Shipping Industry in India and its Environmental Law Challenges

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Introduction

India is positioned strategically in the world map with a vast coastline of approximately 7500 kilometers. India, has been known for its products and trade activities. Marine shipping is one of the most important means of transport through which the trading activities takes place. Shipping transports more than eighty percent of world trade by volume[1] and plays an important role in spreading the benefit of trade and commerce evenly to every part of the world. It plays a key role in transporting goods and commodities and carrying passengers and tourists across continents. Shipping has emerged as the most economical and efficient system of international transportation for most goods as it furnishes a dependable, low-cost means of transporting goods helps in creating prosperity among nations. Shipping industry is a means to millions of people in the developing world and maintains the standard of living of the people in the developed world. It has also assisted in reducing poverty by improving the living standards of millions of people across the world.

But this development comes at the price of polluting the vast spans of ocean. Activities such as oil spill by ships, sewage discharge, littering of the oceans by plastic and discharge of poisonous oxides in the atmosphere (like Nitrogen Oxide and Sulphur Oxide) harms the

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[1] IMO and its role in protecting the world's oceans, https://www.imo.org/en/MediaCentre/HotTopics/Pages/oceans-default.aspx (last visited May 18, 2021).

marine animals, disturbing the underwater ecosystem, polluting the atmosphere and detrimentally affecting the health of the people settled along the coastal region. Internationally, specialized agency such as International Maritime Organisation (*hereinafter* IMO) are relentlessly working to reduce the harm done to the environment, increase awareness and provide for legally binding solutions. IMO is the global standard-setting authority for the safety, security and environmental performance of international shipping. The organization covers all the facet of international shipping from design, construction, equipment, managing, operation and disposal to making shipping activities safe, environmentally friendly, energy efficient and secure. IMO plays a crucial role in developing a fair and effective regulatory framework for shipping industry which can be invariably adopted and applied. India has ratified and been a member of IMO since 1959. In January 2020 IMO mandated merchant ships not to burn fuel with Sulphur content more than 0.5%.[2] This regulation is particularly challenges to countries such as India where our refineries are struggling to meet the mandate and the demand. This has led to massive technological challenges, increase operational costs, incompatible with the engines and structural changes of the shipping industry However one must note that this decision in towards complying with Sustainable development Goals 14 (Conserve and sustainably use the Oceans, seas and marine resources for sustainable development.) The authors in this Article attempt to understand and explore the challenges concerning shipping industry in India, its environmental pollution and Climate change concerns and current regulatory framework addressing the same.

Analyzing the Shipping Industry and Its Environmental Pollution

Dumping of wastes in the oceans is not something of recent phenomenon. Oceans have always been used for disposal of wastes including for disposal of industrial and chemical wastes. In the past, communities living near the seas have used it for eking out livelihood and consequently disposing the wastes generated during the process. It is

[2]Before the ban, fuel had a comfortable sulphur content limit of 3.5%.

significant to understand that no complete record exists of the volumes and types of materials disposed in the ocean waters. In 2010, a rough estimation of plastic waste dumping in the Indian seas was found to be around 8 million tonnes.[3] The seas and marine ecosystems are vulnerable both on and off the shore, as garbage and other wastes are dumped in high seas. The coast is equally prone to pollution due to littering and mismanagement in handling of wastes.

In the United States of America, the National Academy of Sciences came out with a report in 1968 which estimated that the annual volumes of ocean dumping by vessels or pipes. The Report estimated that around 100 million tons of petroleum products, two to four million tons of acid chemical wastes from pulp mills, one millions tons of organic chemical wastes and more than 100,000 tons of organic chemical wastes.[4] Another report by the Council on Environmental Quality on ocean dumping reported that 38 million tons of dredged material; 4.5 million tons of industrial wastes; 4.5 million tons of sewage sludge and 0.5 million tons of construction and demolition debris.[5] As a result of this, the uncontrolled ocean dumping has caused severe depletion of oxygen levels. The United States of America has enacted a legislation viz., Marine Protection, Research and Sanctuaries Act (MPRSA) also known as the Ocean Dumping Act, 1972.[6] The MPRSA provides for a

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[3]R. Prasad, *India pumps 0.6 tonnes of plastic waste into ocean annually: researchers.* The Hindu, 13 February, 2015 https://www.thehindu.com/sci-tech/energy-and-environment/india-pumps-600000-tonnes-of-plastic-waste-into-the-ocean-annually-science-journal/article6890568.ece.

[4]Learn about Ocean Dumping. United States Environment Protection Agency, https://www.epa.gov/ocean-dumping/learn-about-ocean-dumping#Before (Last visited on 27.06.2021).

