Regulating Marine Litter and Plastic Wastes in the South Asian Seas Region

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1. Introduction

Marine Litter mostly from the plastic waste has emerged as one of the serious environmental challenges of our times to the rivers as well as marine and coastal eco-systems. Marine litters along with plastic wastes around the marine environment have been significant concerns for the coastal States and the islands. It could be regarded as a 'common concern'[1] to be addressed globally through concerted inter-governmental actions.

This simmering challenge has quite often been raised by governmental and non-governmental organizations, research institutions, scientists, activists and citizens across the continents. Marine litter or debris are basically "a persistent, manufactured, or processed solid material found in the marine and coastal environment harmful to not only environment and wildlife, but also human health and social life especially fishing and aquaculture, transport and tourism and above all blue economy."[2] Its origins, sources, causes and effects are uncertain and diverse. As recent studies indicate, "around eighty percent of the 4.8-12.7 million tons of land-based plastic waste drawn in 192 coastal countries."[3] Moreover, it is also cause of great concern that "between 1.15 and 2.41 million tons of plastic waste flow from rivers into ocean annually."[4] According to OSPAR (1995), it has been estimated that "about seventy percent of marine litter is on the seabed, fifteen percent is floating in the water column and fifteen percent is found on our shore."[5] In fact estimated cost of damage resulting from marine litter

[1] Balraj K. Sidhu and Bharat H Desai (2018), "Plastics Pollution: A New Common Concern of Humankind?", *Environmental Policy & Law* (IOS Press, Amsterdam), vol.48, no.5, 2018, pp. . Also see Balraj K. Sidhu and Bharat H. Desai (2018), "Break up with the plastic menace", *The Tribune*, 05 June 2018, p.9.

[2] Secretariat of the Convention on Biological Diversity and the Scientific and Technical Advisory Panel/GEF (2012), *Impacts of Marine Debris on Biodiversity: Current Status and Potential Solutions*, Montreal, Technical Series No. 67, p. 12, pp1-67.

[3] Ibid.

[4] C. Joyner and Scot Frew (1999), "Plastic Pollution in Marine Environment", *Ocean Development and International Law*, Vol. 22(1), p.35, pp 33-72; available at*:* https://www.tandfonline. com/doi/abs/10.1080/00908329109545949.pdf

[5] OSPAR (1995), *Monitoring of Marine Debris on Beaches in OSPAR Region*, OSPAR Commission, London, *available at*: URL: https://www.ospar.org/work-areas/eiha/marine-litter-1995.html

across the 21 Pacific nations has been staggering sum of "949 million pound annually in total, 273 million pound for the fishing industry, 209 million pound for the shipping industry and 467 million pound for marine tourism."[6] However, it is difficult to measure the accurate economic cost of marine litter due to diverse range of economic, social and environmental impacts on different countries.

In last two decades, there has been frequent growth of marine litter and plastic wastes across the continents due to growing population, industrialization, production, consumption and waste generation. Marine litter originates from land-based source and/or sea-based sources. It ultimately comes to oceans through different pathways such as river, stream and storm.[7] Due to its very nature, marine litter does cause impact on the marine resources, food security, public health and safety at global, regional and national levels. To address marine litter problem, several international efforts have been made to control or reduce the marine litter through regulatory measures and management strategies. Several international conventions, treaties, programs and action plans have been adopted by various international agencies that have relevance for control and reduction of the marine litter at global and regional levels.

At the regional level, the South Asian Sea (SAS) region comprises five coastal states (Bangladesh, India, Maldives, Pakistan and Sri Lanka) that are highly vulnerable to the impacts of marine litter. Having dense population, low per capita income, dependence on agriculture and biodiversity, and located between Indian Ocean and Arabian Sea, the countries of the SAS region are facing environmental and coastal problems with marine litter and plastic waste in recent times.[8] It has been warned that "degradation of the coastal resources, habitats and biodiversity in the SAS region has immensely caused social, economic and ecological insecurity."[9] It has been also highlighted that "there has been neither a legal instrument adopted to regulate and manage the marine litter nor regional action plan or strategies have been prepared by the SAS countries for this region."[10] Hence, it has become necessary to assess, evolve and prepare specific instruments, strategies or action plans at regional and national level with targeted goals and time limits to manage and reduce the marine litter and plastic wastes that enters the marine environment.

