

## Marine Pollution: A Relative Analysis of the Efficacy of the Persisting Laws in Attaining Sustainable Environment

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### Abstract

*Oceans are one of the most treasured resources of the Planet. Almost 70% of the earth's surface comprises of the oceans. It not only shelters the aquatic beings but also serves multiple purposes ranging from food, medicine, transportation, recreation and the like. The ocean act as one of the chief regulators of the climate by transporting the heat waves from the equator to the poles and thus moderating the climate and the weather patterns. It is responsible for producing about 50%<sup>3</sup> of the oxygen and is equipped to stock 50 times more carbon dioxide than the atmosphere. The ocean in the present day can be regarded as the common dumping place. Ocean was a place which was rich with diverse aquatic species and now all that can be found there is plastic bags, water bottles, hazardous chemicals, oil from boats and ships, sewage substances rendering the ocean population to extinction. Marine pollution is one of the burning issues which needs serious attention and immediate action must be taken in this regard to withhold any further corruption of the aquatic life. There is a mandate on the States to control the aquatic pollution and protect the coastal-environments. In the contemporary world where the right to a safe, clean, healthy and sustainable environment has been recognized in over 155 countries, the protection and prevention of marine litter and plastic pollution has become the national agenda for majority of the countries. Despite the persisting laws at place, it can be observed that the marine pollution is on the rise. About 11 million metric tons of plastic waste enter the ocean every year which is presumed to triplicate by 2040.<sup>4</sup> The issue at hand is a very grave and has caused and in future is capable of causing irretrievable damage to the economies. Through this paper the authors intend to analyze the laws and the Government actions in preventing aquatic pollution.*

**Keywords:** Marine Pollution, National Agenda, Oceans, Aquatic Life

### Introduction:

Water is regarded to be the Elixir of life. It is the lifeblood of the civilizations and the continuity of the planet relies upon water. More than 3/4<sup>th</sup> of the surface of the planet comprises of Oceans. The Oceans play a paramount role in maintaining the ecology. The very existence of the animal kingdom aquatic, terrestrial, avian and the human race, depends upon the oceans as the are the primary source for regulating the climate and also provides most of the oxygen that we breathe.

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<sup>3</sup> Why should we care about the ocean?, <https://oceanservice.noaa.gov/facts/why-care-about-ocean.html#:~:text=The%20air%20we%20breathe%3A%20The,our%20climate%20and%20weather%20pattern> s. (Last Visited: May 10<sup>th</sup> 2022)

<sup>4</sup> Clean Seas campaign promotes the right to a healthy environment, including plastic-free oceans, [https://www.unep.org/news-and-stories/story/clean-seas-campaign-promotes-right-healthy-environment-including-plastic](https://www.unep.org/news-and-stories/story/clean-seas-campaign-promotes-right-healthy-environment-including-plastic#:~:text=The%20campaign%20aims%20to%20break,lakes%2C%20waterways%2C%20and%20oceans) [https://www.unep.org/news-and-stories/story/clean-seas-campaign-promotes-right-healthy-environment-including-plastic](https://www.unep.org/news-and-stories/story/clean-seas-campaign-promotes-right-healthy-environment-including-plastic#:~:text=The%20campaign%20aims%20to%20break,lakes%2C%20waterways%2C%20and%20oceans) (Last Visited on: May 6<sup>th</sup> 2022)

It can be inferred that the role of the oceans in our lives is insurmountable. But the situation that persists in the present-day world is so unfortunate. Several species have become extinct, the oceans have become a dumping ground for factories, oil spillage and such similar problems exists. The human beings can go to any extent to meet their greed and the same has jeopardized the entire ecology and this is going to have a cascading effect over the future generations. The issue that needs immediate attention is the problem of increasing Marine Pollution. The same shall be substantiated below.

