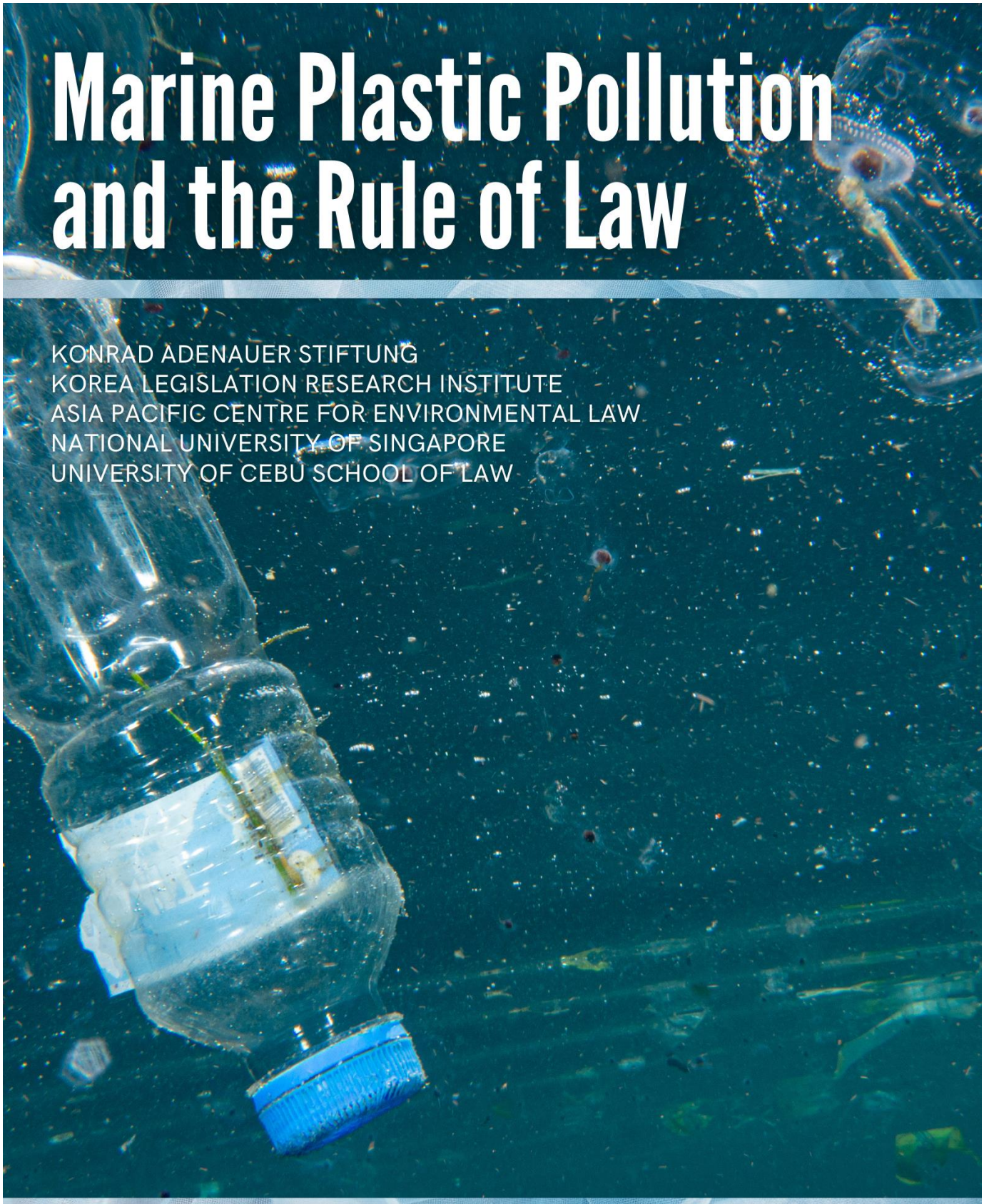
Marine Plastic Pollution and the Rule of Law



KONRAD ADENAUER STIFTUNG
KOREA LEGISLATION RESEARCH INSTITUTE
ASIA PACIFIC CENTRE FOR ENVIRONMENTAL LAW
NATIONAL UNIVERSITY OF SINGAPORE
UNIVERSITY OF CEBU SCHOOL OF LAW

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Marine Plastic Pollution and the Rule of Law

Linda Yanti Sulistiawati and Rose-Liza Eisma-Osorio (eds.)

ISBN: 978-621-96185-2-6

Board of Editors

Acknowledgements:
For administrative and technical support: **Judy Ann O. Ferrater-Gimena**, Research Center, University of Cebu - Banilad Campus and **Kristine Joy P. Argallon**, University of Cebu School of Law, Cebu City, Philippines.

Front cover image: Laarni Jane B. Tolo.
Book design and layout: Laarni Jane B. Tolo.

ISBN 978-621-96185-2-6

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Date Printed: October 2021

Published and distributed by:

Konrad-Adenaeur-Stiftung, Ltd.
Rule of Law Programme Asia
ARC 380, 380 Jalan Besar
#11-01, Singapore 209000
Tel: (65) 6603 6171
Website: http://www.kas.de/rspa/en/

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Preface

Asia-Pacific countries are still struggling to reduce their plastic debris in the ocean. The main sources of marine plastic debris are land-based, from urban and storm runoff, sewer overflows, beach visitors, inadequate waste disposal management, industrial activities, construction, and illegal dumping. Ocean-based plastic originates mainly from the fishing industry, nautical activities, and aquaculture. Despite the presence of laws and institutional mechanisms, these countries continue to face a host of implementation challenges. Thus, there is an urgent need to learn how countries have dealt with these challenges and identify best practices in combating marine plastic pollution.

This book documents selected best practices and challenges in combating marine plastic pollution in Asia Pacific. It is an endeavor of four (4) institutions: the Asia-Pacific Centre for Environmental Law National University of Singapore (APCEL), University of Cebu-School of Law (UC-SOL), Korean Legislation Research Institute (KLRI), and Konrad Adenauer Stiftung (KAS) Rule of Law Asia Programme. Starting in 2020, the organizing committee distributed a 'Call for Papers' for Marine Plastic Pollution Articles in Asia Pacific (July 2020), organized submission of Abstracts (1 August 2020), collected a selection of articles and presenters (25 August 2020), collated draft papers submission (1 October 2020), organized webinar (19-20 October 2020), published selected articles in KLRI Journal (May 2021), conducted editorial work (April-July 2021), and finally, launched the published book in October 2021.

This publication focuses on the complexity of marine plastic pollution rule of law issues in the Asia-Pacific Region. The discussions in the articles emerged from various scopes of international, regional, and domestic laws and policies as well as dwelt on challenges in governance, implementation, and enforcement of marine plastic pollution issues in the region. The basic framework of the arguments is the importance of a better quality of life, pollution-free environment, and a sustainable future for the present and generations yet to come.

Ranging from international-to-regional and national-to-local perspectives, this book elaborates various approaches in marine plastic pollution rule of law. Focusing on international governance, Shang is highlighting China's efforts in marine plastic governance, while Sulistiawati is connecting marine plastic pollution related international agreements and their possible implementation in two Indonesian cities. Yin, Eisma-Osorio, and Gao highlight marine plastic pollution regulations and its challenges in China, the Philippines, and Taiwan, respectively. Within the national perspective, Choudhary and Dutta discuss the issue of liability of marine plastic pollution in the Indian context, and Nguyen describes private participation in waste management in Vietnam.

At the regional level, Peel et.al. offer solutions for the governments of the Pacific Island to combat pollution problems. Likewise, Guzman looks at the issues and challenges in dealing with Abandoned, Lost or Otherwise Discarded Fishing Gear (ALDFG) in developing Asian and Pacific

Island countries, while Bea proposes a Global Architecture for Plastics Plus (GAP+). From a human rights and indigenous people perspective, Liljeblad is focusing on the potential for indigenous coastal communities in ASEAN states to exercise collective rights within a state to deal with transboundary maritime plastic waste.

Harnessing the wealth of knowledge from these articles, we can come into a conclusion that achieving rule of law in marine plastic pollution require not only the presence of laws and institutions but also parallel efforts in improved governance and active stakeholders' participation. Further research on this area is needed to enrich the literature for marine plastic pollution rule of law.

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Regional Solutions: Export Measures for Plastic Recyclables to Reduce Marine Plastic Pollution in the Pacific*

Professor Jacqueline Peel,* Professor Lee Godden,♣ Dr Alice Palmer♦ & Ms Rebekkah Markey-Towler♠

Abstract

While widely acknowledged to be a global problem due to its complex causes and effects, marine plastic pollution presents distinct regional challenges for Pacific Island countries and territories (PICTs). In this context, there is significant scope to devise regional solutions, to complement global and national measures, and thereby address some of the gaps in the currently fragmented international legal landscape. After taking stock of national, regional and international measures, this paper considers such opportunities for regional responses to the export of recyclable plastics by PICTs to incentivise ongoing collection of these wastes and reduce the potential for generation of marine plastic pollution in the first instance. Such solutions could involve developing regional legal and cooperative infrastructure, including by building on existing shipping arrangements in the region that reduce the costs associated with carrying recycled wastes out of PICTs. Overall, these regional solutions offer a 'middle way' approach that can help address the in-country constraints PICTs face in managing wastes, including plastics, while also allowing efforts to be focused at a scale where effective solutions are most possible.

Keywords: 'Plastic' – 'waste' – 'Marine Plastic*' – 'Pacific Island*' – 'export*' – 'Public-Private' – 'Regional governance' – 'recyclables' – 'circular economy'

* This paper has been previously submitted and published as a Featured Article in the Korea Legislation Research Institute's KLRI Journal of Law Legislation, Volume 11 Number 1, 2021, pp. 8-62.

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I. Introduction

Marine plastic pollution[1] has been gaining increasing attention as an environmental issue of international concern.[2] While widely acknowledged to be a global problem due to its complex causes and effects,[3] marine plastic pollution presents distinct regional challenges that offer possibilities for devising specific regional solutions, complementing global and national measures.[4]

This paper considers potential regional options for addressing the particular challenges faced by Pacific Island countries and territories (PICTs) in responding to marine plastic pollution, particularly focusing on the extent to which regional approaches can provide solutions to 'end-of-life' plastics suitable for recycling.[5] It argues that the transboundary problem of marine plastic pollution, in tandem with the in-country constraints on waste management faced by PICTs, requires the development of cross-border solutions. To this end, this paper examines opportunities to develop regional responses to the export of recyclable plastics by PICTs to incentivise ongoing collection of these wastes and reduce the potential for generation of marine plastic pollution in the first instance. There are opportunities for PICTs to leverage their national-level legal developments, in conjunction with existing regional cooperation initiatives and their geographical proximity, to develop tailored cross-border solutions for the export of plastics off island to

[1] The term 'marine plastic pollution' captures both macro-plastic wastes (marine litter/ debris) and microplastics i.e. both trash and chemicals. The United Nations Environment Programme (UNEP) defines marine litter as 'any persistent, manufactured or processed solid material which is discarded, disposed of, or abandoned in the marine and coastal environment': UNEP, Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, U.N. Doc. UNEP(OCA)/LBA/IG.2/7 (Dec. 5, 1995). This definition has not been updated in UN Environment Assembly (UNEA) resolutions on marine plastic litter and microplastics (UNEP/EA.1/Res.6; UNEP/EA.2/Res.11; UNEP/EA.3/Res.7; UNEP/EA.4/Res.6) but has been repeated in other authoritative reports and statements. *E.g.*, it was favourably referred to the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), the advisory body for the UN on the scientific aspects of marine environmental protection, in their 2019 report: Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean 5-6 (2019). It is also the definition on the UNEP website, *available at* https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/marine-litter (visited Dec. 4, 2020). Slightly different definitions have been proposed, *e.g.*, The Honolulu Strategy: A Global Framework for Prevention and Management of Marine Debris (2011) and Youna Lyons et al., Status of Research, Legal and Policy Efforts on Marine Plastics in ASEAN+3: A Gap Analysis at the Interface of Science, Law and Policy, COBSEA and NUS (NUS, 2020).

[2] *See* UNEA resolutions to this effect, *e.g.*, "Noting with concern that the high and rapidly increasing levels of marine litter, including plastic litter and microplastics, represent a serious environmental problem at a global scale, negatively affecting marine biodiversity, ecosystems, animal well-being, societies, livelihoods, fisheries, maritime transport, recreation, tourism and economies": UNEA Res. 6, Marine plastic litter and microplastics, U.N. Doc. UNEP/EA.4/Res.6 (Mar. 15, 2019). A compilation of resolutions is *available at* UNEA, Ad hoc open-ended expert group on marine litter and microplastics, Compilation of United Nations Environment Assembly resolutions on marine litter and microplastics, U.N. Doc. UNEP/AHEG/2019/3/INF/2 (Oct. 25, 2019).

[3] Peter Dauvergne, Why is the global governance of plastic failing the oceans? 51 Global Envtl. Change 22 (2018); Owen McIntyre, Addressing marine plastic pollution as a 'wicked' problem of transnational environmental governance, 25(6) Envtl. Liab. 282 (2020).

[4] The global dimensions of the problem of marine plastic pollution e.g. global patterns of production and consumption mean that regional options can never provide a complete solution to the problem but can nonetheless provide an effective means of addressing specific regional dimensions not able to be addressed via national measures alone or which are incompletely captured in international arrangements and efforts. Hence, as in the sphere of climate change, a multi-level governance approach to addressing marine plastic pollution would seem to be required: McIntyre, ibid. On multi-level governance in a climate context see Jacqueline Peel et al, Climate change law in an era of multi-level governance, 1(2) Transnat'l Envtl. L. 245 (2012).

[5] To be suitable for recycling, plastics must be 'clean', separated from other wastes, and comprise of materials that are recyclable. See discussion in draft Technical guidelines on plastic wastes: Open-ended Working Group of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 'Draft updated technical guidelines on the identification and environmentally sound management of plastic wastes and for their disposal' UN Doc. UNEP/CHW/OEWG.12/INF/14 [13] (May 15, 2020).

recycling facilities in other countries.[6] This could involve developing regional legal and cooperative infrastructure, including by building on existing shipping arrangements that reduce the costs associated with carrying recycled wastes out of PICTs. Such an arrangement, we argue, constitutes a practical implementation of approaches such as the 'circular economy', aiming to keep resources in circulation for as long as possible in order to eliminate waste[7], and the '5Rs' of refuse, reduce, re-use, recycle and return.[8]

Overall, the paper supports a 'lifecycle' approach to the management of plastic waste, including polluting marine plastic debris.[9] This approach views plastic management as a 'process', with measures necessary across each phase of the plastic lifecycle – from production, consumption, and end-of-life fate – to combat environmental and marine pollution. The paper is focused on measures most relevant to the last of these stages, looking to the export of recyclable or recoverable plastics as one possible means of keeping plastics out of the waste disposal facilities that are under pressure in PICTs, and thus to preventing them from entering the ocean.[10] Focusing on the end stage of the plastic lifecycle, rather than other stages, is important in a context where PICTs are already at the forefront of legal measures to prevent and manage plastic waste in-country,[11] and where there is considerable scope for developing cooperative arrangements for re-use, recycling and recovery (a key gap in existing international and regional legal frameworks). Moreover, solutions for end-of-life plastics are essential where the "value chain of plastic remains archetypically linear with less than 20% of plastics re-entering the value chain and huge amounts of plastics ending up in terrestrial and marine environments each year".[12]

The paper proceeds as follows. Part II provides an overview of the particular challenges of waste management and plastic in PICTs, examining the lifecycle of plastics from the point of entry into countries, their management within countries and at the point of exit (or lack thereof). It

[6] It is recognised in this respect that such export of plastic waste creates its own potential environmental risks, such as the possibility of illegal dumping or shipment to countries with inadequate standards for the environmentally sound management of such wastes. These limitations point to the need for increasing clarity around requirements of 'environmentally sound management' under applicable international treaty regimes (see further the paper by Eric Bea in a forthcoming volume following the National University of Singapore's workshop on 'Measures to Counter Marine Plastic Pollution') and in any supporting regional governance arrangements, a point which we address further in Part IV of the paper.

[7] Teresa Domenech, *Explainer: What is a circular economy?*, The Conversation (July 25, 2014) https://theconversation.com/explainer-what-is-a-circular-economy-29666#:~:text=A%20circular%20economy%20is%20one,value%20is%20extracted%20from%20them. (visited Sept. 3, 2020).

[8] This paper uses the '5Rs' in Pacific Regional Action Plan: Marine Litter 2018-2025. But see other, *e.g.*, 3Rs (reduce, reuse and recycle) in 'The future we want' outcome document of the 2012 UN Conference on Sustainable Development in Rio de Janeiro (U.N. General Assembly Res. 66, The Future we Want, U.N. Doc. A/RES/66/288 [135] (July 27, 2012); '3Rs+Return' (reduce, reuse, recycle, return) in Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025; '6Rs' Reduce, Redesign, Refuse, Reuse, Recycle and Recover in UNEP, Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches (2017).

[9] *See* also calls from the U.N. Environment Assembly, *e.g.*, UNEA Res. 6, Marine plastic and microplastics, U.N. Doc. UNEP/EA.1/Res.6 [1] (June 27, 2014); UNEA Res. 6, Marine plastic litter and microplastics, UNEP/EA.1/Res.6 [1] (Mar. 15, 2019); Tobias D. Nielsen et al., Politics and the plastic crisis: A review throughout the plastic lifecycle, 9 WIREs Energy & Env't. 1 (2019); Ina Tessnow-von Wysocki & Philippe Le Billon, Plastics at sea: Treaty design for a global solution to marine plastic pollution, 100 Envtl. Sci. & Pol'y 94 (2019); Karen Raubenheimer & Alistair McIlgorm, Can the Basel and Stockholm Conventions provide a global framework to reduce the impact of marine plastic litter?, 96 Mar. Pol'y 285 (2018).

[10] Navarro Ferronato and Vincenzo Torretta, Waste Mismanagement in Developing Countries: A Review of Global Issues, 16(6) Int'l. J. Envtl. Res. Public Health 1, 6-7 (2019).

[11] Part II below.

[12] Open-ended Working Group of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 'Draft updated technical guidelines on the identification and environmentally sound management of plastic wastes and for their disposal' UN Doc. UNEP/CHW/OEWG.12/INF/14 [13] (May 15, 2020).

highlights key laws and legal mechanisms that have been implemented in PICTs at the national level to target different stages of the lifecycle of plastics; measures that can prevent plastics becoming polluting marine debris. Part III expands the focus to the international legal domain. It examines the currently disparate legal frameworks governing marine plastic in international and regional regimes, highlighting key gaps in and among the international legal regimes. Finally, Part IV presents ideas for a cross-border regional response as part of a holistic approach to combat marine plastic pollution in the Pacific.

II. WASTE MANAGEMENT AND MARINE PLASTIC POLLUTION IN PICTS

Spanning 22 countries and territories[13] of around 11 million people, the Pacific region is geographically vast and sparsely populated. Approximately 98% of the area is covered by ocean[14] which, in turn, underpins Pacific livelihoods and ways of life. As put by the Secretariat of the Pacific Regional Environment Programme (SPREP), the ocean "helps define us as Pacific people".[15] In this context, PICTs have been at the forefront of calls to action on waste and marine pollution management generally,[16] and marine plastic pollution in particular.[17]

A significant part of the challenge for PICTs is preventing plastics from entering the ocean prior to their becoming polluting marine plastic debris or litter. Often highly dependent on imports of plastic products and imported products in plastic packaging, PICTs face compounding difficulties in managing the burden of plastic waste from such imported products as well as from other sources that are generated in-country. Opportunities for in-country re-use, recycling and recovery of wastes are limited by the economies of scale required to manage such infrastructure.[18] When alternatively seeking to export waste for recycling overseas, markets are difficult to locate, particularly following China's restrictions on the import of contaminated plastic waste.[19]

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[13] The countries span three major ethnic sub-regions – Melanesia, Polynesia and Micronesia and comprise 14 independent states: Cook Islands, the Federated States of Micronesia, Fiji, Kiribati, the Republic of the Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu & Vanuatu and 8 Territories: American Samoa, Commonwealth of the Northern Mariana Islands, Guam, French Polynesia, New Caledonia, Tokelau & Wallis and Futuna.

[14] Pacific Regional Action Plan: Marine Litter 2018-2025, 9 (SPREP, 2018); Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025, 9 (SPREP, 2016).

[15] SPREP, Our Pacific Ocean, Our Stories, *available at* https://www.sprep.org/attachments/Publications/FactSheet/FS1-Stories.pdf (visited Sept. 3, 2020).

[16] National initiatives traverse waste regulation and pollution control measures, and also provide opportunities to manage wastes in their environmental, social and cultural context, beyond conventional command and control models. *See* further below Part II.

[17] *E.g.*, at the regional level, PICTs are working to protect the ocean from plastic debris through their Pacific Regional Action Plan on Marine Litter 2018-2025. This is also supported by donor investment, *e.g.*, the Pacific Ocean Litter Project (POLP), a six-year project funded by the Australian government with SPREP as the regional implementing partner aiming to address the threat posed by single-use plastic litter from household and tourism sources by supporting the actions identified in the Regional Action Plan. The Pacific-EU Waste Management Programme (PacWastePlus), funded by the European Union and implemented by SPREP, addresses the cost effective and sustainable management of waste and pollution in priority waste streams of hazardous wastes, solid wastes and related aspects of wastewater. More generally, the Kainaki II Declaration for Urgent Climate Change Action Now adopted at the 50th Pacific Islands Forum in Tuvalu in 2019 calls on Pacific Rim countries to commit to addressing marine pollution and marine debris: Pacific Islands Forum Secretariat, Forum Communique [15] (2019), *available at* https://www.forumsec.org/wp-content/uploads/2019/08/50th-Pacific-Islands-Forum-Communique.pdf (visited Aug. 31, 2020).

[18] Esther Richards & David Haynes, *Solid Waste Management in Pacific Island Countries and Territories*, *in* Municipal Solid Waste Management in Asia and the Pacific Islands: Challenges and Strategic Solutions (Agamuthu Pariatamby & Masaru Tanaka eds., 2014).

[19] A number of laws and measures introduced by China form part of this 'National Sword policy'. *See* discussion Cheryl Katz, *Piling Up: How China's ban on importing waste has stalled global recycling*, Yale Environment 360 (Mar. 7, 2019), *available at* https://e360.yale.edu/features/piling-up-how-chinas-ban-on-importing-waste-has-stalled-global-recycling (visited Sept. 3, 2020); Alex Hofford, *China bans foreign waste – but what will happen to the world's recycling?*, The Conversation (Oct. 20, 2017),

Moreover, the costs of shipping from remote islands can be prohibitively high. Post-consumer plastic waste might not be readily separated from general waste and it is costly to clean to a standard for export.[20] Recyclables, including plastics, might instead be sent to landfill or informal dump sites, incinerated or otherwise stockpiled awaiting export in small island environments where land comes at a premium. This gives rise to environmental management challenges, including escalating plastic waste along coastlines and in surrounding seas.

PICTs are not only affected by waste and plastic debris produced in-country: they are also affected by waste, including plastic waste, generated from foreign vessels and by waste transported to their seas and onto their shores by ocean currents.[21] Global estimates suggest that an average of 8 million tonnes of plastic enters the ocean each year,[22] with only some 9-10% of all plastic waste produced being recycled.[23] Marine plastic pollution causes wide-ranging economic, social and environmental impacts through aesthetic, physical, financial and chemical pathways. Tourism and financial investment might be affected by the visual impacts of plastic waste. Plastic might physically harm animals and ecosystems or damage infrastructure and livelihoods. Ecosystems, species and food supplies might be contaminated by pollutants from plastic debris.[24] PICTs largely bear the financial costs of waste clean-up and management, under already over-burdened waste management systems.