[5] *Id.*

[6] Unregulated dumping of materials into ocean waters endangers human health, welfare, and amenities and the marine environment, ecological systems and economic potentialities. As a matter of policy, the United States regulates the dumping of all the types of materials into ocean waters and to prevent any kind of dumping into ocean that would have an impact on human health and ecology. The law also seeks to regulate the regulation of dumping and transportation for dumping purposes. Marine Pollution by Dumping Wastes and Other Matter Act, 1972. https://www.govinfo.gov/content/pkg/USCODE-2014-title33/pdf/USCODE-2014-title33-chap27.pdf.

regulatory framework for preventing dumping of certain materials in ocean including the high-level radioactive wastes, radiological, chemical and biological warfare agents etc. Incineration at sea is considered as ocean dumping because of the emissions emitted which gets deposited in the surrounding ocean waters.

Coming to the issues faced by the South Asian nations including the Bangladesh, Maldives, Pakistan, Sri Lanka, and more specifically the Indian sub-continent, plastic is the most common type of marine debris.[7] As per the Report by the South Asian Seas Region on Marine litter, major reason for marine pollution of seas is due to non-collection of solid waste which are land filled or incinerated. The goal is to have a cleaner oceans but the South-Asian nations which are mostly developing nations have poor quantification and reporting of marine debris as the data collection does not follow consistent methodology.[8] Further, these areas suffer most from pollution caused by ship traffic due to large concentration of shipping emissions in the region due to rapid economic growth.[9] Therefore, the regulation of dumping in oceans has attained significance to protect and conserve integrity of already depleted marine ecosystem.

International Legal Formulations

Shipping is a global industry and can function efficiently only when standards and regulations are accepted, adopted and applied on an international basis. The expansion of shipping industry has been contemporaneous with the global trade. With the advancement in the world economy, the volume of goods and oil being transported also increased. The surge in the demand for oil accompanied with numerous cases of oil spills had adverse impact on the oceans. One of the most

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[7] Mehar Kaur, Mrinal Mathur *et. al.,* Solid waste pollution in the South Asian Seas (SAS), 09 August, 2019. https://www.teriin.org/article/solid-waste-pollution-south-asian-seas-sas.

[8] *Id.*

[9] Inga Vesper, *Shipping Pollution hotspots mapped with real time data.* SciDevNet, 30 August, 2017. https://www.scidev.net/global/news/shipping-pollution-hotspots-mapped-data/.

infamous cases of oil spill is of *Torrey Canyon Disaster*. In 1967, 100,000 tonnes of oil spilled in the coast of Cornwall due to the super tanker SS Torrey hitting rocks off the coast.[10] The volume of oil spill pointed towards the magnitude of the problem wherein the water was clogged with thick viscous oil. It is estimated that over 15,000 sea birds were killed having a direct impact on planktons and small invertebrate species. Torrey Canyon disaster was one among the major oil spill cases among numerous others including the *Amoco Cadiz Oil Spill* (1978), *Castillo de Bellver Oil Spill* (1983), *Nowruz Oil Field incidents* (1983), *Persian Gulf War Oil Spill* (1991).[11] In another recent case, a Singapore based MV X-Press Pearl carrying chemicals and plastics has sunk in the Indian Ocean after a fire incident.[12] The Captain of MV X-Press is presently facing criminal charges for causing pollution in Sri Lankan waters.

With numerous incidents of oil spills, cargo sinking, and disposal of wastes in ocean has led the IMO to take several measures. The most important one was the International Convention for the Prevention of Pollution from Ships, popularly known as MARPOL Convention[13]. It was adopted by IMO in 1973 aimed at addressing the challenge of

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[10] Benthan Bell and Mario Cacciottolo, Torrey Canyon oil Spill: The day the sea turned black. (17 May, 2021) https://www.bbc.com/news/uk-england-39223308.

[11] John P. Rafferty, *9 of the Biggest Oil Spills*, Britannica, https://www.britannica.com/list/9-of-the-biggest-oil-spills-in-history (Last visited on 22.06.2021).

[12] Termed as one of the worst ecological disasters in the country's history was carrying tons of chemicals and microplastics or plastic pellets which was washed ashore from the sunken MV X-Pearl Press. Meera Srinivasan, *Sri Lanka braces for oil spill from sinking cargo vessel.* The Hindu, 03 June, 2021. https://www.thehindu.com/news/international/sri-lanka-braces-for-oil-spill-from-sinking-cargo-vessel/article34721019.ece.
The Marine Environment Protection Authority (MEPA) Chairman, Dharshani Lahandapura has noted that "This is the worst maritime environmental disaster ….ever since the island has not faced such a situation of this magnitude.
Mohammed Rasooldeen, *Oil spill fears grow over stricken cargo ship off Sri Lankan coast.* Arab News, 02 June, 2021. https://www.arabnews.com/node/1869426/world.

