Appraisal of Legal Framework for Management of Marine Ecosystem in the African Maritime Domain

Ekundayo O Babatunde Ph.D*

Abstract

Globally, container shipping has assumed increased importance, growing consistently since the twentieth century and creating about 4.2 billion jobs. As cargo shipping increases in volume, Africa has gradually become a major player because of its strategic location, large commodity market and accessible port facilities. Besides shipping, Africa's maritime practice has grown to include deep-sea mining, sea-bed exploration and offshore oil extraction as more States discover and begin commercial exploration. However, sustainable maritime practice has become a major issue of concern. This has been intensified by the threat posed to human health and environmental degradation traceable to maritime pollution. Emission of Green House Gases (Particulate Matter (PM), Nitrogen Oxide (NO_X), Black Carbon (CO_2) and Sulfur Oxide (SO_X) has been traced to the death of about 60,000 people globally and respiratory problems among inhabitants of coastal environments. Also, indiscriminate disposal of ballast water threatens the survival of numerous species of flora and fauna. The African maritime landscape is particularly threatened due to lack of adequate surveillance equipment needed to monitor vessel traffic and prevent accidents and lack of regulatory framework, equipment and facilities needed for inspection of vessels, making Africa a safe haven for sub-standard trading vessels and the use of low-grade heavy fuel for powering ships. Drilling, extraction and transportation of crude-oil also constitute major source of maritime pollution. Although various multilateral treaties exist to suppress maritime pollution to which African States are signatories, and the International Maritime Organization (IMO) in conjunction with other bodies have been relentless in efforts to protect maritime environment, much of the responsibility rests on coastal States. Against this backdrop, the study examines the international legal framework and laws applicable within the African continent for protection of maritime environment in Africa. The objective is to determine the effectiveness of those laws and ascertain the factors responsible for failures with the aim of suggesting viable solutions.

* Reader and Acting Head, Department of Public and International Law, Faculty of Law, KolaDaisi University, Ibadan, Nigeria

Introduction

Maritime pollution is a major problem recognised in international maritime law arena and international environmental law in an effort to promote safe shipping, sustainable use of marine resources and preservation of the maritime environment. Protection and preservation of the marine eco-system is crucial because of the dependence on it for human survival, environmental impact and its fragile nature. Human beings depend on the oceans for food, employment, recreation, inter-state relations, transportation, trade, health care, energy source and sustenance of the environment.[1] Therefore, the fear is that the frequency and manner in which the oceans and other marine resources are being used is unsustainable because it endangers the continued existence of the maritime ecosystem with the residual effect of global warming and hazard to human animal and plant life globally.[2] Vessel-sourced marine pollution dates as far back as humans began to navigate the ocean. It may be operational or accidental and may result from cargo, wastes on-board ships, bye product of the operation of the vessel or domestic activities of crew members, and other shipping pollutants.[3] However, because of the relatively low frequency and volume of voyages in the ancient era, the magnitude of marine pollution was not threatening, given the ability of nature to renew and rejuvenate the marine ecosystem.

The problem of vessel sourced marine pollution became a matter of global concern as a major pollutant of the marine environment in the 60s when the world began to witness disturbing level of maritime degradation from massive oil-tanker spills which has continued to be a challenging issue till the 20th century. The renowned cases include the *Torrey Canyon* spill of 1967, *Amoco Cadiz* spill of 1987, *Exxon Valdez* spill of 1989, the spill of *Erika* in 1999 and *Prestige* spill in 2002.[4] These numerous cases of oil spill have devastating effects on the affected maritime ecosystems which often does not fully recover

[1] Douglas M. Johnston, The Environmental Law of the Sea, p.193 (Germany: Esther E. Schmidt ,1981).
[2]Helen Sampson *et al*, 'Greener shipping? A consideration of the issues associated with the introduction of emission control areas', 43(1) Maritime Policy Management, 295–308 (2016). https://orca.cf.ac.uk/73343/1/Sampson%20et%20al.%202015.pdf
[3] Umo Iduk and 'Nitonye, 'Samson Effects and Solutions of Marine Pollution from Ships in Nigerian Waterways' 6(9) International Journal of Scientific & Engineering Research, 81–90 (2015).
[4] LIU Nengye, 'International Legal Framework on Prevention of Vessel-Sourced Pollution', 2 China Oceans Law Review, 240 (2010).

from the effect of the spill even where the oil is cleaned as species of flora and fauna may be lost forever. Beyond the immediate marine ecosystem affected, the connected nature of the ocean makes it possible for pollution at one end to have a bandwagon effect in other parts of the globe, introducing strange foreign species to the ecosystem and adversely affecting the economies of Islands and other nations that depend on the ocean for survival. In addition to vessel-based pollution and oil spills there are several other causes of maritime pollution. As identified by the United Nations Convention on the Law of the Seas (UNCLOS), sources of marine pollution include land-based activities, dumping, vessels, sea-bed activities and human activities in the area as such vessel-sourced pollution only accounts for a small proportion, about 12% of maritime pollution.[5]

Furthermore, in the wake of modern-day globalization which has made the ocean increasingly important as a medium for facilitating international trade, heavy traffic of container shipping through which about 90% of traded commodities are transported means increased pressure on the ocean, higher threat of maritime pollution and depletion of marine resources. Beyond the traditionally known causes of maritime pollution, heavy shipping traffic and cargo activities at various ports have led to increase in the emission of greenhouse gases with its antecedent threat to human health and the environment. Globally, more than 60,000 people are exposed to premature death, while several others are suffering from respiratory problems and terminal ailments traceable to vessel sourced emissions. The International Maritime Organization (IMO) and other bodies have been relentless in their efforts to combat marine pollution through various laws and policies, such as the projection to cut-down sulfur content of oil used in powering vessels by 3.5% as at 2012 and further by 0.05% by 2020.[6] However, efforts of the international community must be balanced with the cooperation of various ports and flag states to solve the problem. The use of bunker fuel, which is low-grade heavy fuel oil used to power ships, has been shown to be a major source of greenhouse gas emissions from the shipping industry. As a result, regulations against these harmful practices and other treaties aimed at eradicating maritime pollution must be domesticated and put into effect on a domestic level. Whereas

[5] Ibid, 239.
[6] Pruzan-Jorgensen, Peder Michael, and Angie Farrag, 'Sustainability trends in the container shipping industry: A future trends research summary' 1 *Business for Social Responsibility* (2010). https://www.bsr.org/reports/BSR_Sustainability_Trends__Container_Shipping_Industry.pdf

develop nations, such as the United States, have strict regulations on the content of hazardous gasses such as sulfur to be contained in fuel used within their maritime domain,[7] developing nations may not be able to achieve the same goal. This raises the fear that, considering the strategic location of Africa for the booming international trade, the continent may become a haven for the use of substandard vessels and fuel, leading to depletion of her maritime resources. Cargo vessels navigating the African Maritime Domain (AMD) are mostly small secondhand vessels with higher threat of emission of deadly gasses as opposed to those of other regions.[8] The threat of maritime pollution in Africa is further heightened as more States begin commercial oil exploration. The emergence of deep-sea mining, sea-bed and high sea exploration also calls for putting laws in place to hold various stakeholders liable for high sea pollution resulting from such activities.[9] It is therefore important to examine the legal framework for control of marine pollution, identify contemporary issues and suggest lasting solutions in a bid to promote sustainability of the maritime eco-system.

The international law regime for the control of maritime pollution is treaty-based, falling within the purview of both public and private international law. These includes the UNCLOS and several other instruments, some of which came into being under the auspices of the IMO and other stake holders. Conventions governing the public international law aspect include 1972 Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo Convention)[10], 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972 London Convention)[11], The International Convention for the Prevention of Pollution from Ships (MARPOL)[12], The Convention on the Control of Transboundary Movement of Hazardous

[7] Ibid, 7
[8] Ndlovu Fikile Portia, 'Maritime Policy and Strategy for African Coasts' 7(1) IIRE Journal of Maritime Research and Development (2023).
[9] Sandra Kloff and Clive Wicks, 'Environmental Management of Offshore Oil Development and Maritime Oil Transport: A Background Document for Stakeholders of the West African Marine Eco Region' (A Research Report by IUCN Commission on Environmental, Economic and Social Policy, 2004).
http://cmsdata.iucn.org/downloads/offshore_oil_eng.pdf accessed 28 December 2017
[10] Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (1972) 932 UNTS 3, 11 ILM 262 (enterd into force 24 March 2006).
[11] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972) 1046 UNTS 120, [ATS] 1985 16, 11 ILM 1294 (entered into force 30 August 1975).
[12] International Convention for the Prevention of Pollution from Ships (MARPOL) (1973) 17 I.L.M. 546 (entered into force 17 February 1978).

Wastes and Their Disposal of 22 March 1989 (1673 U.N.T.S. 126)[13] (Basel Convention), International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention 2004)[14], International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)[15], 2000 Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS)[16] PROT and Bamako Convention[17], while laws dealing with the private international law aspect include FUND, SUPP FUND PROT, CLC, HNS, Bunkers, Salvage.

The problem is more serious in Africa because governance failure, corruption, lack of adequate security and surveillance equipment implies that maritime pollution within the region is subjected to lesser scrutiny and sanction. Vessels navigating the African Maritime Domain (AMD), most of which are foreign flagged or which may resort to flying flag of convenience, may not bother to comply with environmental regulations. Thus, an examination of the regulatory framework for combating maritime pollution in Africa is a necessity, to achieve sustainable use of marine resources and its attendant biodiversity and avoid the devastating effect of marine pollution on plants, animals, the environmental and its contribution to global warming.

Vessel Sourced Marine Pollution from the Legal Purview

The term vessel-sourced pollution is a broad and general term which describes all forms of pollution that emanate from vessel-related activities whether such a ship is on board or berthed or from activities of crew members. It is worthy of mention that maritime pollution is not limited to vessel-sourced pollution as marine pollution may also be atmospheric, land based or may result from dumping of toxic waste in the ocean. Vessel-sourced pollution includes accidental spills, intentional discharges and operational discharges. To aid clarity, several multilateral treaties provide working definitions of

[13]The Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal (Basel Convention (1989), 1673 U.N.T.S. 126 (entered into force 5 May 1992).
[14] The International Convention for the Control and Management of Ships' Ballast Water and Sediments (2004), IMO Doc. BWM/CONF/36 (entered into force 8 September 2017).
[15] International Convention on Oil Pollution Preparedness, Response and Co-operation (1990) (entered into force 13 May 1995)
[16] Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (2000), ATS 41 (entered into force 14 June 2007).
[17] Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1991) (entered into force 22 April 1998).

maritime pollution. The United Nations Convention on the law of the Sea 1982 describes marine pollution as

> the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.[18]

While vessel-sourced pollution was described in the 1973 International Convention for the prevention of Pollution from Ships, amended by the 1978 Protocol (MARPOL) as 'an event involving the actual or probable discharge into the sea of a harmful substance, or effluents containing such substances.'[19] In their study of maritime pollution, Scientists, under the auspices of Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP), identified four causes of maritime pollution. These are vessel-source pollution, atmospheric pollution, land-based pollution, and ocean dumping.[20] Marine pollution may also result from land-based activities where there are leakages of organic and industrial toxic wastes into rivers and oceans. In the case of vessel-sourced marine pollution, it is either a product of the process of operating a vessel, including release of ballast water and oil wastes from domestic activities of crew members onboard or accidental discharge of oil and other accompanying harmful chemicals as a result of shipwreck, collusion, leakage or other unexpected events such as accidents. Thus, vessel-sourced pollution may occur from any form of pollutant emanating from vessels

[18] United Nations *Convention on the Law of the* Sea (UNCLOS) (1982), 1833 UNTS. 397 (entered into force 14 November 1994) Article 1(4) UNCLOS

[19] MARPOL, note 12.