The challenges for PICTs posed by wastes, particularly plastic waste, therefore arise across three distinct phases: at the point of products containing plastic or packaged in plastic entering into countries; during waste management in-country; and when considering opportunities for export of wastes and recycling or recovery offshore. In line with the paper's lifecycle approach to managing plastic, we emphasise the link between land-based sources of plastic pollution and marine plastic debris. This is particularly important given that studies estimate approximately 80% of marine pollution originates from land-based sources.[25]

The following Part highlights the legislative and regulatory approaches PICTs have adopted at the national level to address the three phases in the plastic lifecycle. Such approaches work towards a circular economy and are based upon notions of the five '5Rs'.[26] The 'refuse' element of the 5Rs refers to not buying or using unnecessary items or restricting the entry of certain

available at https://theconversation.com/china-bans-foreign-waste-but-what-will-happen-to-the-worlds-recycling-85924 (visited Sept. 3, 2020).

[20] *See* discussion of SPREP's waste shipment program, the 'Moana Taka' partnership, in Part IV below.

[21] This is often not of a standard suitable for recycling and recovery, and therefore not the focus of this paper, which concentrates on 'clean' plastics before they become polluting marine debris.

[22] Hannah Ritchie & Max Roser, Plastic Pollution (Our World in Data, 2018), *available at* https://ourworldindata.org/plastic-pollution (visited Sept. 3, 2020). See also W.C. Li, H.F. Tse, & L Fok, Plastic waste in the marine environment: A review of sources, occurrence and effects, 566-567 Sci. Total Environ. 333 (2016) and Jenna R. Jambeck et al., Plastic Waste Inputs from Land into the Ocean, 347 Sc. 768 (2015).

[23] Roland Geyer, *Production, use, and fate of synthetic polymers, in* Plastic Waste and Recycling: Environmental Impact, Societal Issues, Prevention and Solutions (Trevor M Letcher ed., 2020); Roland Geyer et al., Production, use, and fate of all plastics ever made, 3 Sci. Adv. 1 (2017).

[24] UNEP & SPREP, Marine Debris, Microplastics and Pollution, *available at* https://www.sprep.org/attachments/Publications/FactSheet/Oceans/marine-debris-microplastics-pollution.pdf (visited Sept. 3, 2020).

[25] Eunomia Research & Consulting Ltd., Plastics in the Marine Environment (Eunomia, 2016), *available at* , http://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/ (visited Sept. 4, 2020).

[26] Pacific Regional Action Plan: Marine Litter 2018-2025, 12.

products into a country in the first place. Legislative restrictions on the sale, distribution and import of certain plastic-containing products and items can address both the 'refuse' and 'reduce' elements of the 5R strategy. 'Reduce' seeks to conserve resources as much as possible, whereas 'reuse' means to use something again for its original purpose or a different purpose. By contrast, 'recycle' involves converting waste into new materials and objects. Examples of legislative tools based on the reduce, reuse and recycle principles include container deposit schemes or environmental levies to fund the cost of environmental protection measures. Finally, 'return' in the 5Rs involves returning waste to producers under, for example, extended producer responsibility schemes, for environmentally sound recycling, recovery or disposal.

A. *Point of entry*

Generally speaking, economic development, including increasing urbanisation, is tied to increases in per capita generation of waste, as access to consumable goods and products increases.[27] This occurs across all societies, including PICTs. Their particular challenge, however, is that PICTs are in a phase of rapid urbanisation, with little supporting infrastructure including waste management, to deal with the movement of people from rural areas.[28] PICTs also import large quantities of materials and packaging from overseas due to limited manufacturing and production locally.[29] For example, a study conducted in 2019 found that Vanuatu generated an estimated 5700 tonnes of plastic waste, almost all of which was from imported plastic consumer products.[30]

For PICTs, there are economic, environmental and social development challenges associated with increases in the reliance on imported goods, including those containing plastic. A recent study conducted by the Pacific Region Infrastructure Facility (PRIF) estimated that of the approximately 4.7 million tonnes of recyclables imported into the region annually, only 1 million tonnes was subsequently exported.[31] This suggests that a large proportion of goods imported into PICTs stays in-country, which in turn causes environmental management challenges, especially given that space is at a premium in many PICTs.

Waste and plastic debris in PICTs also comes from economic sectors that are major contributors to PICT private and public revenues, such as tourism; including cruise ship-generated wastes, and fisheries. Many small island states are highly dependent on tourism in terms of their gross domestic product (GDP) and employment. For example, in 2018, tourism constituted over 50% of GDP in the Cook Islands, Maldives and Palau and approximately 30% in Samoa and Vanuatu. Moreover, tourism provided for more than 30% of total employment in the Cook Islands, Fiji, Niue, Palau and Vanuatu.[32] The debris generated from these sectors adds to the volumes of

[27] Silpa Kaza et al., What a waste 2.0: A global snapshot of solid waste management to 2050 (World Bank Group, 2018).
[28] This is a challenge for cities' authorities in developing countries more generally: Lilliana Abarca Guerrero, Ger Maas & William Hogland, Solid waste management challenges for cities in developing countries, 33 Waste Mgmt. 220 (2013).
[29] Environmental Defenders Office (EDO) NSW & EDO ACT, Regulating plastics in Pacific Island Countries: a guide for policymakers and legislative drafters, 5 (SPREP, 2018).
[30] Vanuatu National Plastics Strategy (2020-2030): Draft for comment (31/01/2020), 5, *available at*, https://vcci.vu/wp-content/uploads/2020/02/Draft_Vanuatu_National_Plastics_Strategy_v2.pdf (visited Sept. 11, 2020).
[31] Pacific Region Infrastructure Facility (PRIF), Pacific Region Solid Waste Management and Recycling: Pacific Country Profiles & Territory, 4 (2018).
[32] Yusuke Tateno & Andrzej Bolesta, Policy responses to COVID-19: Addressing the impact of the pandemic on tourism in Asia-Pacific small island developing States, 2 (UN ESCAP, 2020).

wastes, especially disposable plastics, which PICTs are managing.[33] Studies have also linked abandoned fishing gear to marine pollution. For example, a survey of garbage washed ashore on the uninhabited Henderson Island in the South Pacific estimated that 60% of its content originated from industrial fisheries.[34] Waste, in turn, might have a negative impact on these important economic sectors for PICTs by impacting the visual amenity of island shorelines or by polluting local marine and terrestrial life.

A legislative measure that targets this early stage of the plastic lifecycle – before wastes give rise to marine plastic pollution – involves placing import restrictions on certain plastic containing items or products. A recent paper from the World Trade Organization has observed that, generally speaking, developing countries tend to favour these more "defensive" trade-related plastic policies, with a strong focus on importation bans.[35] Such measures are increasingly prevalent in a number of PICTs, particularly for single-use plastic products. Many PICTs have introduced or are working towards banning the importation, manufacture, distribution, sale and supply of single-use plastic shopping bags, takeaway containers and other plastic-containing items.[36] This includes measures in American Samoa, the Commonwealth of the Mariana Islands, the Cook Islands, Guam, Fiji, the Federated States of Micronesia (FSM), Kiribati, Niue, Palau, Papua New Guinea (PNG), RMI, Samoa, Tonga, Tuvalu and Vanuatu.[37] Best practice implementation of plastic prohibitions, or other importation restrictions, involves consultation and awareness-raising amongst communities and business groups, to enhance plastic waste reduction and its potential to become marine debris.

An example of this measure was introduced in the FSM in 2020, making it unlawful at the national level to import one-time use disposable Styrofoam and plastic food service items such as plates, cups and eating utensils and plastic shopping bags.[38] This national prohibition followed steps in the FSM states of Chuuk, Kosrae, Pohnpei and Yap, to phase out single-use plastic shopping bags.[39] In another example, Vanuatu, in 2018, introduced provisions banning the use of disposable containers, single-use plastic bags and straws. In 2019, phase two of the Vanuatuan ban expanded the prohibition to include the import of other single use plastic items including artificial plastic flowers, disposable plastic cups, disposable plastic forks, disposable plastic knives, disposable plastic plates, disposable plastic spoons, disposable plastic stirrers, plastic egg carton containers, and plastic mesh net.[40] In both countries, entry into force of the bans was staggered over time, with community and business being part of consultations designed to ensure effective implementation of this 'refuse' policy.

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[33] Global Waste Management Outlook, 46 (UNEP, 2015).
[34] Greenpeace, Ghost Gear: The Abandoned Fishing Nets Haunting Our Oceans, 6 (2019).
[35] World Trade Organisation, Communication on trade in plastics, sustainability and development by the United Nations Conference on Trade and Development (UNCTAD) JOB/TE/63 8 (10 June 2020).
[36] EDO NSW & EDO ACT, *supra* note 29, at 19.
[37] *See* generally stocktakes of existing and pipeline waste management legislation in PICTs *available at* https://www.sprep.org/pacwaste-plus (visited Sept. 3, 2020).
[38] Act for the Prohibition on the Importation, Sale or Distribution of One Time Use Disposable Styrofoam and Plastic Food Service Items and Plastic Shopping Bags (Public Law 21-76).
[39] Chuuk State Clean Environment Act of 2018 (ban on single-use plastic bags and Styrofoam); Kosrae State Chapter 19, Code Title 11: Land and Environment; Pohnpei State Chapter 4, Code Title 27; Yap State Chapter 17, Code Title 18 Conservation and Resources.
[40] Waste Management Regulations Order No 15 of 2018; Waste Management Regulations (Amendment) Order No. 128 of 2019. *See* below discussion of measures in Tuvalu.

B. *In-country*

PICTs are particularly vulnerable to the impacts of plastics in-country due to the "financial and institutional challenges in properly managing waste before it is transferred to the marine environment".[41] Once plastic products are consumed, there is significant variation in how this waste stream, along with other waste streams, is both 'formally' managed (for example, through government and private collection services) and 'informally' managed (for example, via rural or local community dump sites or burning of wastes).[42] Some PICTs regulate waste through general environmental legislation and regimes for environmental impact assessment (EIA), with waste collection services coordinated between agencies and local councils.[43] For others, waste management occurs primarily through public health legislation, with provisions relating to the nuisance and public health impacts of pollution arising from waste.[44] More recently, some countries have adopted specialised waste management laws that might enable the government to delegate responsibility for collection to sub-contractors or a specialised entity.[45] However, the limited coverage of most waste collection services in these countries, especially in remote areas, lack of adequate resources and lack of regulation, means that waste is burned or collected in informal dump sites, with the risk of runoff into waterways and the ocean.[46] Moreover, waste, and single-use plastics particularly, are often illegally dumped on land or in waterways, which is then carried out to coastal marine areas.[47]

Even where collection occurs, appropriate separation of recyclables, including plastics, from other waste streams is a significant challenge and much ends up in landfill or dump sites. An often-cited global study suggests that 79% of all plastic waste produced has accumulated in landfills or the natural environment.[48] Although data specific to PICTs remains under-developed,[49] SPREP's Cleaner Pacific 2025 Strategy notes that waste disposal to land through dumps and landfills is the most common method of waste disposal in PICTs and that wastes are often dumped together with no separation.[50] Factors that might contribute to low rates of separation and recycling include: low public awareness; lack of incentives and insufficient economies of scale to support local infrastructure for recycling operations; inadequate collection services; lack of appropriate

[41] Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025, 35.
[42] Wastes may not be 'managed' at all, despite legislation being in place. There can be large amounts of plastic wastes dumped in public places and open areas as municipal services become overwhelmed. This can be the result of a number of challenges. *E.g.*, the most common problems facing Solomon Island provinces are lack of available land for a proper landfill, limited financial/ human resources, poor coordination, limited awareness and a poor collection system: Ministry of Environment, Climate Change, Disaster Management and Meteorology, National Waste Management and Pollution Control Strategy 2017-2026, 36 (2017).
[43] *E.g.* Fiji's Environment Management Act 2005 & Local Government Act 1972; Kiribati's Environment (Amendment) Act 2007 & Local Government Act 1984.
[44] *E.g.* Solomon Islands' Environmental Health Act 1980; PNG's National Capital District Commission Act 2001.
[45] *E.g.* Samoa's Waste Management Act 2010; Tonga's Waste Management Act Cap 32.18; Tuvalu's Waste Management Act 2017.
[46] Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025, 23-24.
[47] F. Alpizar et al, A framework for selecting and designing policies to reduce marine plastic pollution in developing countries, 109 Envtl. Sci. & Pol'y. 25 (2020).
[48] Geyer et al., *supra* note 23.
[49] Regarding marine microplastics associated with land-based sources, see M Ferreira et al, Presence of microplastics in water, sediments and fish species in an urban coastal environment of Fiji, a Pacific small island developing state, 153 Mar. Pollut. Bull. 110991 (2020).
[50] Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025, 23-24.

facilities and infrastructure for collection or treatment;[51] and low value and returns on investment available in the industry.[52]

Despite this disposal practice being common, accumulating plastic waste in landfills or informal dump sites is the least desirable option from the perspective of the hierarchy of waste management strategies, especially for PICTs.[53] Many of the islands are geographically small and have limited available space for landfills or dump sites in the first place. The lifespan of these sites can be increased through proper design and maintenance,[54] but their longevity is ultimately limited. Moreover, given the limitations of space available, existing landfills are often situated near human settlements and ecosystems, especially at the edge of reefs or lagoons, which in turn increases the risk of plastic runoff into waterways and the ocean.[55] The PRIF study, referred to above, estimates that populations in PICTs living within 50 km of coastlines generate approximately 311,090 tonnes of plastic waste each year, of which 227,880 tonnes might potentially become marine debris through either littering, runoff into inland waterways or being blown into the ocean from uncontained disposal sites.[56]

To deal with the challenge of plastic waste in-country, a number of PICTs have experimented with legislative measures going beyond conventional direct regulatory instruments, and which look instead to incentivise changing behaviour. Widely cited as an example of these measures are 'container deposit schemes or laws' (CDL), 'advanced disposal levies' or waste levies. Under such schemes, a small refundable deposit (e.g. 5 or 10 cents) is available to consumers or collectors who return the item (e.g. PET bottles, aluminium cans) for recycling.[57] Jurisdictions that have introduced such schemes include Fiji, Kiribati, the FSM, Palau, the Republic of the Marshall Islands (RMI) and Tuvalu. Some of these measures have been very successful in improving recovery of plastic-containing wastes. Palau, for example, has reported a 90% recovery rate, with approximately 18 million of the 20 million imported beverage bottles collected for recycling.[58] Yap and other FSM states have also reported high rates of return.[59] Yet, the effectiveness of these schemes is ultimately contingent upon locating avenues for the final disposal of collected items, especially offshore markets for recyclables (discussed further in the following section) if local recycling options are limited.

The administration of these schemes varies from jurisdiction to jurisdiction. In some cases, the CDL is established under a special Act, as in Kiribati where collection is managed as part of

[51] Romeela Mohee et al., Current status of solid waste management in small island developing states: A review, 43 Waste Mgmt. 539, 543 (2015).
[52] PRIF, *supra* note 31, at 5.
[53] Mohee et al., *supra* note 51, at 542; Alexander Gillespie, Waste Policy: International regulation, comparative and contextual perspectives, 73 (2015).
[54] SPREP & JICA, A Practical Guide to Landfill Management in Pacific Island Countries and Territories (2nd ed., 2010).
[55] Trisia Farrelly, Paul Schneider & Polly Stupples, Trading in waste: Integrating sustainable development goals and environmental policies in trade negotiations toward enhanced solid waste management in Pacific Islands countries and territories, 57(1) Asia Pacific Viewpoint 27, 29 (2016).
[56] PRIF, *supra* note 31, at 5.
[57] EDO NSW & EDO ACT, *supra* note 29, at 42.
[58] Lark Starkey, Challenges to plastic up-cycling in small island communities: A Palauan tale, 18 (Centre for Marine, Biodiversity & Conservation, 2017). *See* also National Environmental Protection Council (NEPC), State of the Environment Report: Republic of Palau, 80 (May 2019).
[59] SPREP, Federated States of Micronesia State of Environment Report, 133 (2019).

the Kaoki Mange! Project.[60] A deposit of 5 cents for aluminium cans and PET bottles, and $5 for lead acid batteries, is collected from importers at the point of entry into Kiribati and deposited in a special fund, separate from consolidated revenue. Consumers are able to collect 4 cents for each container when returned for recycling and the remaining 1 cent is available to the private operator to support recovery operations.[61] Other countries, such as Tuvalu, have implemented a waste levy and select refund scheme on a wide range of products, including recyclables such as PET bottles. Under Tuvalu's Waste Management (Levy Deposit) Regulation 2019, importers pay a 'levy deposit', added to the sale price of the item, and the spent item can be returned to a collection point for a 50% refund.[62]

Aside from CDLs, some PICTs have introduced visitor environmental levies that might provide financial support for the management costs of plastic wastes generated in-country. For example, Fiji, Niue and Palau all have arrival or departure fees charged to tourists.[63] In 2017, Palau introduced legislation amending its existing 'Environmental Impact Fee' to the 'Palau Pristine Paradise Environmental Fee' to be paid by every non-Palauan passport holder departing Palau, which helps to offset the costs of environmental impacts from the tourism industry.[64] There was an initial delay in implementation,[65] but the cost was to be included in the price of every international airline ticket into Palau.[66] Palau's government has reported that it has raised more than USD$9 million for environmental protection through the fees.[67] Such levies might reduce the amount of waste generated through raising awareness amongst consumers, and support local efforts to recycle or recover the costs of environmental management, such as dealing with marine plastic pollution.

C. *Point of exit*

In many cases, options for recycling and recovery of plastic wastes in-country in PICTs are limited as the economic returns for recyclers are largely insufficient, with metal recycling often being the only economically viable form. There is also a lack of domestic markets for recycled products. For example, there has been some consideration of using plastics (and other recyclables) in road surfaces but this is a long way from realisation.[68] The costs of collecting and processing the aggregate, in addition to the fact that individual PICTs do not likely generate enough waste

[60] Special Fund (Waste Materials Recovery) Act 2004.
[61] SPREP, Improved Waste Management in Kiribati: A case study, *available at* https://www.sprep.org/solid_waste/documents/Kiribati-Case-Study.pdf (visited Sept. 4, 2020).
[62] Waste Management (Levy Deposit) Regulation 2019: https://perma.cc/QVF7-KYZ4.
[63] EDO NSW & EDO ACT, *supra* note 29, at 49.
[64] Pristine Paradise Environmental Fee, RPPL No. 10-02 2017 (Amendment), *available at* https://palaulaw.files.wordpress.com/2018/01/rppl-no-10-2-amendments-to-environmental-impact-fee.pdf (visited Sept. 3, 2020).
[65] Palau Customs, Notice to Public: Pristine Paradise Environmental Fee (Apr. 4, 2017), *available at* http://www.palaucustoms.org/files/common_unit_id/73486f26-93c6-4784-a7e2-99f33f659456/Notice%20to%20Public.pdf (visited Sept. 24, 2020).
[66] Palau Customs, Public Notice: Palau Pristine Paradise Environmental Fee (PPEF) (Dec. 21, 2017), *available at* http://www.palaucustoms.org/files/common_unit_id/c8672894-ba61-43f7-b6c4-6a69acbd1b61/PUBLIC%20NOTICE.pdf (visited Sept. 24, 2020).
[67] Prianka Srinivasan, *Palau's visitor fee helps fund environmental protection, but could it be driving away tourists?* ABC News (Nov. 27, 2019), *available at* https://www.abc.net.au/radio-australia/programs/pacificbeat/industry-pushback-on-palaus-fee-for-environmental-protection/11743290 (visited Sept. 4, 2020).
[68] PRIF, *Road Pavement Design for the Pacific Region: Desk Research on the Use of Locally Available Materials*, i (2016).

plastics on their own except for one-off projects, contribute to economic feasibility difficulties.[69] Community projects, such as Tonga's No Pelesitiki Campaign, are important initiatives for developing options for reuse and recycling of plastic but these rely on voluntary action and are not necessarily on a large-scale.[70]

PICTs might thus look to export plastic waste for final disposal and recycling overseas. However, recycling rates for plastics across the globe remain very low, most commonly attributed to a lack of markets for the after-use of plastics.[71] In this regard, a significant recent development has been China's announcement that it would restrict the import of contaminated plastic waste into the country from 2018. Prior to this point, China had been the world's largest single importer of plastic waste, cumulatively responsible for importing 45% of the world's plastic waste.[72] China introduced the restrictions reporting that much of the solid waste being imported for use as raw materials was contaminated with dirty and hazardous wastes.[73] A recent study of the Chinese restrictions suggests that Southeast Asian countries, like Malaysia, have replaced China as the leading importers of plastics.[74] At the same time, other jurisdictions, including PICTs as outlined above, have introduced bans on single-use plastics to prevent the initial generation of this waste stream.[75]

While industrialised wealthy countries, in particular, have received significant criticism for exporting their plastic waste to markets like China and now Southeast Asia, locating appropriate export markets remains crucial for PICTs. In theory, trade could facilitate effective waste management by providing an avenue for countries like PICTs, with limited infrastructure, to safely recycle or incinerate plastic waste.[76] PICTs have limited space on their shores for landfill or informal dump sites combined with capacity constraints in managing plastic waste for recycling. In addition, the comparatively small levels of waste generated in many PICTs might not be sufficient to justify the costs of establishing large-scale recycling and industrial infrastructure in-country. For example, the United Nations (UN) Environment Programme has noted that in small island developing states, over 50% of waste generated is organic waste.[77] This has led to contemplation of regional solutions (discussed later in this paper), for example, recycling hubs[78]

[69] *Id.*
[70] *No Pelestiki Campaign officially launches,* Tonga Broadcasting Commission (Nov. 27, 2018), *available at* http://www.tonga-broadcasting.net/?p=13695 (visited Nov. 10, 2020).
[71] Phillippa Notten, Addressing marine plastics: A systemic approach - Recommendations for Action, 46 (UNEP, 2019); Ellen MacArthur Foundation, The New Plastics Economy: Rethinking the Future of Plastics and Catalysing Action (2017).
[72] Amy L. Brooks, Shunli Wang & Jenna R. Jambeck, The Chinese import ban and its impact on global plastic waste trade, 4 Sci. Adv. 1 (2018).
[73] World Trade Organisation, China's import ban on solid waste queried at import licensing meeting (Oct. 3, 2017), *available at* https://www.wto.org/english/news_e/news17_e/impl_03oct17_e.htm#:~:text=Earlier%2C%20on%2018%20July%202017,creating%20issues%20for%20its%20traders (visited Sept. 3, 2020).
[74] Wanli Wang et al., Current influence of China's ban on plastic waste imports, 1 Waste Disposal & Sustainable Energy 67 (2019).
[75] *Ibid.*
[76] Carolyn Deere Birkbeck, Strengthening International Cooperation to tackle plastics pollution: options for the WTO, Global Governance Brief No. 1 (January 2020) 4.
[77] UNEP, *supra* note 8, at 69.
[78] *E.g.* the PRIF is currently conducting country waste audits in Fiji and the Cook Islands and exploring options for a regional recycling network: PRIF Coordination Office 3rd Quarterly Progress Report 1 April-30 June 2020, *available at* https://www.theprif.org/sites/default/files/documents/PRIF%203rd%20Quarterly%20Progress%20Report.pdf (visited Sept. 2, 2020).

and waste-to-energy facilities.[79] However, in practice, "countries have been exporting their waste irrespective of whether importing countries have the capacity to properly manage that waste".[80] Steps to stop these exports include, as discussed above, the closure of China's import market in 2018, as well as amendments to the international convention on the UN's Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal in 2019 to regulate the trade in plastics.[81]

Aside from the difficulties of locating appropriate export markets offshore, for those involved in recycling in PICTs, the expense of shipping recovered products to markets offshore, including insurance costs, also makes profitability in the sector highly variable. PICTs are geographically isolated. The weighted average distance between these countries and major foreign markets in Asia, North America, Europe, the Mediterranean, Western Asia and Indian subcontinents is 11,500 km.[82] The long distances between ports, coupled with low trade volumes from in-country waste streams, contributes to high shipping costs and low incentives for offshore recycling.[83] Pricing and quality specifications in these end markets also add uncertainty for local recyclers.[84]

The difficulty of locating international markets for recyclables, including plastics, and the expense of organising such shipments contributes to the stockpiling of recyclables in PICTs. Over time, the quality of such plastic items degrades and decreases the likelihood that these will find a final destination offshore, as end markets specify certain requirements that plastics be of sufficient cleanliness and quality. Stockpiles of plastics might ultimately end up disposed to landfill and potentially become polluting marine debris through entering waterways and the oceans.