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[6] *Ibid.*

[7] UNEP (2016), *Marine Plastic Debris and Micro plastic- Global Lessons and Research to Inspire and Guide Policy Change*, UNEP, Nairobi, p 12, pp. 1-76, *available at*: URL: https://wedocs.unep.org/ rest/ bitstreams/11700/ retrieve.pdf

[8] SACEP (2018), *Regional Marine Litter Action Plan for South Asian Seas Region*, A Report for the South Asian Co-operative Environment Program, Colombo, Sri Lanka, p. 5, pp.1-33; available at: https://www.sacep.org/?page_id=11435.html

[9] *Ibid.*

[10] *Ibid.*

2. Marine Litter and Plastic Waste: Sources, Causes and Effects

Marine litter has become one of the major threats to the marine environment. 'Marine litter' has been defined as "any persistent, manufactured or processed solid material discarded, disposed of or abandoned into the marine and coastal environment."[11] Marine litter has been recognized as "items or materials that have been made or used by human; deliberately discarded into the seas or rivers or beaches; brought indirectly to the sea by river, sewage, storm or winds; accidently lost or deliberately left by people on beaches and shores."[12] It has been classified into several distinct categories:[13]

(i) Plastics - synthetic polymeric material and micro plastic particles.
(ii) Metal - drinking can, foil wrappers and disposal baroques.
(iii) Glass - bottles, bulbs.
(iv) Processed timber - pallets, crates and particle boards.
(v) Paper and cardboard - cartoons, cups and bags.
(vi) Rubber - tyre, balloons and gloves.
(vii) Clothing - shoes, towels and dresses.
(viii) Tar balls - oil residues, cosmetics.

Among these categories, plastic is the most important marine litter found across the countries due to availability, durability and utility. Hence, most of the plastic wastes and debris end up in the oceans and rives as it mostly originates from land-based sources such as industrial and municipal waste.[14] Besides, the sea-based sources also contribute to generation of marine litter through shipping, ferries, cruise liners, pleasure crafts, fishing vessels, offshore oil and gas platforms.[15] Once discarded, the marines litter or plastic waste, both from land base and sea base sources, travels long distances and ends up in remote locations that are far away from its entry point. The circulation, transportation and accumulation of marine litter in

[11] *Supra note* 6 at 12

[12] *Ibid.*

[13] Galgani F., et.al.(2010), *Marine Strategy Framework Directive, Marine Litter Task Group 10 Report*, Luxembourg, *available at:* URL:http://www.dx.doi.org/10.2788/86941.html

[14]Secretariat of Convention on Biological Diversity (2016), *Marine Debris: Understanding, Preventing and Mitigating the Significant Adverse Impacts on Marine and Coastal Biodiversity*, Technical Series No.83; Secretariat of the Convention on Biological Diversity, Montreal, p. 11., pp.1-74, *available at:* URL: https://www.cbd.int/doc/publications/cbd-ts-83-en.pdf

oceans have been a major cause of concern due to lack of assessment, study and coordination among various agencies.

The prevalence of marine litter in the marine environment has the potential of causing social, economic and environmental impacts at national, regional and global levels. The social impacts from marine litter can be attributed to intangible costs incurred to the communities or societies as it causes adverse effect on human health and food safety, public livelihood and occupation.[16] The economic impacts have been recognized with detrimental effect on the trade and occupation, fisheries, transportation, tourism.[17] The marine litter has results in adverse impact on environment and ecosystem as it harms not only species and services, but also habitats and the marine environment.[18] Above all, the most disturbing and visible impacts of the marine litter are ingestion, suffocation and entanglement in marine and coastal areas causing deaths, injuries and infections to human, animal and other species.

In spite of some relevant international legal instruments concerning protection and preservation of the marine environment, however, there is no legal instrument that seeks to directly address prevention and management of marine litter. Hence, prevention and management of marine litter at regional and national level is critically important today.

3. Marine Litter and Plastic Waste: Legal Regulation

There are several legal instruments at international, regional and national level for the protection and management of marine environment including pollution caused by the marine litter and the plastic wastes. These instruments comprise conventions, agreements, strategies, action plans, programs and guidelines divided into two parts: "those one which are explicitly transposed into regional or national schemes; and those which are not explicitly transposed into regional or national schemes."[19] It is well understood that any legal action at any level must be based on the existing body of international law due to trans-boundary existence and effect of the marine litter. It has been well observed also by UN Secretary General António Guterres in the UN Ocean Conference (2017) in New York that *"Now we need concrete steps, from expanding marine protected areas, to the management of fisheries; from reducing*

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[15] *Ibid.*

[16] *Ibid* at p. 9

[17] *Ibid.* at p.10

[18] *Ibid.*

[19] STAP/GEF (2011), *Marine Debris as a Global Environmental Problem: Introducing Solutions based Framework focused on Plastic*, A STAP/Global Environment Facility, Washington, DC, p. 5, pp.1-31, *available at:* URL: www.stapgef.org/sites/default/files/stap/wp-content/uploads/.../Marine-Debris.pdf.

pollution to cleaning up plastic waste. I call for a step change from local and national initiatives to an urgent coordinated international effort."[20]

In view of growing global concern on marine litter, it is incumbent upon the countries to abide by the existing corpus of international legal instruments. Among the most significant international instruments, the 1992 *United Nations Convention on Law of the Sea* (Part XII, Articles 192-237) addresses the protection and prevention of marine environment.[21] While the provisions do not explicitly refer to marine litter, they place general obligations on the member States to control pollution of the marine environment. It requires member States to "prevent, reduce and control the pollution of the marine environment from any source, using for this purpose the best practicable means of their disposal and in accordance with their capabilities."[22] Furthermore, the 1972 London Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matters and its 1996 Protocol restrict the dumping of wastes into the sea. Under the Convention, "the contracting parties shall individually and collectively protect and preserve the marine environment from all sources of pollution and take effective measures according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matters."[23] Here, the member States are required to protect and preserve the marine environment from all the sources of pollution. Besides, the 1973 International Convention for Prevention of Pollution from Ships, known as MARPOL Convention, developed by International Maritime Organization (IMO) to prevent the pollution of marine environment from discharge of the garbage by the ships at sea.[24] Further, Annex V has been added to this Convention as "Regulations for the Prevention of Pollution by Garbage from Ships (1998)" to ban all garbage dumping at sea subject to specific exceptions.