### **Marine Pollution:**

Marine pollution refers to direct or indirect introduction by humans of substances or energy into the marine environment (including estuaries), resulting in harm to living resources, hazards to human health, hindrances to marine activities including fishing, impairment of the quality of sea water and reduction of amenities.<sup>5</sup> Chemical contamination, or nutrient pollution, is concerning for health, environmental, and economic reasons. It occurs when human activities, particularly the use of fertilizer on farms, lead to the surfeit of chemicals into waterways that in due course flow into the ocean. The augmented concentration of chemicals, such as nitrogen and phosphorus, in the coastal ocean encourages the growth of algal blooms, which prove to be toxic to wildlife and harmful to humans. The adverse effects on health and the environment caused by algal blooms hurt local fishing and tourism industries. Marine pollution is hence defined as the induction of toxic materials such as plastic, oil, chemicals, agricultural waste, and industrial waste into the ocean waters.<sup>6</sup>

### **TYPES:**

a. *Pollution due to Acidification:*

Owing to the increasing level of carbon dioxide in the atmosphere it is resulting in the acidification of oceans across the planet, as oceans have the natural tendency to absorb carbon dioxide. It is believed to potentially damage the surface of the earth. The major concern at the instance is that such acidification might consequently result in dissolution of calcium carbonate structures, that can affect the shell formation in shellfish and also the corals.<sup>7</sup>

b. *Pollution due to Chemicals:*

Fertilizers and pesticides which are used by the farmers to prevent the diseases are usually swept out owing to extensive rainfall and all of these eventually flow into the oceans. This has lead to nutritional imbalance in the water which facilitate for the growth of algal blooms which in turn deprive the other animals of the space, sunlight and nutrients they need and thereby destroying the natural balance of ecosystems.

c. *Pollution due to Toxins:*

There are certain obstinate toxins which do not dissolve or disintegrate with the marine ecosystem rapidly. Toxins such as pesticides, DDT, PCBs, furans, TBT, radioactive waste, phenols, and dioxins get amassed in the tissue cells of the marine lifeforms and lead to bioaccumulation impeding the life underwater and sometimes unfavorably affecting in aquatic life forms.<sup>8</sup>

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<sup>5</sup> Glossary of Statistical Terms, Marine Pollution, <https://stats.oecd.org/glossary/detail.asp?ID=1596> (last visited Jan. 12, 2022).

<sup>6</sup> Marine Pollution, An Overview of ocean pollution and its affects in our world, <https://libguides.ccnneb.edu/oceanpollution> (last visited March 2, 2022).

<sup>7</sup> Sophie Hadley, Ocean Pollution Linked to Plastic Pollution, (Jan 13<sup>th</sup>, 2021) <https://earth.org/ocean-acidification-linked-to-plastic-pollution/> (last visited March 12, 2022).

<sup>8</sup> Vaibhav Chakravarthy, Marine Pollution Causes, Types, Effects, Prevention, (July 26<sup>th</sup>, 2018) <https://www.mapsofindia.com/my-india/society/marine-pollution-causes-types-effects-prevention> (last visited March 2, 2022).

d. Pollution due to Noise:

The sound travels longer and farther underwater than that it does in the air. The noise pollution caused by anthropogenic activity poses a comparatively a greater threat to marine animals than it is to those living on the land or in the air. Such noise pollution is likely to cause confusion among the animals who primarily depend upon the sonar signals to feed mate and navigate their way around the ocean, it is also capable of shortening their lifespans and threaten the very existence of entire species.<sup>9</sup>

e. Pollution due to Plastic:

Every year on an average over 14 million tons of plastic is dumped into the oceans. Over 80% of the marine debris comprises of plastic. The impact of such dumping is very unfortunate. It takes a complete toll over the lives of the marine species. They get entangled in the plastic leading them to injury or at times some species suffer and die. Come of them end up consuming plastic. It is presumed that by 2050 the amount of plastic in the oceans will eventually outweigh all the fish population in the sea.<sup>10</sup>

f. Pollution due to Oil Spillage:

The impact of petroleum spills over the marine habitat is very saddening. The hydrocarbons released into the ocean due to petroleum spillage owing to accidents, mining etc., proves to be toxic for all forms of life be it aquatic or terrestrial. The amount of oil released into the environment each year is estimated to be 3.2 million tonnes.<sup>11, 12</sup> The oil floats at the surface due to which the species like sea birds, turtles, and the like. This oil enters into the feathers or the skin surface of the birds there by causing them to die of hypothermia.<sup>13</sup>

g. Pollution due to shipping activities:

The shipping industry is one of the key contributors to the Marine pollution. Large quantity of pollutants is omitted in the course of shipping. Over three percent of carbon emissions are sourced from shipping. Cruise ships use up huge amount of ballast water to stabilize the ship. That water when released into the ocean which is estimated to be over 1000 metric tons, causes irreparable damage to the marine life.<sup>14</sup> This water contains microbes and thereby causing ecological damage.

**Marine Pollution: Violative of the Rights of the Aquatic Animals:**

The marine pollution has stunted the life span of the aquatic animals. They always live under the fear of being tangled in plastic, pieces of glass that get submerged into their bodies, plastic consumption and what not. According to the study conducted by Plymouth University,<sup>15</sup> over 700 million aquatic species are affected due to plastic pollution and an estimated of 100 million

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<sup>9</sup> Linda S Weilgart, The Impact of Ocean Noise Pollution On Marine Biodiversity, [https://awionline.org/sites/default/files/uploads/documents/Weilgart\\_Biodiversity\\_2008-1238105851-10133.pdf](https://awionline.org/sites/default/files/uploads/documents/Weilgart_Biodiversity_2008-1238105851-10133.pdf) (last visited February 22, 2022).

<sup>10</sup> Ocean Pollution, A Global Tragedy for our Oceans and Sea life [https://www.biologicaldiversity.org/campaigns/ocean\\_plastics/](https://www.biologicaldiversity.org/campaigns/ocean_plastics/) (last visited February 3, 2022).

<sup>11</sup> Ismail M.K. Saadoun, Impact of Oil Spills on Marine Life, (October 7th, 2014) <https://www.intechopen.com/chapters/48738> (last visited February 22, 2022).

<sup>12</sup> Afaq, A., & Maryam, A. (2022). Impact of CSR (Corporate Social Responsibility) mandate in India. GLS KALP – Journal of Multidisciplinary Studies, 2(3), 33–44. Retrieved from <https://glskalp.in/index.php/glskalp/article/view/36>

<sup>13</sup> Oil spills: A major marine ecosystem threat, <https://www.noaa.gov/explainers/oil-spills-major-marine-ecosystem-threat#:~:text=Depending%20on%20the%20circumstances%2C%20oil,them%20to%20the%20harsh%20elements.> (last visited March 22, 2022).

<sup>14</sup> 8 Ways Cruise Ships Can Cause Marine Pollution, (June 16, 2021) <https://www.marineinsight.com/environment/8-ways-in-which-cruise-ships-can-cause-marine-pollution/> (last visited February 22, 2022).

<sup>15</sup> Corrine Henn, These 5 Marine Animals Are Dying Because of Our Plastic Trash... Here's How We Can Help, <https://www.onegreenplanet.org/animalsandnature/marine-animals-are-dying-because-of-our-plastic-trash/> (last visited April 11, 2022).

animals succumb to such pollution every year. The plastic consumption by the sea turtles believing it to be viable food source, results in causing blockages in their digestive systems. Over 388 sea lions were documented to be entangled in plastic debris. This was reported by a study conducted in South East Alaska and British Columbia.<sup>16</sup> Even whales and dolphins mistake plastic to be potential food source and thus it thereby takes an unfortunate toll over the lives.

The Animals are innocent beings. They do not have the power to reason and differentiate between what is good and bad for them. The ocean is their home and the humans have encroached upon their territory. The human greed has led to the deterioration of the natural habitat of the aquatic animals and there by violating their right to life.

The aquatic animals are legal persons:

All living creatures inherently are vested with the right of dignity, the right to live peacefully and the right to protect their well-being which encompasses protection from pain and suffering. Animals have also honor and dignity which cannot be arbitrarily deprived of its rights and privacy have to be respected and protected from unlawful attacks. Right to dignity and fair treatment is, therefore, not confined to human beings alone, but to animals as well.<sup>17</sup>

The word life as per Art. 21, must be interpreted in the broadest sense. It includes all forms of life, including animal life. The recent judicial development records the recognition given to animals as 'legal person.'