[13] International Convention for the Prevention of Pollution from Ships (MARPOL), 1973, aims to regulate by preventing and minimizing pollution from ships both accidental and from routine operations. http://www.mepa.gov.lk/web/images/pdf/conventions/marpol.pdf.

pollution from ships by oil; by noxious liquid substance; sewage, garbage and prevention of air pollution from ships. In 1978, the Convention was amended to introduce Annex VI – Regulations for Prevention of Air Pollution from Ships.[14] MARPOL has significantly contributed in reducing pollution from international shipping and applies to ninety-nine percent of the world's merchant tonnage.[15] The author attempts to elaborate on the effect of pollution and specific measures taken under MARPOL to reduce them, the impact on climate change and the measures undertaken. The pollution caused by ships is categorized into oil spills, noxious liquid substance, sewage and garbage, and air pollution. The provisions of MARPOL provide for solutions to prevent oil spills, emission of noxious liquid, proper discharge of sewage and reduce the emission of greenhouse gases.

Oil Spills

Oil spill incidents are frequent and every year many big and small oil spills take place as ships across the world transport 2900 million tons of crude oil and oil products annually. To reduce operational pollution from ships they are safely built and routine cleaning operations are carried out for curbing accidental leakage. Safety regulation such as mandatory traffic separation schemes and international standard for seafarer training and the innovations introduced by MARPOL for allowing discharge of bilge water through oily water separator, oily waters from cargo tanks through the oil discharge and monitoring systems have contributed significantly in decreasing accidental oil

MARPOL Annex VI - [14] MARPOL Annex VI – Prevention of Air Pollution from ships. Came into force initially on 19 May, 2005. Thereafter, the revised Annex VI tightened emission limits, adopted in October, 2008 and came into force on 01 July, 2010. https://www.imo.org/en/OurWork/Environment/Pages/Air-Pollution.aspx (last visited May 19,2021).

[15] Pollution Prevention, https://www.imo.org/en/OurWork/Environment/Pages/Pollution-Prevention.aspx (last visited May 19, 2021).

pollution.[16] These safety measures are important as oil pollution can destroy marine ecosystem and increase the concentration of toxic substance like arsenic and other chemicals in the water.

Noxious Liquid

The oceans are often polluted by toxic chemicals like heavy metal and organic pollutants leaked from the ships. Chemicals pollute and destroy marine life by killing fish, corals and other marine species. Noxious liquids are defined as petrochemicals but include other chemicals, vegetable oils under the guideline of MARPOL. The conventions governing the pollution caused by dangerous chemicals and noxious liquid substance are SOLAS (International Convention for the Safety of Life at Sea)[17] and MARPOL. SOLAS regulations prescribe standards for design and construction of ships carrying bulk liquid and identifies equipment to be carried to curb the risk to ship, crew and environment. The MARPOL Annex II[18] - regulation for pollution control categorizes the noxious liquid in four categories and justifies their limitation if they threaten the human health, marine resources and cause harm to amenities or other lawful use of sea. It also lays out regulation for deterring pollution by harmful substances in packaged form and for issuing detailed standards on packaging, marking, labelling, documentation, storage, quantity limitations, exceptions and notifications for preventing pollution by harmful substances.

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[16] MARPOL Annex I – Prevention of Pollution by Oil, https://www.imo.org/en/OurWork/Environment/Pages/OilPollution-Default.aspx (last visited May 19,2021).

[17] SOLAS, is the International Convention for the Safety of Life at Seas, is an international maritime safety treaty of International Maritime Organisation, the Maritime Arm of the United Nations.

[18] MARPOL Annex II - Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk. https://www.imo.org/en/OurWork/Environment/Pages/ChemicalPollution-Default.aspx (last visited May 19, 2021).

Discharge of Sewage

Sewage is polluting the seas and is also a creating a health hazard. The discharge of raw sewage into the sea is a reason for oxygen depletion in coastal areas. The sources of sewage are either land based or from ships. MARPOL sets out regulation for discharge of sewage from ships, equipment and system for control of sewage discharge, for port reception and for requirements for survey and certification. The revised MARPOL pertains to ships involved in international voyages of 400 gross tonnage and above or which are certified to carry more than fifteen persons requiring them to be equipped with an approved treatment plant or an approved sewage comminuting[19] and disinfecting system or a sewage holding tanks. The discharged of sewage is prohibited in the sea excluding the ships which have an approved sewage treatment plant or when it is discharging comminuted and disinfected sewage using an approved system at a distance of more than three nautical miles from the nearest land. Sewage which is not disinfected could be discharged at a distance of more than twelve nautical miles from the nearest land when the ship is enroute and proceeding at not less than 4 knots[20] and the rate of discharge of untreated sewage should be assented by the administration. For discharging sewage in Special Areas the ship should have an approved sewage treatment plant by the administration otherwise the discharge of sewage is prohibited in these areas.[21]

Garbage

Garbage is the major source of pollution, as it can float on the surface of the sea for years. The marine animals mistake it for food and consume it. Ships dump the garbage in the sea instead of disposing it on

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[19] Comminute refers to reduction to small pieces or particles. https://www.merriam-webster.com/dictionary/comminute (last accessed on 21, May, 2021).