[20] 'Impact of Oil and Related Chemicals and Wastes on the Marine Environment' Joint Group Experts on Scientific Aspects of Marine Environment (GESAMP) Report (1993) 50, (London: IMO Publication) www.jodc.go.jp/jodcweb/info/ioc_doc/html/GESAMP.htm accessed 10 December 2017

on voyages or at berth. Such may occur within any part of the ocean whether on the high-sea, within territorial waters or at sub-marine or sea-bed level.[21]

Historically, the principal cause of vessel-sourced pollution was oil spills from tanker vessels which usually have far-reaching devastating effects on the marine eco-system. Today, tanker oil-spills in the oceans have reduced considerably from 25.2% on the average in the 70s, to an average of 3.8% between 2002 and 2004.[22] Nonetheless the reduced frequency of occurrence of oil spills, the seriousness and volume of oil spilled is quite alarming. Estimated annual illegal discharge of oil into the sea during routine operation accumulates into massive oil spillage, reported to be as voluminous as eight times the Exxon Valdez oil spills or as much as 48 times of the Nakhodka oil spill off the coast of Japan in 1997.[23]

The first commercial quantities of oil were discovered in Oloibiri, Ogbia LGA, Bayelsa State, Niger Delta area, Nigeria, in 1956, and commercial exploration commenced in 1958. Nigeria is one of five African countries that account for 85% of Africa's crude oil reserves, alongside Libya, Algeria, Egypt, and Angola. Nigeria's crude oil is one of the most popular due to its low sulfuric content, low corrosiveness to refinery infrastructure, and lower environmental impact of its byproducts during the refinery process, making its grade, Bonny Light, one of the most expensively priced and sold on the international market. Nigeria ranks 11th among the 20 countries with the world's greatest oil reserves as of 2023.[24]

Nigeria's reserves were estimated to reach 36.89 billion barrels in 2021, with a reported oil production of 1.13 million barrels in November 2022.According to OPEC's monthly

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[21]Ivana Zovco, "The International Liability and Compensation Regimes Relating to Vessel-Sourced Pollution Damage to the Southern Ocean Marine Environment: Overcoming Inertness in International Law" in *New Zealand Yearbook of International Law* 11(2), 281 (2005).

[22] Stavrou, Margarita, *Are International Convention on Civil liability for Oil Pollution Damage (CLC) and International Convention on the Establishment of an international fund for compensation for oil pollution damage (FUND) adequate when it comes to protecting the maritime environment from oil pollution?* (Diss. University of Essex, 2019).

[23]'Costs saving from Non-Compliance with International Environmental Regulations in the Maritime Sector' (OECD Maritime Transport Committee report, 2003) www.oecd.org/dataoecd/4/26/2496757.pdf

[24] Anyanwu John, Kaother Abderrahim, and Amel Feidi, 'Crude oil and natural gas production in Africa and the global market situation' *The African Development Bank Group Chief Economist Complex* 1.4, 1-17(2010).

report for July, Nigeria's oil production fell by 74,000 barrels per day (bpd) to 1.08 million bpd in July, down from 1.26 million in June, based on direct communication. The drop in production caused by oil theft and other issues has lowered earnings from the oil business. According to the Ministry of Finance, Budget, and National Planning, the excess crude account has dropped by 89% over the last eight years, from $4.1 billion in November 2014 to $472,513 in the same month in 2022.[25] The balance on November 23, 2022 was $472,513.64. Nonetheless, oil production is a significant source of cash for the country. Despite oil prices trading at an average of $80 per barrel, the sector's contribution to Nigeria's GDP fell to an eight-year low in the second quarter of 2023, highlighting the economy's fragility. "The Oil sector contributed 5.34 percent to the GDP in the second quarter of 2023, down from the figure recorded in the

corresponding period of 2022 and down from the preceding quarter, where it contributed 6.33 percent and 6.21 percent respectively," according to the National Bureau of Statistics.[26]In the East African region, oil spills are also a major threat to the environment. The East African coastal corridor, along the Red-Sea and Western Indian Ocean is a major oil-tanker route for the supply of crude-oil from the Middle East to the global market. Disposal of oily wastes from vessels along coral reefs near the ports of Djibouti and Port Sudan is a major environmental threat to the marine eco-system in the region. Pollution is also caused to the environment as a result of damage caused to the reef because of poor navigation. Pollutants are spread by the long shore currents and winds in the West Indian Ocean, causing horizontal spread of pollutants which transport oil slicks to the open sea. Also, oil tankers navigating the region often empty their ballast and wash engines on the high seas, residue of degraded oil gathered from these discharges are washed onshore by wind, sea currents and waves. This often led to poisoning of marine wild-life, disrupt the natural food chain and affect safe use of the ocean by humans. [27]

[25] Okechukwu Nnodim, 'FG eyes 2.5 million barrels daily oil production' Punch3rd March 2024.
[26] Chika Izuora, 'Nigeria Ranks 11th Of 20 Countries with Largest Oil Reserves' Leadership News 10 November 2022.
[27] 'Assessment of Land-based Sources and Activities Affecting the Marine, Coastal and Associated Freshwater Environment in the Eastern African Region' (East Africa-Global Marine Oil Pollution Information Gateway, (UNEP GPA), 2000) http://oils.gpa.unep.org/framework/region-11.htm Accessed 29 December 2017

Another major cause of marine pollution is the disposal of toxic waste into the ocean. These are chemical wastes conveyed in packages or large quantity liquid chemicals disposed into the ocean, with destructive effects on the environment. Since the late 1940s, the nuclear industry dominated by the USA, USSR, UK, France, Sweden and Germany disposed toxic wastes into the open sea. However, awareness of the hazardous effects of toxic waste from that industry, on human and environmental well-being necessitated the regulation of the dumping of such wastes at sea. The *1972 Oslo Convention* was the first regional instrument regulating the disposal of the industrial waste of the nuclear industry at sea. Later the *1972 London Dumping Convention* was negotiated as an international instrument to ban the disposal of high-level radioactive wastes at sea. The instrument was later renamed as *London Convention* in 1993 and fully took effect to alongside necessary amendments on the 1st January 1996 as a multilateral instrument banning disposal of all forms of industrial waste at sea.[28]

According to the International Maritime Organization (IMO) the hazardous effect to chemical substances disposed into the ocean may affect more than half of goods transported in dry cargo ships.[29] The extent of risk is heightened by those frequent cases of collusion involving ships carrying nuclear chemical, weapons or radioactive matter. Examples include the accident involving surface vessel MSC Carla which was carrying packages containing radioactive matter in 1997 and the sinking of k-141 Kursk, a nuclear submarine into the Barents Sea in the year 2000 [30] Similarly, the disposal of ballast water, dumping of swage, garbage, harmful residue such as paints used in carrying-out antifouling system of the ship hull are all hazardous to the ecosystem. The exploration and exploitation activities within the sea-bed and sub-soil of the ocean may also cause maritime pollution.

[28]Rémi Parmentier, 'Greenpeace and the Dumping of Watses at Sea: A Case of Non-State Actors' Intervention in International Affairs' 4(3) International Negotiation 1-10 (1999).
[29] Preventing Marine Pollution: The Environmental Threat, International Maritime Organization March 1998. http://www.imo.org/en/KnowledgeCentre/ReferencesAndArchives/FocusOnIMO(Archives)/Documents/Focus%20on%20IMO%20-%20Preventing%20marine%20pollution%20(March%201998).pdf accessed 29 December 2017
[30] International Atomic Energy Agency (IAEA), 'Inventory of accidents and losses at sea involving radioactive material' (Vienna, 2001), IAEA - TECDOC – 1242. http://wwwpub.iaea.org/MTCD/publications/PDF/te_1242_prn.pdf accessed 29 December 2017.

Despite the success achieved by the international community, developing nations still bear the brunt of unlawful disposal radioactive waste from developed nations. For several decades, African States have been victims of un-mindful illegal disposal of toxic industrial wastes from developed countries. Over the years, following the coming into being of the London Convention and the increased level of public awareness, industrialized nations ran-out of facilities for waste disposal. They began to target under-developed nations where the cost of disposal of industrial waste is relatively low. A study conducted in the late 1980s revels that a ton of hazardous waste in Africa was disposed at a cost ranging between $2.50 to $50 dollars whereas in industrialized states the cost of disposing it may range between $100-$2000. It is therefore less-expensive to dispose such wastes in Africa. The situation is worsened by the widespread institutionalized corruption and abject poverty in most African States. Eventually, the hazards of disposal of nuclear wastes became known thus, in the late 1980s waste disposal contracts between foreign companies and African States were widely condemned. This gave rise to the 1989 Basel Convention as a regional instrument under the auspices of the OAU. The Basel Convention described the dumping of such wastes as crime against Africa and Africans and specifies conditions that will make such dumping permissible.[31]

Besides the disposal of wastes in safe havens where the cost of disposal is relatively low, there were still reported cases of illegal dumping operations in developing nations, along the Mediterranean, South East Asia and off the Coast of Somalia, most of which have not enjoyed requisite attention at the international arena. Between 1988 and 1994 there were more than 94 incidents of export of over 10 million tons of hazardous wastes to Africa. There were occasions when such wastes were disposed under formal arrangements such as the ODM programme scheduled to take place in at least 16 countries. There were also incidents of dumping in remote areas, along the coastal line or beaches of countries like Equatorial Guinea, Lebanon, Somalia and the Congo, Nigeria and Haiti.[32]

[31] David Wilson & Fritz Balkan, 'Adopting Hazardous Waste Management to the needs of Developing Countries - An Overview and Guide to Action, Waste Management and Research' 8(2) The Journal of International Solid Waste and Public Cleansing Association 87 (1990).

[32] Bernstorff, A. and Stairs, K 'POPs in Africa: Hazardous Waste Trade 1980-2000, Obsolete Pesticide Stockpiles' (A Greenpeace Inventory, Greenpeace, Amsterdam 2000) www.greenpeace.org/international/Global/...2/.../pops-in-africa-hazardous-wast.pdf

Causes of Maritime Pollution

Human interactions with the maritime environment for economic and other reasons lead to introduction of foreign bodies to the natural habitat which accounts for the several cases of pollution. Besides pollution resulting from navigation, such as the discharge of ballast water, the use for which the ocean is being put determines the type of pollution that may result there-from. Marine pollution is generally defined as:

> … the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities…[33]

This definition identifies the basic cause of marine pollution being human activities, whether through legitimate uses which make such pollution inadvertent or through legitimate uses such as deliberate dumping of wastes from the nuclear industry. The definition is however limited in scope as it does not capture contemporary uses, such as sea-bed mining and other sub-marine activities. It also does not take into account the trans-boundary effect of maritime pollution. Causes of maritime pollution can be categorized into three to land-based pollution, Bessel sourced pollution, and pollution resulting from sub-marine activities (seabed and deep-sea mining).

1. Land-based Maritime Pollution

Human activities on land constitute a major cause of pollution to the marine environment, more than 80% of maritime pollutants are traceable to land-based human activities.[34] Pollutants from human activities on land are diffused into the oceans often as part of surface water, flood or erosion from rain falls. These pollutants affect living organisms in the various water bodies, contaminate human food and may cause skin diseases, organ failure and several other health problems depending on the level of

[33] UNCLOS, note 18, Article 1(4)/ 2(4).
[34] Patricia Birnie and Alan Boyle, *International Law and the Environment* p.408 (Oxford, Oxford University Press 2002).

contact.[35] Land-based marine pollution may result from both natural and artificial structures on land such as Pipelines, estuaries, lake and rivers. The range of human activities on land capable of causing maritime pollution may take place around coastal areas, inland waters, and may relate to various sectors such as agriculture, manufacturing, industrial and military activities. Just as land-based activities capable of causing maritime pollution are diverse, the pollutants are also diverse and may include chemicals, oily wastes, industrial bye products, oily wastes, organic wastes and radioactive substances, real threat sets in from their accumulation.[36] Mostly, land-based pollutants get into the marine eco-system inadvertently, they are invisible, difficult to trace because of their usual long channel and mostly difficult to control. Control of land-based marine pollution therefore calls for sound regulatory control at the national level and the availability of facilities for proper disposal of industrial and domestic wastes.