In the case of Karnail Singh and Ors v State of Haryana and Ors,<sup>18</sup> Recognizing the Rights of the animals, Justice Rajiv Sharma, in his Judgement, said that:

*All the animals have honor and dignity. Every species has an inherent right to live and is required to be protected by law. The rights and privacy of animals are to be respected and protected from unlawful attacks. The entire animal kingdom, including Avian and Aquatic are declared as legal entities having a distinct persona with corresponding rights, duties and liabilities of a living person.*

*Further the judgement provides that the animals should be healthy, comfortable, well nourished, safe, able to express innate behavior without pain, fear and distress. They are entitled to justice. They cannot be treated as objects or property. Further declare that the Citizens as the guardians of the animal kingdom with a duty to ensure their welfare and protection.*

In the light of the persisting problem and the aforementioned judgements it can be said that as the human beings are deemed guardians of the animal kingdom it vests them with the supreme responsibility to make sure that these animals must be made to live in a healthy and safe environment. The first step one shall take in this regard is by employing means and methods to cut down on marine pollution.

*In the context of human rights, right to life and liberty, pollution free air and water is guaranteed by the Indian Constitution under Art. 21, 48-A and 51-A (g).<sup>19</sup> In T.N Godavarman v Union of India<sup>20</sup>, a three judge bench of the Supreme Court read Article 48-A and 51- A together laying down the foundation for a jurisprudence of environmental protection and held that, “ today, the State and the Citizens are under a fundamental obligation to protect and improve the environment including forests, lakes, rivers, wildlife and to have compassion for living creatures.”*

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<sup>16</sup> <https://news.mongabay.com/2020/03/study-finds-that-sea-turtles-might-be-eating-plastic-because-it-smells-like-food/> (last visited April 11, 2022).

<sup>17</sup> Animal Welfare Board of India v Nagaraja and Ors, [2014], SLP (Civil) No: 11686 of 2007 [2019], CRR-533-2013

<sup>19</sup> Charan Lal Sahu v Union of India, AIR 2003 SC: 1480

<sup>20</sup> AIR 2003 SC 724

The Apex Court in the light of ensuring the Right to free and unpolluted environment observed in the case of *Ishwar Singh V State of Haryana*<sup>21</sup>, that

*“We see around us growing evidence of man-made harm in many regions of the earth; dangerous levels of pollution in water, air, earth and living beings; major and undesirable disturbances to the ecological balance of the bio-sphere; destruction and depletion of irreplaceable resources.”*

In *Sachidananda Pandey v State of West Bengal*<sup>22</sup> the Supreme Court held that:

*“Today, society’s interaction with nature is so extensive that the environmental question has assumed proportions affecting all humanity. Industrialization, urbanization, explosion of population, over-exploitation of resources, depletion of traditional sources of energy and raw materials and the search for new sources of energy and raw materials, the disruption of natural ecological balances, the destruction of a multitude of animal and plant species for economic reasons and sometimes for no good reason at all are factors which have contributed to environmental deterioration. While the scientific and technological progress of man has invested him with immense power over nature, it has also resulted in unthinking use of the power, encroaching endlessly on nature. If man is able to transform deserts into oases, he is also leaving behind the deserts in the place of oases.”*

A great German Materialist Philosopher once warned the mankind that:

*“Let us not, however, flatter ourselves over much on account of our human victories over nature. For each of such victory nature takes its revenge on us. Each victory, it is true, in the first place brings about the results we expected, but in the second and third places it has quite different unforeseen effects which only too often cancel the first.”*

#### **Applicability of the Principles of Environment Law to Curb Marine Pollution:**

Certain principles underpin the framework of environmental law. In order to ascertain the liability for marine pollution these principles enshrined in the EC Treaty (Art. 130) will sever to be helpful.