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[20] Inaugural Speech given by UN Secretary General, Antonio Guterres in United Nation Ocean Conference, 2017 held on 5-9 June, 2017 at New York, USA, *available at*: URL: https://oceanconference.un.org/agenda/ en/../session.html

[21] United Nations Convention on the Law of the Sea (1982); (Articles 192- 237, Part XII), Dec. 10, 1833 U.N.T.S., 397, also *available at*: URL: https://www.un.org/Depts/los/convention_agreements/ texts/unclos/unclos_e.pdf

[22] *Ibid.* Article 194.1

[23] London Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matters (1972); Article 2; *available at*: URL: www.imo.org/en/OurWork/Environment/LCLP/Pages.aspx

[24] International Convention for Prevention of Pollution from Ships, 1973, *available at*: URL: www.imo.org/.../MARPOL%201973%20-%20Final%20Act%20and%20Convention.pdf

Besides, Declaration of the 1972 United Nations Conference on the Human Environment (UNCHE), also state that "States shall take all possible steps to prevent pollution of the seas by substance that are liable to create hazards to human health, to harm living resource and marine life, to damage amenities or to interference with other legitimate uses of the sea".[25] In year 1982, The UN General Assembly adopted Resolution 2749/1982 on the "Declaration of Principles Governing the Seabed and the Oceans Floor and Subsoil".[26] It proclaimed that:

"States shall take appropriate measure for and shall co-operate in the adoption and implementation of international rules, standards and procedures for the prevention of pollution and contamination; other hazards to the marine environment, including the coastline, and of interference with the ecological balance of the marine environment".[27]

The 1992 United Nation Conference on Environment and Development (UNCED) in its Agenda 21 addressed in Chapter 27 the marine environment from sustainable development perspective that marine litter or plastics pose the greatest threat to the marine environment.[28]

Further, the 1995 Washington Declaration on Protection of the Marine Environment from Land-based Activities has called for "sustained and affective action to deal with all land-based impacts upon the marine environment, specifically those resulting from sewage, persistent organic pollutants, radioactive substance, heavy metals, oil, nutrients, sediment mobilization, litter and physical alteration and destruction of habitats".[29] It has been supported by 1995 Global Program of Action for the Protection of the Marine Environment from Land-based Activities.[30] Besides, the 2011 Fifth International Marine Debris Conference adopted the Honolulu Strategy for the global effort to reduce the ecological,

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[25] United Nations Conference on Human Environment, 1972, held on June, 1972 at Stockholm, Sweden; available at: https://www.legal.un.org/ avl/pdf/ha/dunche/dunche_e.pdf

[26] UN General Assembly Resolution 2749/1982: "Declaration of the Principles on Seabed and The Ocean Floor and Subsoil thereof"; available at: www.un-documents.net/a25r2749.html

[27] *Ibid.*

[28] United Nation Conference on Environment and Development, 1992, held on Rio de jenerio, Brazil on 3-14 June, 1992; available at: https://www.unsystem.org/content/united-nations-conference-environment-and-development-unced-1992.html

[29] Washington Declaration on Protection of the Marine Environment from Land-based Activities, 1995; available at: https://wedocs.unep.org/bitstream/handle/20.500.../WashingtonDeclaration.pdf

[30] Global Programme of Action for the Protection of the Marine Environment from Land-based Activities,1995; available at: https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/addressing-land-based-pollution/governing-global-programme.html

economic and social impacts of marine debris.[31] One of its goals called for reduction of the amount and impact of land-based source of marine debris introduced into the sea. Recently, the 2017 UN Ocean Conference (New York) committed in its document entitled *Our Ocean, Our Future: Call for Action* that "Member countries accelerate actions to prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris, plastic and micro plastic"[32] There has been also an initiative taken to establish a 2012 Global Partnership of Marine Litter by UNEP to work with all major stakeholders for the marine litter prevention and management.[33]