In an attempt to control land-based marine pollution, UNCLOS places States under obligation to adopt domestic regulations that will prevent, curtail and control land activities capable of causing pollution.[37] States are also to take steps to domesticate relevant international rule and adopt internationally recognized standards to aid the control of land based marine pollution.[38] The major challenge is the usual enforcement difficulty that confronts all international instruments. Also, the provisions of UNCLOS will only bind State signatories to the Convention and cannot be enforced against non-member States.

2. **Vessel-Sourced Marine Pollution**

Vessel sourced pollutants constitute another major cause of maritime pollution, it is the traditional cause of maritime pollution which has been occurring since ocean navigation began and may be difficult to end since it has the tendency of occurring so long as humans navigate the ocean. The International Convention for the Prevention of Pollution from Ships 1973 amended by the 1978 Protocol (MARPOL) described vessel-sourced pollution

[35] M. Vikas and G. Dwarakish, 'Coastal Pollution: A Review' 4 Aquatic Procedia 381– 388 (2015).
[36] Edith Brown et al, *International Environmental Law* p. 673 (USA, Aspen Publisher 2006) 673
[37] UNCLOS, note 18, Article 194, Articles 204-212.
[38] UNCLOS, note 18, Article 207, 213.

as "an event involving the actual or probable discharge into the sea of a harmful substance, or effluents containing such substances."[39]

Although vessel sourced pollution may occur on the high sea, within the territorial waters of coastal States or within inland waters, the historical cases of shipping pollution which gave rise to evolution of international law regime to control it are those that occurred in the ocean mostly the late 1970s and early 1980s. Vessel sourced marine pollution is characterized by its trans-boundary nature, influenced by the connectedness of the ocean and the use of vessels across State boundaries to facilitate international transportation and trade. Thus, pollutants are easily spread from one part of the ocean to another, while such pollutants or its impact can be carried across jurisdiction by ocean current, waves, tide or wind; affecting diverse interests.[40]

Vessel-sourced pollution may be accidental or operational, operational pollution is traceable to routine usage and maintenance of the vessels such as washing of tanks, and emptying of ballast water. Accidental pollution may be voluntary or involuntary. Voluntary pollution involves deliberate acts which pollute the maritime environment such as disposal/ discharge of oil intentionally or dumping of radioactive wastes, while involuntary pollution relates to pollution which is traceable to the process of exploration or exploitation of the seabed or ocean floor. [41] Thus, UNCLOS requires that the measures to be adopted to control vessel-sourced pollution should depend on whether it is operational, voluntary accidental or involuntary accidental type of vessel-sourced marine pollution.[42] The various forms of vessel-sourced marine pollution will be further examined below.

[39] MARPOL, note 12, Art 2(6).
[40] Yan Xiaolu, ' The International Legal Framework for Prevention of Vessel-Sourced Pollution and Its Implementation in Chinese Legislation' (Masters Thesis, Lund Dissertation, 2011) http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=1980400&fileOId=1981161 accessed 29th December 2017
[41] Thomas Mensah, 'The Legal Problems Relating to Marine Pollution by Oil', in Peter Hepple (eds), *Water Pollution by Oil*, Proceedings of Seminar Sponsored by the Institute of Water Pollution Control and the Institute of Petroleum p.295 (London: the Institute of Petroleum, 1971)
[42] UNCLOS, note 18, Article 194.

- Accidental Pollution

Accidental vessel-sourced marine pollution arises without the intent of the parties responsible for polluting the ocean. It is usually traceable to unintended discharge of oil or hazardous wastes into to the ocean in the event of an accident. The most popular case of accidental pollution involves the discharge into the ocean, of oil from oil-tanker vessels conveying it as cargo. Cases of accidental oil pollution of the maritime environment include the sinking of tanker conveying oil such as the cases of Prestige and Torrey Canyon oil tanker accidents and the loss of Metula in the Strait of Magellan.[43] Usually, the severity or impact of such incidents usually depends on the volume of the oil and the region concerned. Generally, the climatic condition of the arctic region is not very conducive for cleaning oil spills or curtailing its impact, thus environmental recovery from spills in the Barents Sea is relatively more difficult than oil spillage in the Persian Gulf.[44] In order to reduce the occurrence of accidental pollution, the MARPOL Convention makes provision for vessel construction and certification, other regulatory aspects capable of affecting safety of life at sea is within the provision of the SOLAS Convention and customary international law principles governing the rights of flag and coastal states in the event of an accident.[45]

Whereas, pollution resulting from accidental oil discharge usually attracts international attention because of the immediate environmental impact and singularity of pollution sight which makes it perceivable at once, routine operational discharges are usually more severe, lead to discharge of larger quantity of oil, and cause more severe environmental hazard. The OCED have found that the annual volume of routine oil discharge may be as high as eight time the Exxon Valdez oil spill.[46] This implies that greater attention need be paid to the operational discharge in order to preserve the maritime environment.

[43] Douglas Johnston, *The Environmental Law of the Sea* 204 (IUCN, Berlin 1981).
[44] W. *Elshorbagy*, '*Overview* of *marine pollution* in the *Arabian Gulf* with *emphasis* on *pollutant transport modeling*' p.5 (*Keynote Address* for the First International Conference on. *Coastal* Zone Management and Engineering in the Middle East, Dubai, 27th–29th November, *2005)*.
[45] R. Churchill and A. Lowe. A, *The Law of the sea* 328-339 (Manchester, Manchester University Press,1999).
[46] 'Costs saving from Non-Compliance with International Environmental Regulations in the Maritime Sector', (Maritime Transport Committee (OECD), 4 (2003) www.oecd.org/redirect/dataoecd/4/26/2496757.pdf accessed 1st January 2018

- Operational Discharge Induced Oil Pollution

Operational discharges are deliberate discharges that occur in the daily usual course of operating a vessel. As opposed to accidental discharges that are unplanned and unexpected, operational discharge are calculated and subject to human intervention, carried-out as part of regular operational or maintenance activities of the ship. Operational marine pollution may include discharge of oil, oily waste, crude-oil residue, chemicals and other toxic substances. This may result from the discharge of bilge water from the machinery compartment, or discharge of ballast water of fuel tanks. The oil residue from ballast water of large oil tanker constitutes significant contribution to maritime pollution.[47] In addition to the oil waste or residue from tankers, bilge water may contain harmful or toxic chemicals and biological agents.

Ballast water is particularly dangerous and capable of damaging the surrounding marine environment as it transmits and introduces non-indigenous aquatic species such as viruses, microorganisms, plants and animals from other regions which may cause imbalance and destruction of the ecosystem of the area to which it was introduced.[48]A typical example is the transmission of zebra mussel Dreissena polymorpha from Europe to the North American Grate Lakes through ballast water discharge. The mussels caused reduction of the number of fish with plamktonic larva stages, increased clarity of the lake and altered the natural habitat of adult fish within the eco-system. The mussel also destroys shipping equipment by causing clog water intake in the pipes and valves, as a result of which additional cost of repairs is incurred.[49] In order to protect the maritime ecosystem from the huge havoc caused by the discharge of ballast water, the Ballast Water Management (BWM) Convention came into force on the 8th of September, 2017, under the auspices of the IMO. The Convention requires that all applicable ships obtain requisite

[47] UNEP Global Maritime Oil Pollution Information Gateway, 'Operational Discharges of Oil' http://oils.gpa.unep.org/framework/framework.htm accessed 1st January 2018

[48] Peter Ehlers, 'Effects of Climate Change on Maritime Transport' in Neil Bellefontaine and Olof Linden (eds.), *Impacts of Climate Change on the Maritime Industry* 43 (Malmö World Maritime University 2008).

[49] National Ocean Pollution Program 51-53 (1991). https://catalog.hathitrust.org/Record/00833367 accessed 1st January 2018.

confirmation showing that the vessel has fully complied with the minimum requirement for ballast water exchange.[50]

- Dumping

The deliberate dumping of industrial wastes into the ocean is another major cause of maritime pollution. Some of these wastes are radioactive wastes from the nuclear industry and other toxic industrial wastes with disastrous effect on human and environmental life. Dumping is categorized as a vessel sourced pollution because the various wastes are conveyed in containers transported on the sea to their chosen dump site. Although, since the early 1940s, the nuclear industry dominated by developed nations namely, the USA, the USSR, France, the UK, Germany, Sweden used the sea as their dump site,[51] realization of the potential deadly effects of such dumping led to the evolution of various regional and international instruments which now prohibit the deliberate dumping of industrial and other wastes at sea. The *1972 Oslo Convention*[52] was the first regional Treaty to prohibit dumping of wastes at sea, immediately followed by the *London Dumping Convention* in the same year. The London Dumping Convention was limited in scope because of the classification of radiological wastes issued by the IAEA which grouped radioactive wastes into high, medium and low level. The Convention only prohibited the dumping of high-level radioactive wastes at sea and does not prohibit dumping under the Sea-bed part of the ocean. With the increase in the dumping of radioactive wastes and chemical residues at sea in the 1980s, Greenpeace made persistent effort through various campaigns to end ocean dumping industrial wastes. However, by the 90s, the world had gained increased awareness of the hazards of ocean dumping thus, in 1992, the London Dumping Convention was renamed as the London Convention and it completely banned ocean dumping of radioactive wastes with effect from 1st January 1996.[53]

In addition, as the world advance in science and technology, the production of chemical and industrial wastes has continued to increase from 7 million metric tons in the 1950s to

[50] Loyds's Register, 'Statutory Alert: IMO Ballast Water Management (BWM) Convention- New Implementation Dates agreed for Installation of Ballast Water Treatment Systems' http://info.lr.org/l/12702/2017-07-07/45byzv accessed 1st January 2018
[51] Rémi Parmentier, note 28, 2.
[52] Ibid, 5.
[53] Ibid, 7.