Extended producer responsibility (EPR) or product stewardship models aim to involve the private sector in finding solutions to waste problems. EPR is a policy approach that gives producers responsibility (financial and physical) for the management of end-of-life products.[85] Such programs generally focus on 'take-back' or recycling programs and apply to a range of products, for example, electronic waste such as mobile phones or batteries.[86] These models have particularly emerged in the European context but some PICTs are also engaging with this policy tool as a way to manage their waste.[87] As an example, Samoa has partnered with the New Zealand company HP for the collection of e-waste, starting with toners and ink cartridges, and shipping them overseas

[79] *E.g.* Tonkin + Taylor prepared a study for Infrastructure Cook Islands on options for solid waste disposal which, inter-alia, noted that conventional waste to energy facilities would likely be very expensive at the small scale required for the Cook Islands: Tonkin + Taylor, *Waste Management Feasibility Study* (Nov. 2016), *available at* http://ici.gov.ck/sites/default/files/downloads/86125%20Cook%20Islands%20Waste%20Feasibility%20Study%20FINAL.pdf (visited Sept. 2, 2020).
[80] Birkbeck, *supra* note 76, 4.
[81] *See* Part III.A below.
[82] Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025, 10.
[83] *Id.*
[84] PRIF, *supra* note 31, at 5.
[85] OECD, Extended Producer Responsibility, *available at* https://www.oecd.org/env/tools-evaluation/extendedproducerresponsibility.htm (visited Sept. 2, 2020).
[86] Leila Monroe, Tailoring Product Stewardship and Extended Producer Responsibility to Prevent Marine Plastic Pollution, 27 Tul. Envtl. L.J. 219, 224 (2014).
[87] Gillespie, *supra* note 53, 73-75.

for proper disposal and recycling.[88] Through such schemes, PICTs are able to deal with the challenge of ensuring that recyclables and plastics do not enter the ocean as marine debris. Producer stewardship might arise from voluntary action of companies or industries, or it might be a requirement of laws in the place of manufacture.[89] The scope for PICTs to require producer stewardship through legislation is likely limited to the charging of fees or imposing restrictions that incentivise the reduction or substitution of certain materials such as plastic in imported goods as opposed to mandating the return of spent goods (with bottles from breweries and soft drink cans being a possible exception).

Yet, EPR agreements can only go so far to address the problem of plastics at the end-of-life stage. These are national level arrangements with individual companies. While a practical implementation of the 'polluter pays' approach, EPR agreements are not primarily directed towards broader, regional solutions for the management of end-of-life clean plastic recyclables. Developing such frameworks should occur at the international and regional level. However, as will be discussed in Part III below, cooperative arrangements for the re-use, recycling and recovery of plastics have largely been neglected in existing frameworks.

D. *A holistic 'lifecycle' approach at the national level?*

Pervasive and compounding problems in managing plastics and preventing marine plastic pollution require the development of a range of solutions across a jurisdiction to achieve optimal coverage. In addition to the specific legislative tools outlined above, PICTs have taken steps to approach waste and ocean governance in holistic ways at the national level. For example, Vanuatu recently developed a National Plastics Strategy (2020-2030). The strategy, specifically dedicated to plastic waste, suggests an approach to the reduction of plastic pollution that aims to 'close the loop' on plastics in Vanuatu. It embeds notions of the circular economy, tailored to the Vanuatuan context, and seeks to use a combination of legal and economic instruments, waste management infrastructure improvements, voluntary actions and agreements, and education and awareness raising within the community to remove plastic pollution from the land, waters and oceans of Vanuatu.[90]

Vanuatu has also developed a National Ocean Policy for integrated, modern marine management, which includes traditional marine resource management knowledge and systems.[91] The policy articulates an ecosystem-based approach to ocean management and planning to guide better management of Vanuatu's ocean environment.[92] The Maritime and Ocean Affairs Division is currently developing a legal framework to empower traditional governance systems to support the Government's efforts to manage use of the ocean, both onshore and offshore, while

[88] Ministry of Natural Resources and Environment, Launch of e-waste collaboration, https://www.mnre.gov.ws/launch-of-e-waste-colaboration/ (visited Sept. 2, 2020).
[89] *See* e.g. Australia's Recycling and Waste Reduction Bill 2020 (Cth).
[90] Vanuatu National Plastics Strategy (2020-2030): Draft for comment (31/01/2020), 7-8, *available at*, https://vcci.vu/wp-content/uploads/2020/02/Draft_Vanuatu_National_Plastics_Strategy_v2.pdf (visited Sept. 11, 2020). Other PICTs have also developed national strategies for managing solid waste generally and some plastic waste in particular such as the Cook Islands' Single Use Plastic Ban Policy 2018-2023 and PNG's Environment (Ban on Non-Biodegradable Plastic Shopping Bags) Policy 2009.
[91] Vanuatu's National Ocean Policy (2016), *available at* http://extwprlegs1.fao.org/docs/pdf/van176560.pdf (visited Sept. 2, 2020).
[92] *Id* 8-9.

simultaneously protecting the marine ecosystems, critical to ways of life.[93] This integrated approach, in line with notions of the 'lifecycle' of plastics and measures to prevent and manage pollution in a holistic way, can be contrasted to the fragmented approaches at the global level, discussed in the following Part.

III. INTERNATIONAL AND REGIONAL FRAMEWORKS FOR MARINE PLASTIC POLLUTION

Steps at the national level in many PICTs to deal with the challenge of marine plastic pollution are taking place against a backdrop of growth in similarly-focused initiatives at the international and regional levels developed through legal frameworks, including treaty regimes, soft law strategies and arrangements for transboundary responses. These international and regional frameworks should ideally provide a 'whole of life' approach to managing plastic wastes in order to prevent marine plastic pollution, including measures for the export of 'clean' plastics suitable for recycling (the end-of-life stage). However, international and regional frameworks have largely focused on the transboundary movement of waste and regulating marine pollution, rather than developing cooperative arrangements for re-use, recycling and recovery. Indeed, despite increasing activity, the emerging global framework is fragmented and uneven.[94] As noted by the UN Environment Programme, in reference to marine plastic litter and microplastics in 2017, "[t]his long-lasting and transboundary plastic is a source of pollution that is not addressed under a single international legally binding instrument…[s]ome applicable measures are weakly distributed amongst these global instruments, but the reduction of marine plastic litter and microplastics is not a primary objective of any".[95]

Current international and regional legal frameworks, including major multilateral conventions governing transboundary waste movement, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention),[96] lack detailed provision for international cooperation on re-use, recycling and recovery operations. They have limited integration of waste management concepts such as the circular economy (in contrast to national efforts outlined above). Other authors have engaged with the question of why the frameworks remain fragmented, pointing to challenges of regulating plastic as an 'object' given its utility and ubiquity in everyday life, the globalisation and economic power of the plastics industry aligned as it is with fossil fuel exploitation, the variety of sources of plastic pollution (complicated further by microplastics) and the transboundary nature of the problem.[97] For instance, Elizabeth Kirk and others have examined in depth the need and prospects for a new treaty to address these gaps.[98] Such analysis and debates lie beyond the scope of this paper, which takes as its starting point that the present regulatory framework needs a greater focus

[93] Glenda Willie, *SANMA Council endorses Marine Spatial Planning Consultations*, DailyPost Vanuatu (Nov. 11, 2019), *available at* https://dailypost.vu/news/sanma-council-endorses-marine-spatial-planning-consultations/article_7f9984ae-0405-11ea-b7ae-6feae8acd980.html (visited Sept. 2, 2020).
[94] McIntyre, *supra* note 3.
[95] UNEP, *supra* note 8, at 9.
[96] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Mar. 22, 1989, 1673 U.N.T.S. 125, 28 I.L.M. 657 (1989) (Basel Convention).
[97] Nielsen et al., *supra* note 9; Dauvergne, *supra* note 3; McIntyre, *supra* note 3, at 283. *See* also Elizabeth A. Kirk & Naporn Popattanachai, Marine Plastics: Fragmentation, Effectiveness and Legitimacy in International Law-Making, 27 RECIEL 222 (2018).
[98] Elizabeth A. Kirk, The Montreal Protocol or The Paris Agreement as a Model for a Plastics Treaty? 114 AJIL Unbound 212 (2020). *See* also Tessnow-von Wysocki & Le Billon, *supra* note 9.

on lifecycle approaches that might be particularly possible at the regional level. The following sections canvass key legislative and policy frameworks with relevance to marine plastic pollution, noting their gaps for addressing the particular challenges arising in the PICT context.

A. *International frameworks and their gaps*

1. Global agreements to manage hazardous chemicals and waste

The Basel Convention and the Stockholm Convention[99] are the two main legally binding chemicals and waste-oriented international agreements with relevance to marine plastic litter and microplastics. However, generally speaking, these agreements do not provide a lifecycle framework for the management of marine plastic pollution. Their primary focus is not on facilitating international cooperation for recycling of plastic waste, although they have incidental relevance for this objective. Rather, the Basel Convention seeks to regulate the transboundary movement of hazardous and other wastes, with the aim to protect human health and the environment. Although technical guidelines aiming to reduce the volume and possible harm of plastic waste have been produced, including *Technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal*,[100] these are non-binding and difficult to enforce.[101] Moreover, the Basel Convention provides "no indicators, targets, timelines or reporting for reductions in generation of plastic waste or the trade thereof", making it difficult to track progress and support arrangements for cooperation on recycling of plastics.[102] Further, while the Stockholm Convention aims to limit the use, production and release of persistent organic pollutants (POPs), it only has peripheral relevance to plastic waste, when it falls within the scope of POPs.

Basel Convention

The Basel Convention was adopted in 1989 with a view to regulating the transboundary movement of wastes through its prior informed consent procedure. While the Convention imposes general obligations addressing pollution – requiring parties to ensure that the generation of hazardous and other wastes is reduced to a minimum[103] and to cooperate to improve the environmentally sound management of wastes and to prevent illegal traffic in wastes[104] – its primary focus is to regulate the export and import of wastes. It requires parties to restrict the transboundary movement of wastes, except where it is in accordance with the principles of environmentally sound management.[105] This reflects the 'proximity principle' that hazardous and other wastes should, as far as is possible and in alignment with environmentally-sound and efficient management, be disposed of in the state where they are generated.[106]

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[99] Stockholm Convention on Persistent Organic Pollutants, May 22, 2001, 2256 U.N.T.S. 119, 40 I.L.M. 532 (2001) (Stockholm Convention).
[100] Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal, U.N. Doc. UNEP/CHW.6/21 (Aug. 23, 2002).
[101] Raubenheimer & McIlgorm, *supra* note 9, at 287.
[102] *Id.*
[103] Basel Convention, article 4(2)(a).
[104] *Id.*, article 4(2)(h).
[105] *Id.*, article 4.
[106] *Id.*, article 4(2)(b).

The Basel Convention defines environmentally sound management of hazardous and other wastes as "taking all practicable steps to ensure [these wastes] are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes".[107] It is broad ranging in the scope of transboundary movements of waste it regulates. 'Wastes' are defined as "substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law".[108] The Basel Convention operates to cover wastes defined as 'hazardous wastes' based on origin and characteristics (Annex I, III) or defined as hazardous wastes in the domestic legislation of an importing, exporting or transit party, as well as covering 'other wastes' (Annex II).

Most relevantly for the purposes of this paper, 'other wastes' in Basel Convention Annex II includes wastes collected from households, as well as residues arising from the incineration of household wastes, and plastic waste; including mixtures of such waste. In May 2019, parties to the Basel Convention adopted an amendment to the Convention adding the reference to plastic waste to the list of 'other wastes' covered by the Annex.[109] The amendment creates an exemption for plastic waste that is almost free from contamination (i.e. 'clean') and destined for recycling in an environmentally-sound manner. This would exempt certain shipments of waste from the prior informed consent procedures of the Basel Convention, for example, appropriately cleaned and processed PET bottles destined for environmentally-sound recycling in other countries. Sabaa Ahmad Khan has identified several issues that are likely to present challenges for the implementation of the plastic wastes amendment, including a lack of clarity around the meaning of contamination and evidence of non-contamination for plastic waste falling outside the reach of the amendment.[110]

For wastes that are covered by the scope of the Basel Convention, for example, plastic waste that has been mixed with other wastes collected from households or that is otherwise unclean or contaminated, the Convention operates on the basis of a prior informed consent procedure. Shipment of wastes is prohibited to a state that has prohibited the import of hazardous or other wastes for disposal (and informed other parties of their decision through notification to the Secretariat, the Convention's administrative body) and the shipment of wastes to a state that is not party to the Basel Convention.[111] However, parties may enter into bilateral, regional or multilateral agreements regarding the transboundary movement of wastes, provided that such agreements do not deviate from the environmentally-sound management requirements of the Convention.[112] Parties must not allow exports to states where they believe that the wastes will not be managed in an environmentally-sound manner and should also prevent the import of wastes where there is reason to believe the wastes will not be managed in an environmentally-sound manner.[113]

[107] *Id.*, article 2(8).
[108] *Id.*, article 2(1).
[109] *Id*, article 4A, Annex VII.
[110] Sabaa Ahmad Khan, Clearly Hazardous, Obscurely Regulated: Lessons from the Basel Convention on Waste Trade, 114 AJIL Unbound 200 (2020).
[111] *Id.*, article 4.
[112] *Id.*, article 11. The regional Waigani Convention is one such agreement, discussed below.
[113] Basel Convention, article 4(2).

Where the above principles are met, prior to the export of waste, the exporting state must notify the competent authorities in the import state, and any states through which the wastes will transit, of the proposed movement and detailed information about the intended movement. Only once all states have provided their written consent to the movement can the shipment take place.[114] States are generally required to cooperate on the environmentally-sound management of wastes, including through transmission of information and technical assistance,[115] but the text of the Basel Convention does not go into specifics on required cooperation for recycling efforts.

Stockholm Convention

The Stockholm Convention on Persistent Organic Pollutants (POPs) was adopted in 2001 and establishes international rules for POPs, which are organic chemicals that persist in the environment, bioaccumulate in organisms up the food chain and are transported long distances through air and water. Plastics might contain hazardous substances, including POPs, that can be slowly released into the ocean e.g. some plasticisers and flame retardants. Plastics might also absorb POPs, such as PCB, DDT and dioxins, which are frequently detected in marine plastic litter.[116]

The Stockholm Convention is primarily concerned with limiting the use, production and release of POPs listed in its Annexes.[117] The aim for POPs listed in Annex A (26 substances, including PCBs) is elimination, with some specific exemptions for use and production which parties can apply for and register. For POPs in Annex B (2 substances, DDT and perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride), the Convention aims to restrict their production and use, subject to acceptable purposes and exemptions. Parties must also take steps to reduce the unintentional releases of POPs (e.g. from the burning of wastes) listed in Annex C.

Of particular relevance to marine plastic pollution, the Stockholm Convention might reduce the quantity of plastics containing POPs through its articles regulating the import and export of POPs designed for use in plastics.[118] Imports of POPs in Annexes A and B are only permitted for approved uses or purposes, or for environmentally sound disposal. Exports of Annex A and B POPs similarly must only be: to a party permitted to use that chemical under Annex A and B, to a non-party to the Convention who has provided an annual certification to the exporting party, or for the purposes of environmentally sound disposal.

Further, parties must take steps to reduce or eliminate releases of POPs from stockpiles or wastes.[119] For wastes, including plastic waste that contains or is contaminated with POPs, parties must ensure wastes are: (a) handled, collected, transported and stored in an environmentally sound way; (b) disposed of in a way that the POP content is destroyed or transformed so they do not exhibit the characteristics of POPs or disposed of in environmentally sound manner; (c) not subject

[114] *Id.*, articles 6 & 7.
[115] *Id.*, articles 10 & 13.
[116] Secretariat of the Basel, Rotterdam and Stockholm Conventions, Marine plastic litter and microplastics: Stockholm Convention on Persistent Organic Pollutants, *available at* http://chm.pops.int/Implementation/Publications/BrochuresandLeaflets/tabid/3013/Default.aspx (visited Sept. 7, 2020). The need to clarify the relationship between POPs and microplastics has been identified in scientific literature: Joana Patrício Rodrigues et al, Significance of interactions between microplastics and POPs in the marine environment: A critical overview, 111 Trends in Analytical Chemistry 252 (2019).
[117] Stockholm Convention, articles 3-5.
[118] *Id.*, article 3(2); Raubenheimer & McIlgorm, *supra* note 9, at 287.
[119] Stockholm Convention, article 6.

to disposal operations that could lead to recovery or reuse of POPs; and (d) not transported across international boundaries without taking into account relevant international regulations.[120]
While the Stockholm Convention endeavours to provide a lifecycle approach to managing the harmful effects of POPs, its application to marine plastic pollution is limited to plastic waste containing or contaminated with the POPs listed in the Convention.[121] This would exempt from coverage, for example, plastic packaging such as food wrappings. Plastic packaging more generally comprises 26% of the total volume of plastics used.[122] Moreover, while the Stockholm Convention seeks to prevent harm caused by POPs, its purpose is not to promote cooperative arrangements for recycling of plastics and to prevent marine pollution.

2. Global agreements to prevent pollution of the marine environment

In terms of international environmental law that is designed to combat plastic pollution, there is a particular gap in 'hard' law relating to land-based sources of marine pollution, with provisions relating to marine pollution from ocean-based sources being more well-developed. This limits the adoption of a lifecycle approach to managing marine plastic pollution, given that the majority of such pollution comes from land-based sources. Inadequate attention to the coordination of recycling efforts as part of the circular economy similarly limits the ability to adopt cross-boundary solutions.

The United Nations Convention on the Law of the Sea 1982 (UNCLOS),[123] the overarching international instrument regulating the oceans, contains a general obligation for states to protect and preserve the marine environment.[124] It calls for states to take measures to prevent, reduce and control pollution of the marine environment from any source.[125] In particular, states are to "adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources" and to establish global and regional rules, standards and procedures to do so.[126] Yet, this provision is normatively weak as it provides no timeframe for implementation and no binding obligations or rules to give effect to the obligation.[127] It leaves the detail of such measures to manage pollution from land-based sources up to international, regional and national efforts, such as the non-binding programmes that have proliferated at the international level (discussed further below).[128]

In contrast to law regulating land-based sources of pollution, the international law regulating marine pollution from dumping and ships is more developed. For dumping, under the UNCLOS, states are called upon to adopt laws and regulations to prevent, reduce and control the pollution of the marine environment by dumping.[129] These measures must be "no less effective in

[120] *Id.*, article 6(1)(d).
[121] Raubenheimer & McIlgorm, *supra* note 9, at 288.
[122] Ellen MacArthur Foundation, *supra* note 71, at 12.
[123] United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397, 21 I.L.M. 1261 (1982).
[124] UNCLOS, article 192.
[125] *Id.*, article 194.
[126] *Id.*, article 207.
[127] Kirk & Popattanachai, *supra* note 97, 223.
[128] UNEP, *supra* note 8, 54; Donald McRae, Introduction to the Symposium on Global Plastic Pollution 114 AJIL Unbound 192, 192-193 (2020).
[129] UNCLOS, article 210.

preventing, reducing and controlling such pollution than the global rules and standards".[130] This refers to the 1972 London Dumping Convention[131] and makes this the primary instrument at international law for dealing with the disposal of waste into the ocean.[132]

The London Convention calls upon parties to "take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, harm to living resources and marine life, to damage amenities or to interfere with other legitimate uses of the ocean".[133] To achieve this, the Convention creates a system based on three tiers of waste categorisation (Annexes I, II, II), with each categorisation possessing different regulatory requirements.[134] Dumping of all wastes in Annex I is prohibited (including persistent plastics and other persistent synthetic materials), dumping of wastes in Annex II requires a prior special permit and all other wastes requires a prior general permit (article IV). Consequently, under Annex I, the dumping of plastic waste into the ocean is prohibited.

Following concerns around the effectiveness of the London Convention, the 1996 Protocol[135] was adopted and entered into force in 2006. It extended the general protection duty to call for parties "to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter".[136] The Protocol adopts a precautionary approach to environmental protection where "appropriate preventative measures are taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects".[137] It also embeds the principle of 'polluter pays' into its provisions.[138] To respond to the challenges experienced with the London Convention, the Protocol reverses the dumping list; while previously wastes listed in the Annexes could not be dumped or were regulated, now, only the wastes listed may be dumped.[139] Further, even if wastes are listed in Annex I, assessments must still be undertaken.[140] The 1996 Protocol therefore confirms the position under the Convention, prohibiting the dumping of plastics at sea.

International law also regulates ship-based sources of pollution, including plastics. Article 211 of the UNCLOS, as a framework provision, calls for states to adopt laws and regulations to prevent, reduce and control pollution of the marine environment from ships. The control of waste from ships is dealt primarily through the 1973/78 International Convention for the Prevention of Pollution from Ships (MARPOL).[141] Annex V contains regulations specifying the distances from land and manner in which garbage may be disposed. Of particular relevance to marine plastic

[130] *Id.*, article 210(6).
[131] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Dec. 29, 1972, 1046 U.N.T.S. 120, 11 I.L.M. 1294 (1972).
[132] Gillespie, *supra* note 53, at 158.
[133] London Convention, article 1.
[134] *Id.* 159.
[135] 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Nov. 7, 1996, [2006] A.T.S. 11.
[136] 1996 Protocol, article 2.
[137] *Id.*, article 3(1).
[138] *Id.*, article 3(2).
[139] *Id.*, article 4; Annex I.
[140] *Id.*, Annex II; Gillespie, *supra* note 53, at 166.
[141] 1978 Protocol Relating to the 1973 International Convention for the Prevention of Pollution from Ships (including Annexes, Final Act and 1973 International Convention), Feb. 17, 1978, 1340 U.N.T.S. 61, 17 I.L.M. 546 (1978).

pollution, regulation 3.1 absolutely prohibits the disposal into sea "of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products which may contain toxic or heavy metal residues".