At the regional level, there are several international instruments dealing with protection and improvement of marine environment. First of its kind, 1994 Bamako Convention was adopted by the African Union for prohibiting the impact of any hazardous waste and its trans-boundary movement and management.[34] However, the marine litter may not directly fit in the definition of 'hazardous wastes'. This convention just creates an opportunity for a dispute to be raised against marine litter pollution even if not included in the definition of hazardous waste. Convention for Protection of Marine Environment of the North-East Atlantic (OSPAR Convention) was adopted by 15 States which came into force in 1998.[35] Article 3 of OSPAR Convention provides, "The contracting parties shall take individually and jointly are possible steps to prevent and eliminate pollution from land-based sources in accordance with the provisions of the convention."[36] The 1986 Cartagena Convention is another legally binding environmental treaty for governing marine debris in the Gulf of Mexico, the Caribbean Sea and parts of the Atlantic Ocean for marine pollution through land-based sources. It requires that the "contracting parties shall take all appropriate measures to prevent, reduce and control the pollution of the convention area caused by coastal disposal or by discharges emanating

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[31] UNEP & NOAA (2012), The Honolulu Strategy: A Global Framework for Prevention and Management of Marine Debris, Honolulu; available at: http://www.marinedabris.noaa.gov.sit/default/honolulu strategy.pdf

[32] UNO (2017), "Our Ocean, Our Future: Call for Action", United Nations Ocean Conference held during 5-9 June, 2017 at New York, USA; available at: https://oceanconference.un.org/agenda/ en/../call_for_action.html

[33] Global Partnership of Marine Litter, 2012; available at: https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/land-based-pollution/global-partnership-marine.html

[34] Bamako Convention, 1994; available at*:* https://www.jus.uio.no/lm/hazardous.waste.ban.bamako.convention.../portrait.pdf

[35] OSPAR Convention for Protection of Marine Environment of the North-East Atlantic, 1998; available at: https://www.ospar.org/convention.html

[36] *Ibid.* Article 3

from rivers, estuaries, coastal establishments, outfall structures or any other sources on their territories."[37] It has been further supplemented by a Protocol concerning Pollution from Land-based Sources and Activities (1999).

There is also a framework Convention for the Protection of the Marine Environment of the Caspian Sea (2012). It is better known as 'Tehran Convention' and seeks to regulate pollution from land-based sources. It also explicitly stating that "the parties shall take all appropriate measures to prevent, reduce and control pollution of the Caspian Sea from land-based sources."[38] The Tehran Convention has been supplemented by the 2012 Moscow Protocol for the Protection of the Caspian Sea against Pollution from Land-based Sources.[39] Through due regulatory process, the region has adopted the 1978 Kuwait Regional Convention for Corporation on the Protection of Marine Environment from Pollution along with its 1999 Protocol for the Protection of the Marine Environment against Pollution from Land-based Sources.[40] Similarly, the 1992 Convention on the Protection of the Marine Environment of the Baltic also contains provision for regulating land-based sources of pollution. It is known as the Helsinki Convention. Article 5 imposes an obligation on the Contracting Parties to prevent and eliminate pollution of the Baltic Sea Area from land-based sources by using, inter alia, best environmental practices for all the sources and the best available technology for the point sources.[41] This Convention has clear definitions, specific obligations and effective enforcement mechanism for the prevention of marine pollution.

Furthermore, the 1992 Convention on the Protection of the Black Sea against Pollution was adopted by the six Black Sea Countries for the protection and prevention of marine environment of the Black Sea. It lays down that "the contracting parties shall prevent, reduce

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[37]Cartagena Convention, 1986; available at: https://www.cep.unep.org/cartagena-convention/Cartagena%20Convention%20English%20.html

[38] Convention for the Protection of the Marine Environment of the Caspian Sea, 2012; available at: https://www.ecolex.org/details/treaty/framework-convention-for-the-protection-of-the-marine-environment-of-the-caspian-sea-tre-001396.html

[39] Moscow Protocol for the Protection of the Caspian Sea against Pollution from Land-based Sources, 2012; available at: https://wedocs.unep.org/bitstream/handle/.../tehran_convention_n.a_schneider.pdf

[40] Kuwait Regional Convention for Corporation on the Protection of Marine Environment from Pollution, 1978; available at: https://www.sedac.ciesin.columbia.edu/entri/texts/kuwait.marine.pollution.1978.html

[41] Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992; available at: https://www.helcom.fi/.../Convention%20and%20commitments/Helsinki%20Convention/1992.html

and control pollution of the marine environment of the Black sea from land-based source in accordance with the protocol."[42]

The 1976 Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean Sea was adopted at Barcelona for the prevention of pollution in the Mediterranean Sea by dumping from ships and aircraft.[43] This has been also supported by a separate 1980 Protocol for the Protection of the Mediterranean Sea against Pollution for Land-based Sources. It is better-known as the LBS Protocol.[44] This is the only binding legal instrument which specifically targets marine litter for land-based sources. Under this Protocol, a 'Regional Plan on Marine Litter Management in the Mediterranean Sea' has taken shape with the objective to "prevent and reduce to the within marine litter pollution in the Mediterranean in its compact on ecosystem services, habitats, species in particular the endangered species, public health and safety."[45] This Regional Plan contains binding and time bound obligations for the contracting parties to address the problem of marine litter pollution.