250 million metric tons in 1985, and even more in the 21st century. This necessitated the evolution of anti-illegal waste disposal regime backed by various international interments. One of such instruments is the *1989 Basel Convention*, and environmental multilateral treaties which address the transfer of hazardous wastes across national boundaries and their illegal disposal at sea. However, the increased scarcity of waste disposal sites and incinerators for the disposal of radioactive, chemical, industrial toxic wastes gave rise to the thriving waste trade.[54] Africa naturally is a preferred location for exporting and dumping of industrial wastes due to the low level of awareness, relatively low environmental standards, high rate of corruption among public office holders and the relatively low cost of waste disposal. The 1989 Basel Convention was signed to protect the interest of Africans from unfair waste disposal contracts with foreign corporations and prevent illegal waste disposal.[55] Furthermore, in 1991, 12 members of the OAU signed the BAMACO Convention which later took effect in 1998. The Bamaco Convention prohibits the exportation of hazardous wastes to less developed countries. This was targeted at preventing developed nations from perceiving developing African States as their junk site for the disposal of hazardous waste. Also, in 2006 the European Union amended the Protocol for protecting the Mediterranean Sea from dumping, thereby improving the provisions of the Basel Convention. The Protocol enjoyed application by all the 27 member States of the European Union.[56]

Despite the existence of these copious international and regional instruments for the protection of the maritime environment from dumping of industrial, chemical, radioactive and toxic wastes, there are still several incidents of illegal dumping of wastes along the coastlines of developing countries especially in Africa. In Somalia, for example, the country suffered from illegal dumping of hazardous wastes for several decades. The rate of illegal dumping of wastes in Somalia at several points fueled by the arms and ammunitions obtained in exchange for dumping of toxic wastes.[57] These have a cumulative adverse effect on the human health and traditional means of livelihood as it destroyed the environment. In September 1992 the coordinator of Greenpeace Italia in

[54] Cyril Gwam, 'Toxic Wastes and Human Rights' VII (2) *The Brown Journal of World Affairs* 186-188 (2000).
[55]Ibid, 198-191
[56] Carpenter Angela and Tafsir Johansson, 'The Barcelona Convention and its role in oil pollution prevention in the Mediterranean Sea' *Oil Pollution in the Mediterranean Sea: Part I: The International Context* 129-166 (2018).
[57] Ibid, 194.

cooperation with his Switzerland colleague stated that a self-appointed Somali minister signed an illegal deal with European companies for the export of five hundred thousand tons of toxic waste per year for a 20 years duration. Similarly in 1997, a UNEP field mission confirmed that there had been several cases of illegal dumping of hazardous toxic waste along the Somali coast.[58] Likewise, in 2005 the UNEP issued an official statement confirming that the Somali Coastline is being used for the illegal dumping of hazardous nuclear wastes from developed nations during the Somali civil war.[59] Those companies took advantage of the lack of established political authority and the state of unrest, knowing there will be limited regulatory control of such act during that period. A further report issued by the UN special envoy in 2009 also confirmed that solid nuclear wastes had been dumped along the coast of Somalia.[60]It has been established that waste trade is managed by criminal organizations in Italy who import toxic wastes from industrialized countries and dispose same in the Somali coast and other places.[61]The effect is the development of unusual health problems among the people. The diseases take various forms and are mostly difficult if not impossible to cure, they include severe respiratory infections, dry cough, mouth bleeding and stomach hemorrhage, thyroid, tongue colon cancer and delivery of deformed babies.[62]

Whereas the effect of dumping radioactive and nuclear wastes along the Somali coastline is found to be the destruction of human, animal and environmental health, the global community may continue to suffer from the effect for centuries as those toxic wastes diffuse into the ocean and are being swept away by ocean current. This questions the effectiveness of the international law regime for the control of ocean dumping of industrial wastes and calls attention to the need for strict sanction when such act is committed within the arena of confines of maritime law.

[58] Bashir Hussein, 'The Evidence of Toxic and Radioactive Wastes Dumping in Somalia and Its Impact on the Enjoyment of Human Rights: A Case Study' (Paper presented at the United Nations Human Rights Council, Geneva, 8 June 2010) http://somalitalk.com/sun/toxic_waste_dumping_somalia.pdf 6
[59] Ibid.,7
[60] Ibid, 8
[61] Ibid 9
[62] Ibid 10-12

3. **Atmospheric Pollution**

Another element that may cause pollution of the maritime environment is atmospheric pollution. Atmospheric pollution can simply be described as the release of harmful gasses into the atmosphere, contaminating clean air and producing harmful effect on human and environmental health. Environmental Encyclopedia defines atmospheric pollutants as substances that accumulate in the air to a degree that is harmful to living organisms or to materials exposed to the air. Common examples of atmospheric pollutants include smoke, smog, and gases such as carbon monoxide, nitrogen and sulfur oxides, and hydrocarbon fumes.[63]

Shipping is one of the known causes of atmospheric pollution, while pollution of the atmosphere may in turn cause maritime pollution. In the process of shipping, hazardous gasses namely Nitrogen Oxides (NO_X) and Sulphur Oxides (SO_X) and particulate matter are emitted into the atmosphere, as smoke contents. These gasses pose serious adverse effects to the ozone layer, particularly in the troposphere layer of the atmosphere, it produces greenhouse effects and causes global warming. These gases may also cause the downpour of acid rain and resultant acidification of the ocean, rise in ocean temperature with a long-run effect of inducing global warming.[64] As volume of international trade and container shipping grows, the amount of harmful gasses released into space also increases, raising global concerns. For instance, as at the year 2000, air pollution from international trading vessels in the seas surrounding Europe (Baltic Sea, North Sea, the north-eastern part of the Atlantic, the Mediterranean and the Black Sea) was found to be approximately 2.3 tones of SO2, 3.3 million tonnes of NOx and 250,000 tonnes of particulate matter (PM). This is projected to increase by a range of between 40-50% by the year 2020. However, efforts towards reducing this emission level have been continuous with the target of achieving significant reduction by 2020.[65]

[63] Environmental Encyclopedia, 'Encyclopedia.com' (2003) http://www.encyclopedia.com/environment/encyclopedias-almanacs-transcripts-and-maps/atmospheric-air-pollutants accessed 05 January 2018

[64] Peter Ehlers, note 35, 43.

[65] AirClim, 'Air Pollution from Ships' Air Pollution and Climate Secretariat http://www.airclim.org/air-pollution-ships accessed 5 January 2018.

In order to protect the maritime environment, UNCLOS requires State signatories to enact domestic regulations to prevent, reduce and control atmospheric pollution.[66] The MARPOL Convention, which came into being under the auspices of the IMO, controls and regulates the permissible level of shipping emission. The Convention, which was originally signed in 1997, came into force in 2005. Article VI specifies the internationally accepted percentage of Sulphur and Nitrogen Oxide emission from shipping fuel. The Convention was revised in 2010 to take care of contemporary demands of further reduction of emission limits from ship engines in response growing rate of emission resulting from international trade. The new provision sets the lower limit of Sulphur emission at 3.50% by 2012 to be further reduced to 0.05% by 2020. Other steps taken includes setting a higher emission standard for new ship engines. [67] Also, in 2011, the IMO set Energy Efficiency Design Index (EEDI) Regulation which sets energy efficiency standards for ships built after 2013. The need for policy tools towards reduction of shipping emission is the exponential increase in the volume of international trade, with commodities conveyed across the sea, thus increasing emissions from these vessels. In 2012, an estimate of about 1,000 million tones, which is 3% of the global manmade emission traceable to the shipping industry, with a projection that without adoption and implementation of emission control policies the figures will triple by 2050. Meanwhile, adoption of suitable measures, such as speed reduction and use of bio-fuels can aid dramatic reduction in emission of greenhouse gasses from the shipping industry.

It is an established fact that most international trading vessels are constructed and owned by industrialized nations, although these nations often opt to fly flags of convenience. Theses industrialized nations have the necessary equipment to monitor the emission of hazardous gasses from the shipping industry and other economic sectors. Consequently, the EU, US and other developed nations have adopted shipping policies that take into cognizance the need to cut-down emission control in the shipping industry. However, international shipping and trade cuts across continents thus, necessitating the adoption of universal policies. Most States in Africa, for instance, lack the political will, equipment and facilities necessary to control emission and ensure compliance with shipping policies.

[66] UNCLOS, note 18, Article 212.
[67] Airclim, note 65.

The situation is worsened by the institutionalized corruption in most African States. This creates avenue for foreign corporations to bribe their ways through shrewd shipping practices such as the use of bunkered fuel within the African maritime space. Meanwhile, the atmosphere just like the seabed and ocean floor are for the purpose of usage considered as the common heritage of mankind, as such effects of activities of mankind eventually impact the entire human race and the environment in which he lives.[68] It therefore follows that to achieve the end-result of reducing emission of harmful gasses from the shipping industry and preserving the ecosystem through sustainable shipping, universal legal and policy framework must be adopted with some form of implementation and sanctioning strategy.

4. Sea-bed Activities Related Pollution

The quest of mankind for energy to service the ever-growing industrialization, science and technological advancement has led to exploration of the deep-sea and sea-bed, as land-based energy sources are stretched to their maximum capacity and have become highly expensive. Many industrialized nations are currently engaging in deep-sea mining including Canada, Japan, South Korea, China and the UK to explore minerals such as copper, manganese, cobalt and rare earth metals.[69]

Seabed mining also includes the exploration or exploitation of the seabed level of continental shelf or territorial sea. These may either involved platform-based activities or rig-generated activities, involving exploration of crude-oil and natural gas and transmission of the oil and gas to reception facilities. Oil spills and escape of natural gas usually occur in the process of exploration and transmission of oil and gas from the seabed. In addition, other forms of pollution also arise from the process, these include mixture of mud in the extraction process and sewage formation which if not properly handled may cause marine pollution.[70]

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[68] Prue Taylor, 'The concept of the common heritage of mankind' in Douglas Fisher (eds), *Research Handbook on Fundamental Concepts of Environmental Law Research Handbooks in Environmental Law seri*es p. 304-334 (United Kingdom: Edward Elgar Publishing, 2022).

[69] Clark Allen *et al*, 'Toward the Development of a Regulatory Framework for Polymetallic Nodule Exploitation in the Area' 11 *International Seabed Authority Technical Study* (2013) http://www.isa.org.jm/files/documents/EN/Pubs/TStudy11.pdf accessed 5th January 2018

[70] Douglas M. Johnston, note 43, 193.

Today, exploration of the deep-sea has spread to cover territorial waters of States like Papua New Guinea and several seas including the Pacific, Atlantic and the Indian Ocean, as scientists fully establish the rich natural resources found in the ocean floors. While there is a future projection for obtaining license for commercial exploration and development of international instruments to regulate deep-sea activities.[71] However, exploration is relatively strange to that sea-level as such it threatens the unique species found within the ocean floor, exposing them to irregular distribution, growth and extinction through threat of their natural habitat and pollution.

Pollution of the ocean floor results from toxic particles found in sediment plumes capable of smothering species and their natural habits? exposing them to heavy metals and acid. Sediments form the mining processes are capable of clogging the feeding apparatus of filter-feeding organisms and cause them to starve to death. The mining process is also capable of reducing available oxygen level and several other impacts of released metals on the ocean currents and vulnerable species cannot be absolutely predicted. Pollution and release of heavy metals may also result from the process of separating heavy metals and other pollutants from the ocean.[72]Seabed mining is also capable of exposing the marine food chain to contamination through chemicals which may later accumulate in tissues of marine organisms including fish which form the major source of food for mankind. This chemical may be harmful to the sea organisms as well as other living beings feeding on them. [73]

Deep-sea causes noise pollution. The mining process and use of heavy equipments disrupts the usual silence of the relatively serene seabed. The deep-sea fish are sensitive to sound as they communicate at relatively low sound frequencies, reacting to changes on food sources and other organic matter from which their food is derived. Whales react to sound communication and so react to increased noise, while baleen whales are suffer

[71]Ramirez-Llodra Eva, *et al*, 'Man and the last great wilderness: human impact on the deep sea' 6(8) *PLoS one*, 10 (2011).
[72] Kaikkonen, Laura, *et al*, 'Assessing the impacts of seabed mineral extraction in the deep sea and coastal marine environments: Current methods and recommendations for environmental risk assessment' 135 *Marine pollution bulletin* 1183-1197 (2018).
[73] Luick John, 'Physical oceanographic assessment of the Nautilus EIS for the Solwara 1 project', (2012). http://www.deepseaminingoutofourdepth.org/wp-content/uploads/EIS-Review-FINAL-low-res.pdf accessed 5ht January 2018

chronic stress when exposed to shipping noise.[74] Nose resulting from mining of the ocean floor travel as far as 600km affecting nose sensitive species[75] like whale while the bright mining light may also affect species like deep-sea vent shrimp that react to bright light.[76] Because of the huge potential negative effect of seabed mining, recycling of existing metals has been suggested as a suitable alternative exploration of the seabed.[77] This will also aid protection of the atmosphere from accumulation of huge piles f wastes, hazardous chemicals that may emanate there from. If deep sea mining must be relied upon, there is need for a well drafted agreement which protects the marine eco-system by ensuring sustainable exploration, protect the interest of developing nations who lack the means and technology to carry-out such exploration or ensure compliance with exploration agreement. Such instrument must provide efficient implementation mechanism, in order to achieve the set objective. Although the Agreement on conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ Treaty) was recently adopted on the 19th of June 2023, and opened for signature on the 20th of September 2023, it is a new instrument that is yet to be put to test to ascertain its tenacity for preservation of marine biodiversity.[78]