Despite the restrictions contained in the London Convention and MARPOL, plastic waste in the ocean is continuing to grow.[142] This can be attributed in large part to the fact that the vast majority of plastic debris comes from land-based sources, which is not well-regulated under international law and typically not well regulated under national laws either. To this end, the international community has adopted a number of soft law, non-binding initiatives that seek to address the issue., all of which "have called for reductions of the problem of plastic debris at source and/or effective waste management strategies, such as recycling, which capture this waste before it gets into the ocean".[143] Concerted efforts by the international community to address the challenge of marine plastic debris are relatively recent and still under development.[144]

3. Non-binding initiatives of inter-governmental bodies

Various international programmes seek cooperation on marine litter and pollution management. Notable work is being undertaken under the auspices, for example, of the UN Environment Assembly and the Conference of the Parties to the Basel Convention.[145] As yet, these initiatives have not resulted in cohesive strategies for managing marine plastic pollution at the international level, including through supporting recycling efforts, which are critical for PICTs. These programmes are situated in the broad context of the Sustainable Development Goals (SDG). Most relevantly, SDG 14.1 provides: "By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution".[146]

The SDGs, as a major normative agenda at the international level, provide an opportunity for all countries to address the issue of plastic waste, prior to it becoming marine pollution. A key finding of this paper is that fragmented and overlapping regimes have clustered around environmental problems at the international level, including treaties addressing the sound management of chemicals and wastes and the protection of oceans and marine resources.[147] In this

[142] Ritchie & Roser (n 22); Li, Tse & Fok (n 22); Jambeck et al. (n 22); Geyer (n 23).
[143] Gillespie, *supra* note 53, at 175.
[144] The Ad hoc open-ended expert group on marine litter and microplastics was established at the third session of the UNEA and its mandate extended at the fourth session: UNEA Res. 3, Marine litter and microplastics, U.N. Doc. UNEP/EA.3/Res.7 (Jan. 30, 2018) and UNEA Res. 6, Marine plastic litter and microplastics, U.N. Doc. UNEP/EA.4/Res.6 (Mar. 15, 2019). Its current programme of work includes taking stock of existing bodies of work on marine plastic litter and microplastics, identifying existing financial and technical resource/ mechanisms, exploring partnerships and analysing the effectiveness of existing and potential response options. It has produced a first draft of 2020 assessment on sources, pathways and hazards of litter including plastic litter and microplastic pollution. *See* generally UNEA, Ad hoc op-ended expert group on marine litter and microplastics, *available at* https://environmentassembly.unenvironment.org/expert-group-on-marine-litter (visited Sept. 24, 2020).
[145] *Ibid*. *See* also COP of the Parties to the Basel Convention, Terms of reference for the Basel Convention Partnership on Plastic Waste and workplan for the working group of the Partnership on Plastic Waste for the biennium 2020–2021, U.N. Doc. UNEP/CHW.14/INF/16/Rev.1 (11 June 2020).
[146] *See* also *e.g.* SDG 3.9, 6.3, 8.4, 12.4, 12.5, 14.2: U.N. General Assembly Res. 70, Transforming our world: the 2030 Agenda for Sustainable Development, U.N. Doc A/RES/70/1 (Sept. 25, 2015).
[147] For a discussion of the 'clustering' of multilateral environmental agreements around environmental problems, treaties addressing the SDGs, and an argument that the adoption of SDGs may lend greater coherence across the UN system *see* Marie-Claire Cordonier Segger & Alexandra Harrington, *Environment and Sustainable Development, in* The Oxford Handbook of United Nations Treaties (Simon Chesterman, David M Malone & Santiago Villalpando eds., 2019).

context, the SDGs are an overarching framework, spanning across 17 global goals and 169 targets, across a range of priorities.[148]

In 1995, the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) was adopted by 108 governments and the European Commission. This focused on establishing and strengthening intergovernmental action to address the issue of land-based pollution, including marine litter as a priority source category.[149] In 2012 at the UN Conference on Sustainable Development (Rio+20), the Global Partnership on Marine Litter (GPML) was established under the GPA. The GPML seeks to address marine litter by: (a) providing a mechanism for cooperation and coordination; (b) involving all stakeholders to achieve action; and (c) contributing to the 2030 Agenda, especially SDG 14.1.[150]

In addition, the UN Environment Assembly has adopted several resolutions on marine litter and microplastics.[151] It has established the Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics, which is undertaking an extensive programme of work, including assessments of international governance strategies on marine litter and Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean.[152]

Other initiatives include the UN Environment Regional Seas Programme, which was launched in 1974 and now includes 18 Regional Seas Conventions and Action Plans, including the Pacific through SPREP (see further below), for the sustainable management of marine and coastal environments.[153] The Honolulu Strategy is a voluntary global framework for the management of marine debris worldwide to reduce the amount and impact of land-based litter, sea-based sources of marine debris and accumulated marine debris on shorelines.[154] The Food and Agriculture Organisation Code of Conduct for Responsible Fisheries also deals with abandoned or lost fishing gear.[155]

Another significant initiative is the Basel Convention Partnership on Plastic Waste.[156] As a multi-stakeholder forum, it will provide a platform for gathering information and developing

[148] https://sdgs.un.org/goals (visited Sept, 24, 2020).
[149] UNEP, Governing the Global Programme of Action, *available at* https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/addressing-land-based-pollution/governing-global-programme#:~:text=The%20Global%20Programme%20of%20Action%20for%20the%20Protection%20of%20the,issue%20of%20land%2Dbased%20pollution (visited Sept. 24, 2020).
[150] Global Partnership on Marine Litter: Purpose, Function and Organisation (October 2018), *available at* https://gpmarinelitter.org/sites/default/files/Framework%20Document/GPML%20Framework%20Document%20-%20English.pdf (visited Sept. 7, 2020).
[151] UNEA, Ad hoc open-ended expert group on marine litter and microplastics, Compilation of United Nations Environment Assembly resolutions on marine litter and microplastics, U.N. Doc. UNEP/AHEG/2019/3/INF/2 (Oct. 25, 2019).
[152] See generally UNEA, Ad hoc open-ended expert group on marine litter and microplastics, *available at* https://environmentassembly.unenvironment.org/expert-group-on-marine-litter (visited Sept. 24, 2020).
[153] UNEP, Why does working with regional seas matter?, *available at* https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/why-does-working-regional-seas-matter (visited Sept. 7, 2020).
[154] The Honolulu Strategy: A Global Framework for Prevention and Management of Marine Debris (UNEP & National Oceanic and Atmospheric Administration), *available at* https://wedocs.unep.org/bitstream/handle/20.500.11822/10670/Honolulu%20strategy.pdf?sequence=1&isAllowed=y (visited Sept. 7, 2020).
[155] Code of Conduct for Responsible Fisheries (Food & Agriculture Organisation of the United Nations, 1995), *available at* http://www.fao.org/3/v9878e/V9878E.pdf (visited Sept. 7, 2020).
[156] COP of the Parties to the Basel Convention, *supra* note 145.

strategies for the management of plastic waste in consultation with relevant businesses and civil society. The proliferation of these soft law programmes are important efforts to develop 'lifecycle' solutions to marine plastic debris and to address fragmentation at the global level.

B. *Gaps and inadequacies in international laws for PICTs*

Supporting PICTs to recycle plastics offshore is critical as space, infrastructure and resources to manage that waste in-country are limited. Yet the fragmented international legal landscape focuses primarily on the permissible movement and trade in waste, rather than integrating a whole-of-life approach to wastes and plastics, premised upon instituting the circular economy of plastic and providing opportunities to re-use, recycle and recover clean plastics.[157] The Basel Convention, for example, contains provisions on the environmentally-sound management of waste and international cooperation (supplemented by technical guidelines). It is designed to prevent industrialised states from transporting their wastes to poor countries ill-equipped to manage it or without their consent.[158] There are no international treaties that create any binding obligations relating to the recycling of wastes, such as plastics, nor do they assist states like PICTs to deal with their waste challenges by facilitating the transport of wastes to countries better equipped to manage it.

The UNCLOS is the only binding international agreement that deals with all sources of pollution into the ocean, from land-based and sea-based sources, but it is a framework instrument with only broad obligations, leaving the detail of any such arrangements to states.[159] Other binding conventions have a more narrow focus. For example, the international framework preventing marine plastic pollution arising from dumping and from ships is well-developed, but there are no binding international obligations regulating land-based sources of pollution. There is a lack of international targets and timelines for reducing marine plastics and a lack of quantitative restrictions or other limits on generation of wastes.[160] This means that PICTs have limited options, working through the global framework, to stem the proliferation of marine plastic debris and microplastics in their seas.

C. *Regional approaches*

With the deficiencies in international legal frameworks and particular challenges faced by PICTs, these states have turned to regional approaches to combat waste and pollution generally, and marine plastic pollution in particular. In this regard, SPREP is the primary regional organisation with responsibility for environmental management and sustainable development in the Pacific. SPREP was established in 1992 by its 21 PICT members (American Samoa, Cook Islands, the FSM, Fiji, French Polynesia, Guam, Kiribati, RMI, Nauru, New Caledonia, Niue, Northern Marianas, Palau, PNG, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Wallis & Futuna) and five developed countries members (Australia, France, New Zealand, the

[157] Shifting from a "produce, use, dispose approach to a design, use, re-design/re-use approach" and which encourages investment along the lifecycle of plastics, prior to it entering the ocean as marine plastic debris: Joanna Vince & Britta D. Hardesty, Governance Solutions to the Tragedy of the Commons that Marine Plastics have become, 5 Frontiers in Marine Science 1, 8 (2018); Ellen MacArthur Foundation, *supra* note 71.
[158] See, *e.g.*, the proximity principle in the Basel Convention and the 2019 amendment.
[159] UNEP, *supra* note 8, at 55.
[160] Phillipe Sands & Jacqueline Peel, Principles of International Environmental Law, 613 (Cambridge University Press, 2018).

United Kingdom and the United States).[161] It works with member states – and its significant partner and donor base – to support cooperation and coordination across the region.[162] It has served as the focal point for many of the regional approaches and strategies adopted. The Pacific Islands Forum is also an important vehicle for addressing issues impacting the region, such as waste management.[163]

1. Regional agreements

SPREP serves as the Secretariat for the regional conventions most relevant to marine plastic pollution: the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (1986) (the Noumea Convention),[164] with two additional Protocols including the Dumping Protocol that entered into force in 1990,[165] and the 1995 Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement of Hazardous Wastes within the South Pacific Region 1995 (the Waigani Convention).[166]

The Noumea Convention is the overarching agreement for the protection, management and development of the marine and coastal environment in the Pacific. Parties are generally to take all appropriate measures "to prevent, reduce and control pollution of the Convention Area, from any source, and to ensure sound environmental management and development of natural resources, using for this purpose the best practicable means at their disposal, and in accordance with their capabilities".[167] In particular, the Convention calls on parties to take appropriate measures to prevent, reduce and control pollution caused by vessels, from land-based sources, seabed activities, atmospheric pollution and from dumping of wastes.[168] It also calls on parties to take steps to prevent, reduce and control pollution resulting from the storage of toxic and hazardous wastes.[169] The Waigani Convention regulates the transboundary movement of hazardous wastes in the Pacific region. It is modelled on the provisions of the Basel Convention with some differences in the types of wastes covered. The Waigani Convention covers hazardous wastes, which are defined in a similar way as under the Basel Convention, that is covered wastes are those listed in Annex I, unless they do not possess any of the characteristics contained in Annex II or are otherwise defined as hazardous in national legislation. The Waigani Convention also extends to radioactive wastes.[170] Most relevantly to plastic waste, hazardous wastes under the Waigani Convention includes wastes collected from households, but an exception is created for clean, sorted recyclable wastes which do not possess any of the hazardous characteristics defined in Annex II. This differs from the Basel

[161] SPREP, About Us, *available at* https://www.sprep.org/about-us (visited Sept. 24, 2020).
[162] SPREP, Annual Report 2019 (2020).
[163] Pacific Islands Forum Secretariat, The Pacific Islands Forum, *available at* https://www.forumsec.org/who-we-arepacific-islands-forum/ (visited Nov. 10, 2020).
[164] 1986 Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, Nov. 24, 1986, 26 I.L.M. 38 (1987).
[165] 1986 Protocol for the Prevention of Pollution of the South Pacific Region by Dumping, Nov. 25, 1986.
[166] Convention to ban the importation into Forum island countries of hazardous and radioactive wastes and to control the transboundary movement and management of hazardous wastes within the South Pacific Region, Sept. 16, 1995, 2161 U.N.T.S. 91 (2001).
[167] Noumea Convention, article 5.
[168] *Id.*, articles 6-10.
[169] *Id.*, article 11.
[170] Waigani Convention, article 2(1).

Convention under which shipments of household wastes are covered as 'other wastes' even if they do not have hazardous characteristics.

Where plastic wastes fall within the definition of regulated wastes, the Waigani Convention requires all parties to take "appropriate legal, administrative and other measures" to ban the import of all hazardous wastes and radioactive wastes from outside the Convention area.[171] Other parties, namely Australia and New Zealand, must similarly ban the export of all hazardous wastes and radioactive wastes to all Forum Island Countries or territories in the Convention area.[172] A notification procedure is set out for the shipments of hazardous wastes to other parties.[173] Shipments cannot occur without the written consent of importing parties and transit states, written confirmation of the existence of a contract specifying the environmentally sound management of the wastes, and written confirmation of adequate insurance, bonds or other guarantee.[174] Transboundary movement of hazardous wastes must be accompanied by a movement document containing listed information in Annex VI.[175] Further, it must be covered by insurance, bond or other guarantee as required or agreed to by importing or transit party.[176]

The Waigani Convention requires parties to ensure adequate treatment and disposal facilities for the environmentally sound management of hazardous wastes are located within their jurisdictions, taking into account structural considerations. However, the Convention contemplates cooperative solutions, where, for example, hazardous wastes cannot be safely disposed in a Pacific party's territory.[177] To this end, parties to the Waigani Convention are called upon to "cooperate with one another, non-Parties and relevant regional and international organisations, to facilitate the availability of adequate treatment and disposal facilities and to improve and achieve the environmentally sound management of hazardous wastes."[178] Such facilities are to be "located within the Convention Area to the extent practicable taking into account social, technological and economic considerations".[179] This provision expressly contemplates the possibility of regional solutions for the disposal of hazardous wastes, such as recycling 'hubs' and, by extension, recycling of plastic wastes. There is therefore potential to leverage this provision to develop regional legal and cooperative arrangements and infrastructure to prevent plastics entering oceans and becoming polluting marine plastic debris.

2. Non-binding initiatives of inter-governmental bodies

Steps to address marine plastic pollution by PICTs have included the adoption of regional programmes and frameworks that are not legally binding, but which guide harmonised and

[171] *Id.*, article 4.
[172] *Id.*
[173] *Id.*, article 6.
[174] *Id.*, article 6(3).
[175] *Id.*, article 6(9).
[176] *Id.*, article 6(10).
[177] *Id.*, article 4(4) contains the general 'proximity principle': parties are to ensure "the availability of adequate treatment and disposal facilities for the environmentally sound management of hazardous wastes, which shall be located, to the extent practicable, within areas under its jurisdiction, taking into account social, technological and economic considerations. However, where Parties are for geographic, social or economic reasons unable to dispose safely of hazardous wastes within those areas, cooperation should take place as provided for under Article 10 of this Convention".
[178] *Id*, article 10.
[179] *Id.*

coordinated approaches to waste management. In particular, the *Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025* (CP2025) and the *Pacific Regional Action Plan: Marine Litter 2018-2025* provide overarching guidance on waste and pollution management and marine litter in the region. The CP2025 identifies marine litter, particularly marine plastic and microplastic pollution from land- and sea-based sources, as a priority area of concern.[180] The strategy seeks to integrate modern waste management concepts into its guiding principles namely the '3Rs + Return' (compared with the 5Rs in the subsequent Action Plan on Marine Litter),[181] product stewardship, the polluter pays principle, the proximity principle, regionalism, the precautionary approach and public-private partnership.[182]

The strategy also sets out four strategic goals which embody a lifecycle approach to waste management: (a) preventing generation of wastes and pollution; (b) recovering resources from waste and pollutants; (c) improving management of residuals; and (d) improving monitoring of the environment.[183] The strategy establishes key performance indicators (KPIs) for reaching each of these strategic goals. For waste recovery, one of the main KPIs is to achieve a recycling rate of 60% by 2020 and 75% by 2025 in the region, from a baseline of 47% in 2014.[184] The remainder of the KPIs for recovery of wastes focus on the number of composting programs, CDLs and EPR schemes adopted by PICTs.

More specifically related to marine plastic pollution, the *Marine Litter Action Plan 2018-2025* sits under the ambit of the CP2025. It recognises the importance of building across PICTs "key components of a circular economy in partnership with those countries manufacturing and importing goods to our countries and territories".[185] To this end, the Action Plan seeks a waste management system across all PICTs premised upon the 5Rs. Implementation activities span across 11 strategic actions including those on: (a) building a policy and regulatory framework; (b) shipping and vessel operations; (c) fishing vessel waste; (d) cruise ship waste; (e) take-away food and beverage containers; (f) plastics and other waste materials addressed generally through CP2025 activities; (g) awareness and action; (h) tourist focused awareness and action; (i) tourist enterprise waste; and (j) disaster waste.

Of particular relevance to marine plastic pollution, implementation activities under the Action Plan include applying model legislation to ban single-use plastics, Styrofoam and plastic packaging and implementing the solid waste management initiatives outlined above in the CP2025. The action plan also seeks to implement the Moana Taka partnership agreement with Swire Shipping from 2018 to 2021 and beyond, in order to address plastic and other waste materials.[186] Options for further leveraging this arrangement are discussed in the final Part below as part of a regional solution to address barriers to recycling and recovery operations and to prevent plastics from contributing to marine pollution.

[180] Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025, 35.
[181] See (n 8) for discussion of various iterations in international and regional documents.
[182] *Id.,* 42.
[183] *Id.*
[184] *Id.,* 43.
[185] Pacific Regional Action Plan: Marine Litter 2018-2025 12.
[186] *Id.* 24.

III. REGIONAL GOVERNANCE AND PUBLIC-PRIVATE PARTNERSHIPS

A key aspect of a lifecycle approach to preventing and managing marine plastic pollution is providing practical solutions for the recycling of plastics, prior to their entry into the oceans as pollutants. As previously noted, existing global and regional legal frameworks have a focus on transboundary movements of waste but there are significant gaps when it comes to re-use, recycling and recovery operations. To this end, this final Part explores options for developing both regional-level governance and public-private partnerships to export plastics from PICTs to foreign countries equipped to recycle, recover or dispose of plastic waste in an environmentally-sound way. The authors acknowledge that significant work remains to be done – especially in the global waste management frameworks outlined above – to clarify the notion of 'environmentally sound management' in order to ensure that export of plastic wastes for recycling does not itself contribute to pollution problems. Moreover, the extent to which regional arrangements for the export of clean plastic recyclables can provide solutions to the problem of increasing plastic waste and marine plastic pollution is also contingent on a range of factors, including political context.[187] Nevertheless, for PICTs, enhanced options for facilitating export of plastic recyclables are an important part of a lifecycle approach to dealing with plastics, which could help to incentivise the collection of plastic wastes and reduce the potential for marine plastic pollution. Before considering these regional options in detail, however, this Part provides an overview of an existing public-private partnership for waste export operating in the Pacific region, SPREP's Moana Taka partnership.

1. The Moana Taka partnership

In March 2018, SPREP and the China Navigation Company signed a memorandum of understanding (MOU) known as the 'Moana Taka Partnership' to reduce waste streams that are accumulating in PICTs.[188] Under the MOU, the 21 Pacific island member countries and territories of SPREP are eligible to request shipment of wastes by Swire Shipping, the liner business division of the China Navigation Company, at greatly reduced costs.[189] Swire Shipping makes its empty shipping containers in PICTs available at no charge for shipments of recyclable waste out of those countries to appropriate export markets.[190] Exporters in PICTs have the responsibility and liability to pay for insurance, the costs of transporting the container from the Swire agent to the customer, loading the container, its transport back to the wharf and any fees and permits such as those required in accordance with the Basel and Waigani Conventions.[191] Exporters also bear the

[187] For example, see recent tensions in the Pacific Islands Forum: Carreon, Bernadette and Doherty, Ben, *Pacific Islands Forum in crisis as one-third of member nations quit*. The Guardian (Feb. 8, 2021), *available at* https://www.theguardian.com/world/2021/feb/09/pacific-islands-forum-in-crisis-as-one-third-of-member-nations-quit (visited Mar. 3, 2021).

[188] SPREP, "Moana Taka Partnership" Unfolds Exciting Recycling Possibilities For The Pacific Islands, (Mar. 20, 2018), *available at* https://www.sprep.org/news/moana-taka-partnership-unfolds-exciting-recycling-possibilities-pacific-islands (visited Sept. 7, 2020).

[189] The Moana Taka Partnership Charter, *available at* https://www.swirecnco.com/getattachment/Sustainable-Development/Our-Initiatives/Our-Communities/The-Moana-Taka-Partnership-Charter-Rev-2-2-Non-commercial.pdf.aspx?lang=en-US (visited Sept. 7, 2020).

[190] Swire Shipping, Moana Taka Partnership: Moving recyclable waste out of the Pacific Islands. https://www.swirecnco.com/CNCoWeb/media/Departments/SD/Moana-Taka-partnership.pdf (visited Sept. 7, 2020).

[191] *Id.*

responsibility for identifying suitable export markets and consignees that are willing to import the wastes, which has posed a challenge, particularly in the context of plastics.

The agreement aims to support PICTs which have insufficient landfill space to store waste, inadequate waste management infrastructure, and face financial barriers to shipping recyclable waste overseas.[192] The agreement is presently restricted to non-commercial wastes (i.e. those that are not commercially viable to ship), that can be hazardous or non-hazardous waste streams. Shipments of recyclables typically include bulk 'clean' recyclables such as plastics, aluminium cans, and glass. Hazardous liquid wastes, such as waste oil, are more difficult to ship given the significant cost of insurance for such shipments. Since the partnership was launched, approximately 686 tonnes of waste have been shipped from eligible PICTs for treatment and recycling in the Asia Pacific. Shipments so far have included six containers of scrap metal from Samoa and PNG, three containers of used oil from the RMI, 16 containers of varied waste contents from Fiji and nine containers of plastic waste from Fiji.[193]

For a shipment to take place, PICTs contact SPREP for information about eligibility and the types of waste covered. SPREP then evaluates the 'bid', particularly in terms of the potential recycling destination and coordinates with the China Navigation Company/Swire Shipping, to identify a viable shipping route and schedule. If the shipment is agreed to, SPREP will assist all parties with obtaining any necessary documentation for the shipment of the specified waste between the ports and territories. Once the documentation is secured, the container will be loaded and transported to the port of destination.[194]

Other regional organisations and partners are also exploring similar arrangements to the Moana Taka partnership. These include services by: Kyowa Shipping in the Northern Pacific, including countries like the FSM and Palau, which provides shipping routes through the Pacific Islands; the GEF ISLANDS Project, which includes efforts to increase recycling opportunities across the Pacific, Caribbean and Indian Oceans;[195] and the Commonwealth Clean Oceans Alliance which aims to provide technical assistance, capacity building and coordination to combat marine plastic pollution.[196] Through the Moana Taka partnership, and potentially in tandem with other initiatives, there are opportunities to scale-up options for the export of recyclables, particularly plastics, with different shipping companies providing for transportation of wastes to export markets.[197]

[192] SPREP, *supra* note 188.
[193] IISD, Shipping Partnership Advances Waste Management in Pacific Islands (Apr. 7, 2020), *available at* http://sdg.iisd.org/commentary/policy-briefs/shipping-partnership-advances-waste-management-in-pacific-islands/ (visited Aug. 31, 2020).
[194] The Moana Taka Partnership Charter, *supra* note 189.
[195] GEF, Implementing Sustainable Low and Non-Chemical Development in SIDS (ISLANDS) (2019), *available at* https://www.thegef.org/sites/default/files/web-documents/10185_PFD_SIDS_PFD.pdf (visited Sept. 7, 2020).
[196] Clean Oceans Alliance, *available at* https://bluecharter.thecommonwealth.org/action-groups/marine-plastic-pollution/ (visited Sept. 7, 2020).
[197] Several shipping companies operate in the Pacific region, *see* e.g. those listed in UN Economic and Social Commission for Asia and the Pacific (ESCAP), *Background paper for the High-level Meeting on Strengthening Inter-island Shipping and Logistics in the Pacific Island Countries* (July 2013).