The European Union region has adopted the 2008 'Marine Strategy Framework Directive' for the protection of the marine environment following an ecosystem-based, adaptive and integrated approach to the management of human activities which have an impact on the marine environment.[46] It has established a framework within which the Member States shall take necessary measures to achieve or maintain good environmental status (GES) by 2020. Here, marine litter has been listed as the tenth of eleven qualitative disciplines for determining GES in Annex I, as 'properties and qualities of marine litter do not cause harm to the coastal and marine environment'.[47] If any of the Member States permit the generation of

[42] Convention on the Protection of the Black Sea against Pollution, 1992; available at: https://www.blacksea- commission.org/_convention.asp

[43] Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean Sea, 1976; available at: https://treaties.un.org/doc/Publication/UNTS/... /volume-1102-I-16908-English.pdf

[44] Protocol for the Protection of the Mediterranean Sea against Pollution for Land-based Sources, 1980; available at: https://web.unep.org/unepmap/4-lbs-protocol-and-amendments.html

[45] Regional Plan on Marine Litter Management in the Mediterranean Sea, 2005; available at: https://www.cbd.int/doc/meetings/mar/mcbem-2014.../mcbem-2014-03-120-en.pdf

[46] EU Marine Strategy Framework Directive, 2008; available at: https://europa.eu/../marine/eu.marine-strategy-framework-directive/index_en.html

marine litter beyond 2020, they would violate their obligation to preserve good environmental status of their marine waters.

4. Marine Litter Pollution in SAS Region: Status, Impact, Regulation and Best Management Practices

The marine litter and micro-plastic have immensely affected the marine environment in the South Asian Seas (SAS) region. The quantity and intensity of the marine litter and the plastic waste ending up in the SAS region has been recognized at an alarming stage.[48] Majority of the countries in SAS region contribute to marine litter pollution and plastic waste from the land-based sources and sea-based sources. However, the origin and routes of the marine litter are diverse and exact quantities and pathways are not fully known.[49] Still, it is widely known that top twenty polluting rivers end up in the ocean of SAS region. On this account, however, the basic information, data, report, assessment, plan and strategies are very limited.[50] All the SAS region countries face similar problems as regards assessment, disposal and management of the marine litter and the plastic wastes in the oceans. There is also lack of basic legal framework and initiatives for effective regulation and management of the marine litter and plastic waste in the SAS region.[51] No country except Sri Lanka has even established or designated the specialized institution or agency for marine litter disposal and management.[52]

Status: The SAS region comprises Bangladesh, India, Maldives, Pakistan and Sri Lanka situated along the Indian Ocean, the Bay of Bengal and the Arabian Sea. These countries are quite rich in biodiversity, marine resources and wetlands harboring the plants, animals and microorganisms. The marine litter pollution and plastic wastes has emerged as a major problem to SAS region countries due to over production, utilization and disposal for the last two decades. Most of the countries in SAS region are also among top the list of countries causing pollution of the marine environment due to growing amount of marine litter and plastic waste. The major source of marine litter and plastic wastes in these countries are domestic and industrial wastes through sewage and tanneries, shipping and dumping, fishing

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[47] *Ibid*

[48] SACEP (2007), Marine Litter in South Asian Seas Region, A Report for the South Asian Co-operative Environment Program, Colombo, Sri Lanka, p. 6, pp.1-123; available at: https://www.apps.unep.org/redirect.php?.../-Marine%20Litter%20in%20the%20South%20Asian.pdf

[49] *Ibid.*

[50] SACEP (2018), *Regional Marine Litter Action Plan for South Asian Seas Region*, A Report for the South Asian Co-operative Environment Program, Colombo, Sri Lanka, p. 5, pp.1-33; available at: http://www.sacep.org/?page_id=11435.html

[51] *Ibid*

[52] *Ibid*

and aquaculture, tourism and recreational activities adjacent to the coasts or seas.[53] Most of the marine litter and plastics are categorized as 'solid wastes' coming from land-based and sea-based sources that pollute the marine environment. However, no uniform standard or method has been found to assess the exact status, quantity and impact of the marine litter and plastic wastes in these countries of the SAS region.[54]

Impact: In view of this complex problem of marine litter and plastic wastes, all the countries of SAS region are facing social, economic and ecological ill-effects detrimental to the sustainable development and marine environment. There is lack of exhaustive and authentic study and research that assess the negative impacts on the social, economic and environmental status of the countries individually or jointly.[55] There is, however, general information, awareness and experiences individually and collectively in these countries about the domestic and trans-boundary effect of the marine litter and the plastic wastes. The basic indicators and parameters for the negative impact on the social life have been related to public health and food security, trade transportation and occupation, cultural and aesthetic relation attached with the marine resources and environment. The economic impact could be realized on the basis of economic cost and commercial interest incurred through marine trade, transportation and tourism. The ecological impact has been addressed with marine resources, services and intrinsic value exhausted by through creation of marine litter and plastic wastes. Still, there is absence of concrete and certain assessment and data on actual and potential impacts of the marine litter and plastic wastes in these countries of the SAS region to devise the mechanism for proper regulation and management.[56]