International legal Framework for the Control of Marine Pollution

The international legal framework for the control of marine pollution includes customary international law and general principles of law, multilateral treaties such as the provisions of UNCLOS and other international instruments most of which came into being under the auspices of the IMO as well as regional agreements. Also applicable are non-binding instruments such as guidelines and principles otherwise known as soft laws. Customary international laws are those practices among States which have gained general acceptance. Conventions are mostly applicable within the arena of public international

[74] Nowacek Douglas *et al,* 'Responses of cetaceans to anthropogenic noise' 37 *Mammal Review* 81-115 (2007).
[75] R. Rolland *et al*, 'Evidence that ship noise increases stress in right whales', *Proceedings of the Royal Society* (2012) www.int-res.com/articles/esr2017/34/n034p417.pdf accessed 5th January 2018
[76] P. Herring *et al*, 'Are vent shrimps blinded by science' in Imants G. Priede (eds) *Deep Sea Fishes: Biology, Diversity, Ecology and Fishes* p. 1-5 (Cambridge University Press, 2017).
[77] Alicia Craw *et al*, 'Deep Seabed Mining an Urgent Wake-up Call to Protect Our Oceans' (Greenpeace International, Netherlands, 2013) file:///C:/Users/Grace%20Range/Desktop/Deep-Seabed-Mining.pdf accessed 4 January 2018.
[78] Abegón-Novella Marta, 'Making sense of the agreement on biodiversity beyond national jurisdiction: the road ahead' 1-20 *Environmental Policy and Law* Preprint (2023).

law, which makes them more suitable for inter-state and inter-organizational relations. However, maritime activities within the private international law domain, such as mercantile law, shipping and carriage of goods by sea also cause maritime pollution. Meanwhile, there are instruments specifically tailored towards particular forms of pollution, such as the *1972 London Convention*, which speaks to the dumping of radioactive, chemical and toxic wastes within the maritime domain. This 1vessel sourced pollution, land-based pollution, atmospheric pollution or pollution from seabed activities. Despite the existence of these arrays of laws, maritime pollution is still a major problem confronting sustainable maritime practice in the 21st century. These laws and rules of regulation are examined below.

1. Customary International Law Rules and General Principles of Law

Although marine pollution has been occurring since man began to navigate the oceans, consciousness of the need to control marine pollution is relatively new. Over the years, certain rules have emanated from the engagement of States in maritime practice administration. They include:

- The Rule of *sic utere tuo ut alienum non laedas* (use your own property so as not to injure that of another)

Out of the principle of *Marie Liberium* to the effect that the ocean is a common heritage of mankind as propounded by Arvido Pardo from the work of Hugo Grotius, is the need to ensure that the use and exploration of maritime domain by one State does not cause harm or injury to others.[79] This gave rise to the customary international law rule of *sic utere tuo ut alienum non laedas* (use your own property so as not to injure that of another), as laid down in by the arbitral panel in the *Trail Smelter arbitration case*.[80] Similarly, in the *Corfu Channel's case,*[81] the ICJ referred to this principle though in the context of the obligation of every State to avoid deliberately allowing the use of their territories for purposes that will adversely affected the rights of other states.

[79] Theutenberg, Bo Johnson, 'Mare clausum et mare liberum' 37 (4) *Arctic* 481-492 (1984).
[80] The Trail Smelter Arbitration Case (United States Vs Canada) U.N. Rep. Int'L Arb. AWARDS 1941, 1905.
[81] Compensation **Corfu Channel** (United Kingdom v Albania), Judgment, ICJ 201 ICGJ **1949**, 244.

The prohibition of the use of the ocean by a State, in a manner that will infringe on the right of other States, gained further traction when it was incorporated into the 1972 Stockholm Declaration. This was later acknowledged by the United Nations Conference on Environment and Development in the 1992 Rio Declaration. Principle 21 of the Stockholm declaration is in line with the United Nations Charter and other recognized international law principles. It requires that in the exercise of right to explore resources in their environment to effectuate their developmental objectives, States must apply necessary caution to prevent such exploration from causing physical or environmental damage to other States. This principle was further acknowledged by the ICJ in rendering legal opinion on the *Legality of Use of Nuclear Weapons*.[82] Although the customary international law principle under consideration has the capability to control maritime pollution, it equally applies as an environmental law principle.

The effectiveness of this principle is however limited by the fact that a State may be exonerated from liability where due-diligence and due caution has been exercised to avoid causing damage to other States.[83] This raises several questions. Does the exercise of due-diligence change the fact that any State carrying-out the act in question will reasonably expect that harm may result there from other States? What is the standard of the expected due diligence that an exploring State ought to exercise? Can supervening factors, such as the activities in question, technical and economic capacity of a State, associated risk and availability of technological equipment and technical know-how vary the expected extent of due diligence? For instance, developed nations like the US, UK, Russia and China have the wherewithal and technology to better determine the extent of contemporary practice of deep-sea mining, where a coastal State grants contractual right to a developed state which though has the wherewithal and equipment to carry-out due-diligence in line with the contract has not been entirely truthful in presenting the due-diligence report and the exploration causes harm to a third party. Deep-sea in this context refers to an area over which the coastal state enjoys right of exploration, having a depth of approximately 200 m

[82] Anastassov Anguel, 'Are nuclear weapons illegal? The role of public international law and the international court of justice' 15(1) *Journal of Conflict & Security Law* 65-87 (2010).
[83] Pisillo Mazzeschi, 'The Due Diligence Rule and the Nature of the International Responsibility of States' 35 *German Yearbook of International Law* 9-52 (1992).

(660 ft) below the continental shelf, beneath the contiguous zone and exclusive economic zone, but not the area.

Also, contemporary international environmental law principles such as the principle of "common but differentiated responsibility"[84] calls for clarification of what amounts to due-diligence in particular circumstances. The rule of carrying out simple due-diligence may not?? be sufficient to protect the maritime environment in modern times, considering the diverse causes of maritime pollution. As such due-diligence may not reveal that disposal of wastes on land, or leakages of pollutants on land diffuse into nearby water bodies. The rule of due-diligence has also been condemned because of its *modus operandi*. This is because it operates to impose liability on an erring State after the damage has been done, and lacks the necessary preventive element.[85] More so, the principle operates more in the arena of public international law, meanwhile waste disposal contracts which account for dumping of toxic wastes in the ocean will often invoke the responsibility of the flag state, but where a flag if convenience is being flown, such obligation is often not be taken seriously.

Another major limitation to the principle is the requirement that the harm in question must be significant before a State can be held liable. This again brings about uncertainty and the issue of perspective and convenience in the interpretation of what amounts to significant harm. Hence the inadequacy of the rule of *sic utere tuo ut alienum non laedas* in protection of the maritime environment and the need for supportive provision.

- **The International Law Rule on Abuse of Rights**

The customary international law rule against abuse of rights is to the effect that a State must not exercise her rights in a manner that leads to the infringement of the rights of other states or for such ends other than the primary object of such right as a result of which other States suffer injury. In relation to the law of the sea, Article 300 of UNCLOS incorporates the abuse of rights principle to the effect that State parties shall fulfill their obligations under the Convention in good faith, taking into cognizance the jurisdiction

[84]M.A Fitmaurice, 'International Protection of the Environment' 293 *RCADI* 288-289 (2001)
[85]Yoshifumi Tanaka, 'Regulation of Land-Based Marine Pollution in International Law: A Comparative Analysis Between Global and Regional Legal Frameworks ' 66 *ZaoRV* 535-574, 539 (2006).

and freedom set-out by the convention, in a manner that will not lead to abuse of rights. UNCLOS also provides for the exercise of necessary caution in various circumstances, in the failure of which injury may be caused to a state party. The provisions of Article 294 prohibit abuse of legal process. In relation to fishing rights, Article 297 (3) (b) ii and iii provides that without just cause fail to determine allowable catch or allocate surplus catch. In addition, article 187 (b) (ii) prohibits the abuse of power by the Seabed Authority in excess of its specified jurisdiction. Since the doctrine of abuse of rights prevents States from exercising their right to marine exploration and use in a manner that will adversely affect other States and pollution being an adverse effect of maritime use and exploration, the doctrine can apply to control maritime pollution.

However, critics of the doctrine argue that the criteria for ascertaining acts that amount to abuse is unclear. There is relative uncertainty about the moment when a State can be said to be guilty of abuse of right. The lack of clarity makes the principle relatively abstract. This raises the issue of the yardstick for establishing such criteria. Although such criteria can be established by international courts, this is still relatively difficult as the jurisdiction of international courts is usually vested in particular cases subject to the agreement of parties. This places the responsibility on the international community to gradually evolve acceptable criteria in form of international custom.[86] Although this suggestion appears viable, it will be difficult to have a unified position; States may therefore align towards most the favourable interpretation. As such several cases of abuse of right will not be sanctioned.

2. International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL) 1954[87]

Adopted in London in 1954, the OILPOL Convention was the foremost instrument that addressed oil pollution within the maritime environment. The Convention prohibits the intentional discharge of oil, oil mixture or oily wastes from vessels into the certain oceans. It specified permissible areas into which ballast water from vessels can be discharged. The discharge is to be entered into an oil record book to be inspected by the flag state, which

[86] Ibid 541.
[87] International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL) 327 UNTS 3. (1954).

is charged with the responsibility of enforcing the convention. This laid the foundation for other multilateral instruments such as the MARPOL Convention.