a. *The Polluter pays principle:*

The nature of this principle is such that it emphasizes upon the payment of costs of environmental damage to be borne by the persons responsible for such principle. It basically provides that the polluter should be made to pay for the administration of the pollution control system; and must also be made to pay for the consequences of the pollution such as for the clean up and compensation.<sup>23</sup>

b. *Preventive Principle:*

This principle revolves around the proverb ‘prevention is better than cure’. It lays emphasis on the steps to be undertaken to minimize the effects of pollution before the polluting process begins. This principle imposes an obligation upon the State to prevent such damage to the environment in its respective jurisdiction.<sup>24</sup>

c. *Precautionary Principle:*

This principle is expressed in the Rio Declaration, which stipulates in principle 15 Rio Declaration, where there are *“threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective*

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<sup>21</sup> AIR, 1996 P and H 30(47)

<sup>22</sup> AIR 1987 SC 1109

<sup>23</sup> What is the polluter pays principle? (May 11<sup>th</sup>, 2018)<https://www.lse.ac.uk/granthaminstitute/explainers/what-is-the-polluter-pays-principle/>

<sup>24</sup> <https://www.eea.europa.eu/help/glossary/eea-glossary/prevention-principle> (last visited April 11, 2022).



*measures to prevent environmental degradation.*”<sup>25</sup>The essence of this principle is that when there exists no firm scientific evidence as to the effect of a particular substance or activity the protection of the environment should be the primary concern. One need not wait for conclusive scientific proof before the preventive action is taken.  
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d. Sustainable Development Principle:

The principle of sustainable development has been defined by the 1987 Brundtland Report<sup>27</sup> as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It lays down that the States should take proactive steps to strike a balance between development and environment.  
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The aforementioned principles can aid in cutting pollution to a greater extent. The polluters’ can be made to pay for the damage that is caused by them due to disposal of factory waste, dumping of plastic, oil spillage etc., into the ocean. The factory owners, the owner of the ships etc must be made to pay and undertake measure to compensate the damage. The preventive and the precautionary measure will ensure for the government to be proactive and thereby enabling the employment of new and innovative measures of preventing marine pollution. The sustainable development principle holds very significant relevance in the current times as the situation at hand is alarming and it is necessary that we utilize the resources in such a manner that it is preserved for the future generations to use.

**Legal Provisions:**

1958 Geneva Conventions on the law of the sea:

The primary task which was entrusted to the Geneva Conference of 1958 was “to examine the law of the sea, taking account not only of the legal but also of the technical, biological, economic and political aspects of the problem and to embody the results of its work in one or more international conventions or such other instruments as it may deem appropriate.”<sup>29</sup> The convention contains pioneering provisions on pollution by the discharge of oil and radio active wastes.

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter of 1972:

This convention is also called as the London Convention, which is also one of the earliest international agreements for the protection of the marine environment from the human activities. The contracting parties to this convention entered into a free-standing treaty in 1996. This treaty is popular as the London Protocol. The significance of this protocol is that it expressly prohibits the incineration at sea the export of wastes and

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<sup>25</sup> United Nations Convention on the Rio Declaration of Environment and Development, June 15, 1992, principle 15.

<sup>26</sup> D Kriebel, J Tickner, P Epstein, J Lemons, R Levins, E L Loechler, M Quinn, R Rudel, T Schettler, and M Stoto, The precautionary principle in environmental science, (Sep 2001), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240435/> (last visited April 10, 2022).

<sup>27</sup> Report of the World Commission on Environment and Development (the Brundtland Report).

<sup>28</sup> Meaning, Principles And Goals Of Sustainable Development In India, (March 11, 2021 ) <https://lawcorner.in/meaning-principles-and-goals-of-sustainable-development-in-india/> (last visited April 1, 2022).