Regulation and Management: The regulation and management for the reduction and disposal of the marine litter and plastic wastes is significant and urgent not only national but also regional level due to its trans-boundary movement, existence and effect. Though, there are international legal instruments and management strategies dealing with the pollution of the marine environment including marine litter and plastic wastes, yet very few are being applied or implemented fully in the SAS region due its own regional or problem specific limitations. Under UNEP's Regional Seas Program, a region specific action plan for SAS region was adopted in year 1995 to tackle the problem of the marine litter and plastic wastes.[57] Since then, UNEP in association with SACEP have taken several initiatives and developed management strategies and action plans for the safe handling, transfer, disposal and management of the marine litter as 'solid wastes' in this SAS region.[58] At the SAS regional level, there are limited instruments, strategies and best practices on solid waste

[53] *Supra note* 47 at 9
[54] *Ibid*

[55] *Supra note* 49 at 26

[56] *Ibid* at 27

[57] *Supra note* 47 at 12

[58] *Ibid*

management including marine litter and plastic wastes. Even at the national level, some of the countries in this region have not even formulated specific legislation or regulation; constituted specialized authority or agency and initiated actions and activities against the marine litter pollution and plastic wastes. Besides, there are other major barriers to address the marine litter pollution and plastic wastes in SAS region such as inadequate research and studies, information and data, education and awareness, budget and infrastructure to realize, evaluate and manage the challenge of marine litter and plastic wastes. These SAS countries have also very limited direct developmental activities, best waste management practices, market related instruments and tools that can effectively address regulation and management of marine litter and plastic wastes.

5. Country Specific Reports in the SAS Region

The evaluation of the individual status in the SAS region countries for better understanding and solution of the problem of marine litter helps in suggesting appropriate regulatory mechanism and management strategy to deal with the marine litter and plastic wastes:

I) Bangladesh:

Marine litter and plastic wastes has been a cause serious concern to the government for last two decades. Marine litter has caused serious damage to the ecological, economic and social health and life of the people as well as the marine environment. The preliminary investigation was conducted in year 2017 in two districts adjacent to the coast of the Bangladesh. In four sampling stations or beaches of Cox's Bazar and Chittagong districts, 6705 numbers of marine litters were found specifically of plastic or micro plastics from land-based sources only.[59] A large quantity of plastic wastes was found in the Cox's Bazar as compared to the Chittagong district. It suggested that the sources of these marine litters in both the districts were rivers and canals, dumping by ships and boats, surface drainage and other sources.[60] However, it has been difficult to find out exact quantity and sources of the marine litter. Ironically, no specific agency has been constituted for marine litter monitoring and management. There is no specific policy as well as legislation on marine litter pollution in Bangladesh. The Government, however, uses the provisions of the environmental law and other regulations in this regard.[61] For the coastal management, there is Coastal Zone Policy (2005) and Costal Zone Strategy (2006). In 1995, National Environmental Management Action Plan was prepared for the reduction of marine litter pollution.[62] Dhaka City

[59] SACEP (2018), *Marine Litter Action Plan for South Asian Seas Region*, Bangladesh Country Report for the South Asian Co-operative Environment Programme, Colombo, Sri Lanka, p. 9, pp.1- 56

[60] *Ibid* at 26

[61] *Ibid* at 32

[62] *Ibid* at 33

Corporation has taken the lead by adopting best waste management practices for collection, transportation, disposal and treatment of the plastic waste in the metropolitan areas including costal and beach areas. However, it has only fifty percent manpower and financial capacity to manage solid or plastic wastes.

II) India:

Marine litter and plastic wastes has been major problem for India due to long coasts and large islands within its maritime jurisdiction. Marine litter occurs in all the five compartments such as coastline, surface, main water column, seabed and biota in these regions from both land-based sources and sea-based sources. It has impacted the human health and food safety, trade and transportation, fisheries and aquaculture, ecology and biodiversity of the country. Some studies have been made in coastal areas of Gujarat, Maharashtra, Goa, Kerala, Karnataka, Tamilnadu, Andaman and Nicobar Islands.[63] Major aspects for the studies include distribution, abundance, composition and quantification of the types, amount, sources and impact of the marine litter in east and west coast of India. The plastic pollution has been found to be prominent at all the beaches, coasts and islands due to disposal of domestic wastes and other anthropogenic disposals. India is also among the top countries in the production and utilization of the plastic products. It has sixty percent capacity of recycling out of the discarded plastic wastes.[64] Though, there are statutory institutions and agencies that are engaged in prevention and control of environmental pollution including marine pollution. Notwithstanding this, there is no specific national marine litter policy, legislation and regulation.[65] Recent initiatives under the ages of nationwide campaigns such as *Swachh Bharat Abhiyan*, efforts have been to clean up the coastal areas as well as monitor marine litter pollution.[66] Community participation, collaboration with industries and NGOs has been also been part of this concerted process. Still it requires special measures to strengthen the legal and institutional regime, capacity building, public awareness, research and studies for the proper regulation and management of the marine litter in India.