3. The United Nations Convention on the Law of the Sea (UNCLOS) 1982

The UNCLOS is the foremost regulation on global maritime practice and administration. It sets the minimum threshold on ocean navigation, sustainable exploration and exploitation of the maritime domain, with binding effect on State signatories upon ratification. The entire content of UNCLOS part XII – Articles 192 to 237 – is dedicated to the protection and preservation of the marine environment. The part opens by setting general and specific obligations on states towards the prevention of maritime pollution, while preserving their right to exploit natural resources within their maritime domain.[88]

Article 194 of UNCLOS addresses State obligation on preservation of the maritime environment by taking necessary measures to prevent pollution. States are obliged to adopt measures consistent with the provisions of the convention, based on available means and capability to control and reduce pollution of the marine environment from all sources.[89]In addition, States also have the duty to monitor activities within their domain and ensure that the means of executing such activities doses not result in pollution capable of damaging the immediate environment or the environment of neighboring States. Where activities within the jurisdiction of a State pollute her maritime domain, the State must exercise necessary control to ensure that the pollution does not spread beyond her territory, causing harm to other States and amounting to abuse of right.[90] In order to give effect to the first two subsections, Article 194(3) takes into cognizance all possible sources of marine pollution and require States to adopt preventive and combative measures, individually and jointly. Measures adopted should seek to control marine pollution from toxic waste, on-shore activities, atmosphere and dumping; whether intentional, accidental or operational leakages. As part of measures to prevent pollution within the maritime domain, equipment and machineries operated within maritime environment are to have installations designed to prevent accidents and cater for

[88] OILPOL, Article 192, 193.
[89] UNCLOS, note 18, Article 194 (1).
[90] UNCLOS, note 18, Article 194(2).

emergencies to prevent pollution.[91] States are also expected to exercise necessary caution to ensure that pollutants are not transferred across boundaries to other areas to cause hazards.[92] In the course of using technological devices within their maritime domain, States are to ensure that harmful alien species capable of causing marine pollution are not transferred from one jurisdiction to another.[93]

The Convention takes cognizance of trans-boundary nature of marine resources and therefore prescribe inter-state cooperation both at the regional and international arena, through establishment of legal and institutional frameworks to improve standards and prescribe acceptable practices for the preservation of the maritime environment.[94]A State's maritime domain has been polluted with the tendency that such pollution might spread to other States, the other States likely to be affected and competent international bodies are to be promptly informed, and to collaborate on developing a contingency plan to prevent the pollution or minimize the extent of damage.[95]

In order to make a success of the efforts to control and prevent marine pollution, UNCLOS imposes obligations in relation to various sources of pollution on various parties depending on the area being protected and cause of the pollution. In relation land-sourced pollution, every state is obliged to enact domestic regulations to prevent and control marine pollution, adopt suitable policies and harmonised those policies with regional policies. States are also expected to cooperate with regional organizations through meetings and conferences, to establish regional and international standards, rules and standard procedure on the control of maritime pollution from land-based activities. The recommended standards shall cover control of the release of hazardous on land which diffuse into water bodies.[96] In relation to pollution from seabed activities, coastal States are vested with the responsibility to adopt suitable regulations to protect their maritime environment, including artificial islands and installations from pollutions resulting from seabed activities. Such regulations and policies shall be harmonized with regional efforts on the subject matter. States shall collaborate with international

[91] UNCLOS, note 18, Article 194(3).
[92] UNCLOS, note 18, Article 195.
[93] UNCLOS, note 18, Article 196.
[94] UNCLOS, note 18, Article 197.
[95] UNCLOS, note 18, Article 198 and 199.
[96] UNCLOS, note 18, Article 207.

organizations through diplomatic conferences to forge regional and international standards on control of maritime pollution from seabed activities.[97] The responsibility is placed on the global community to adopt international regulation to prevent and control pollution from activities in the area. However, in relation to vessels and installations, the flag State has the obligation to adopt suitable regulation to prevent and control marine pollution which such vessels and installation may cause in the area, based on acceptable international standards. [98]

In relation to pollution from dumping, States are to adopt suitable laws, policies, regulations to prevent and control pollution of the maritime environment from dumping. These efforts shall include collaboration through diplomatic conferences at the regional and international arena to achieve international standards on control of marine pollution from dumping. Dumping within Exclusive Economic Zone (EEZ), territorial waters and continental shelf shall be with the prior approval of a coastal State who has the liberty to withhold such approval. Coastal States are obliged to adopt laws based on international standards to prevent and control pollution from dumping.[99] By implication, dumping within a coastal States' territorial waters is not absolutely prohibited, provided the prior approval of the State concerned has been sought and obtained. The question then is whether it is possible for dumping of wastes within territorial waters to be carried-out in various parts of the world without adverse effect of maritime pollution at the long-run or short run. If the response is no, then it is high time this provision of UNCLOS be reviewed. Another variance to this is the high level of institutionalized corruption in African States as a result of which permission to dump wastes within coastal waters may be granted simply to enrich corrupt politicians without a properly carried-out Environmental Impact Assessment (EIA) causing long-run adverse effect as seen in Somalia.[100] The question then is, what constitutes consent duly sought and obtained for dumping of waters??? within territorial waters of a coastal states?

Detailed provision is also made for the protection of the maritime space from vessel sourced pollution. Because of the nature of international shipping, obligation to control

[97] UNCLOS, Art 208.
[98] UNCLOS, Art 209.
[99] UNCLOS, Art 210.
[100] Bashir Mohamed Hussein, note 58, 8-12.

vessel sourced pollution I? shared by coastal States, flag States and the international community. The sates? shall act through international organizations or diplomatic conferences to adopt international standards for the prevention and control of vessel-sourced marine pollution.[101] This shall include adoption of international routing to minimize accidents capable of causing pollution.[102] Flag States are also obliged to adopt suitable laws to prevent and control maritime pollution by vessels flying their flag, in line with established international standards. All States with precondition of prevention of maritime pollution for vessels to access their maritime domain, shall base such preconditions on international standards and grant it adequate publicity.[103] In relation to atmospheric sourced maritime pollution, States are obliged adopt laws regulating their flagged ship, aircraft and air-space to prevent their use from causing marine pollution. For the purpose of prescribing international standards, States shall cooperate with international organizations or diplomatic conferences to establish regional and global rules and standards to prevent atmospheric sourced marine pollution.[104]

4. The Intervention Convention 1969[105]

The International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution, otherwise known as the 'Intervention Convention' came into being as a response to the 1967 Torrey Canyon oil spill. It is a foremost public international law instrument which established coastal State's jurisdiction over foreign vessels on the highseas, subject to the provisions of the convention. At the time of occurrence of the Torrey Canyon disaster, the existing international instruments being the 1954 Convention for the Prevention of Pollution of the Sea by Oil (OILPOL), emphasized operational discharges and not accidental spillage. This made obvious the lacuna in the authority of coastal States to protect their territory from high seas pollution capable of affecting them. This is particularly so where the incident occurs on the high sea or is cable? of jeopardizing business interest of foreign ship owners. Thus, the 1969 Brussels diplomatic conference in response adopted the duo of the Intervention Convention and the Civil Liability

[101] UNCLOS, note 18, Article 211 (1).
[102] UNCLOS, note 18, Article 211(2).
[103] UNCLOS note 18, Article 211(3).
[104] UNCLOS note 18, Article 212.
[105] International Convention relating to intervention on the high seas in cases of oil pollution casualties (1969) 11 UNTS 970 (entered into force 6 May 1975).

Convention.[106] Whereas the Civil Liability Convention is concerned with the private international law aspect of pollution, the intervention convention which took effect in 1975 deals with the public international law aspect. The Intervention Convention grants right to Coastal states to intervene in cases of oil spillage on the high seas, where there are pollution casualties, this is in contrast to the freedom of the sea principle, and the former's flag state exclusive jurisdiction on the high seas. The Intervention Convention is made up of 17 articles, out of which Articles I-VIII are fundamental as they specify the precondition for execution of intervention measures. A State signatory is authorized to unilaterally intervene if there are casualties from where oil spills on the high seas. An intervening State shall apply necessary measures to avert potential danger from the pollution and whittle-down the effect of the pollution on her coastline or other assets.[107]The convention, for the sake of clarity, defines maritime casualty as ship collision or other navigational accidents which causes immediate or imminent danger to ship or cargo. Such accident may involve shipping vessels or cause?? spillage of crude oil, diesel oil and lubricant oil. It may also affect tourist sites, health and well-being of coastal population, wildlife and living marine resources.[108]The Convention requires the intervening State to consult with the flag State of the vessel involved in the accident and other States where the effect of the incident spread to other States. Where the intended measures have the tendency of affecting any person, or entity, such a person or entity must be promptly informed, and their opinions taken into consideration. Where an intervening state requires the services of an independent expert, the experts must be chosen from the IMO list of experts made in pursuant of Article IV. However, the requirement of consultation may be waived or consultation canceled in cases of extreme urgency. The execution of such consultation must take cognizance of the need to protect human lives during the intervention, to avoid exposing any human to risk and provide necessary assistance to those who may suffer distress as a result of the accident; such assistance may include vessel repatriation. In the event of any resulting accident, measures adopted by the concerned state and intervening state must commensurate with the threat or damage that resulted from the accident and

[106] IMO, "List of Conventions: The Intervention Convention of 1969" accessed May 2011.
[107] The Intervention Convention, note 105, Article I.
[108] The Intervention Convention, note 105, Article II.

must not be in excess of what is necessary or reasonably expected, to mitigate the danger to which the coastline of the intervening state is exposed as a result of the accident.

However, before a coastal State can intervene in an accident, certain preconditions must be met. It must be established that the accident pose pending danger that can only be mitigated by those measures; that there is a high probability that those measures will be effective; and the degree of potential damage were those measures not adopted must also be ascertained.[109] The Convention further regulates the exercise of right of intervention, by prescribing payment of damages by a State who wrongfully intervene, to a third State who suffered loss as a result of such wrongful intervention.[110]Where dispute arise from the application of the Convention, it shall be first referred to negotiation, in the failure of which it shall then be referred to conciliation and arbitration where the conciliation fails.[111]A major limitation to the Intervention Convention is its applicability; it is limited in scope as it only applies to marine pollution. However, this defect was addressed by the 1973 Protocol and the 1996 updated list of substances to the Convention to bring marine pollution resulting from other sources within its sway. The improvement introduced by the 1969 Convention has formed the basis for similar regional and multilateral conventions targeted at protecting the maritime environment.

5. International Convention for the Prevention of Pollution from Ships (MARPOL) 1973

The MARPOL Convention is one of the instruments that came into being as a response to the Torrey Canyon incident. It addresses pollution caused by oil, chemical substances, packaged noxious substances, sewage and garbage whether accidental or operational.[112]The MARPOL Convention was adopted in 1973 while the protocol to it was adopted 1978, as a necessary measure in response to the Amoco Cadiz oil spill to reinforce the 1973 convention. The MARPOL convention improved on the 1954 OILPOL, the duo of the 1973 MARPOL convention and the 1978 protocol came into force in 1983. The MARPOL convention has gained wide acceptability among nations as over 150 countries,

[109] The Intervention Convention, note 105, Article V (3).
[110] The Intervention Convention, note 105, Article VII.
[111] The Intervention Convention, note 105, Art VIII.
[112] Özçayır, Oya, 'Port state control' (Informa Law from Routledge, 2018) 12.

responsible for 99.14 of the world trade volume have signed as parties Annexes I and II. The provisions of the convention are contained in 20 Articles: Annex I regulates the prevention of oil pollution while provision of Annex II deals with pollution from bulk Noxious Liquid Substances (NLS). Annexes III, IV and V address pollution from packaged harmful substances, sewage from vessels garbage from ships respectively, while Annex VI found in the 1996 protocol to the convention addresses air pollution from vessels. By virtue of Article 14, ratification of Annex I and II is mandatory for state signatories while the other Annexes only bind parties that consent to it.

MARPOL adopts a definition of "harmful Substances"[113] which is in tandem with "pollution of marine environment" as described under UNCLOS,[114] being the introduction into the marine environment of substances capable of causing harm to human health, resources and disrupting the legal use of the sea. However, UNCLOS captures all forms of marine pollution while MARPOL is limited to vessel-sourced pollution. For the purpose of enforcement, MARPOL vests jurisdiction over CDEM of ships in the flag State, while port states are to inspect foreign vessels to ensure that anti-pollution standards are met. A port state has the authority to institute legal proceedings relying on municipal laws and in line with Art 228 of UNCLOS.