2. Regional governance and expanding public-private partnerships

Regional governance, in combination with expanding public-private partnerships, provides an opportunity to create a circular economy for plastic in the Pacific region. Supplementary approaches to public-private partnerships, such as the shipping arrangements discussed above, are necessary as current shipping routes service only major centres and do not provide services to outer islands. Expanding the Moana Taka partnership and developing other initiatives might therefore require a sub-network, bringing waste from outer islands and smaller ports to major centres. This could potentially be managed through a regional recycling hub(s) that then links to major export shipping routes, facilitated by a regional coordinating body. The capacity of institutions, such as SPREP, to support and administer such programs would require additional human and financial resources.

Any agreement for such an arrangement would require provision for an organisational structure and procedural process for handling requests for shipments. Specifying the criteria and policy under which shipments are to be processed, for example, on the basis of urgency of the request, the order in which requests are lodged and so on, may go some way to meeting concerns about preferential treatment. The agreement may also contemplate establishing a 'transparency' mechanism, such as a centralised e-lodgement system accessible by parties. This could include basic details about the request for shipment (when it was lodged, who it was lodged by, current status of processing) but omit sensitive information about the specific nature of the shipment. Regular meetings of parties to the agreement could also be established to provide a specific forum in which to discuss regional cooperative possibilities for plastic waste management.

An important foundation for any future expansion of a regional export arrangement, such as the Moana Taka partnership, in terms of waste volumes and shipping routes, is supporting PICTs to develop appropriate in-country capacity to manage waste. This includes infrastructure and capability for the collection as well as segregation and cleaning of plastics from other waste streams. This is vital for rural populations and outer island communities who often do not have access to regular collection services. Even in urban centres, there is a need for collections to provide for appropriate collection and segregation of the wastes.[198] Development of common quality standards for plastics, suitable for shipment overseas or to a regional hub, together with capacity building and training, would be required, as well as appropriate port infrastructure.[199]

Such common quality standards would need to give attention to a variety of aspects, including embedding standards within a national regulatory framework founded on general objectives of environmental protection and protection of human health. This may require the development of mirror legislation or adoption of standards into domestic legislation. The standards would need to be incorporated into national legislative tools designed to incentivise the collection of clean recyclables, such as CDLs or EPR-type models. In addition, the responsibilities of parties participating in shared arrangements would need to be carefully articulated, including the specific

[198] Japan International Cooperation Agency (JICA), Data Collection Survey on Reverse Logistics in the Pacific Islands Final Report, xvi (Jan. 2013), *available at* https://openjicareport.jica.go.jp/pdf/12112264_01.pdf (visited Sept. 7, 2020).
[199] The new port in Nauru, *e.g.*, is expected to bring down shipping costs: *Construction begins for Nauru's first international port, supported by ADB,* Asian Development Bank (Oct. 21, 2019) *available at* https://www.adb.org/news/construction-begins-naurus-first-international-port-supported-adb (visited Nov. 10, 2020).

responsibilities of participating countries and shippers, consignees in export countries, the shipping containers to be involved, and the coordinating agency for waste shipments.

Common quality standards to facilitate regional cooperation on collection and preparation of plastic wastes for overseas shipment would need to pay attention to questions of liability and the responsibility to ensure socially responsible and environmentally-sound management at the destination point. It is highly undesirable from a health and environmental perspective to export recyclables from PICTs to foreign countries if this arrangement could simply result in a transfer of the waste problem or give rise to greater risks of illegal plastic waste disposal. As discussed earlier, after China introduced restrictions on plastic imports in 2018, many industrialised countries were found to have redirected their contaminated recyclable waste to developing countries.[200] Following the Basel plastic waste amendment,[201] several of those wealthy states have since committed to ban such exports and are likely to develop standards and requirements that could also guide PICTs in their requirements for export markets for wastes not covered by the Basel Convention, namely uncontaminated plastic waste destined for recycling and recovery.[202]

In developing such standards, consideration could be given to specification of requirements relating to liability, insurance, bonds and guarantees for shipments. Another option to consider would be the incorporation in shipping contracts of an extended duty of care whereby shippers would be required to carry out due diligence to ensure that treatment and disposal of the wastes in the countries to which they are shipped will meet standards for socially responsible and environmentally-sound management. Alternatively, preference could be given to aiding processes where some developed countries in the region agree to take and dispose of waste in an environmentally and socially sound manner.

Regional partnerships, expanding or modelled on the Moana Taka partnership, could be developed in the broader context of global initiatives, such as the Basel Convention Partnership on Plastic Waste. Markets for recycling and other processes are being examined in the context of this partnership.[203] Neither PICTs nor regional shipping companies, however, appear to be among the initial list of members.[204] It will be important for PICTs to ensure that their regional interests are properly represented in the work programme of the Basel Convention's global initiative. In particular, they would likely benefit from the partnership's project groups on 'Plastic waste collection, recycling and other recovery including financing and related markets' and 'Transboundary movements of plastic waste'.

[200] Wang et al. (n 74).
[201] Basel Convention, article 4A, Annex VII. Discussion in (n 109-110) and accompanying text.
[202] See, *e.g.*, Australia's National Waste Policy Action Plan (2019) and Recycling and Waste Reduction Bill 2020 (Cth); the EU's proposed delegated regulation to prohibit the export of hazardous and difficult to recycle plastic waste from EU to non-OECD countries which was open for consultation between June-July 2020: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12256-EU-rules-on-transboundary-waste-shipments-update-concerning-plastic-wastes (visited Sept. 24, 2020).
[203] *See* the project group on plastic waste collection, recycling and other recovery including financing and related markets: Basel Convention, Project groups and activities, *available at* http://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/Projectgroupsandactivities/tabid/8410/Default.aspx (visited Sept. 24, 2020).
[204] *See* http://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/Membership/tabid/8098/Default.aspx (visited Sept. 24, 2020).

UNEP's Global Partnership on Marine Litter and the *Ad hoc open-ended expert group on marine litter and microplastics* are also likely to be important vehicles for regional arrangements facilitating public-private partnerships for the export of plastic waste from PICTs. In circumstances where international legal frameworks are fragmented and unclear as to their scope when it comes to distinguishing between contaminated and non-contaminated plastic waste, multi-stakeholder avenues for developing practical solutions in partnership with businesses and civil society are likely to be critical to finding solutions for plastic waste management in PICTs.

IV. Conclusion

There is no shortage of statistics on the magnitude of the problem of marine plastic pollution. For instance, some estimates predict that by 2050 there will be more plastic in the ocean than fish.[205] In this context, PICTs are leading the way with innovative national approaches and potential cross-border regional solutions to deal with waste management in a holistic way, including a lifecycle approach to marine plastic pollution. As international frameworks have largely failed to respond to the particular needs of these states, PICTs have opportunities to build on existing cross-border options for the export of recyclables, including plastics. This call to action by PICTs might similarly inspire or provide a model for action on marine plastic pollution more generally. As declared in the Kainaki II Declaration for Urgent Climate Change Action Now at the 50th Pacific Islands Forum in Tuvalu in August 2019:

> We are working to protect our ocean from harmful plastics through our Pacific Regional Action Plan on Marine Litter 2018-2025 and call on Pacific Rim countries to join and commit to action on addressing marine pollution and marine debris.[206]

Addressing the problem of marine plastic pollution will require a lifecycle approach if the causes of the problem are to be effectively managed. Given the global causes and effects of marine plastic pollution, action at multiple levels of governance is likely to be necessary. However, the capacity of states to adopt and fully integrate a circular economy model into their domestic waste management laws varies considerably, as this paper's discussion of the challenges faced by PICTs illustrates. In this context, tailored solutions might be more appropriate, which recognise the benefits of a lifecycle approach but also allow for specific assistance to developing country PICTs to facilitate shipment and processing of plastics for recycling abroad. Regional solutions offer a 'middle way' approach that can help address the in-country constraints PICTs face in managing many forms of wastes, including plastics, while also allowing efforts to be focused at a scale where effective solutions are most possible.

[205] Ellen MacArthur Foundation, *supra* note 71.
[206] Kainaki II Declaration for Urgent Climate Change Action Now [15] (2019), *available at* https://www.forumsec.org/wp-content/uploads/2019/08/50th-Pacific-Islands-Forum-Communique.pdf (visited Aug. 31, 2020).

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Littoral Indigenous Communities & Transboundary Ocean Plastic Waste in Southeast Asia: Potential Approaches in International Human Rights Law

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Abstract

Recent scientific studies indicates that a large proportion of maritime plastic waste is washing back upon littoral areas, threatening the health and livelihoods of coastal communities. The paper looks to the potential for indigenous coastal communities in ASEAN states to exercise group rights within a state to deal with transboundary maritime plastic waste. Specifically, the analysis explores potential legal theories for under international environmental law and international human rights law approaches. While finding that there are relatively greater prospects for indigenous claims under international human rights law, the analysis identifies issues in substantive and procedural rights, particularly within the ASEAN region states. Hence, as much as it is may be possible for indigenous coastal communities in ASEAN states to use international human rights law approaches to pursue indigenous rights claims against the harms from transboundary maritime plastic pollution, such prospects are conditional upon the circumstances of each individual state.

I. Introduction

The growing issue of marine plastic pollution in the world's oceans[1] extends to Asia, with the countries of the region recognized as both a major source and victim of plastic debris in the surrounding seas.[2] Marine plastic is particularly significant in Southeast Asia[3], with ASEAN states seen as being among the top producers of plastic debris in the world.[4] Compounding the problem are the elevated levels of vulnerability of Southeast Asian societies, with coastal areas of the region hosting roughly 70% of its population in shoreline environments experiencing increasing

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[1] see for example Sanae Chiba, et al., Footprint in the Abyss: 30 Year Records of Deep-Sea Plastic Debris, 96 *Marine Policy* 204-212 (2018); H.S. Auta, et al., Distribution & Importance of Microplastics in the Marine Environment: A Review of the Sources, Fate, Effects, & Potential Solutions, 102 *Environment International* 165-176 (2017); Luis Gabriel Antao Barboza, et al. (2015) Microplastics in the Marine Environment: Current Trends and Future Perspectives, 97 *Marine Pollution Bulletin* 5-12 (2015); L.C.-M. Lebreton, et al., Numerical Modelling of Floating Debris in the World's Oceans, 64 *Marine Pollution Bulletin* 653-661 (2012) [hereinafter cited as Lebreton et al 2012}.

[2] see for example Beatriz Garcia, et al., Marine Plastic Pollution in Asia: All Hands on Deck!, 3 *Chinese Journal of Environmental Law* 11-46 (2019) [hereinafter cited as Garcia et al 2019]; Ocean Conservancy, *Stemming the Tide: Land-Based Strategies for a Plastic-Free Ocean*. (McKinsey & Co 2015), available at: https://www.mckinsey.com/business-functions/sustainability/our-insights/stemming-the-tide-land-based-strategies-for-a-plastic-free-ocean# (visited July 1, 2020).

[3] Association of Southeast Asian Nations (ASEAN), *ASEAN Framework of Action on Marine Debris* (ASEAN 2019), available at: https://cil.nus.edu.sg/wp-content/uploads/2019/11/2019-ASEAN-Framework-Marine-Debris.pdf (visited July 20, 2020) [hereinafter cited as ASEAN 2019]; Youna Lyons, et al., *A Review of Research on Marine Plastics in Southeast Asia: Who Does What?*, (Centre for International Law, National University of Singapore 2019) [hereinafter cited as Lyon et al 2019], available at: https://cil.nus.edu.sg/wp-content/uploads/2019/07/A-review-of-research-on-marine-plastics-in-Southeast-Asia_Final28June2019Rev4July2019.pdf (visited August 10, 2020); Markus Lasut, et al., From Coral Triangle to Trash Triangle—How the Hot Spot of Global Marine Biodiversity Is Threatened by Plastic Waste, *Proceedings of the International Conference on Microplastic Pollution in the Mediterranean Sea* 107-113 (2017).

[4] Lebreton et al 2017; Jenna Jambeck, et al., Plastic Waste Inputs from Land Into the Ocean, 347 *Science* 768-771 (2015) [hereinafter cited as Jambeck et al 2015].

urbanization, pollution, natural resource exploitation, and ship traffic.[5] Particularly vulnerable are the littoral indigenous communities inhabiting the extensive coastlines of Southeast Asia, whose cultures are tied to marine resources.[6]

Attendant with other elements of society, coastal indigenous peoples are also experiencing increases in ocean plastic debris.[7] However, relative to non-indigenous communities, coastal indigenous peoples face an added risk in that traditional cultures are linked with and dependent upon their surrounding environments, and hence to the extent that ocean plastic harms marine and shoreline environments it also harms the integrity of their associated cultures.[8] A particular example are the Bajau peoples inhabiting the shores of Indonesia, Sabah, and Philippines. Historically a distinct sea-based society, the Bajau worldview, culture, identity, and livelihoods are tied to maritime resources, rendering them dependent upon the health of their marine environments to sustain their communities.[9]

State responses in Southeast Asia to address hazards of marine plastic suffer from problematic management regimes.[10] While there are efforts within individual state and regional levels[11], there are also calls for more non-state activism.[12] Critics argue that "top-down" approaches reliant upon state and regional mechanisms are insufficient to address the scale and holistic nature of marine plastic pollution, and that more effective solutions require multi-actor and multi-level approaches that accommodate "bottom-up" strategies that involve local communities as stakeholders.[13] Local-level mechanisms would better focus on the subnational sources of marine plastic pollution that might otherwise avoid state or regional efforts.[14]

The present analysis explores the potential for bottom-up strategies in ASEAN involving legal action by coastal indigenous communities like the Bajau against transboundary marine plastic waste. The analysis begins with a review of pre-existing approaches to deal with transboundary environmental harms, looking first at international environmental law and then turning to international human rights law as offering potential advantages for indigenous litigation against transboundary marine plastic pollution. The analysis explores potential substantive and procedural

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[5] Peter Todd, et al., Impacts of Marine Life in Southeast Asia, 19 *Biodiversity & Conservation* 1063-1082 (2010) [hereinafter cited as Todd et al 2010].

[6] See for example Tom Gunnar Hoogevorst, Ethnicity & Aquatic Lifestyles: Exploring Southeast Asia's Past & Present Seascapes, 4 *Water History* 245-265 (2012) [hereinafter cited as Hoogevorst 2012]; Julian Clifton & Chris Majors, Culture, Conservation, & Conflict: Perspectives on Marine Protection Among the Bajau of Southeast Asia, 25 *Society & Natural Resources* 7: 716-725 (2011) [hereinafter cited as Clifton & Majors 2011].

[7] see for example Grace Heathcote, "Monstrous": Indigenous Rangers' Struggle Against the Plastic Ruining Arnhem Land Beaches, THE GUARDIAN, May 15, 2019, available at: https://www.theguardian.com/australia-news/2019/may/15/monstrous-indigenous-rangers-struggle-against-the-plastic-ruining-arnhem-land-beaches (visited August 10, 2020); Clifton & Majors 2011.

[8] see for example Lisa Hiwasaki, et al., Local & Indigenous Knowledge on Climate-Related Hazards of Coastal & Small Island Communities in Southeast Asia, 128 *Climatic Change* 35-56 (2015); Clifton & Majors 2012.

[9] Hoogevorst 2012; Clifton & Majors 2011.

[10] Lyons et al 2019; Jambeck et al 2015.

[11] Lyons et al 2019; Gregoria Joanne Tiquio, et al., Management Frameworks for Coastal & Marine Pollution in the European & South East Asian Regions, 135 *Ocean & Coastal Management* 65-78 (2017).

[12] Garcia et al 2019; Joanna Vince & Britta Hardesty, Plastic Pollution Challenges in Marine & Coastal Environments: From Local to Global Governance, 25 *Restoration Ecology* 123-128 (2017) [hereinafter cited as Vince & Hardesty 2017].

[13] Garcia et al 2019; Vince & Hardesty 2017; Lauren Butterly & Erika Techera, Critical Linkages: Trans-Jurisdictional Approaches to Advancing Indigenous Marine Governance, in TRANS-JURISDICTIONAL WATER LAW & GOVERNANCE (J Gray et al. eds., 2016) [hereinafter cited as Butterly & Techera 2016].

[14] Garcia et al 2019; Vince & Hardesty 2017.

rights issues in using international human rights to address transboundary marine plastic pollution, and also reviews the specific challenges facing indigenous peoples in ASEAN. The analysis concludes with a final assessment and directions for future research.

II. Conceptualizing indigenous claims/defenses against transboundary marine waste

To the extent that it crosses territorial boundaries between states, marine plastic pollution is a form of transboundary environmental harm. Transboundary environmental harm is a subject of both international environmental law and international human rights law. A review of both, however, suggests that the latter may provide greater utility for indigenous peoples as groups. The following subsections clarify the differences between the two fields.

International Environmental Law

International environmental law accords some recognition of indigenous rights, with examples such as the United Nations Framework Convention on Climate Change (UNFCCC 1992) as well as the Convention on Biological Diversity (CBD 1992) and its accompanying Nagoya Protocol.[15] These are, however, relatively recent developments and it is uncertain as to the degree to which international environmental law aids indigenous rights on the topic of marine plastic. There is more specifically relevant action such as the World Indigenous Network of Land and Sea Managers arising from the United Nations Conference on Sustainable Development[16], but these are non-legal venues and so do not serve as legal mechanisms. In terms of law, marine plastic debris falls under a range of international legal instruments that include the Convention on the Control of Transboundary Movements of Hazardous Wastes & Their Disposal (Basel Convention 1989), United Nations Convention on the Law of the Sea (UNCLOS 1982), International Convention for the Prevention of Pollution from Ships (MARPOL 1973), and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London Convention 1972).[17]

Under international environmental law, it is possible to address transboundary harms originating from state or non-state sources. With respect to states, public international environmental law imposes liability for a state's activities within its territory that harm the

[15] Alan Boyle, Climate Change, the Paris Agreement, & Human Rights, 67 *International & Comparative Law Quarterly* 759-777 (2018) [hereinafter cited as Boyle 2018]; United Nations General Assembly, Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy, & Sustainable Environment, A/HRC/34/49 (2017), available at: https://documents-dds-ny.un.org/doc/UNDOC/GEN/G17/009/97/PDF/G1700997.pdf?OpenElement (visited August 20, 2020) [hereinafter cited as UNGA 2017]; United Nations, *Paris Agreement* (2015); available at: https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf (visited August 20, 2020) [hereinafter cited as UN 2015]; *Convention on Biological Diversity*, (1992), available at: https://www.cbd.int/ (visited September 20, 2020) [hereinafter cited as CBD 1992].

[16] Butterly & Techera 2016.

[17] Ina Tessnow-von Wysocki & Philippe Le Billon, Plastics at Sea: Treaty Design for a Global Solution to Marine Plastic Pollution, 100 *Environmental Science & Policy* 94-104 (2019); Micah, Landon-Lane, Corporate Social Responsibility in Marine Plastic Debris Governance, 127 *Marine Pollution Bulletin* 310-319 (2018); Karen Raubenheimer & Alistair McIlgorm, Can the Basel and Stockholm Conventions Provide a Global Framework to Reduce the Impact of Marine Plastic Litter?, 96 *Marine Policy* 285-290 (2018); Patricia Villarrubia-Gomez, et al., Marine Plastic Pollution as a Planetary Boundary Threat: The Drifting Piece in the Sustainability Puzzle. *Marine Policy* 213-220 (2018) [hereinafter cited as Villarrubia-Gomez et al 2018]; Christopher Mooradian, Protecting Sovereign rights: The Case for Increased Coastal State Jurisdiction Over Vessel-Source Pollution in the Exclusive Economic Zone, 82 *Boston University Law Review* 767-816 (2002).

environment of another state. Such liability is recognized as a result of the *Trail Smelter* arbitrations between Canada and the United States (*Trail Smelter* 1941) as well as from principles articulated by the declarations from the United Nations Conference on the Human Environment (Stockholm Declaration 1972) and the United Nations Conference on Environment and Development (Rio Declaration 1992).[18] With respect to non-state sources, private international environmental law also allows for actions between non-state actors, with civil actions such as nuisance torts allowing potential remedies for individuals or class-actions involving groups of individuals against polluters residing in another state.[19]

Both of the above public and private approaches, however, are problematic for indigenous claims in that both place indigenous concerns at the discretion of state authority. Public international environmental law orients liability in terms of state-to-state transboundary harms, and so render non-state actors such as an indigenous group dependent upon the willingness of their home state to advocate on their behalf regarding pollution originating from a foreign state.[20] Private international environmental law looks to liability between non-state actors, which places an indigenous group at the mercy of either their home state or the host state of the polluter to provide appropriate remedies.[21] Either way, the state-centric nature of international environmental law operates to proscribe the avenues through which indigenous peoples can seek relief for transboundary environmental harms.[22]

International Human Rights Law

Prospects of redress for indigenous grievances from transboundary marine plastic pollution are more apparent within international human rights law, which hosts academic and policy discourses recognizing human-environment linkages and inter-related rights for both humanity and the environment.[23] Embedded in such discourses is the idea of a human right to a healthy environment with procedural and substantive obligations of states to both other states and non-

[18] Maria Banda, Regime Congruence: Rethinking the Scope of State Responsibility for Transboundary Environmental Harm, 103 *Minnesota Law Review* 1879-1959 (2019); Boyle 2018; Alan Boyle, Globalising Environmental Liability: The Interplay of National & International Law, 17 *Journal of Environmental Law* 17(1): 3-26 (2005) [hereinafter cited as Boyle 2005].

[19] Robert Percival, Liability for Environmental Harm and Emerging Global Environmental Law, 25 *Maryland Journal of International Law* 37-63 (2010) [hereinafter cited as Percival 2010]; Boyle 2005

[20] Banda 2019; Jaye Ellis, Extraterritorial Exercise of Jurisdiction for Environmental Protection: Addressing Fairness Concerns, 25 *Leiden Journal of International Law* 397-414 (2012) [hereinafter cited as Ellis 2012]; Boyle 2005; Peter Lepsch, Ecological Effects Know No Boundaries: Little Remedy for Native American Tribes Pursuing Transboundary Pollution Under International Law, 11 *Buffalo Environmental Law Journal* 61-88 (2003) [hereinafter cited as Lepsch 2003].

[21] Percival 2010; Boyle 2005; Lepsch 2003.

[22] see for example Stephen Allen, Nigel Bankes, & Oyvind Ravna, THE RIGHTS OF INDIGENOUS PEOPLES IN MARINE AREAS (Hart Publishing 2019); Lepsch 2003; Stuart Kaye, Jurisdictional Patchwork: Law of the Sea & Native Title Issues in the Torres Strait, 2 *Melbourne Journal of International Law* 381-413 (2001).