III) Pakistan:

Marine litter has been one of the major environmental problems in the coastal areas of Pakistan. It has been largely through disposal of solid wastes, untreated effluents, fishing activities, tourism and other land-based sources. The kind of marine litter found in Pakistan includes plastic bags, balloons, glass bottles, fishing nets, oil leakage and garbage dumped

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[63] SACEP (2018), *Marine Litter Action Plan for South Asian Seas Region*, Indian Country Report for the South Asian Co-operative Environment Programme, Colombo, Sri Lanka, p. 18, pp.1-79.

[64] *Ibid* at 56

[65] *Ibid* at 69

[66] *Ibid* at 72

from the ships.[67] The marine litter has its own negative ecological, economic and social impact on the coastal areas of Pakistan. The societal impacts include the human and animal health, food security and safety, life and livelihood of fishermen as well as the tourism. The economic impact of the marine litter has been especially in the coastal provinces and cities harming the aquaculture, tourism, trade and transport. There have been several environmental laws and policies in Pakistan for addressing coastal and marine pollution. They do not, however, adequately and exclusively address the problem of marine litter. As such no specific laws relating to marine litter have yet been developed at the national as well as the provincial levels in Pakistan.[68] Pakistan Environmental Protection Act (1997) imposed the ban on plastic products. It has also designated the Pakistan Maritime Zone for monitoring and removing marine pollution through marine litter and plastic wastes.[69] However, in its coastal areas and ports, Pakistan has to adopt specific strategic planning and coordination with all relevant stakeholders along with best waste management practices to combat the marine litter.

IV) Maldives:

Maldives located in the Indian Ocean is an Island in the south west India. Marine litter has been one of the major concerns for the marine environment of Maldives. This problem has been aggravated due to growing population, changing consumption patterns and lack of waste disposal and management. Along with land-based sources, the sea-based sources have also contributed to the marine litter. In Maldives, the marine litter mostly occurs from local sources like community dwellings, tourists, marine vessels and domestic wastes that cause social, economic and ecological ill-effect on the marine environment.[70] Marine litter has diminished the intrinsic social values, life and security, human health and food safety in Maldives. The economic impact has been related to consumption and utilization of marine resources, trade and transportation, tourism and recreational activities. The ecological impact has been attributed to the human, animal and wildlife that depend upon the marine environment. The marine litter is regulated as 'solid waste' under the solid waste management regulation in the Maldives. It is called the National Solid Waste Management Regulations (2013) passed under the Environmental Protection and Preservation Act of 1993.[71] Besides, there have been campaigns, strategies and activities to reduce and reuse the marine litter and plastic wastes in Maldives. There has been certain gaps and challenges in

[67] SACEP (2018), *The Marine Litter Action Plan*, Pakistan Status Report for the South Asian Co-operative Environment Programme, Colombo, Sri Lanka, p. 4, pp.1-36.

[68] *Ibid* at 27

[69] *Ibid* at 23

[70] SACEP (2018), *Maldives Marine Litter Action Plan*, Maldives Country Report for the South Asian Co-operative Environment Programme, Colombo, Sri Lanka, p. 2, pp.1-21

[71] *Ibid* at 13

the regulation and management of the marine litter in Maldives such as: insufficient data and information, inadequate regulations and management strategies, monitoring and enforcement, lack of education and awareness about the marine litter. [72]

V) Sri Lanka:

Sri Lanka is one of the SAS countries located in the Indian Ocean. The country is facing the problems of marine litter and waste management as a major threat to the marine environment in all the five provinces of Sri Lanka.[73] The marine litter entering into the ocean of Sri Lanka has been categorized as sea-based sources, costal based sources and island-based sources. The marine litter survey has been done in twenty two selected beaches around Sri Lanka in year 2016 where amount, size and variety of marine debris was found to be diverse and large in number.[74] The land-based litter was contributing more than ninety percent to the total litter entering into the marine and coastal areas of Sri Lanka through rivers and canals.[75] Marine litter has negatively impacted the ecological, economic and social life in Sri Lanka. It has impacted the cereal reef, sea-grass beds and mangroves along with biodiversity and marine ecosystems, coastal industries and tourism, human health and food safety, social life and security especially in coastal areas. The country has the Marine Pollution Prevention Act (20080 as a major legislation to prevent, reduce and control the marine pollution along with Marine Environment Protection Regulation (2012) that seeks to prohibit the dumping of marine wastes and other matters. [76] Still there is no specific national level policy on the marine litter in Sri Lanka. There are certain gaps and challenges as regards regulation and management of marine litter, institutional and enforcement mechanism, budget and infrastructure, education and awareness in Sri Lanka.

