retirement of single-hull tankers, and strengthened systems for liability and compensation for oil pollution damage.

The 1987 sinking of the *Herald of Free Enterprise*, which led to the unpredictable loss of numerous lives, exposed significant flaws in management practices. Problems like departing with the bow door unsecured and ignoring prevailing safety issues highlighted a weak safety culture. This disaster highlighted the need for safety regulations in the maritime industry and resulted in significant reforms designed to enhance safety practices.

The International Safety Management (ISM) Code was introduced in 1989 and made mandatory in 1998. It provides a structured approach for ship owners and operators to create and implement Safety Management Systems (SMS), focusing on risk prevention, clear responsibilities, preparedness for emergencies, and regular audits.

An overview of roles like the Designated Person Ashore (DPA) highlights their function in connecting ship operations with shore-based management, ensuring adherence to regulations. The ISM Code introduced a significant cultural change by emphasizing the importance of the human element and accountability in maritime operations.

In 2006, a ferry operated by the British Columbia company, carrying North Korean passengers, sank after encountering rough conditions, resulting in the loss of two lives. It is crucial to note that mandatory audits frequently fail to identify significant safety issues in operations. Specifically, these mandatory evaluations frequently miss key security vulnerabilities.

A year later, in 2007, the large container vessel MSC Napoli experienced a hull fracture in turbulent seas, resulting in its abandonment.

This incident is attributed to design deficiencies, the improper weight of the container, and poor management of extreme weather conditions. It underscores the persistent concerns surrounding container ship safety and brings attention to new SOLAS regulations requiring the verification of container weights.

## **CONCLUSION AND SUGGESTIONS**

The ongoing deterioration of the marine environment caused by plastic pollution highlights a significant issue not the absence of legal frameworks, but rather the inconsistency in their implementation, weak enforcement, and insufficient scope.

While global instruments like UNCLOS and MARPOL have laid foundational principles for marine environmental protection, the inconsistent enforcement, insufficient compliance mechanisms, and transboundary nature of marine pollution significantly undermine their effectiveness. The issue is further exacerbated by the absence of regional enforcement guidelines, leading to fragmented national efforts that lack synergy.

The case of the MV X-Press Pearl disaster and similar incidents underline the urgent need for technologically-driven monitoring and regional cooperation to prevent, detect, and respond to marine pollution. Initiatives like Sri Lanka's OSDS project and India's NATPOLREX drills represent meaningful advancements, yet their effectiveness hinges on ongoing commitment, sufficient financial support, and well-aligned multilateral collaboration.

Marine litter, particularly plastic and micro plastics, is not merely an environmental hazard but a direct threat to biodiversity, food security, human health, and economic activities, particularly in developing coastal nations. Coral reef ecosystems, crucial for marine biodiversity and local livelihoods, are especially vulnerable to pollution, climate change, and unsustainable fishing practices.

Given the limitations of global multilateralism in this context and the limited scope of bilateral agreements, regional cooperation emerges as the most viable and impactful approach. The Caribbean Environment Programme's RAPMaLi provides a strong example of how regionally customized action plans can work, integrating local realities, scientific data, and stakeholder engagement.

### **Recommendations**

Develop and adopt regional protocols under existing international conventions like MARPOL or UNCLOS to enforce uniform marine litter regulations tailored to geographic and socio-economic realities.

Establish international financial support mechanisms, with contributions from high-income countries and polluting industries, to help low- and middle-income countries improve their waste management infrastructure and enforcement capacities.

Encourage the adoption of circular economy models, allocate resources toward the development of biodegradable substitutes, and bolster local waste segregation and recycling programs through collaborative efforts between the public and private sectors.

Introduce legally binding instruments under regional seas conventions with penalty structures for non-compliance and incentives for cooperation, especially in plastic waste tracking and data sharing.

Launch comprehensive regional awareness campaigns aimed at transforming consumption habits, minimizing the use of single-use plastics, and dispelling misconceptions about “biodegradable” plastics, which often remain in marine ecosystems.

Promote ecosystem-based MSP approaches that integrate marine litter control with broader objectives like coral reef protection, sustainable tourism, and fisheries management.

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