Annex I of MARPOL prescribe technical specification of vessels to curtail oil spills whether accidental or operational. These includes provision on the oil discharge limits, limit for the release of contaminated water from ships and technical standards to be met by tankers conveying oil. It stipulates standards to be met by various types of vessels based on size and other factors. Including the standard of specification for vessels with gross tonnage above 400tons, discharge standards and regulation for equipment, technical specifications to be met by oil tankers, technical standards to be met to enable oil-tankers limit oil-spills from collusion like segregation of ballast tanks, dedicated clean ballast tanks to prevent ballasting in oil tanks, Crude Oil Washing (COW) and International Oil Pollution Prevention Certificate (IOPPC). The provisions of Annex I was furthered by amendment to MARPOL which requires oil tankers to have double hull as from 6th July, 1995. It also specifies a 25-year duration for compliance with the double haulage standard

[113] MARPOL, note 12, Art 2(2) and (3).
[114] UNCLOS, note 18, Art 1(4).

for older vessels, with the deadline fixed for 2007 and 2012 in some cases. On the other hand, the deadline for compliance with the requirement of segregated ballast water was set at 2026.[115]

Annex II of MARPOL speaks to bulk carriage of liquid noxious substances. It stipulates the criteria for the discharge of different types of chemicals based on the environment in which they operate. It also provides the standard for washing of tanks and related pumping and piping measures. The convention contains a comprehensive list of over 250 substances evaluated and prohibit? discharge of noxious substances within 12 miles of the on-shore.[116] Annex III, which is optional, addresses pollution from harmful substances in packages, portable tanks freight containers rail tank, wagons, etc. It provides detailed specification to be met regarding packing, marketing and labeling. It also stipulates the towage quality to be met, exceptions and notifications permissible for prevent pollution. The IMO International Maritime Dangerous Code (IMDG Code) spell-out the harmful substances to which the Annex apply.[117] Annex IV address pollution from vessel sewage while Annex V speaks to the disposal of garbage from ships.

The prevention of air pollution from ships is addressed in Annex VI which took effect in 2005 and was amended in 2010. The amendment established the North American Emission Control Area where emission from noxious gases from ships is strictly regulate. In similitude to UNCLOS Article 211 (6), Annexes I, II and V of MARPOL specify compulsory provisions for prevention of pollution in identified special areas. They include enclosed and semi-enclosed areas, such as EEZ and the high sea, and only apply to discharge of harmful substances. This is distinguishable from UNCLOS Article 211(6) which does not prescribe measures to be adopted. The special area stated in MARPOL also differ from Particularly Sensitive Areas (PSSAs) referred to in IMO Resolution A927 (22) and A982 (24) which refer to ecologically significant areas preserved because of their significance to international shipping and international maritime environment.[118]

[115] MARPOL, note 12, Annex I.
[116] MARPOL, note 12, Annex II.
[117] MARPOL, note 12, Annex II.
[118] JingJing Xu, 'The Public Law Framework of Ship-Source Oil Pollution' 13 *Journal of International Maritime* p. 423(2007).

6. 1974 International Convention for the Safety of Life at Sea [SOLAS]

The SOLAS Convention is targeted at promoting the safety of life at sea, it established a liability regime for breach and prescribe payment of compensation as penalty for such breach. SOLAS took effect on the 1st July 2002. It oblige all ships to keep Voyage Data Records (VDRs) similar to aircraft black boxes to facilitate investigation of ship accidents and some vessels are under obligation to have Automatic Identification Systems (AIS).[119] Also, in carrying-out the duty to designate sea lanes and prescribe traffic separation schemes in territorial sea as specified under UNCLOS,[120] coastal states are to take cognizance of SOLAS provisions on ship routine systems and take into account IMO regulations, which made establishment of routing system compulsory for certain group of vessels conveying some type of cargo, upon signing the convention.[121]

7. Antifouling Convention 2008

A traditional shipping problem is the attachment of mollusks, algae and other living maritime organisms to the hull of vessels, sowing-down the movement of vessels and increasing the amount of fuel for navigation. Traditionally, lime and arsenic water were used to coat hull of ships, however, in contemporary times, chemically composed antifouling paints have been resorted to. These paints are however hazardous because they are made up of chemical compounds which diffuse into the sea, killing living marine organisms and contaminating the natural food chain. In the 1960s, a particularly effect antifouling paint used has a chemical composition of organotintributylin (TBT), known to deform oysters and cause change in sex of whelks. The attention of the IMO was called to the pollution effects and hazards of antifouling chemicals in 1989, in response to which Marine Environmental Protection Committee (MEPC) was set-up in 1990. The committee passed a resolution in which it was recommended that measures should be adopted to end the use anti-fouling chemicals with TBT composition on non-aluminum hulled measuring below 25 meters in length. It was also prescribed that the use of anti-fouling paints which have a leaching rate of more than four micrograms of TBT per day be

[119] International Convention on the Safety of Life at Sea (SOLAS) (1974) 1184 UNTS. 3 (entered into force 25 May 1980) Chapter V
[120] UNCLOS, note 18, Art 22(3) (a).
[121] *SOLAS Convention, note 119.*

banned. A resolution was adopted by the IMO in November 1999 calling on the MEPC to develop a multilateral instrument addressing antifouling system of vessels, particularly to prohibit the use of organotin compounds in developing antifouling paints, because it acts as biocides. This led to the adoption of the anti-fouling convention on 5th of October 2001 and it entered into force on the 17th of September 2008.

The 2008 anti-fouling Convention defines anti-fouling systems as a coating, paint, surface treatment, surface or device that is used on ship to control or prevent attachment of unwanted organism." The convention requires parties to prohibit the uses of hazardous anti-fouling systems on ships flying their flags and ships not entitled to fly their flag but operating under their authority, and all ships utilizing their port, shipyard and offshore terminal. The provision on the control of anti-fouling systems of ships is designed to apply to vessels used for international voyages, having gross tonnage which is of and above 400gross, to the exclusion of fixed or floating platforms, Floating Storage Units (FSUs) and Floating Production Storage and Offtake units (FPSOs)s. Before commencing navigation and prior to obtaining an International Anti-fouling System Certificate, the vessels are to undergo an initial survey, and subsequent surveys upon the changing of the vessels' antifouling system. Every vessel with a length of 24 meters and above but with gross tonnage that is below 400 and used in international voyages, to the exclusion of fixed or floating platforms, FSU s and FPSOs must have in their possession an anti-fouling system declaration signed by the owner of the vessel or an agent so authorized by the owner. In addition to the declaration, the vessel must also possess other necessary documents relating to anti-fouling systems including a paint receipt or contractor invoice. The antifouling convention contains a list of prohibited antifouling systems, to be updated as and when necessary.[122]The annex to the convention specified 1st January 2003 as effective date for prohibiting used of antifouling systems which has organotin compounds that act as biocides

As from 1st January 2008, it is completely prohibited for ships to apply organotin compounds to their hull or external surface, apply a coating which form a barrier to such

[122] International Convention on the Control of Harmful Anti-fouling Systems on Ships (2001) ATS 15 (entered into force 17 September 2008) https://www.congress.gov/congressional-report/110th-congress/executive-report/19 accessed 20 December 2017

compounds leaching from underlying anti-fouling system which is different from what is allowed. However, where a vessel is unduly delayed for inspection to ensure compliance with the convention, the vessel shall be entitled to compensation.[123]

8. International Law Instruments on Control of Dumping of Hazardous Wastes at Sea

Dumping and incarceration of wastes from ships, aircrafts and other vessels at sea, particularly radioactive and industrial chemical wastes is one of the major causes of maritime pollution with potential long run devastating effect on the living and wellbeing of mankind and the environment. The control of the movement and dumping of wastes at sea is governed by a different regime of international and regional instruments, the root of which is traceable to the relentless efforts of Greenpeace international and other stake holders.[124]

The first regional instrument on the control of dumping of wastes at sea was the *Oslo Convention* negotiated and opened for signature in Oslo, in 1972. Atlantic Ocean. The *London Dumping Convention* later known as the *London Convention* was also negotiated in 1972, it was the first international instrument on the regulation of dumping of wastes at sea. The *London Convention* was also grossly inadequate as it accommodated classification of radioactive wastes into high, medium and low level of radioactivity and failed to cover low level radioactive wastes which may also contain isotopes such as plutonium and strontium that are extremely hazardous.[125] The convention also failed to prohibit the nuclear industry as such dumping, mostly on the high-seas persisted. By the 1980s dumping of radioactive and nuclear wastes at the seabed level was really high. As the panel constituted by the International Atomic Energy Agency (IAEA) failed to prove that ocean dumping was safe, Greenpeace convinced contracting parties to the London Convention to consider the effect of incineration and dumping of industrial wastes into the ocean. Eventually, a resolution was adopted to phase-out the dumping of liquid wastes

[123] Anti-fouling Convention, note 122, Article 13.
[124] Tolba K Mostafa and Osama A. El-Kholy, 'International responses' *The World Environment 1972–1992: Two decades of challenge* 737-798 (Springer Netherlands 1992).
[125] Rémi Parmentier, note 28, 12.

at sea in 1988 and industrial wastes by 1990.[126] In 1992 the convention was renamed as the London Convention, contracting parties adopted amendment to ban dumping of industrial waste in November 1993 to take effect on 1st January 1996.[127]

Another major instrument on the control of dumping of noxious wastes at sea is the *1989 Basel Convention*. [128] The Convention, which was signed in 1989, assumed the force of law in 1992. It is a multilateral treaty which came into being under the auspices of the United Nations Environmental Programme (UNEP), targeted at controlling Transboundary Movement of Hazardous Wastes and their disposal. This is with the objective of reducing generation of hazardous wastes, facilitate healthy disposal of such wastes to protect human and environmental health and prevent uncontrolled inflow of wastes from industrialized nations.[129]This was in response to the massive inflow of industrial wastes into developing nations, legally and illegally, as production of such wastes continue to increase, in contrast with increased level of public awareness, high cost of disposal and reduction in incineration avenues in the developing nations, hence, the recourse to safe haven for the disposal of those wastes and the resulting health and environmental threat to developing nations.[130] The Basel convention is widely accepted with well over 170 state signatories. It set rules and standards for the exportation of hazardous wastes to be complied with by member states. These includes obligation of exporting states to give prior notice of to appropriate authorities of importing state of intention to effect tranboundary movement of hazardous waste. Every vessel conveying hazardous waste shall be accompanied by proper documentation showing the origin of the wastes and the proposed destination for disposal. Upon arrival at the specified destination, disposal of waste shall be effected in a manner that is not harmful to the environment. The convention encourages bilateral agreements which should form the basis of trade in hazardous waste with non-member states.

[126] London Dumping Convention, note 11, Resolution 35 (11) Status of Incineration of Noxious Liquid Wastes at Sea, and Resolution 43 (13) Phasing Out Disposal of Industrial Waste.
[127] London Dumping Convwntion, note 11, Article XV (2).
[128] The Basel Convention, note 13.
[129] Cyril Uchenna Gwam, 'Toxic Wastes and Human Rights' VII (2) *The Brown Journal of World Affairs* 185-189 (2000).
[130] Katharina *Kummer,* '*Transboundary* Movements of Hazardous Wastes at the Interface of Environment and Trade' 7 United Nations Environment Programme (UNEP) Environment and Trade 8 (1994).

The Basel Convention has certain loopholes which affects its effectiveness. One of such lacunae is its failure to include radioactive wastes within the scope of the convention. This necessitated adoption of a supplementary regime, being the Code of Practice on International Trans-boundary Movement of Hazardous Wastes. Although the code facilitated harmonization of laws and policies in the field, it is a non-binding instrument. Another lacunae in the Basel Convention is its offer of limited protection to developing countries, as it seeks to balance the interest of both developing and developed states which is mostly contrasting. Moreover, the severity the severity of the problem calls for a stringent regime to fully protect developing nations. [131]

The Inadequacies of the regime of Basel Convention in protecting developing African nations from the influx of radioactive, nuclear and other toxic chemical wastes led to the adoption of the Bamako Convention *in 1991*. The Convention on the Ban of the Import into Africa of and Control of Trans-boundary Movement and Management of Hazardous Waste in Africa was adopted in Mali, on the 29th January 1991, by the OAU Pan-African Conference on Environment and Sustainable Development in Africa and it took effect in 1998. It finds its basis in the Basel convention but adopts a more restrictive regime. The convention require all parties to adopt proper measures within their territory to prohibit importation of Hazardous wastes into the African continent, from non-contracting states. Any importation of hazardous waste from Africa is perceived as a crime. [132]In addition, a system of controlling transboundary movement and management of hazardous wastes within Africa was considered. European nations are identified as major culprit in the importation of chemical and toxic wastes into Africa, as such a proposal was submitted to the EEC on the control of the control of Shipments of waste into and out of the European community, to replace the EEC Directive 84/632 on the trans-frontier movement of toxic wastes.