[23] see for example United Nations, *Special Rapporteur on Human Rights and the Environment* (2020), available at: https://www.ohchr.org/en/Issues/environment/SRenvironment/Pages/SRenvironmentIndex.aspx (visited July 28, 2020) [hereinafted cited as UNGA 2020]; Jenny Springer, *IUCN's Rights-Based Approach: A Systemization of the Union's Policy Instruments, Standards, and Guidelines* (International Union for the Conservation of Nature IUCN 2016), available at: https://www.iucn.org/sites/dev/files/content/documents/iucn_rba_systematization_compiled.pdf (visited July 1, 2020) [hereinafter cited as Spring 2016]; Puneet Pathak, Human Rights Approach to Environmental Protection, 7 *OIDA International Journal of Sustainable Development* 17-24 (2014); United Nations General Assembly, Human Rights & the Environment, A/HRC/RES/19/10 (United Nations General Assembly 2014), available at: https://documents-dds-ny.un.org/doc/RESOLUTION/GEN/G12/131/59/PDF/G1213159.pdf?OpenElement (visited July 4, 2020) [hereinafter cited as UNGA 2012].

state actors.[24] Substantive obligations relate to the content of laws in determining fair outcomes[25], and involve state duties to address environmental problems that interfere with the enjoyment of human rights held by individuals and groups.[26] Procedural obligations relate to state duties for transparency in environmental information, facilitating public participation in environmental decisions, and providing access to non-state actors for remedies against environmental harm.[27] Such developments in international human rights law are accompanied by a recognition of indigenous rights, both directly as rights specific to indigenous peoples and indirectly as rights held by groups that include indigenous communities.[28] The notion of human rights accords empowerment of indigenous peoples in that it looks to the promotion of human dignity[29] that implies a recognition of agency[30], autonomy[31], human potential[32], moral worth[33], capacity to participate in collective human endeavors[34], and consideration of cultural context.[35] International human rights law advances such ideals by imposing liabilities upon a state for its own actions and the actions of non-state actors within its respective jurisdictions[36], and thereby encourages respect for indigenous rights by both state and non-state entities.

The differences between international environmental law and international human rights law are also apparent in their contrasting treatment of liabilities. While international environmental law orients state and non-state liabilities in ways that leave indigenous peoples at the mercy of states to provide means of remedy, international human rights law provides a system of international liabilities that allow indigenous peoples a way of pursuing transboundary claims.

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[24] see for example John Knox, Constructing the Human Right to a Healthy Environment, 16 *Annual Review of Law & Social Science* 4-17 (2020); John Knox & Ramin Pejan (eds.), THE HUMAN RIGHT TO A HEALTHY ENVIRONMENT (Cambridge University Press 2018); United Nations General Assembly, Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy, & Sustainable Environment, A/HRC/37/59 (United Nations General Assembly 2018), available at: https://undocs.org/A/HRC/37/59 (visited August 28, 2020) [hereinafter cited as UNGA 2018a]; United Nations General Assembly, Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy, & Sustainable Environment, A/73/188 (United Nations General Assembly 2018), available at: https://undocs.org/A/73/188 (visited August 28, 2020) [hereinafter cited as UNGA 2018b]; Springer 2016; Alan Boyle, Human Rights & the Environment: Where Next?, 23 *European Journal of International Law* 613-642 (2012).

[25] Sidney Dekker & Hugh Breakey, "Just Culture": Improving Safety by Achieving Substantive, Procedural, & Restorative Justice, 85 *Safety Science* 187-193 (2016) [hereinafter cited as Dekker & Beakey 2016]; Tyrone Kirchengast, Beyond Normative Constraints: Declining Institutionalism and the Emergence of Substantive and Procedural Justice, 41 *International Journal of Law, Crime, & Justice* 292-302 (2013); Paul Stancil, Substantive Equality and Procedural Justice, 102 *Iowa Law Review* 1633-1690 (2017).

[26] United Nations General Assembly, Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy, & Sustainable Environment, A/HRC/34/49 (United Nations General Assembly 2017), available at: https://documents-dds-ny.un.org/doc/UNDOC/GEN/G17/009/97/PDF/G1700997.pdf?OpenElement (visited August 28, 2020) [hereinafter cited as UNGA 2017].

[27] UNGA 2017; Dekker & Breakey 2016; Boyle 2012; Kyle Whyte, The Recognition Dimensions of Environmental Justice in Indian Country, 4 *Environmental Justice* 199-205 (2011).

[28] Jennifer Corrin, From Horizontal & Vertical to Lateral: Extending the Effect of Human Rights in Post Colonial Legal Systems of the South Pacific, 58 *International & Comparative Law Quarterly* 31-71 (2009); David Engel, Vertical & Horizontal Perspectives on Rights Consciousness, 19 *Indiana Journal of Global Legal Studies* 423-455 (2012).

[29] Michael Goodhart, HUMAN RIGHTS: POLITICS & PRACTICE (Oxford University Press 2009).

[30] A. Gewirth, THE COMMUNITY OF RIGHTS (University of Chicago Press 1996).

[31] Joseph Raz, THE MORALITY OF FREEDOM (Oxford University Press 1986).

[32] Amartya Sen, DEVELOPMENT AS FREEDOM (Anchor Books 2000)

[33] Ronald Dworkin, TAKING RIGHTS SERIOUSLY (Harvard University Press 1977).

[34] John Rawls, THE LAWS OF PEOPLES WITH 'THE IDEA OF PUBLIC REASON REVISITED'(Harvard University Press 1999).

[35] Kyle Whyte, The Recognition Dimensions of Environmental Justice in Indian Country, 4 *Environmental Justice* 199-205 (2011).

[36] Lottie Lane, The Horizontal Effect of International Human Rights Law in Practice, 5 *European Journal of Comparative Law & Governance* 5-88 (2018) [hereinafter cited as Lane 2018].

Specifically, international human rights law directs attention to the obligations of a state to promote the rights of non-state actors within the state's jurisdiction, fostering an international system of unilateral obligations by states to rights-holders within their respective jurisdictions.[37] The notion of jurisdiction can be extra-territorial, and so may extend a state's obligations to include the human rights of actors outside a state's territory.[38]

The nature of liability can be state or non-state, in that under international human rights law a state is responsible not just for its own actions but also for promoting the observance of human rights by individuals and groups within its jurisdiction.[39] As a result, international human rights law provides redress for transboundary environmental harms originating from either state or non-state actions in cases where 1) a foreign state is responsible for a transboundary environmental harm affecting the human rights of a particular individual or group; and 2) a foreign non-state actor is responsible for a transboundary environmental harm infringing upon the human rights of an individual or group.[40] For indigenous peoples, such options means that they can turn to international actions to address transboundary environmental harms and thereby bypass state-delimited strategies offered by international environmental law.

Moreover, international human rights law provides additional value in that it expands potential legal strategies by accommodating a range of rights applicable for both individuals and groups relevant for environmental harms.[41] Such an expansion enables a more holistic scope covering the concerns of indigenous peoples.[42] In particular, it allows the accommodation of indigenous group rights to cultural integrity, self-determination, and traditional environmental resources.[43] All three areas of rights relate to each other, in that indigenous culture is connected to

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[37] Maria Banda, Regime Congruence: Rethinking the Scope of State Responsibility for Transboundary Environmental Harm, 103 *Minnesota Law Review* 1879-1959 (2019) [hereinafter cited as 2019]; Ibrahim Kanalan, Extraterritorial State Obligations Beyond the Concept of Jurisdiction, 19 *German Law Journal* 43-64 (2018) [hereinafter cited as Kanalan 2018]

[38] Banda 2019; Kanalan 2018; Natalie Dobson & Cedric Ryngaert, Provocative Climate Protection: EU Extraterritorial Regulation of Maritime Emissions, 66 *International & Comparatively Law Quarterly* 295-334 (2017); Peter Szigeti, The Illusion of Territorial Jurisdiction, 52 *Texas International Law Journal* 369-399 (2017); Jorge Vinuales, A Human Rights Approach to Extraterritorial Environmental Protection?, In THE FRONTIERS OF HUMAN RIGHTS (Nehal Bhuta eds., 2016) [hereinafter cited as Vinuales 2016]; Boyle 2012; Olivia De Schutter, et al., Commentary to the Maastricht Principles on Extraterritorial Obligations of States in the Area of Economic, Social, & Cultural Rights. 34 *Human Rights Quarterly* 1084-1169 (2012); Hugh King, Extraterritorial Human Rights Obligations of States, 2009 *Human Rights Law Review* 521-556 (2009); Bankovic v Belgium, App. No. 52207/99, 2001-XII Eur. Ct. H.R. 333; Burgos v Uruguay, Commc'n No. 52/1979, UN Doc. CCPR/C/13/D/52/1979; Meneses v Ecuador, Petition 189-03, Inter-Am. Comm'n H.R., Report No. 153/11 (2011); Andreou v Turkey, App. No. 45653/99, Eur. Ct. H.R. (admissibility 3 June 2008); Pad v Turkey 2007, App. No. 60167/00, Eur. Ct. H.R. (admissibility 28 June 2007); Kovacic v Slovenia, App. Nos. 44575/98, 45133/98, 48316/99, Eur. Ct. H.R.(admissibility 1 April 2004); Gueye v Grance, Commc'n No. 196/1985, UN Human Rights Comm., U.N. Doc. CCPR/C/35/D/196/1985 (1989); Stephens v Malta, App. No. 11956/07, Eur. Ct. H.R. (admissibility 21 April 2009).

[39] Banda 2019.

[40] Ibid.

[41] UNGA 2017; United Nations General Assembly, Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy, & Sustainable Environment, A/HRC/34/49 (United Nations General Assembly 2017), available at: https://documents-dds-ny.un.org/doc/UNDOC/GEN/G17/009/97/PDF/G1700997.pdf?OpenElement (visited September 1, 2020); Peter Zwiebach, Whose Right Is It Anyway? Rethinking a Group Rights Approach to International Human Rights, 4 *Human Rights & Human Welfare* 79-89 (2004); Peter Jones, Human Rights, Group Rights, & Peoples' Rights, 21 *Human Rights Quarterly* 80-107 (1999).

[42] UNGA 2017; Susana Borras, New Transitions from Human Rights to the Environment to the Rights of Nature, 5 *Transnational Environmental Law* 113-143 (2016) [hereinafter cited as Borras 2016].

[43] UNGA 2017; Borras 2016; *United Nations Declaration on the Rights of Indigenous Peoples* (2007), available at: https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html (visited May 1,

surrounding environmental contexts and self-determination is directed to control over environmental resources and the cultural practices tied to those resources.[44]

Following the above discussion, it is apparent that international human rights law offers potential advantages for indigenous groups seeking legal action against transboundary marine plastic pollution. While international environmental law allows plaintiffs to mobilize their home state to advocate on their behalf, the prospects for relief are confined to issues of state liability. Private law actions against foreign non-state polluters are conceivable in terms of litigation in the courts of an aggrieved indigenous group's home state or the courts of the foreign state hosting the polluter, but such options are largely oriented towards individual and group actions. For both public and private options, international environmental law places indigenous rights subject to the discretion of the state, with the state holding authority to eschew advocacy on behalf of those rights or deny their existence altogether. In contrast, international human rights law offers both the possibility of state liability towards non-state actors and an international recognition of indigenous rights, making it more potentially promising for cases of indigenous claims against transboundary marine plastic pollution.

III. Substantive and procedural rights for transboundary indigenous claims

Under international human rights law, indigenous rights litigation against transboundary marine plastic pollution would involve substantive and procedural components. Substantive components involve the specific indigenous rights being violated by a transboundary environmental harm, which under the preceding discussion means reference to particular human rights held that are held by a given indigenous group and which are impacted by the health of their environment. Procedural components involve the identification of legal mechanisms that allow the exercise of such rights in terms of indigenous access to environmental information, participation in environmental decisions, and indigenous access to remedies for environmental harms. The following subsections address each of these components with respect to indigenous coastal communities in ASEAN such as the Bajau peoples.

Substantive rights issues

With respect to substantive issues, state obligations vary according to the particular circumstances of individual situations.[45] It is possible to determine obligations by identifying the rights to be upheld in a given case. In regards to human rights related to the environment, the enjoyment of human rights draws upon ecosystem services to fulfil a right to subsistence; right to adequate standard of living in terms of housing, food, and water; right to life and health; and right to culture.[46] To the extent that transboundary maritime plastic causes harm to the ecosystem services in the environment surrounding indigenous communities, it is causing a violation of the aforementioned rights held by those indigenous populations. Such rights are indigenous rights to

2020) [hereinafter cited as UNDRIP 2007]; Cherie Metcalfe, Indigenous Rights & the Environment: Evolving International Law, 35 *Ottawa Law Review* 101-140 (2003) [hereinafter cited as Metcalfe 2003].

[44] A.W. Harris, Making the Case for Collective Rights: Indigenous Claims to Stocks of Marine Living Resources, 15 *Georgetown International Environmental Law Review* 379-428 (2003); Meltcalfe 2003; Lawrence Watters, Indigenous Peoples & the Environment: Convergence from a Nordic Perspective, 20 *UCLA Journal of Environmental Law & Policy* 237-304 (2001).

[45] UNGA 2017

[46] UNGA 2017: 4, 17-18.

the extent that they overlap with the content of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP 2007) or the International Labor Organization Convenntion for Indigenous and Tribal Peoples Number 169 (ILO No. 169 1989), which proffer dedicated enumerations of specific indigenous rights recognized by international law.[47]

Note should be made regarding the binding status of UNDRIP and ILO No. 169 under international law. ILO No. 169, as a treaty, expresses obligations that are binding upon state parties. UNDRIP, as a declaration, is non-binding and hence constitutes a more aspirational expression of norms than a corpus of rights states parties are required to enforce as law. The rights listed in UNDRIP, however, can become binding as legal rights to the extent that they overlap with existing international legal instruments that have binding authority. Examples include human rights treaties such as the International Covenant on Civil and Political Rights (ICCPR) or the International Covenant on Economic, Social, and Cultural Rights (ICESCR). States which become parties to a treaty bind themselves to the obligations within the treaty—including the terms which may not explicitly express the term "indigenous" but which nonetheless correlate with indigenous rights contained in the non-binding UNDRIP or rights otherwise sought by indigenous peoples.[48] Compliance to a treaty involves implementation of the rights contained within the treaty, such that a state party enforces them as legal rights.

As a result, for a case involving an indigenous group seeking redress for an environmental harm, the identification of available legal rights incurs an exercise in mapping their home state's status under various treaties. The scope of a state's participation in various treaties determines the range of rights available to the peoples within the state's jurisdiction, and hence to the extent that they overlap with conceptions of indigenous rights they set the range of rights that indigenous peoples within the jurisdiction can seek in addressing an environmental problem. Following the above discussion, this means 1) associating human rights related to ecosystem services that are recognized as indigenous rights within UNDRIP and overlap with human rights treaties such as the ICCPR and ICESCR, or which are expressed in ILO No. 169; and 2) for a particular indigenous group, charting the status of their home state against the aforementioned rights and associated treaties. With respect to the first step, it is possible to see the location of rights within treaties in Table 1 below, which shows the expression of ecosystem-related human rights in a sample of international human rights instruments:

[47] UNDRIP 2007; International Labor Organization Convention on Indigenous & Tribal Peoples No. 169 (1989), available at: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C169 (visited September 1, 2020) [hereinafter cited as ILO No. 169 1989].

[48] Andrew Erueti, Maori Rights to Freshwater: The Three Conceptual Models of Indigenous Rights, 24 *Waikato Law Review* 58-80 (2016) [hereinafter cited as Erueti 2016]; Pearl 2018.

Table 1[49]

Substantive human rights	***International human rights instruments***
Right to subsistence	UNDRIP Art. 20; ICCPR Art. 1; ICESCR Art. 1
Right to adequate standard of living (housing, food, & water)	UNDRIP Arts. 20-24; UDHR Art. 25; ICESCR Art. 11
Right to life & health (including personal liberty & security)	UDHR Art. 3; UNDRIP Art. 7, 20-24; ICCPR Arts. 6-10
Right to culture	UNDRIP Arts. 11-13; ICESCR Art. 15; ICCPR Art. 27; UDHR Art. 27

With respect to the second step, charting the status of a home state requires the selection of a case, and so renders an abstract discussion into a rhetorical exercise for an unidentifiable indigenous group. For purposes of the present discussion, a case of indigenous communities in ASEAN such as the Bajau involves mapping the status of ASEAN states under the instruments noted above. A summary of the mapping is given in Table 2 below:

Table 2[50]

Country	***ICCPR***	***ICESCR***	***UDHR***	***ILO No. 169***	***UNDRIP***
Indonesia	*Ratified (2006)*	*Ratified (2006)*	*Member*	-	*Voted in favor*
Timor-Leste	*Ratified (2003)*	*Ratified (2003)*	*Member*	-	*Voted in favor*
Thailand	*Ratified (1996)*	*Ratified (1999)*	*Member*	-	*Voted in favor*
Cambodia	*Ratified (1992)*	*Ratified (1992)*	*Member*	-	*Voted in favor*
Philippines	*Ratified (1986)*	*Ratified (1974)*	*Member*	-	*Voted in favor*
Vietnam	*Ratified (1982)*	*Ratified (1982)*	*Member*	-	*Voted in favor*
Myanmar	-	*Ratified (2017)*	*Member*	-	*Voted in favor*
Malaysia	-	-	*Member*	-	*Voted in favor*
Brunei	-	-	*Member*	-	*Voted in favor*
Singapore	-	-	*Member*	-	*Voted in favor*

[49] compiled by author from UNDRIP 2007; International Covenant on Economic, Social, & Cultural Rights (1966, available at: https://www.ohchr.org/en/professionalinterest/pages/cescr.aspx (visited August 10, 2020) [hereinafter cited as ICCPR 1966]; International Covenant on Economic, Social, & Cultural Rights (1966), available at: https://www.ohchr.org/EN/ProfessionalInterest/Pages/OPCESCR.aspx (visited August 10, 2020) [hereinafter cited as ICESCR 1966]; Universal Declaration of Human Rights (1948), available at: https://www.un.org/en/universal-declaration-human-rights/ (visited August 28, 2020) [hereinafter cited as UDHR 1948].

[50] compiled by author from UNDRIP 2007; ILO No. 169 1989; ICCPR 1966; ICESCR 1966; UDHR 1948.

The above table shows that none of the ASEAN states are parties to ILO No. 169, and so direct indigenous peoples to seek rights in international human rights instruments that correlate to rights enumerated in UNDRIP. The countries of Malaysia, Brunei, and Singapore voted in favor of UNDRIP, but are not currently parties to the ICCPR or the ICESCR, effectively leaving indigenous peoples upon the availability of rights in domestic laws to address transboundary harms. Myanmar is somewhat uncertain, as it voted in support of UNDRIP and is a party to the ICESCR but is not a party to the ICCPR. As a result, indigenous peoples in Myanmar are limited to exercising the rights within the ICESCR. In contrast, the countries of Indonesia, Timor-Leste, Thailand, Cambodia, Philippines, and Vietnam all voted in favor of UNDRIP and are parties to both the ICCPR and ICESCR, and so obligate those four countries to implement legal rights for the indigenous rights contained within the overlap between UNDRIP and those treaties. For a case such as the Bajau peoples, there is relief across all the aforementioned international human rights instruments with respect to Philippines and Indonesia, but much less possibility with respect to Malaysia or any other state.

Hence, following the above, to some degree there are substantive legal rights through international human rights law for cases involving indigenous communities within a bare majority of ASEAN countries experiencing a degradation of ecosystem services arising from transboundary marine plastic pollution. Using international human rights law provides a holistic array of rights for indigenous peoples to advance their interests, either through the express recognition of indigenous rights or the allowance of group rights. Because human rights treaties render those rights as binding legal obligations upon state parties, indigenous peoples can pursue transboundary claims for violation of rights against actors outside their home states. This expands the scope of legal actions beyond the possibilities offered by the state-centric nature of obligations under international environmental law or the confines of remedies granted within the limits of domestic laws.

Procedural rights issues

The existence of substantive legal rights is not by itself sufficient to ensure indigenous remedies, as there must also be mechanisms for the exercise of legal rights. The exercise of substantive rights calls for attendant procedural rights that ensure rights-holders can seek remedies against actors responsible for violating legal rights. For vulnerable populations, such as indigenous peoples who are closely connected to the environment, the dependence upon ecosystem services poses particular needs to emphasize procedural rights for indigenous interests regarding non-discrimination, information, free participation, free expression, free association, and participation in environmental decisions on behalf of indigenous interests (UNGA 2017: 10, 16-17).[51] These rights are embodied within international human rights law, with each right located articulated within specific clauses in international human rights instruments. Examples for the human rights instruments raised by the preceding subsection on substantive human rights are given in Table 3 below:

[51] UNGA 2017.

Table 3[52]

Procedural human rights	***International human rights instruments***
Rights to equality & non-discrimination	ICCPR Art. 14; ICESCR Art. 2; UDHR Art. 2; UNDRIP Art. 2
Right to information	ICCPR Art. 19; UDHR Art. 19
Right to free expression	ICCPR Art. 19; UDHR Art. 2
Right to free association	ICCPR Arts. 21 & 22; ICESCR Art. 8 (for trade unions); UDHR Art. 20
Right to participate in public decisions	ICCPR Art. 25; ICESCR Art. 8 (for trade unions); UDHR Art. 21; UNDRIP Arts. 5 & 18

Following the reasoning from the previous discussion regarding Table 2, indigenous groups within the ASEAN countries of Malaysia, Brunei, and Singapore and are not assured of the above procedural rights, since none of them are state parties to the binding obligations of either the ICCPR or ICESCR. Indigenous groups in Myanmar are only assured of the rights to equality and non-discrimination as well as the right to free association, with only a marginal right under Myanmar's obligations to the ICESCR regarding participation in public decisions to the degree that they work through trade unions. However, the above slate of rights are available in Indonesia, Timor-Leste, Thailand, Cambodia, Philippines, and Vietnam, as they are all parties to the binding commitments of both the ICCPR and ICESCR. In the case of the Bajau peoples, this means more opportunities for relief in Indonesia and Philippines, but less so in Malaysia.

Some additional caution should be taken in that there is an antecedent issue of access to remedies.[53] Access to legal remedies requires an antecedent determination of legal personality, in that a discussion of rights-based approaches involves a preliminary need to identify actors holding legal rights enforceable by law, with the subsequent consequence that anyone not allowed to hold legal rights is denied access to the law.[54] Legal personality for indigenous peoples means recognition by a state, which entails attendant discourses about the relative status of powers of indigenous peoples as colonized groups vis-à-vis the powers of state as sovereigns in international law.[55] Discussions over the status of a group as an indigenous people involves notions of identity, self-determination, and authority to control collective property[56], which correlate with articles in binding international human rights treaties regarding rights to collective identity and nationality; right to self-determination; and right to free, prior, and informed consent (FPIC) over traditional

[52] compiled by author from UNDRIP 2007; ICCPR 1966; ICESCR 1966; UDHR 1948.
[53] UNGA 2017: 10.
[54] Alan Boyle, Climate Change, the Paris Agreement, & Human Rights, 67 *International & Comparative Law Quarterly* 759-777 (2018).
[55] see for example Vinuales 2016; Erueti 2015; Robert Snyder, International Legal Regimes to Manage Indigenous Rights & Arctic Disputes from Climate Change, 22 *Colorado Journal of International Environmental Law & Policy* 1-40 (2011); Jay Williams, The Impact of Climate Change on Indigenous People – The Implications for the Cultural, Spiritual, Economic, & Legal Rights of Indigenous People, 16 *The International Journal of Human Rights* 648-688 (2012); Patrick Macklem, Indigenous Recognition in International Law: Theoretical Observations, 30 *Michigan Journal of International Law* 177-210 (2008) [hereinafter cited as Macklem 2008].
[56] UNGA 2017: 16-17; Macklem 2008; UNDRIP 2007.

property. With the specific examples of human rights instruments included in the present analysis, it is possible to identify the location of the aforementioned rights in Table 4 below:

Table 4[57]

Rights regarding indigenous status	***International human rights instruments***
Right to collective identity & nationality	ICCPR Arts. 2, 3, 24 (no discrimination based on identity); ICESCR Art. 15; UDHR Art. 15 (re cultural life); UNDRIP Arts. 2-6
Right to self-determination	ICCPR Art. 1; ICESCR Art. 1; UNDRIP Arts. 3-5
Right to free, prior, informed consent	UNDRIP Arts. 10, 11, 28-29

For indigenous peoples in ASEAN the right to FPIC is not available, as UNDRIP is non-binding and none of the states in the region are parties to ILO No. 169. There is, however, some measure of availability with respect to rights of identity, nationality, and self-determination in that the majority of ASEAN states, with the exceptions of Malaysia, Brunei, and Singapore, are parties to either the ICCPR or the ICESCR.