<sup>29</sup> Tullio Treves, 1958 GENEVA CONVENTIONS ON THE LAW OF THE SEA, [https://legal.un.org/avl/pdf/ha/gclos/gclos\\_e.pdf](https://legal.un.org/avl/pdf/ha/gclos/gclos_e.pdf) (last visited April 21, 2022).

other matter for the purpose of ocean dumping. The Annex I of the London Protocol<sup>30</sup> provides for the list of activities that amount to dumping and the same is as follows:

- Dredged material.
- Sewage sludge.
- Fish wastes or material resulting from industrial fish processing operations.
- Vessels and platforms or other man-made structures at sea.
- Inert, inorganic geological material.
- Organic material of natural origin.
- Bulky items primarily comprising iron, steel, concrete and similarly unarmful materials for which the concern is physical impact, and limited to the circumstances where such wastes are generated at locations with no land-based alternatives.
- Carbon dioxide streams from carbon dioxide capture processes for sequestration in sub-seabed geological formations.

United Nation Convention on the Law of Sea, 1982:

This is a benchmark convention as it establishes a comprehensive regime of law by laying down rules that govern all uses of oceans and their resources.<sup>31</sup> In 2015 the UN decided to develop an international legally binding instrument under this convention on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. The first inter-governmental conference was held in 2017 followed by the one in 2018 where the where the topics agreed in 2011 conference were addressed namely,

- the conservation and sustainable use of marine Biological diversity of areas Beyond National Jurisdiction;
- marine genetic resources, including questions on benefit-sharing (MGR);
- Area Based Management Tools (ABMT), including marine protected areas;
- environmental impact assessments (EIA); and
- capacity-building and the transfer of marine technology (CB&TMT)

International Convention for the Prevention of Pollution from Ship:

This convention is the primary international convention that deals with prevention of marine environment by ships from operational or accidental causes.<sup>32</sup> The Convention comprises of regulations intended at preventing and curtailing pollution from ships - both accidental pollution and that from routine operations - Special Areas with strict controls on operational discharges are included in the Annexes. There are in total six Annexes namely:

1. Annex I Regulations for the Prevention of Pollution by Oil (entered into force 2 October 1983)

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<sup>30</sup> Ocean Dumping: International Treaties, <https://www.epa.gov/ocean-dumping/ocean-dumping-international-treaties#:~:text=The%20London%20Protocol%20entered%20into,the%20purpose%20of%20ocean%20dumping> (last visited April 11, 2022).

<sup>31</sup>United Nations Convention on the Law of the Sea, <https://www.imo.org/en/OurWork/Legal/Pages/UnitedNationsConventionOnTheLawOfTheSea.aspx#:~:text=The%20United%20Nations%20Convention%20on,the%20oceans%20and%20their%20resources> (last visited April 22, 2022).

<sup>32</sup> International Convention for the Prevention of Pollution from Ships (MARPOL), [https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-\(MARPOL\).aspx#:~:text=The%20International%20Convention%20for%20the,2%20November%201973%20at%20IMO.](https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx#:~:text=The%20International%20Convention%20for%20the,2%20November%201973%20at%20IMO.) (last visited April 11, 2022).

2. Annex II Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk (entered into force 2 October 1983)
3. Annex III Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form (entered into force 1 July 1992)
4. Annex IV Prevention of Pollution by Sewage from Ships (entered into force 27 September 2003)
5. Annex V Prevention of Pollution by Garbage from Ships (entered into force 31 December 1988)
6. Annex VI Prevention of Air Pollution from Ships (entered into force 19 May 2005)

Convention on Biodiversity, 1992:

The Convention on Biological Diversity provides for a detailed prerequisite for conducting EIAs for activities under a Contracting Party's jurisdiction or control which are likely to have significant adverse effects on biodiversity – both terrestrial and marine – and for areas within and beyond national jurisdiction.<sup>33</sup> Under Article 14 (1) (a) and (d), each Contracting Party shall,

(a) Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures;

(d) In the case of imminent or grave danger or damage, originating under its jurisdiction or control, to biological diversity within the area under jurisdiction of other States or in areas beyond the limits of national jurisdiction, notify immediately the potentially affected States of such danger or damage, as well as initiate action to prevent or minimize such danger or damage.

Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. (Aarhus Convention):<sup>34</sup>

Article 4 of the Aarhus Convention requires parties to ensure that their public authorities, in response to a request for environmental information, make such information available to the public within the framework of national legislation, including copies of the actual documentation. The definition of “environmental information” is very comprehensive and includes any information in written, visual, aural, electronic or any other material form on:

(a) The state of elements of the environment, such as air and atmosphere, water, soil, land, landscape and natural sites, biological diversity and its components and the interaction among these elements;

(b) Factors such as substances, energy, noise and radiation, and activities or measures, including administrative measures, environmental agreements, policies, legislation, plans and programs, affecting or likely to affect the elements of the environment and environmental decision-making;

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<sup>33</sup> CONVENTION ON BIOLOGICAL DIVERSITY, <https://www.cbd.int/doc/legal/cbd-en.pdf> (last visited April 11, 2022).

<sup>34</sup>Aarhus Convention, <https://ec.europa.eu/environment/aarhus/#:~:text=The%20United%20Nations%20Economic%20Commission,C onference%20as%20part%20of%20the%2022> (last visited January 11, 2022).



(c) The state of human health and safety, conditions of human life, cultural sites and built structures, in as much as they are or may be affected by the state of the elements of the environment.

**INDIA:**

Section 277 of Indian Penal Code:

The Code provides for the punishment to be given to the person who commits an offence of fouling of a public reservoir or a public spring voluntarily shall be liable to be punished with imprisonment of three months or with a fine of 500 Rupees or with both.

The Water (Prevention and Control of Pollution) Act, 1974:

This was enacted to provide a comprehensive framework for the prevention and control of water pollution, and for the maintaining or restoring of wholesomeness of water in the country. The Act was amended in 1988. The Water (Prevention and Control of Pollution) Cess Act was enacted in 1977, to provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities. This cess is collected with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974. The Act was last amended in 2003.<sup>35</sup>

Maritime Environment Protection:

The Maritime Zones of India Act 1976, enables the Government to take measures for protection of the marine environment.<sup>36</sup> The Coast Guard Act 1978 states that the preservation and protection of marine environment and control of marine pollution is the function of the Indian Coast Guard.<sup>37</sup> The ICG has been accordingly nominated in 1986 as the Central Coordinating Authority for oil-spill response in the Maritime Zones of India and Coast Guard officers have been empowered under the Merchant Shipping Act 1958, for taking necessary actions against polluters. Any oil-spill response requires inter-agency coordination. Necessary preparedness measures need to be addressed collectively, and towards that effort, a national level contingency plan, that provides all the necessary details and functional responsibilities of various agencies, has been prepared. The Government of India approved the National Oil-spill Disaster Contingency Plan (NOSDCP) in 1993,<sup>38</sup> and allocated functional responsibilities to various ministries and departments for oil-spill response in the Maritime Zones of India. The ports are responsible for oil-spill clean-up within port limits, and oil-handling agencies are responsible for oil-spill clean-up up to 500 meters around the oil-handling installations. The

<sup>35</sup> Water Pollution, [https://cpcb.nic.in/water-pollution/#:~:text=The%20Water%20\(Prevention%20and%20Control,Act%20was%20amended%20in%201988](https://cpcb.nic.in/water-pollution/#:~:text=The%20Water%20(Prevention%20and%20Control,Act%20was%20amended%20in%201988)

<sup>36</sup> Marine Environment, [https://indiancoastguard.gov.in/content/246\\_3\\_MarineEnvironmentProtection.aspx](https://indiancoastguard.gov.in/content/246_3_MarineEnvironmentProtection.aspx) (last visited January 11, 2022).

<sup>37</sup>Duties and Functions of The Coast Guard, <https://www.advocatekhaj.com/library/bareacts/coastguard/14.php?Title=Coast%20Guard%20Act,%201978&STitle=Duties%20and%20functions%20of%20Coast%20Guard> (last visited January 1, 2022).

<sup>38</sup>NATIONAL OIL SPILL DISASTER CONTINGENCY PLAN, <https://www.indiancoastguard.gov.in/WriteReadData/bookpdf/201512281221565793127NOSDCPCGBR771.pdf> (last visited January 31, 2022).