[20] Four (4) Knots refers to 7.408 kmph, wherein 1 knot is 1.15 miles per hour. https://oceanservice.noaa.gov/facts/nauticalmile_knot.html (last accessed on 21, May, 2021).

[21] Prevention of Pollution by Sewage from Ships, https://www.imo.org/en/OurWork/Environment/Pages/Sewage-Default.aspx (last visited May 19,2021).

ports. Annex V of MARPOL defines garbage as all kind of food, domestic and operational waste, all plastics, cargo residue, incinerator ashes, cooking oil, fishing gear and animal carcasses produced during the normal operation of the ship and is liable to be disposed continuously or periodically and does not includes fresh fish and parts thereof produced as a result of fishing activities undertaken in a voyage or as a consequence of aquaculture. According to MARPOL every ship operating in the sea from commercial ships like fixed or floating platforms or non-commercial ships like pleasure crafts and yachts should reduce and eliminate dumping of garbage in the sea. It prescribes a blanket ban on discharge of garbage into the sea except food waste, animal carcasses, cleaning agents and additives. For an easy and smooth disposal of garbage an efficient port reception facility is important. The governments are obliged under MARPOL to develop and facilitate efficient port facility for disposing garbage without causing any delay to the ships and according to the need of the ships using them.[22]

Air Pollution

The shipping industry releases particulate matter (PM), Sulphur oxide (SO_x), Nitrogen oxide (NO_x), Carbon Dioxide (CO_2), Carbon monoxide (CO), Methane (CH_4), Nitrous Oxide (N_2O), black carbon (BC), Non-Methane Volatile Organic Compounds (NMVOC) and Ozone Depleting Substances into the atmosphere. These emissions are one of the main sources of air pollution. The release of carbon dioxide leads to the greenhouse effect causing acidification of sea water which is harmful for the natural balance of ocean and marine life. Oceans have the capacity to absorb carbon in the atmosphere, the amount of carbon absorbed has increased due to deforestation and change in land use. The carbon concentration in the atmosphere has increased due to human activities and resultantly, the pH of the ocean has fallen by 0.1 pH units.[23] Though it may not seem to be a drastic increase, but it represents

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[22] Prevention of Pollution by Garbage from Ships, https://www.imo.org/en/OurWork/Environment/Pages/Garbage-Default.aspx (last visited May 20,2021).

[23] Ocean Acidification. National Oceanic and Atmospheric Administration. 01 April, 2020. https://www.noaa.gov/education/resource-collections/ocean-coasts/ocean-acidification.

approximately 30% increase in acidity that can have a tremendous impact on the marine species.[24]

Sulphur oxide is a greenhouse gas and is responsible for acid rain. Sulphur oxide is harmful to human health, causing respiratory, cardiovascular lung disease and premature deaths. It is important to reduce the release of Sulphur oxide otherwise the air pollution from ships would lead to estimated 5,70,000 premature deaths in the world between 2020-2025. Reducing the emission of Sulphur Oxide (SOx) from ships can have a positive impact on human health and environment and especially for population living close to coasts and ports. Heavy oil residues from crude oil after distillation have high sulphur content. Burning of such fuel releases particulate matter along with sulphur oxide. So, limiting the emission of gas will also reduce the release of particulate matter in the atmosphere. Alternative fuels like Very Low Sulphur Fuel Oil (which have maximum 0.50 percent of sulphur by mass) or Marine Gas Oil (which have sulphur content between 0.10 - 0.50 percent) could be used.

The new measure taken by IMO in the form of IMO 2020 Rule limits the use of sulphur in fuel oil used on board. The guideline applies to all ships big or small and should use fuel which meets the 0.50 limit from 1st January 2020. Before this rule most ships were using heavy oil. This rule will lead to a considerable reduction in limiting the sulphur content outside designated emission control areas from 3.50 percent m/m to 0.50 percent m/m. And an even stricter limit of 0.10 percent m/m is to be followed in the four Emission Control Areas (ECAS). This limitation is anticipated to bring a reduction of 77 percent of sulphur oxide from the ships. To comply with the new reduction the ships should limit the sulphur content in fuel oil by either using an alternative oil or by installing exhaust gas cleaning systems. For a low Sulphur fuel the ships could either use a low Sulphur fuel or blend a high sulphur content fuel with low Sulphur content fuel to achieve the compliant fuel oil. The other way to reduce the emission is to install exhaust cleaning system or scrubbers. The scrubbers are designed to eliminate Sulphur oxide from

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[24] *Id.*

the ship's engine and boiler exhaust plans, so a ship installed with scrubber can use heavy oil.[25] The recent amendments made to MARPOL bans the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship except when the ships are installed with scrubbers. For compliance to the new limits of sulphur emission a new guideline for port State control under MARPOL was adopted in 2019.