Summarizing the preceding discussion of substantive and procedural rights, there are issues delimiting the scope and access of remedies for potential indigenous claims in ASEAN states against transboundary marine plastic pollution. For both substantive and procedural aspects, the possibility of using international human rights law to address indigenous environmental harms is confined to states that are parties to human rights treaties hosting rights related to ecosystem services. Such a condition covers the majority of ASEAN states, but it excludes the jurisdictions of Malaysia, Brunei, and Singapore and thereby effectively removes them from potential indigenous rights claims undertaken through international human rights strategies. Myanmar also poses issues, in that its status as a party to the ICESCR allows substantive group rights amenable to indigenous grievances but its aversion for the ICCPR weakens the procedural rights, particularly rights regarding information and free expression, necessary for the exercise of substantive rights. As a result, for indigenous peoples within ASEAN, the options of using international human rights law to address transboundary environmental harms is largely confined to the select ASEAN states holding binding obligations as state parties to human rights treaties.

IV. Conclusion

The preceding analysis explored potential legal theories addressing ways in which indigenous peoples can pursue actions under international law against transboundary maritime plastic pollution. The previous sections identified avenues under international environmental law and international human rights law. While international environmental law recognizes principles regarding state actions driving transboundary environmental harms, it provides less recourse for non-state actors like indigenous groups on the issue of maritime plastic. In contrast, international human rights law recognizes extraterritorial state liability to individuals and groups for violations of human rights arising from the actions of a state or the actions of non-state actors under that state's jurisdiction. As a result, to the extent that the human rights of an indigenous community relate to the ecosystem services of their surrounding environment, international human rights law

[57] compiled by author from UNDRIP 2007; ICCPR 1966; ICESCR 1966; UDHR 1948.

provides more possibilities for indigenous groups suffering from transboundary maritime plastic debris to seek relief. Such possibilities, however, are not absolute in that the scope of international human rights protection is constrained by substantive and procedural issues and the feasibility of actions to advance those rights are frustrated by the nature of human rights enforcement mechanisms. Thus, while indigenous groups seeking redress for transboundary maritime plastic pollution do have a slate of legal and non-legal options encompassing international environmental and international human rights approaches, each of those options carries attendant complexities that challenge their use. Particularly within Southeast Asia, the status of ASEAN states vis-à-vis international treaties greatly narrows the possibility of indigenous claims against the harms of transboundary maritime plastic pollution.

The analysis raises a number of directions for future research to further understanding regarding theory and application of the approaches outlined by the previous sections. First, the orientation of discussion in the preceding sections was largely theoretical, considering the possibilities of international human rights law as a potential alternative framework to international environmental law in addressing the grievances of non-state actors such as indigenous peoples regarding transboundary environmental harms. While the analysis tied discussion in relation to indigenous peoples in ASEAN states, the focus was on clarifying the major components and issues with respect to substantive and procedural rights and the mechanisms to exercise those rights. As such, the commentary served as a broad introduction to the features describing how an international human rights approach might appear. Hence, the elements outlined in the analysis would benefit from further studies detailing the potential legal arguments associated in pursuing legal claims involving the features presented herein. In particular, future work would delineate the relevant legal sources and procedural actions specific to a chosen international or domestic forum, with different studies investigating the these types of details for different fora to expand the theoretical understanding of how an international human rights approach can work as an option in redressing transboundary environmental harms.

Second, considerations of theory would benefit from grounding in empirical work, with the findings from empirical studies informing theoretical deliberations to more accurately reflect the complexities of non-state actors and transboundary environmental issues. In particular, with respect to the present analysis, it would be helpful for future research to study cases of indigenous groups pursuing legal actions for transboundary marine plastic pollution, not just in ASEAN but also other geographic areas in the world. The insights from case studies would provide valuable information regarding the ways in which they advance their rights and thereby help to identify areas of theory requiring additional consideration. In the aggregate, they would also provide comparative basis to denote nuances regarding the extent to which the theory is universal, and hence broadly applicable, or particular, and thus variable according to context.

Third, additional empirical work would also involve interdisciplinary study, in that an aggrieved indigenous group may operate not just via legal actions but also through political, social, and economic strategies. Indigenous activism exists within a holistic space, with decisions regarding law being made in relation to additional concerns for political, social, or economic interests. As a result, understanding the exercise of legal rights and the pursuit of legal claims calls for contributions from other social science disciplines that can clarify the interactions between such disparate issue spaces and the subsequent treatment of the law. Doing so would indicate the

degrees of sophistication and the complexities of indigenous activism, not just with respect to transboundary marine plastic in particular but transboundary environmental issues in general.

Fourth, the analysis explored the substantive and procedural components of indigenous rights litigation against transboundary marine plastic pollution using international human rights law. However, the exercise of substantive and procedural rights occurs through mechanisms in the form of institutions of law that hear legal claims. Such institutions exist in the form of domestic courts as well as international bodies. Additional study is needed to illustrate the issues encountered by indigenous groups in accessing such institutions to exercise substantive and procedural rights against transboundary marine plastic pollution.

Finally, the present analysis left an unresolved issue in terms of the concept of indigeneity. Indigeneity, as much as it relates to collective identity of a group of people, requires recognition under law to be accorded legal rights and access to legal mechanisms to exercise those rights. Recognition poses issues at both international and domestic levels. With respect to international notions of indigeneity, there are differing definitions for the notion of indigenous peoples across different international legal instruments and different issues spaces, with examples including the inconsistent conceptions between the global discourses over climate change (UNFCCC), human rights (UNDRIP), and labor (ILO No. 169). For domestic levels, the nature of sovereignty under international law reserves to each state exclusive authority over its population, territory, and resources, allocating it power to determine the status of a collective of people as an indigenous group with legally enforceable indigenous rights. Hence, while the present study explored the availability of international human rights approaches in addressing the transboundary environmental issues for indigenous peoples in ASEAN, there is a further question as to which communities are able to claim legal rights as indigenous peoples within each ASEAN state. The question extends more generally beyond ASEAN, since the potential variety of state approaches to the recognition of indigenous peoples and indigenous rights poses a danger of inconsistent access to remedies for transboundary environmental harms.

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Navigating in a Sea of Plastics: A Critical Reflection on the Legal Responses in the Philippines to Marine Plastic Debris*

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Abstract

One of the greatest threats to marine biodiversity in our oceans today is plastic debris. A number of international commitments and declarations highlight the need to prioritize actions to address marine plastic pollution. However, actions taken in many countries to minimize plastic waste have not been sufficient. The Philippines, which is among the biodiversity hotspots in the world, has emerged as among the top marine plastic debris polluters with the largest source of single use plastics leaking into the ocean. As one navigates around its over 7,100 islands, one cannot miss the sea of plastics in its oceans and communities. But the Philippines has no overarching national plastics legislation. While national laws exist to tackle solid wastes, pollution in general, and aquatic or marine pollution, these are inadequate to address the growing menace of marine plastic pollution in the country. The 20-year-old national solid waste management law, Ecological Solid Waste Management Act (RA 9003) could, however, provide opportunities to set out a policy framework to address plastic wastes. However, there are gaps in the legal and institutional frameworks. Since majority of plastic wastes in the Philippines come from land-based sources due to the unregulated use and indiscriminate dumping of plastics, an overarching legal framework regulating plastic wastes and coherence of existing laws and regulations on marine pollution are critical. In examining the domestic legal frameworks for marine plastic pollution, key policy and institutional responses have been identified. The existing policy gap can be addressed if the national government sets clear guidelines on the legal provision on 'non-environmentally acceptable products or packaging'. Greater coordination by many governmental agencies involved in marine plastic pollution governance is also required. Likewise, it is vital to recognize the important role of local governments in the implementation framework. Lessons can be drawn from jurisprudence as set by the courts in ensuring coordination between national agencies and local governments in accordance with their mandates.

Keywords: marine plastic debris, solid wastes, marine pollution, non-environmentally acceptable products or packaging

* This paper has been previously submitted and published as a Featured Article in the Korea Legislation Research Institute's KLRI Journal of Law Legislation, Volume 11 Number 1, 2021, pp. 63-96.

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I. Introduction

The greatest imminent threat to fragile marine ecosystems in most developing countries today, with the Philippines as no exception, is marine plastic debris. Plastic has been identified as a major component of marine debris, because of its prevalence in the waste stream and its longevity.[1] Recent global estimates show that plastic litter in the oceans range from around 27 to 66.7 million tons, with 12.2 million tons entering the marine environment every year.[2]

There is no doubt about the importance of the oceans to the Asia-Pacific Region which are considered as areas of exceptional marine biodiversity. The Asia-Pacific region hosts the Coral Triangle, a marine area known for its staggering number of corals as well as diverse species of coral reef fish, which is the global epicenter of marine biodiversity[3]. But like most countries in the region, the Philippines' biodiversity is in fast decline[4]. It is under threat with deterioration of its marine waters due to plastic debris. These plastics enter the marine environment though land-based sources such as uncontrolled dumpsites, landfills, and residential areas. Majority of macro- and microplastics are released from the terrestrial environment which are then transported through rivers and stormwater runoffs, and get deposited in beaches and other marine habitats.[5] Other sources include ghost nets and other fisheries materials, shipping and transportation, and atmospheric outfall.[6]

A host of international commitments and declarations highlight the need to prioritize actions to address marine plastic pollution. One of these is the United Nations' Sustainable Development Goals (SDGs), specifically Goal 14 on Life Below Water, seeks to prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution by 2025. But according to the Secretariat of the Convention on Biological Diversity, actions taken in many countries to minimize plastic waste have not been sufficient to reduce this source of pollution.[7] Hence, plastic pollution is accumulating in the oceans, with severe impacts on marine ecosystems, and in other ecosystems with still largely unknown implications.[8]

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[1] Ocean Conservancy and McKinsey Center for Business and Environment, *Stemming the tide: Land-based strategies for a plastic-free ocean* (2015) at 11, *available* at https://oceanconservancy.org/wp-content/uploads/2017/04/full-report-stemming-the.pdf (last visited Dec. 1, 2020).

[2] Jenna R. Jambeck, Roland Geyer, Chris Wilcox, Theodore R. Siegler, Miriam Perryman, Anthony Andrady, Ramani Narayan, Kara Lavender Law, *Plastic waste inputs from land into the ocean*, 347 Science, 768 (2015). *See also* Chris Sherrington, *Plastics in the Marine Environment*, eunomia (Jun. 19, 2016), https://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/.

[3] World Wildlife Fund, Coral Triangle: Facts. *See* https://www.worldwildlife.org/places/coral-triangle (last visited Mar. 10, 2021).

[4] Convention on Biological Diversity, Philippines – Main Details, https://www.cbd.int/countries/profile/?country=ph (last visited Mar.10, 2021).

[5] Anna E. Schwarz, Tom N. Lighthart, Elise Boukris, Toon van Harmelen, *Sources, transport, and accumulation of different types of plastic litter in aquatic environments: a review study*, 143 Marine Pollution Bull., 92 (2019); Deo Florence L. Onda, Norchel Corcia F. Gomez, Daniel John E. Purganan, Mark Paulo S. Tolentino, Justine Marey S. Bitalac, Jahannah Victoria M. Calpito, Jose Nickolo O. Perez, and Alvin Claine A. Viernes, *Marine Microbes and Plastic Debris: Research Status and Opportunities*, 149 Phil. J. Science, 71 (2020).

[6] Britta D. Hardesty, Joseph Harari, Atsuhiko Isobe, Laurent Lebreton, Nikolai Maximenko, Jim Potemra, Erik van Sebille, A. Dick Vethaak, and Chris Wilcox, *Using numerical model simulations to improve the understanding of micro-plastic distribution and pathways in the marine environment*, 4 Front. Mar. Sci., 30 (2017); Onda, et al. *Ibid.*

[7] Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 5*, (2020), at 70.

[8] *Id.*

The Philippines, which is among the biodiversity hotspots in the world, has emerged as among the top marine plastic debris polluters with the largest source of single use plastics leaking into the ocean.[9] The Philippines is also considered a "sachet economy," which means the majority of the population consumes products in small packaging.[10] Extrapolated figures by the Global Alliance for Incinerator Alternatives (GAIA) show that almost 164 million pieces of sachets are used daily nationwide, equating to around 59.7 billion pieces of sachets per year.[11]

The Philippines' primary law on solid waste management is Republic Act. No. 9003, otherwise known as the Ecological Solid Waste Management Act which was enacted in 2000.[12] According to the Philippine submission of potential response options pursuant to UN Environment Assembly Resolution 3/5 Subparagraph 10(d), the law's primary objective is to holistically manage solid wastes and address leakage of marine litter and microplastics into rivers, seas and oceans.[13] It was also reported that a number of cities and municipalities have prohibited single-use plastic across the country and over the past decades.[14] Despite the presence of these laws, indiscriminate dumping of plastics continues thereby exacerbating flooding, deteriorating water quality, and adversely affecting public health and the environment.

The Philippines has likewise committed to various international regimes protecting biodiversity, addressing climate change, and combatting marine pollution, including global soft law instruments like several United Nations Environmental Assembly (UNEA) Resolutions on marine plastic litter and microplastics that contain expressions of concern and the need for action.[15] In a submission in response to UNEA 3 Resolution 7, aimed at providing possible response options to combat marine plastic litter and microplastics from all sources,[16] the country's environmental department noted that "while its plastic trade and plastic consumption are comparatively minimal, the country like many others in Asia is greatly affected by the plastic sachet economy resulting in persistent unsustainable plastic packaging wastes." This is compared to its neighbors in Indonesia, Thailand Vietnam, and Malaysia.[17] In addition, plastic waste imports in the Philippines rose 150% from 2016 to about 11,800 tons in 2018.[18] Further, the Philippines in its submission, reiterated its position for the consideration of the feasibility and effectiveness of a potential international legally binding agreement on marine litter and microplastics[19], and its support for the start of the

[9] Ocean Conservancy, *supra* note 1.
[10] Global Alliance for Incinerator Alternatives, *Plastics Exposed: How Waste Assessments and Brand Audits Are Helping Philippine Cities Fight Plastic Pollution* (2019), at 24, *available* at https://www.no-burn.org/wp-content/uploads/PlasticsExposed-3.pdf (last visited Dec. 29, 2020).
[11] *Id.*
[12] *See also* https://www.officialgazette.gov.ph/2001/01/26/republic-act-no-9003-s-2001/.
[13] U.N. EA of the UNEP, Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics 4th Meeting, UNEP/AHEG/2020/4/1/Add.1 (Sept. 1, 2020).
[14] *Id.*
[15] *See* for *e.g.*, UNEP/EA/4/Res. 6 (Mar. 28, 2019) and UNEP/EA.3/Res.7 (Jan. 30, 2018) on marine plastic debris and microplastics at https://www.informea.org (last visited March 10, 2021).
[16] UNEP/AHEG/2020/4/1/Add.1, *supra* note 13.
[17] Center of International Environmental Law, *Support Grows to Control Plastic Waste in International Trade Treaty*, (Sept. 6, 2018), *available* at https://www.ciel.org/news/support-grows-to-control-plastic-waste-in-international-trade-treaty/ (last visited Dec. 29, 2020).
[18] Jun Endo, *Philippines slams the door on world's plastic waste*, Nikkei Asian Review (Sept. 14, 2018), *available* at https://asia.nikkei.com/Spotlight/Environment/Philippines-slams-the-door-on-world-s-plastic-waste (last visited Dec. 1, 2020).
[19] UNEP/AHEG/2018/2/5 (Feb. 21, 2019).

negotiations of a new global treaty and the discussion of its elements to combat marine plastic pollution.[20]

Despite all these, as one navigates around the over 7,100 islands in the Philippines, one cannot miss the sea of plastics in its oceans and communities. Thus, this article primarily focuses on advancing marine plastic pollution policy and governance in the Philippines. It employs theories of governance given the intrinsic complexities in the current regulatory and institutional frameworks. The article utilizes the Driver-Pressure-State-Impact-Response (DPSIR) framework[21] as advanced by various authors and groups to determine existing policy gaps. It also employs the theoretical work of Geradin and McCahery[22] which argues that optimal governance requires a flexible mix of competition and cooperation between governmental actors, as well as between governmental and non-governmental actors. This is known as the 'regulatory co-opetition' theory.[23] The article explores the application of this theory in the current regulatory framework for marine debris in the Philippines in general. It will determine how an enabling legal framework for solid waste management and marine pollution exists can address the issue of marine plastic debris. But it also analyzes the gaps and barriers in the current regulatory and institutional frameworks at different aspects of governance. Finally, the article identifies policy responses that are appropriate to address critical issues in terms of marine plastic debris in the Philippine context.

II. The Current Regulatory Framework for Marine Plastic Debris in the Philippines

In the Philippines, there is no overarching national legislation dealing with marine plastic debris at the source. Plastic pollution is a production, consumption and waste management challenge that must be tackled upstream.[24] However, plastic-specific laws or regulations that directly deals with plastic packaging and its primary production do not exist at the national level. Although there may be some local legislation or ordinances banning single use plastics in place, the Philippines has no nationwide ban on single use plastics.

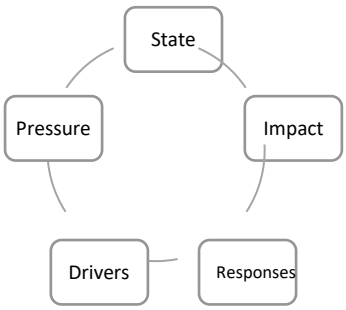
Despite these, there are two (2) national legislations in the Philippines that can provide an enabling environment to address the problem of marine plastic pollution. *First*, the general framework to control solid wastes in the Ecological Solid Waste Management Act. This law deals with solid waste management in general, but it suggests a plausible roadmap for plastic waste management. *Second*, the legal frameworks that control marine pollution in general. There are several laws that provide regulatory measures for actions causing marine and/or aquatic pollution. These include Clean Water Act,[25] Philippine Fisheries Code,[26] Marine Pollution Decree,[27]

[20] UNEP/AHEG/2020/4/1/Add.1, *supra* note 13.
[21] *See* Smeets and Weterings, *infra* note 33.
[22] Damien Geradin, D. and Joseph A. McCahery, Regulatory Co-opetition: Transcending the Regulatory Competition Debate, 2005 TILEC Discussion Paper Ser., 14 (2005).
[23] *Id.*
[24] International Union for Conservation of Nature, *Marine Plastics and Coastal Communities (MARPLASTICCS) Project*, (2019), at 1, *available* at https://www.iucn.org/sites/dev/files/marplasticcs_factsheet_updated_august_2019.pdf (last visited Dec. 29, 2020).
[25] Clean Water Act, Rep. Act No. 9275 (Phil.).
[26] Philippine Fisheries Code, Rep. Act No. 8550, as amended by Rep. Act No. 10654 (Phil.).
[27] Marine Pollution Decree, Pres. Dec No. 979 (Phil.).

Pollution Control Law,[28] Revised Coast Guard Law,[29] Expanded National Integrated Protected Areas Act,[30] Toxic Substances and Hazardous and Nuclear Wastes Control Act,[31] and Climate Change Act[32].

Specifically, the aforementioned laws seek to: (i) reduce waste at source and regulate land-based sources of plastic wastes to prevent leakage to the marine environment; and (ii) prohibit sources of marine pollution activities. The first is addressed by the Ecological Solid Waste Management Act (RA 9003) which deals with management of solid wastes from land-based sources, while the second is addressed by several marine pollution laws, as afore-mentioned, which generally enforce against overt acts of causing marine pollution.

However, there exists gaps and deficiencies in these legislations as well as overlaps in these regulatory regimes resulting in lack of coherence. To aid in the analysis of the barriers in the implementation of the current legal and policy framework for marine plastic pollution, this paper employs the causal chain or Driver-Pressure-State-Impact-Response (DPSIR) framework originally developed in order to assess and monitor sustainability. The driver–pressure–state–impact–response-model is a conceptual framework consisting of a feedback system of drivers, pressures, states, impacts, and responses, and it is widely used as a tool to model human–environmental systems.[33] It facilitates the analysis of specific cause-effect relationships within these systems.[34] It can be applied in the context of this paper because it helps to link various environmental and socioeconomic factors causing the current state of marine plastic debris in the country. This is done by illustrating causal relationships between the *drivers* of human action or driving forces of the problem, which is the unregulated use, manufacturing and importation of plastics. These create *pressures* on the *state* of the marine environment by plastic pollution. One of the *drivers* of human action that led to the unregulated actions is the lack of an overarching legal framework regulating marine plastic pollution and lack of coherence in existing regulations. The effects of these human actions create adverse *impacts* on the said marine ecosystems, which in turn require adequate policy *responses*. A simplified diagram is presented in Figure 1 below:



[28] Pollution Control Law, Pres. Dec. No. 984 (Phil.).
[29] Revised Coast Guard Law, Pres. Dec. No. 601 (Phil.).
[30] Expanded National Integrated Protected Areas Act, Rep. Act No. 11038 (Phil.).
[31] Toxic Substances and Hazardous and Nuclear Wastes Control Act, Rep. Act 6969 (Phil.).
[32] Climate Change Act, Rep. Act No. 9279 (Phil.).
[33] Edith Smeets and Rob Weterings, *Environmental Indicators: Typology and Overview*, European Environmental Agency (1999), at 6, *available* at https://www.eea.europa.eu/publications/TEC25 (last visited Jan. 27, 2021) citing Burkhard B. & F. Müller, *Drivers-Pressure-State-Impact-Response*, in S.E. Jørgensen and B.D. Fath, *Ecological Indicators, vol. 2 of Encyclopedia of Ecology (5 vols.)* 867-970 (Oxford: Elsevier, 2008); European Environment Agency, *Air Pollution in Europe 1997: Executive Summary*, *available* at https://www.eea.europa.eu/publications/92-9167-059-6-sum (last visited January 27, 2021).
[34] Smeets & Weterings, *supra* note 33.

Figure 1. Simplified DPSIR Diagram adapted from the EEA Framework[35]

Majority of plastic wastes in the Philippines come from the unregulated use, manufacturing and importation of plastics which are indiscriminately dumped or deposited to dumpsites and landfills that create *pressures* on the marine environment. The lack of an overarching legal framework regulating these actions as well as lack of coherence of existing regulations are the main *drivers* of the problem of marine plastic pollution, hence the need for appropriate policy *responses*.