6. Marine Best Waste Management Practices

In view of the above, some best waste management practices could be used for combating the marine litter through reduction and reuse, recycling, composting and fermentation, better

[72] *Ibid* at 18

[73] SACEP (2018), *Status of Marine Debris Management in Sri Lanka*, Country Report for the South Asian Co-operative Environment Programme, Colombo, Sri Lanka, p. 5, pp.1-60

[74] *Ibid* at 16

[75] *Ibid* at 26

[76] *Ibid* at 40

management of landfills and land application.[77] For the challenge of marine litter, the best solid waste management practices could be adopted that could include the following:[78]

a) Waste Collection: organized and innovative method of collection, segregation and transport.

b) Source Reduction: Eco- design, single use, waste reuse and recycling, port reception facilities.

c) Scientific Landfills: Designing scientific landfills and dumping yards, prohibition of waste burning and landfills fire.

d) Cleanup Activities: Promotion of cleanup activities and initiatives in collaboration of international and national organizations.

e) Changing Human Behavior: Discourage polluting behavior and promotion of cleanness in beaches, coasts, tourism and recreational places.

f) Economic/Market based Instruments: Imposing the landfill taxes, product taxes, high fees and fines, deposit-refund schemes.

Judicious application of all these efforts/practices through appropriate policy, legislation and institutional mechanisms could contribute to the better marine litter management and reduction as well as sustainable waste management practices in SAS region. Individual SAS countries have also adopted best solid waste management practices, but not specifically for the marine litter.[79] Marine litter has been considered as solid waste only for the reduction, management and disposal within national jurisdiction. The best solid management practices have been adopted by some of the SAS countries such as:[80]

a) Plastic Waste Collection, Handling, Transport and Disposal

b) Plastic Waste Avoidance, Reduction, Reuse, Recycle or Treatment.

c) Banning the Fishing Gear and Ghost Fishing.

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[77] UNEP/ISWA (2015), *Global Waste Management Outlook*, Nairobi, Kenya; available at: https://www.uncclearn.org/sites/default/files/inventory/unep23092015.pdf

[78] The Energy and Research Institute, (2012), *Challenges and Opportunities in Plastic Waste Management in India*, TERI, New Delhi, p.6, pp. 1-20; available at: https://www.teriin.org/research-paper/discussion-paper-challenges-and-opportunities-plastic-waste-management-india.html

[79] SACEP (2007), *Marine Litter in South Asian Seas Region*, A Report for the South Asian Co-operative Environment Programme, Colombo, Sri Lanka, p. 6, pp.1-123.

[80] *Ibid*

d) Construction of Proper and Scientific Landfills.

e) Beach Cleanup and Conservation Activities.

    a. Strengthening Waste Management rules/Regulations/Strategies/Practices.

    b. Use of Economic/Market based Instruments

For the SAS countries, it is essential to integrate the marine litter management practices with solid waste management practices beneficial to the marine environment and the sea. The best regional practices could also be adopted alike the Wider Carrabin or Mediterranean region. Some best solid waste management practices adopted by some developed countries like USA, UK, Sweden, Japan and Netherland could provide useful models for marine litter management practices in the SAS region.[81] The national governments of the SAS region could incorporate and coordinate best marine litter management practices through appropriate plans/programs/funds/research/studies.

7. Conclusion

The abovementioned review leads us to suggest some steps for the better and effective management of marine litter and plastic wastes in the SAS region. Firstly, the SAS countries need to establish or designate specific or dedicated statutory institutions for the regulation and management of the marine litter and plastic wastes. Secondly, they need to adopt or strengthen the legal framework for marine litter and plastic wastes at regional and national level in consonance with some of the existing multilateral environmental agreements (MEAs). Thirdly, these countries need to develop and encourage development activities, best waste management practices and market based instruments for the proper marine litter management and reduction of plastic wastes. Fourthly, they need to prepare afresh or review the existing management strategies; promote or initiate research, innovation and education for better management of the marine litter and the plastic wastes. Last but not least, these countries need to also involve all stakeholders, private and public sector and civil society groups for effective marine litter management and regulation. These observations and suggestion, cumulatively, could help in effectively addressing the challenge of marine litter, its status and impact, legal instruments and strategies, gaps and weakness. As a corollary, they would be instrumental in providing a robust pathway in the development and effective implementation of the marine litter management and regulation in SAS region.

Apart from the above, the following strategic steps and collaborative partnership would augment capacity of the SAS region to work upon best management practices:

[81] UNEP (2016), *Marine Plastic Debris and Micro Plastic- Global Lessons and Research to Inspire and Guide Policy Change*, UNEP, Nairobi, p 12, pp. 1-76; available at: URL: URL:https:// wedocs.unep. org/ rest/bitstreams/11700/retrieve.pdf

I. SACEP needs to take the lead in promoting education and awareness in consultation with SAS member countries.; e.g. the UN Clean Seas Campaign (launched in Jan.2017).

II. UNEP needs to provide all possible assistance in technical and funding to SAS program as part of UNEP's 'jewel in the crown' –Regional Seas Program (RSPs).

III. SACEP and SAS can work on developing a Regional Action Plan/Guidelines that could encourage member countries to fine tune respective policies, legislative and institutional mechanisms.

IV. Need to employ a variety of tools, techniques and legal instruments to make decisive dent on the menace of marine litter in a time bound manner.

V. SACEP and UNEP need to work in unison to make SAS region plastic-free in the foreseeable future.

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