Apart from MARPOL the other significant conventions for preventing marine pollution includes International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION) 1969[26], London Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972[27], International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) 1990[28], Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances 2000[29], International Convention on the Control of Harmful Anti-fouling

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[25] IMO 2020 – cutting sulphur oxide emissions, https://www.imo.org/en/MediaCentre/HotTopics/Pages/Sulphur-2020.aspx (last visited May 20, 2021).

[26] Adopted on 29th November, 1969 and came into force on 6th May, 1975. Convention affirms the right of a coastal state to take such measures on high seas to prevent, mitigate or eliminate danger to its coast line from pollution by oil or the threat. https://www.imo.org/en/About/Conventions/Pages/International-Convention-Relating-to-Intervention-on-the-High-Seas-in-Cases-of-Oil-Pollution-Casualties.aspx (last accessed on May 21, 2021).

[27] London Convention is an International treaty created to protect the marine environment from pollution caused by ocean dumping. https://www.epa.gov/sites/production/files/2015-10/documents/lc1972.pdf (last accessed on May 21, 2021).

[28] OPRC is an International instrument that provides a framework designed to facilitate international cooperation and mutual assistance in preparing for and responding to a major oil pollution incidents. https://www.imo.org/en/OurWork/Environment/Pages/Pollution-Response.aspx#:~:text=The% 20International%20Convention%20on%20Oil,to%20major%20oil%20pollution%20incidents. (last accessed on May 21, 2021).

[29] *Id.* Protocol is under the OPRC Convention which extends the regulatory framework to address pollution incidents involving hazardous and noxious substances mostly chemicals.

Systems on Ships 2001[30], International Convention for the Control and Management of Ships ballast Water and Sediments, 2004[31], International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (BUNKER)[32] and The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships 2009[33]. These measures taken by IMO or the provision of convention such as MARPOL might seem sufficient but they are not. As the IMO has not shown willingness to establish requirements based on the best technologies and fuels. It has only codified the technologies already largely adopted by industry due to market forces.

Legal Framework for Shipping Industry in India

The vast coastline bounded by three expanses of water, has over 1280 islands has broad continental shelf off the western coast. This supports the trade activities which forms the backbone for industries relying on imports. As per the data India by the Ministry of Shipping, approximately 95% of India's trade by volume and 68% by volume is

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30 The International Convention on the Control of Harmful Anti-Fouling Systems on Ships, adopted on 5th October, 2001. To prohibit use of harmful organotin compounds in anti-fouling paints . https://www.imo.org/en/OurWork/Environment/Pages/Anti-fouling.aspx#:~:text=Anti%2Dfouling%20systems-,The%20International%20Convention%20on%20the%20Control%20of%20Harmful%20Anti%2Dfouling,other%20harmful%20substances%20in%20anti%2D (last accessed on May 21, 2021).

31 The Convention was adopted on 13th February 2004 and came into force on 8th September, 2017. https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-(BWM).aspx (last accessed on May 21, 2021).

32 The Convention was adopted to ensure that adequate, prompt and effective compensation is available to persons who suffer damage caused by spills of oil when carried as fuel in ships' bunkers. https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-Civil-Liability-for-Bunker-Oil-Pollution-Damage-(BUNKER).aspx (last accessed on June 07, 2021).

33 The Convention was adopted at a Diplomatic Conference in Hong Kong, May 2009. Objective of the Convention is aimed at human health, safety and environment risks from ships reaching their operational lives. https://www.imo.org/en/OurWork/Environment/Pages/Ship-Recycling.aspx (last accessed on May 21, 2021)

moved through maritime transport.[34] India has robust legislative, administrative, regulatory and adjudicatory framework established under several legislations for governing shipping industry. Merchant Shipping Act, 1958 is one such legislation which provides for pollution by ships (both Indian and foreign ships).[35] Due to the increase in trading activities, the question of air pollution caused by ships entering Indian waters came up as issue before the National Green Tribunal (NGT). The NGT noted that there is lack of effective monitoring of air pollution caused by ships entering Indian Maritime Zone.[36]

The emissions and pollution of air are governed under the Environment (Protection) Act, 1986 (EPA); Air (Prevention and Control of Pollution) Act, 1974 (Air Act) and Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976. Despite the Air Act and EPA, the pollution caused in coastal areas are dealt with by Ministry of Shipping through its organizations viz., National Shipping Board and Director General of Shipping (DGS). Under the Merchant Shipping Act, 1958, several powers have been conferred with the Central Government regard to pollution caused by ships from sewage, garbage and oil. The list of rules are as follows[37] –

- Merchant Shipping (Control of Pollution by Noxious Liquid Substance in Bulk) Rules 2010;
- Merchant Shipping (Prevention of Pollution by Harmful Substances carried by Sea in Packaged Form) Rules 2010;

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[34] Shibani Ghosh v. Ministry of Environment, Forests and Climate Change (MoEFCC) and others. O.A. No.433 of 2017, decided on 13 December, 2019 (National Green Tribunal, New Delhi).