Coastal States and Union Territories are responsible for shoreline clean-up, whenever the oil-spill reaches the shore, and threatens the shoreline.

### **Innovative Methods to Prevent Marine Pollution:**

#### ***Water resistant and bio-degradable plant-based plastic:***

A group of researchers at Japan's Osaka University have developed an alternative type of plastic which is biodegradable in seawater and water-resistant under normal use. This is made from cellulose nanofibers and starch, which are extracted from plants. A process is developed by the researchers which improves the water-resistance and strength of the composite so that it can be used in the same way as petroleum-based plastics. However, the plastic also breaks down after an extended period in seawater.<sup>39</sup>

#### ***Arctic Thermal baths powered by waste from Cruise Ships:***

June Tong, an Architecture Student has developed a proposal for an arctic-based thermal bath powered by the waste from cruise ships. The idea is that thermal baths will help create a "green Arctic experience" for tourists. Guests will be able to enjoy thermal baths that are powered by waste from the same cruise ships that transport them. Arctic bathing will allow towns, such as the one in Longyearbyen, to continue benefiting from the income provided by Arctic tourism without the downside of ice melting.<sup>40</sup>

#### ***Mr Trash Wheel:***

This machine is a trash interceptor. It removes trash from water. Mr trash wheel is powered by water wheels and solar cells. Mr. Trash Wheel removes floating debris using rotating forks that dip into and out of the water, and which then place the trash onto a conveyor belt which moves it into a dumpster. The water wheel can be controlled remotely on the Internet. This project has collected over 2004.47 tonnes of trash and debris and it stands alone as one of the most successful engineering-based clean-up projects.

#### ***Cloud of Sea:***

The cloud of sea is one of the contemporary, modern, innovative, user-friendly machines which is adaptable to any kind of boat. It encourages and facilitates seafarers interested in the health of the marine world, to remove microplastics that contaminate the waters of our planet. Cloud of Sea is a product designed to be hooked on to all boats using ropes. The product contains an internal rotating filter that can capture micro-plastics in the water. Cloud of Sea moves in the sea via a boat so therefore it does not need any other source of energy to move through the sea to collect micro-plastics. It is an intuitive product and allows for easy carryover and sorting of rubbish on the shore.<sup>41</sup>

These new innovative methods can be employed on the larger scale so that it will speed up the process and thereby preserve the marine environment. The governments of the countries must undertake the production of such machines in their respective jurisdictions and employ these machines in the water bodies. Simultaneously research should be carried out to develop more biodegradable alternatives to plastic and fuel to cut down of carbon emission and pollution.

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<sup>39</sup> WATER-RESISTANT AND BIODEGRADABLE PLANT-BASED PLASTIC, <https://www.springwise.com/sustainability-innovation/science/plant-based-plastic> (last visited February 11, 2022).

<sup>40</sup> ARCTIC THERMAL BATHS POWERED BY WASTE FROM CRUISE SHIPS, <https://www.springwise.com/travel-innovation-sustainable-cruise-ship> (last visited February 11, 2022).

<sup>41</sup> THE INDEX PROJECT, <https://theindexproject.org/award/nominees/6406> (last visited February 11, 2022).

**Conclusion:**

Oceans are one of the most precious assets to the human race. Currently, the preservation of the marine population and protecting it from pollution has become the need of the hour. Since more than 70% of the earth's surface is covered by oceans it imposes a primary responsibility over the nation-states to undertake measures in this regard. Combatting Marine pollution has become the policy issue in most of the countries. Many voluntary organizations have taken up the task to clean oceans. There is a lot of research being carried in this regard as well. Moreover, the best solution to this crisis will be responsible citizenry and development of compassion towards the marine animals. The same has been held by the Apex Court as well thereby casting a supreme responsibility over them to guard the animals. Plastic consumption should be cut down and it can be done by imposing regulations of the manufacturing of plastic. Several innovative methods are coming to light in this regard and if the same is employed by the nations then it will serve to be helpful in combatting the marine pollution crisis.