[131] A. Nollkaemper, 'Laws of the Sea: Transboundary movement of hazardous wastes for the purpose of dumping at sea' 22(8) *Marine Pollution Bulletin* 377-380 (1991).

[132] Bamako Convention, note 17.

Challenges Confronting the Legal Regime for the Control of Maritime Pollution in Africa

The international community has over the years developed a comprehensive legal regime for the control of maritime pollution. Regional and international instruments exist to tackle all forms and sources of maritime pollution. Nonetheless, the laws have proven to be inadequate in protecting the international maritime domain, with increasing threat posed by rise in international container shipping, scientific and technological advancement which aids deeper explorati9on of the sea. Africa is particularly vulnerable to maritime pollution because of its strategic location for aiding international trade, predominant corruption, bad governance, availability of undeveloped vast land and coastline often harnessed for illegal incineration and dumping of wasted by industrialized nations. The amount of hazardous waste produced globally is about 350 million tons, over and above the quantity that can be absorbed and decomposed by the ecosystem.[133] The EU is one of the highest producer and transporter of toxic wastes, producing as high as 8.9 million tons per year as at 2009.[134] The lack of sufficient avenue for incineration and treatment of hazardous wastes gave rise to illegal disposal and illegal trade in the noxious substances. Countries like – Austria, Greece, Ireland, Iceland, Liechtenstein and Luxembourg have no provision for landfills designated for the disposal of toxic wastes at all. [135] Meanwhile, trade in hazardous waste, trans-boundary movement and illegal disposal of radioactive waste is escalating. Italian mafias (Eco-mafia) are renowned for illegal dumping of hazardous wastes both within Italy and unlawful exportation to developing countries. A study of the Institute for Cancer Research at the Temple University in Philadelphia revealed that illegal dumping of toxic wastes around Northern and Southern Naples and other nearby towns' accounts for the high rate of breast cancer at the rate of about 47% above the average rate within the countries. Cancer of other parts like lungs, liver, gastrointestinal track are also about 12% higher than the national average.[136]

[133] Mario Obradovi *et al,* 'Dumping and Illegal Transport of Hazardous Waste, Danger of Modern Society' 38 (2)(2 *Coll Antropol* 793–803 (2014)
[134] Ibid, 794-796
[135] T. Frohlich, Organized member states, (Max-Planck-Institute for Foreign and International Criminal Law, Kassel, (2003).
[136] Obradović, Mario, note 133, 793-803.

Africa has been particularly targeted as destination for illegal trans-boundary movement of radioactive and toxic wastes, for several reasons among which have been referred to above. In 2006, 500 tons of hazardous wastes were illegally deposit in Ivory Coast, as a result about 17 people died and hundreds others were injured. Illegal dumping of toxic waste in Africa depicts the inefficiency of the efforts at the domestic, regional and international arena to tackle the problem. Illegal movement of toxic waste is usually carried-out as a trans-national organized crime. For instance, the Ivory Coast incident, the vessel that conveyed the waste is owned by a Greek company, registered in Panama, it was leased by a Dutch company located in Britain and operated by Russian crew.[137] This shows the high level of sophistication that may be involved in the illegal disposal of waste, calling for global efforts as regards law making and implementation to tackle the problem. In other instances, the importation of toxic waste is secretly granted consent by African government without taking cognizance of the potential impact on human and environmental health. For instance, in 1980 the Government of Guinea Bissau accepted an offer for the importation of several tons of hazardous wastes from the US upon collection of 600 million dollars.[138]

Although the long-run effect of inefficient legal regime for prevention and control of maritime pollution is a cross to be shouldered by the global community, the immediate effect is often felt by developing nations, most of which lack the capacity to handle it. For instance, Somali coastline have for several years been a preferred site for dumping radioactive, nuclear and hazardous wastes by European and other industrialized nations, both illegally and sometimes with the consent of corrupt public officials. Reports show that the country has a high record of unknown diseases and unusual health issues including "acute respiratory infections, heavy dry coughing, mouth bleeding abdominal hemorrhage and unusual chemical skin reaction". In addition, there are high incidents of cancer, spontaneous miscarriages, delivery of malformed babies, thyroid, tongue and colon cancer around the Merka, a coastal city. In 1998, Dr. Pirko Honenen who works for UNICEF Somalia reported that in Bardale city, there are high incidents and alarming

[137] Monica Massari and Paola Monzini, 'Dirty Businesses in Italy: A Case-study of Illegal Trafficking in Hazardous Waste' 63(4) *Journal of Global Crime* 285-304 (2004).

[138] Jennifer Clapp, 'Africa, NGOs and International Toxic Waste Trade' 3(2) *The Journal of Environment and Development* 17-46 (1994).

death rate from a disease that could not be diagnosed exhibiting symptoms like high fever, trembling, nose and mouth hemorrhage".[139]

The problem of maritime pollution poses serious threat to the sustainability of maritime exploration and the much desired blue African economy. At present, African states are not applying to the problem the requisite efforts to reduce maritime pollution within the AMD. The African maritime landscape is denied the necessary attention for sustainable maritime practice as reliance is being placed on crude oil as income source. However, the fear is that if necessary steps are not taken to combat maritime pollution in Africa, the continent may suffer serious economic imbalance if and when crude oil resources are completely depleted as the maritime resources would have been lost to decades of pollution and unsustainable practices. This is in addition to the fact that problems emanating from maritime pollution over-stretch the inadequate health and environment facilities of affected states.

Conclusion and Recommendations

The above discussion raises the question as to the challenges confronting the legal regime for the control of maritime pollution in Africa to which workable solutions are prescribed. Principal among the challenges confronting efficiency of the legal framework for prevention, regulation and control of maritime pollution in Africa is the failure to implementation signed agreements. Often at the point of signing an instrument, a state may have laudable plans towards its enforcement, but in reality, enforcement is usually affected by several interfering factors including lack of political will, lack of transparency and accountability, corruption and the influence of international politics. These often hinder the implementation of international instruments at the national arena. Hence, the need for political will on the part of the government of the day to make good, obligations in relevant international instrument, to aid its enforcement. As part of regulation and control, it is important for international legal regime to make provision for monitoring compliance with relevant instruments as and when possible. An efficient enforcement

[139] Bashir Hussein, note 58, 8-15.

regime must be backed by sanction and other compliance inducing elements such as moral suasion in order to get desired results.

A corollary to the issue of lack of political will is the inadequate skill and technical knowledge or lack of skilled personnel needed to monitor compliance with relevant legal instruments in most developing states. Most of the officials in charge of ensuring compliance with the standards set in the various instruments lack the skills needed to effectively carry out their duties. For instance, Article V and VII of MARPOL specify standards which require inspection to ensure compliance by vessels within a state's maritime domain. However, in the absence of requisite inspection, foreign vessels may refuse to comply. It is therefore observable, that the fact that the international regime places reliance on states to see to the compliance with maritime pollution laws, despite the lack of strict enforceability affects the efficacy of multilateral instruments and calls for an urgent review.[140]

Another factor found to influence difficulty in preventing maritime pollution in Africa is the jurisdictional regime of UNCLOS, which is not exactly suitable for protection of the marine environment against pollution. The regime attempts to strike a balance between the right of a coastal state to govern her maritime domain by ensuring compliance with various applicable regional and multilateral instruments and the theory of the ocean as a common heritage of mankind granting the flag state navigational freedom.[141] Whereas a coastal state may be immediately affected by activities of a vessel within her maritime domain in the ocean nearby, a flag state may never gave the course to interact with the vessel flying her flag and may be totally unaffected by the activities of such vessel as such enforcement of anti-pollution laws may never be effected by the flag state. Where a vessel never navigates the maritime domain of the state whose flag it flies, the state may lack the necessary incentive and avenue to enforce relevant laws. [142]The situation is worsened by

[140] Emeka Duruigbo, 'Reforming the International Law and Policy on Marine Oil Pollution' 31 *Journal of Maritime Law and Commerce* 81-85(2000).
[141]Véronique Frank, 'The European Community and Marine Environmental Protection in the International Law of the Sea: Implementing Global Obligations at the Regional Level' 40 (USA, Nijhoff Publishers 2007).
[142] Alan Tan, 'Vessel-Source Marine Pollution: The Law and Politics of International Regulation 18 (Cambridge Cambridge University Press 2006).

the practice of flying flag of convenience which makes the relationship between the flag state and the vessel further estranged.

Regulation and control of maritime pollution on the high sea, within areas beyond the sight of coastal states constitute another major problem. Because of the lacuna in the governance and enforcement of anti-pollution laws on the high sea, it has become a target for illegal dumping and incineration of toxic wastes. For instance, after the Tsunami which hit the Somali coast in December 2004, the sea washed off the coast lots of rotting containers and leaking drums of toxic substances which had been dumped into the sea years before. Similarly, in the course of carrying-out a survey in 2006, a Mogadishu-based NGO called Daryeel Bulsho Guud found fifteen sealed toxic waste containers washed by the Tsunami.[143]

Prevention and control of maritime pollution in Africa is also affected by the lack of adequate capacity, technical know-how and wherewithal to monitor compliance with relevant international instruments. The disparity in technological advancement between developed and developing nations cannot be over emphasized. Meanwhile, most of the states in Africa are developing states as such they lack the capacity and finance to develop and implement national programmes to ensure compliance with environmental standards in maritime relations. To prevent maritime pollution in Africa, there is need for inter-state, inter-regional and international cooperation, to acquire expertise and ensure compliance with best practices on environmental standards within the African Maritime Domain. This is in line with Article 202 of UNCLOS which oblige developed nations who are signatories to the convention to provide assistance to developing nations to aid skill acquisition in scientific, educational and technical knowledge needed to prevent maritime pollution. Much of the obligation is vested in industrialized nations to provide requisite support to enable developing nation's effect programs relating to marine science and technology.[144]

Another aspect which calls for intensified efforts in order to control maritime pollution within the AMD is the monitoring of environmental impact of maritime activities. The

[143] Bashir Mohamed Hussein, note 58.
[144] UNCLOS, note 18, Article 266(2).

United Nations Environmental Programme (UNEP) in 1987 described Environmental Impact Assessment (EIA) as "an examination, analysis and assessment of planned activities with a view to ensuring environmentally sound and sustainable development".[145] State obligation to carryout EIA is also incorporated into Article 206 of UNCLOS. Efforts towards carrying out this obligation needs to be intensified through regional instruments which must also set out state obligations in bilateral maritime relations with African states. An example of such regional agreement is the 1992 Helsinki Convention which in its Article 7 specifies state obligations in relation to EIA around the Baltic Sea.[146] Another measure which can be adopted at the AU arena to protect the AMD from pollution is introduce a reporting system through a convention which does not only call for reporting but also give a guide on the prescribed content of the report to ensure accuracy of the report and commitment on the part of the reporting state.

[145] Sands, Philippe, 'International law in the field of sustainable development' 65(1) *British Yearbook of International Law* 303-381(1994).
[146] Convention on the Protection of the Marine Environment of the Baltic Sea Area, (1992) (Helsinki Convention Revised) 1507 UNTS 166, 13 ILM 546 (entered into force 17 January 2000).