[35] Part XB of the Merchant Shipping Act, 1958, provides for Civil Liability for Oil pollution damage.

[36] Shibani Ghosh v. Ministry of Environment, Forests and Climate Change (MoEFCC) and others. O.A. No.433 of 2017, decided on 13 December, 2019 (National Green Tribunal, New Delhi).

[37] *Id*.

- Merchant Shipping (Prevention of Pollution by Sewage from Ships) Rules 2010;
- Merchant Shipping (Prevention of Pollution by Garbage from Ships) Rules 2010;
- Merchant Shipping (Prevention of Pollution by Oil from Ships) Rules 2010;
- Farming of Merchant Shipping (Civil Liability for Oil Pollution Damage) Rules 2008;
- Merchant Shipping (International Fund for Compensation for Oil Pollution Damage) Rules 2008.

However, it is noted that there are no rules with regard to air pollution that has been introduced by the Central Government. The DGS has prescribed certain norms for preventing air pollution. vide M.S Notice 02 of 2012 Foreign flag vessels visiting Indian ports have to strictly adhere to the inspection for compliance of MARPOL Annex VI. In order to enforce the prescriptions laid down by the Director General of Shipping and Ministry of Shipping, Port State Control Officers (PSCOs) have been authorized.[38] The PSCOs are equipped with powers to verify the contents of MARPOL compliance certificates through physical inspections of Foreign Ships visiting Indian ports. MARPOL Annex VI prescribes certain requirements including for various chemicals and particulate matters. With this, the Directorate General of Shipping has been enforcing MARPOL requirements for both Indian and foreign vessels. In another case decided by the NGT, a ship MV Rak sank 20 nautical miles off the coast of Mumbai carrying 60,000 metric tonnes of coal from Indonesia to Gujarat. As a result, a thick layer of oil and tar balls were spotted at many beaches in Mumbai, extending along the coastline up to Raigadh, Maharashtra.[39] The NGT while deciding the case

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[38] *Id.*

[39] Samir Mehta v. Union of India and others, O.A. No.24 of 2011, decided on 23 August, 2016 (National Green Tribunal).

noted that no party from any country has right/privilege to sail unseaworthy ship to the contiguous and Exclusive Economic Zone of India and in any event to dump the same in such waters causing marine pollution, damage and degradation.

As India is the third largest emitter of greenhouse gases and accounts for four percent of global emission. But even before the Paris Climate Agreement, India announced a consolidated policy instrument as National Action Plan on Climate Change (*hereinafter* NAPCC) introduced in 2008. The objective of the NAPCC was the protection of poor and vulnerable section of the society through inclusive and sustainable development strategy; achievement of national growth through qualitative changes enhancing ecological sustainability and deployment of appropriate technologies for both adaptation and mitigation of greenhouse gases emissions extensively. The NAPCC has not been effective due to an ineffective monitoring system, lack of funds as there is inadequate budgetary allocation and no State Action Plans on Climate Change (SAPCC) aligned to NAPCC[40]. The signing of Paris Climate Agreement renewed the efforts taken to combat the challenges of climate change. International agreement's function is confined to goal setting and does not go in the detail of implementation and enforcement within domestic legal system of individual signatory candidates. India being a dualist nation has to translate the international agreements into domestic laws to implement them in the country. But since there is no time-bound requirement to do so India is yet to enact a domestic legislation to enforce the provision of international agreement on climate change[41].

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[40] Shreeshan Venkatesh, Kundan Pandey, Jitendra, Ishan Kukreti, Avikal Somvanshi, Akshit Sangomla,
India's National Action Plan on Climate Change needs desperate repair, DOWN THE EARTH
https://www.downtoearth.org.in/news/climate-change/india-s-national-action-plan-on-climate-change-needs-desperate-repair-61884 (last visited May 19,2021).

[41] Parul Kumar & Abhyaraj Naik, India's Domestic Climate Policy is Fragmented and Lacks Clarity, ECONOMIC & POLITICAL WEEKLY,
https://www.epw.in/engage/article/indias-domestic-climate-policy-fragmented-lacks-clarity (last visited May 20, 2021).

Paris Climate Agreement introduced the concept of Nationally Determined Contribution where every state decided to reduce national emissions and impact of climate change[42]. Article 4, para 2 of the Paris Agreement 2015 says that each party should prepare, communicate and maintain successive nationally determined contributions that it wants to achieve. Pursuance to this India also introduced its climate plan known as the Intended Nationally Determined Contribution (*hereinafter "*INDC"). Under the INDC India has agreed to generate additional carbon sink of 2.5-3.0 billion tons of CO2 by 2030 as a part of Nationally Determined Contribution.

The Shipping and Maritime sectors have a major role in accomplishing this task achieving the INDC. The Maritime India Vision, 2030[43] sets the objective of achieving 40% of energy through the renewable sources and in alignment with the 9 United Nations Sustainable Development Goals. This includes the obligations on safe, efficient and sustainable ports. Some schemes which are already in place including the initiatives of Solar and Wind energy adoption, Swachh Sagar Portals for Waste Management under Swachh Bharat Abhiyaan. The Policy also seeks to reduce the air emissions, optimizing water usage, improving solid waste management, Zero Accident Safety program to achieve a safe, sustainable and green ports. The key in reducing emissions and pollution can be achieved through the adoption of renewable sources of energy and adoption of advanced energy solutions including that of tidal, solar thermal and wave energy. In addition to this, clean fuels like that of Liquified Natural Gas can reduce the vehicle emissions at Ports. The Government, under the policy sets an ambitious target to achieve by 2030. In two phases, wherein under Phase I, CNG, LNG and electricity will be used for short haul, long haul and small vehicles respectively. Under phase II, Hydrogen, ammonia, methanol powered batteries and fuel cells would be used for future usage.

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[42]Nationally Determined Contributions (NDCs), https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs (last visited May 20,2021).

[43] Maritime India Vision 2030 https://static.investindia.gov.in/s3fs-public/2021-03/MIV%202030%20Report.pdf (last visited May 20,2021).

Implementation of these schemes will enhance India's contribution in tackling the issue of global climate change.

The threats posed by climate change are not distant anymore. The increase in the global temperature is going to be a cause for increase in sea level, endangering the lives of people dwelling in the coastal region, loss of livelihood and decrease in rainfall. An average rise of 24-30 cm is predicted by 2065 and 40-63 cm by 2100 relative to the reference period of 1986-2005.[44] The shipping industry is an important contributor in the wellbeing of global and regional economies but the threats posed by climate change will have a negative impact on transport infrastructure. The international shipping accounts for release of 2.2 percent of global carbon dioxide and they are predicted to grow between 50-250 percent by 2050 if no steps are taken to address this.[45] The emissions from shipping Industry cannot be attributed to a particular country therefore, an active participation at both national and international level is required to curb the emissions of CO2 from this industry. The Paris Climate Change Agreement does not address the international shipping and aviation directly.

Though, international shipping has a sizeable contribution in the global emissions of carbon dioxide[46] necessary steps have to be taken to improve the energy efficiency and have an effective emission control for the relentlessly growing shipping industry.[47] To find a solution to the existing challenge emanating from climate change important steps are taken at international level. For instance, the commitment to reduce carbon emissions by fifty percent in 2050 compared to the carbon emission in 2008. To reduce the emission of carbon dioxide from

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[44] Climate Change, https://www.un.org/en/global-issues/climate-change (last visited May 19,2021).

[45] World Nations Agree to At Least Halve Shipping Emissions by 2050, (2014) https://unfccc.int/news/world-nations-agree-to-at-least-halve-shipping-emissions-by-2050 (last visited May 19, 2021).

[46] *Id.*

[47] Bajaj, Pushp; Guduru, Sameer, et al. Assessing the Shipping Industry's Contribution to Greenhouse Gas Emissions. 24 August, 2020. https://maritimeindia.org/assessing-the-shipping-emissions/.

international shipping the IMO adopted mandatory technical and operational energy efficiency measures in 2011 and they were enforced from 1st January 2013.

The industry has to balance the economic and environmental performance as it faces an increased competitive, regulatory and community pressures. Therefore, apart from international conventions and guidelines there is a need to imbibe green practices in the shipping industry. The Green Shipping practice is one such practice where the shipping firms engages in environmental management practice for waste reduction and resource conservation while handling and distributing cargos. An example of one such practice is counting the carbon footprint of shipping routes and using an alternative transportation equipment with the objective of mitigating environmental damage in performing shipping activities. One such initiative is taken by CMA-CCM, a French container transportation which uses River Shuttle Container service to transfer goods between main and secondary ports by feeder ships that have a higher carrying capacity than trucks. Using such ships to provide shuttle service reduces carbon emission in terms of gram/ tonnes versus road transportation using trucks.

Climate Change became an international concern decades ago but there was no international framework in place to address the issue of emissions. It was only after the enforcement of Kyoto Protocol that addressed the issue of emissions. It emerged as the first Multilateral Environmental Agreement that took the emission-reducing obligation seriously but was poorly implemented. The reason for ineffectiveness of Kyoto Protocol could be attributed to the disregard of implementation issues, less involvement in overseeing the emissions and laxity in facilitating compliance.

After the Kyoto Protocol the Paris Climate Agreement 2015 appears as one of the promising international agreement for climate change. The Paris Climate Agreement aims to limit the increase in global temperature to well below 2 degree Celsius above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 degree

Celsius[48]. The main objective of this agreement was the long-term vision, procedural issues related to review cycle, monitoring and reporting guidelines, and financial and technology support needed for climate change. The countries are committed under this agreement to formulate and communicate long-term strategies to cut greenhouse gas emissions and also to update their actions every five year. The Paris Climate Agreement follows a bottom-up approach where every country can contribute in reducing the emissions through Intended Nationally Determined Contributions. The INDC places accountability on both developed and developing nations but for ensuring accountability no specific enforcement branch is in place. Accountability is ensured only through a non-intrusive and non-punitive means by biennial reports, international assessment and international consultation.[49]

The Paris Climate Change has been by far the most structured treaty on climate change. But it also suffers from implementation problem just like the other international treaties. The agreement offers the countries to take voluntary pledges for their contribution without being legally binding in nature. For enforcing the emission reduction standard it does not have a punitive clause. The non- punitive clause again makes the agreement a loose set of international norms for climate change. International treaties can become effective only when they are sincerely implemented in their national domains. Even if the country has cleared the first step of implementation by passing relevant legislations. The second step after the implementation of treaty is to find the wherewithal to execute the plans under the treaty. The proper execution of climate change treaty requires capacity building, technology transfer in developing, developed and poor nations. All this requires an extraordinary and undisturbed financial support from the international fraternity .The developing and the poor country are either on the brink of being industrialised or have not completely industrialised and hence do

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[48] Art. 2, Paris Climate Agreement.

[49] Esmeralda Colombo, Enforcing International Climate Change Law in Domestic Courts: A New Trend of Cases for Boosting Principle 10 of the Rio Declaration, UCLA J. ENVTL. L. & POL'y (2017).

not have a firm financial footing. They need a balanced approach to develop their economy and preserve their ecology simultaneously.

Conclusion

The future of oceans are in jeopardy due to large scale trade activities that are happening and the best possible chance of tacking it is by reducing the pressures of climate change and ocean acidification. Shipping industry has been responsible for significant proportions of global climate change problems. But the carbon dioxide emissions from ocean going vessels are currently unregulated.[50] In the age of climate change the conundrum of 'ecology versus economy' can be resolved only by a robust monetary support. The question of structuring the monetary support has been the reason for conflict among different parties. The developed countries are expected to contribute more by virtue of them being fully industrialised and having resilient economies. But they tend to place the burden on the shoulders of developing countries who are majorly contributing in the emission of greenhouse gases. Even the Paris agreement fails to assign the proper roles for funding its vast objectives. Paris Climate Change Agreement has been criticized vehemently for not marking the financial accountability. The lack of strong financial plan makes the Agreement a toothless treaty. As no matter how well planned the implementation be, it can bring change only by having a monetary support. The international law does not have a centralized enforcement system which makes it vulnerable to breaches.

The willingness of rich and developed nation also contributes to a treaty's success or failure. It can be observed that developed nations pull out from treaties without taking responsibility of its historical GHG emissions. Canada pulled out from the Tokyo protocol on the ground that the compliance cost are more compared to the benefit they get by being in the protocol and even the United States of America pulled out from Paris Climate Change Agreement saying that USA cannot pay solely for the emissions of developing countries like India and China. The shrugging off of responsibility by developed countries has enfeebled

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[50] Ellycia Harrould Kolieb, Shipping Impacts on Climate: A Source with solutions. July, 2008. https://oceana.ca/sites/default/files/reports/Oceana_Shipping_Report1.pdf.

international environment instruments to a great extent. Treaties like Paris Climate Agreement should not only offer a lot of hope but should be strategically planned to ensure implementation at the state level, devise a smooth funding process and actively supervise the steps taken by the countries to reduce emissions. In addition to this, the industry must also shift to alternative fuels like biofuels which are low carbon alternative to oil. Regulatory framework in terms of controlling and abating pollution in the seas are the need of the hour. Combined with a database for reporting not just accidents but the overall health of oceans. Therefore, in the long run, low carbon shipping economy and further attempts to decarbonising the shipping sector would be a significant milestone to achieve to fulfil the sustainable development goals.