A. The laws and policies on solid waste and marine pollution, and their application to marine plastic pollution

A reduction of plastic wastes can somehow be addressed by the Ecological Solid Waste Management Act (RA 9003), which provides the regulatory framework that focuses on the avoidance of solid wastes from households and other land-based sources. Policy-wise, this legislation deals with 'solid wastes', which can include plastics. The law broadly defines the term 'solid wastes' to "include all discarded household, commercial waste, non-hazardous institutional and industrial waste, street sweepings, construction debris, agricultural waste, and other non-hazardous/non-toxic solid waste."[36] Despite its broadly-defined terminology, plastics are not directly referenced in the term -'solid wastes'.

Nevertheless, this legislation can help address the growing menace of marine plastic pollution in the country through the implementation of various solid waste management strategies. The Act aims to ensure, among others, the protection of public health and the environment by setting guidelines for solid waste avoidance and volume reduction through source reduction.[37] It contains seven chapters and 66 sections providing the policy direction for collection, transfer and transport, processing, and disposal of solid wastes. However, the lack of a direct reference to plastics in particular is evident therein.

Nevertheless, the law can be used to control the dumping of solid wastes, including plastics, into dumpsites and landfills. As held in the case of *Province of Rizal, et al. v. Executive Secretary*,[38] the Supreme Court declared that this law mandates the formulation of a National Solid Waste Management Framework which should include, among other things, the method and procedure for the phaseout and eventual closure of existing open dumps and/or sanitary landfills located within an aquifer, groundwater reservoir or watershed area. The law, therefore, provides a land-based solution to the management of plastic wastes through two (2) critical elements. *First*, it seeks to manage solid wastes that have a high risk of polluting rivers and oceans by imposing the immediate closure of open, uncontrolled dumpsites. *Second*, it imposes penalties on activities causing pollution in both terrestrial and marine areas.

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[35] European Environment Agency, *supra* note 33.

[36] *See* Ecological Solid Waste Management Act of 2000, §3(kk), Rep. Act No. 9003 (Phil.). However, the law expressly excludes from its definition other types of solid wastes, such as infectious waste from hospitals, hazardous waste of a solid, liquid, contained gaseous or semisolid form and waste resulting from mining activities, including contaminated soil and debris.

[37] *Id.*, §2; *See also* Whereas Clause of the implementing rules and regulations (IRR) of Republic Act No. 9003.

[38] Digest Province of Rizal v. Exec Sec, G.R. No. 129546 S.C.R.A. (Dec. 13, 2005). Here, the Supreme Court ordered the permanent closure of a landfill based on its adverse effects on its environs and to ensure the protection of sources of water.

Best estimates would show that the dominant source of marine plastic debris is the land-based input at 70-80 percent, while the remaining 20-30 percent sources come from marine sources,[39] with less than ten percent of these marine sources coming from abandoned, lost or discarded fishing gear[40]. Plastic wastes are also deposited to the oceans through river systems. For instance, one of the greatest polluting rivers across the world is Pasig River in Metro Manila. It was ranked eighth in the top 20 polluting rivers as predicted by the global river plastic inputs mode, with an input of approximately 63,700 tons of plastic into the ocean each year.[41]

Aside from land-based sources, marine plastic pollution is also caused by indiscriminate acts of causing marine pollution. These are referenced in various laws in the country that seek to: (1) define 'pollution' in different ways; and (2) penalize the acts of causing pollution accordingly.

At the first instance, these laws provide a definition of the term 'pollution'[42], 'hazardous wastes', and 'aquatic pollution'. The Pollution Control Law (PD 984) broadly defines the term 'pollution' as those substances that are harmful, detrimental or injurious to public health, safety or welfare. The act of causing 'pollution' is punished whenever an establishment or person generates or discharges sewage or wastes that pose threats to life, public health, safety or welfare, or to animal or plant life, or exceed the allowable standard.[43]

Relatedly, although it uses the same term 'pollution' similar to the Pollution Control Law, the Clean Water Act expands the scope of the term 'pollution'[44] to include those that are potentially hazardous to health. Another recent and more specialized law, Toxic Substances and Hazardous and Nuclear Wastes Control Act, defines the term 'hazardous wastes'[45] in particular. This definition covers refers to unsafe materials and its by-products, side-products, etc. that are shipped for dumping in the country. This law specifically deals with the regulation, restriction or

[39] Wai- Chin Li, Tse Hung Fat, and Lincoln Fok, *Plastic waste in the marine environment: A review of sources, occurrence and effects*, 566 Science of the Total Env't 333 (2016) cited in Hannah Ritchie and Max Roser, *Plastic Pollution*, Our World in Data (2018), *available* at https://ourworldindata.org/plastic-pollution (last visited December 1, 2020).

[40] Graeme Macfadyen, Tim Huntington, and Rod Cappell, *Abandoned, lost or otherwise discarded fishing gear*, UNEP/FAO (2009).

[41] Laurent C.M. Lebreton, Joost van der Zwet, Jan-Willem Damsteeg, Boyan Slat, Anthony Andrady and Julia Reisser, *River plastic emissions to the world's oceans*, Nature Communications, 8, 15611 (Jun. 7, 2017), *available* at https://www.nature.com/articles/ncomms15611#t1 (last visited Jan. 27, 2021).

[42] Under § 2(a), Pollution Control Law, Pres. Dec. No. 984 (Phil.), commonly known as the Pollution Control Law, the term "Pollution" is defined as, "any alteration of the physical, chemical and biological properties of any water, air and/or land resources of the Philippines, or any discharge thereto of any liquid, gaseous or solid wastes as will or is likely to create or to render such water, air and land resources harmful, detrimental or injurious to public health, safety or welfare or which will adversely affect their utilization for domestic, commercial, industrial, agricultural, recreational or other legitimate purposes."

[43] *Estrada, et al. v. Court of Appeals, et al.*, G.R. No. 137862 (Nov. 11, 2004).

[44] *See* §4(bb), Clean Water Act, Rep. Act No. 9275 (Phil.) which defines "pollutant" as more than just any hazardous substance, whether solid, liquid, gaseous or radioactive, which directly or indirectly alters the quality of any segment of the receiving water body so as to affect or tend to affect adversely any beneficial use thereof, but it also includes those that are: potentially hazardous to health; imparts objectionable odor, temperature change, or physical, chemical or biological change to any segment of the water body; or is in excess of the allowable limits or concentrations or quality standards specified, or in contravention of the condition, limitation or restriction prescribed in this Act.

[45] *Supra* note 31, §5(h). Hazardous wastes are defined as substances that are without any safe commercial, industrial, agricultural or economic usage and are shipped, transported or brought from the country of origin for dumping or disposal into or in transit through any part of the territory of the Philippines. Hazardous wastes shall also refer to by-products, side-products, process residues, spent reaction media, contaminated plant or equipment or other substances from manufacturing operations, and as consumer discards of manufactured products.

prohibition of the importation, manufacture, processing, sale, distribution, use and disposal of chemical substances and mixtures that present unreasonable risk and/or injury to health or the environment.[46]

The Amended Fisheries Code (RA 8550, as amended by RA 10654) likewise defines pollution in reference to marine areas in particular. The law refers to 'aquatic pollution' as those introduced by human or machine, directly or indirectly, to the aquatic environment which result or is likely to result in such deleterious effects as to harm living and non-living aquatic resources, pose potential and/or real hazard to human health, hindrance to aquatic activities such as fishing and navigation.[47]

Nevertheless, all these definitions found in different laws can be applicable to plastic pollution as it affects the marine environment. Although the definitions seem to be generic at times, there is no doubt of its direct application to marine plastic debris. For instance, as shown in the definition of 'aquatic pollution' under the Philippine Fisheries Code, the inclusion of the phrase "dumping or disposal of waste and other marine litters, x x x, and other, radioactive, noxious or harmful liquid, gaseous or solid substances, from any water, land or air transport or other human-made structure" in the definition impliedly suggests the inclusion of plastic wastes in the said term.

The afore-mentioned marine pollution laws also punish overt acts of causing pollution, or specifically 'dumping' any kind of pollutants into the environment. In the Clean Water Act, 'dumping' means any unauthorized or illegal disposal into any body of water or land of wastes or toxic or hazardous material, except those that are within the effluent standards.[48] However, the Marine Pollution Decree, as amended, provides a more specific definition of the term 'dumping' which associates the act with the source of the disposals from vessels, aircraft, platforms or other man-made structures at sea.[49] Finally, the Fisheries Code declares unlawful the act of "introducing, directly or indirectly, substances to the aquatic environment that are harmful to its living and non-living aquatic resources" and punishes such act with criminal and/or administrative penalties.[50]

Many of the marine pollution laws in the Philippines are usually in reference to a point-source pollution. Although the term 'pollution', 'hazardous wastes' or 'aquatic pollution' broadly includes solid wastes, the statutory standards for point source pollution that exists in the country are usually in reference to liquid or gaseous wastes, and none of these standards apply to solid wastes. For instance, an existing Administrative Order provides for the classification of water bodies into different categories for purposes of maintaining water quality.[51] It uses primary parameters such as BOD, Chloride, color, dissolved oxygen, fecal coliform, nitrate, pH, phosphate,

[46] *Supra* note 31, §2.
[47] *Supra* note 26, §4(4).
[48] *Supra* note 26, §4(l).
[49] *Supra* note 27, §3(b). "Dumping" means any deliberate disposal at sea and into navigable waters of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea, including the disposal of wastes or other matter directly arising from or related to the exploration, exploitation and associated off-shore processing of sea bed mineral resources unless the same is permitted and/or regulated under this decree: Provided, That it does not mean a disposition of any effluent from any outfall structure to the extent that such disposition is regulated under the provisions of Republic Act Numbered Three Thousand Nine Hundred Thirty-One, nor does it mean a routine discharge of effluent or other matter incidental to the propulsion of, or derived from the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment.
[50] *Supra* note 26, §107.
[51] Department of Environment and Natural Resources, Admin. Ord. 2016-08 (May 24, 2016).

temperature and total suspended solids.[52] These are clearly referencing liquid wastes, and not solid wastes.

B. Analyzing the institutional framework for marine plastic debris governance

This section demonstrates the complexity of the institutional framework in place for the protection of marine environment against the adverse impacts of marine plastic pollution. In the management of solid wastes, the Philippines' regulatory framework enables the top-down and bottom-up approach. This is evident in its current law for solid waste management. Related national laws also show the other national agencies involved as well as the role of local governments in the enforcement of marine pollution laws.

The institutional framework showing the various functions and responsibilities of all government agencies and local government units in marine plastic pollution management is illustrated in the table below:

Table 1. Philippine Institutional Framework for Marine Plastic Debris Management

Management Strategy	**National**				**Local**
	NSWMC	**DENR**	**BFAR**	**PCG**	**LGU**
Policy instruments	✓	✓	✓	✓	✓
Planning	✓	✓	✓	✓	✓
Issuance of Regulations, Standards and Guidelines	✓	✓	✓	✓	
Enforcement		✓	✓	✓	✓
Capacity-building	✓				
Information, Education and Communications	✓				
Manufacturing	✓				
Importation and Exportation		✓			

Legend: NSWMC=National Solid Waste Management Commission; DENR=Department of Environment and Natural Resources; BFAR=Bureau of Fisheries and Aquatic Resources; PCG=Philippine Coast Guard; CCC=Climate Change Commission; LGU=Local Government Unit.

The top-down approach in the management of solid wastes from land-based sources is established with national government agencies at the helm. The current law, Ecological Solid Waste Management Act (RA 9003), identifies both the National Solid Waste Management Commission and the Department of Environment and Natural Resources as the lead governmental entities to undertake policy setting and enforcement responsibilities. However, a bottom-up approach is also obvious in the said law, when it identifies the local government units as the main avenues for the implementation of solid waste management strategies.

[52] *Id.*

Functionally, it is clear that many governmental agencies may be involved in marine plastic debris governance, and this can result in incoherence and uncoordinated implementation of laws. The National Solid Waste Management Commission prepares the national solid waste management framework,[53] whilst the primary enforcement and responsibility of solid waste management is retained by the local government units[54] in line with the principle of local autonomy. The law also promotes a decentralized waste management by creating the Solid Waste Management Board in each local government unit. While the National Solid Waste Management Commission seems to have the overarching responsibility to address solid wastes - which can include plastics - pollution, other government entities have also been given authorities to address marine and/or aquatic pollution.[55] Examples of these government agencies are the Philippine Coast Guard,[56] the Philippine National Police – Maritime Group,[57] and the Bureau of Fisheries and Aquatic Resources[58]. Specifically, the Philippine Coast Guard can apprehend violators who discharge substances from any ship, barge or other floating craft or vessel of any kind, among others for purposes of marine environmental protection of the territorial waters of the Philippines.[59] Likewise, under the Clean Water Act, the agriculture department is charged with coordinating with the Philippine Coast Guard and the environmental department for the enforcement of water quality standards in marine waters. More specifically, its Bureau of Fisheries and Aquatic Resources shall be primarily responsible for the prevention and control of water pollution for the development, management, and conservation of the fisheries and aquatic resources.[60]

Horizontal coordination is required through the set up provided by the national solid waste management law in creating the 17-member National Solid Waste Management Commission. The Commission, which is established under the Office of the President, is a 17-member body, with 14 members from the government sector and 3 members from the private sector.[61] Thus, it is inherent within the Commission itself for national government agencies, such as the Department of Agriculture, Department of Interior and Local Government, etc., to regularly coordinate their plans, programs and activities towards achieving the objectives of this law. Interestingly, the

[53] *Supra* note 36, §5(a). The Commission, through the National Solid Waste Management Framework, lays down in broad strokes the policies and strategic actions for the management of solid wastes in the country. This framework provides the vision, mission, and goals that can guide localized plans and actions of local government units.
[54] *Supra* note 36, §2(g) and 10.
[55] Local Government Code of 1991, Rep. Act No. 7160 (Phil.); *Tano, et al. v. Socrates, et al.*, G. R. No. 110249 (Aug. 21, 1992).
[56] Pursuant to *supra* note 27, §4 and §6 of Presidential Decree 979.
[57] In accordance with *supra* note 26, §124 of Republic Act 8550.
[58] *Supra* note 25, §22(c).
[59] *Supra* note 29, §2.
[60] *Supra* note 25, §22(c). The latter's jurisdiction over marine waters beyond the 15-kilometer municipal waters is also recognized under the Fisheries Code. It must be noted that spatially, marine waters in the Philippines are to be understood in terms of municipal waters, which are measured 15-kilometers from the high tide line, and such is within the territorial jurisdiction of local government units, specifically cities and municipalities. Since aquatic pollution is defined and punished in accordance with the Fisheries Code, the jurisdiction to enforce this prohibition is to be determined in accordance with this marine spatial divide.
[61] The National Solid Waste Management Commission members come from the government sector, such as the Department of Environment and Natural Resources as the lead agency, Department of Interior and Local Government, Department of Science and Technology, Department of Public Works and Highways, Department of Health, Department of Trade and Industry, Department of Agriculture, Metro Manila Development Authority, Leagues of provincial governors, city mayors and municipal mayors, Association of barangay councils, Technical Education and Skills Development Authority, and Public Information Authority. The private sector representatives come from non-government organizations whose principal purpose is to promote recycling and the protection of air and water quality, recycling industry, and manufacturing or packaging industry. The government sector is represented by the heads of agencies in their ex officio capacity. *See supra* note 36, §4.

National Solid Waste Management Commission through its Resolution 1361 (2020) mandated the environmental department to enforce a ban on single use plastics in all national government agencies, local governments and government-controlled corporations despite the absence of a national legislation on single use plastics. In other words, the Commission has tasked the DENR to vertically and horizontally coordinate with national and local government offices to ensure the implementation of the ban on single use plastics in all government offices and units.

Conversely, vertical coordination is likewise inherent within the country's environmental department, Department of Environment and Natural Resources (DENR), as the lead agency of the aforesaid Commission. This is more likely given that there are many sub-units or bureaus within the department that are tasked with a host of responsibilities to address marine pollution, such as the Environmental Management Bureau, Biodiversity Management Bureau, and the like. Overall, the DENR plays a critical role in the implementation of laws aimed at the conservation, management, development, and proper use of the country's environment and natural resources.[62] For solid waste management in particular, the DENR is tasked to (i) establish methods and other parameters for the measurement of waste reduction, collection and disposal;[63] (ii) provide technical and other capability building assistance and support to the local governments in the development and implementation of local solid waste management plans and program;[64] and (iii) recommend policies to eliminate barriers to waste reduction programs;[65] among others. On the other hand, there are two (2) relevant offices within the DENR that are particularly tasked with enforcement powers. *First,* the DENR through the Protected Area Superintendent of all nationally-protected marine areas, is tasked to apprehend violators of said law, including those who dump wastes in marine protected areas. The protected areas are managed by the Biodiversity Management Bureau. *Second,* the Environmental Management Bureau (previously the National Pollution Control Commission) is tasked with the responsibility to, among others: (1) determine the location, magnitude, extent, severity, causes, effects and other pertinent information regarding pollution of the water, air and land resources of the country; (2) take such measures, using available methods and technologies, as it shall deem best to prevent or abate such pollution; and (3) conduct continuing researches and studies on the effective means for the control and abatement of the pollution; and (4) develop comprehensive multi-year and annual plans for the abatement of existing pollution and the prevention of new or imminent pollution, the implementation of which shall be consistent with the national development plan of the country.[66]

Nevertheless, there is still lack of coordination and an obvious disconnect between responsibilities of agencies to manage solid wastes, which could include plastics, as well as the responsibility on marine and/or aquatic pollution. The institutional framework requires an interaction between the two legal regimes on solid wastes and marine pollution. Although there exists a comprehensive, multi-tiered institutional framework that enables solid and plastic waste management as well as enforcement of current laws against marine and/or aquatic pollution, there

[62] §4, Exec. Ord. No. 192 (Phil.). The Clean Water Act, Expanded National Integrated Protected Areas System Act and Wildlife Conservation Act also designated the DENR as the primary government agency responsible for their enforcement and implementation, more particularly over all aspects of water quality management, protected area management and wildlife protection.
[63] *Supra* note 36, §8d.
[64] *Id.*, at §8e.
[65] *Id.*, at §8f.
[66] *See* Exec. Ord. No. 192 *infra* note 66.

is no integrated approach to address marine plastic pollution. While some of these agencies are or represented by national-level agencies, such as the Department of Agriculture for the Bureau of Fisheries and Aquatic Resources (BFAR) and the Department of Interior and Local Government (DILG) for local government units, which could open up an opportunity to horizontally coordinate their activities and create policies for marine plastic pollution, however, this opportunity for institutional coordination seems futile absent the clear national guidelines about plastics.

On the other hand, the environmental department's vertical coordination across its sub-units seems to exhibit a lack of synergy in its programs and actions. While the National Solid Waste Management Commission leads in the policy-formulation for solid wastes in general, it must vertically coordinate with other sub-units within the agency. To illustrate this problem, the Biodiversity Management Bureau has prepared a Draft National Plan of Action for Marine Litter.[67] It sets out clear pathways towards establishing science-based baseline information on marine litter, supporting sustainable consumption and production, implementing prevention of leakage and sea-based litter, and institutionalizing a management program for litter already existing in the marine or riverine environment. But without the Commission's guidelines on plastics, the program for marine litter management as envisioned in the said national plan cannot be fully implemented.

Nevertheless, the draft National Plan of Action also specifies that it is crucial to ensure sufficient human and financial resources as well as to address the limited technical capacities of local governments in the enforcement of environmental laws relevant to marine litter.[68] This demonstrates the inherent requirement to vertically coordinate with these local government units and improve human, technical and financial capacities so that strategic plans to address marine litter can be effectively and efficiently implemented. Indeed, local actions and initiatives that are financed and implemented locally can provide a long-term solution to address plastic wastes that can be seen as one navigates around different islands in the archipelago.

On the matter pertaining to marine pollution, it is likewise important to create synergies of institutions charged with the implementation of various national laws. For instance, for the management of plastic waste streams from rivers, this is addressed in the Clean Water Act, Marine Pollution Decree and Fisheries Code which regulate the disposal of pollutants, solid, liquid, gaseous or radioactive, into water bodies while transport of hazardous wastes is also strictly regulated in the Toxic and Hazardous Substances Act.

Institutionally, the environment department exercises jurisdiction "over all aspects of water pollution, determine[s] its location, magnitude, extent, severity, causes and effects and other pertinent information on pollution, and [takes] measures, using available methods and technologies, to prevent and abate such pollution" under the Clean Water Act.[69] In the adjudication of pollution cases, including the determination of reparation, restitution of damages and losses resulting from pollution, the Pollution Adjudication Board under the Department Secretary is the one tasked by law. Moreover, in line with the Toxic Substances and Hazardous and Nuclear

[67] This was a result of a multi-stakeholder consultation process which was spearheaded by the government. *See* https://www.ph.undp.org/content/philippines/en/home/blog/2019/a-problem-as-huge-as-the-ocean.html (last visited Mar. 10, 2021).
[68] *Id.*
[69] *Supra* note 25, §19.

Wastes Control Act, which was enacted in accordance with the Basel Convention, the environmental department was tasked to implement the key objectives, which include the monitoring and regulating of the importation, manufacture, processing, handling, storage, transportation, sale, distribution, use and disposal of chemical substances and mixtures that present unreasonable risk or injury to health or to the environment.[70] In essence, the powers of the environment department are broad as it can also prevent the entry, even in transit, as well as the keeping or storage and disposal of hazardous and nuclear wastes into the country for whatever purpose.[71]

III. Appropriate policy responses to the problem of marine plastic pollution

Opportunities to address the issue of marine plastic pollution through appropriate policy responses are: (1) addressing the policy gap in the Ecological Solid Waste Management Act; (2) enhancing the critical role of local government units in marine plastic debris management; and (3) improving plastic waste governance in general.

A. Addressing the policy gaps in the current law dealing with solid wastes

One of the policy responses is actually presented in the Ecological Solid Waste Management Act (RA 9003) itself, particularly in Section 29 thereof. This section deals with the preparation of a list of non-environmentally acceptable products or packaging (NEAPP) within a year from the law's enactment, which shall be prohibited thereafter. NEAPPs are defined in the implementing rules as products or packaging that are unsafe in production, use, post-consumer use, or that produce or release harmful products. But these exclude (a) packaging used at hospitals, nursing homes or other medical facilities; and (b) any packaging which is not environmentally acceptable, but for which there is no commercially available alternatives as determined by the Commission.

Further, the aforesaid section provides that there will be no prohibition "unless the Commission first finds that there are alternatives available which are available to consumers at no more than ten percent (10%) greater cost than the disposable product." Further, it states that any decision to prohibit certain packaging types and products must be supported by available scientific, environmental, technical, and economic information and scientific studies including but not limited to life cycle assessment and economic analysis. Technical assistance for the conduct of such studies are provided by other government agencies, such as the Department of Science and Technology.

However, the lack of a policy identifying the NEAPPs is considered as one of the key barriers in the effective implementation of the law especially against the continuing menace of plastic pollution. Although there is such a provision that allows for the identifying of NEAPPs, the National Solid Waste Management Commission has failed to determine a comprehensive list of such materials.

Furthermore, the specified power given to a national body like the National Solid Waste Management Commission to solely determine whether or not to issue the said list has been a

[70] *Supra* note 31, §4(b).
[71] *Id.*, at §4(e).

subject of debate as well. The legal provision as written contains a *proviso* which requires available alternatives at no more than 10 percent of the disposable product. It must be noted, however. that the mandate to create the list within one year was taken out in the implementing rules. This seems to conflict with the provision that also states that the National Solid Waste Management Commission shall annually review and update the list of prohibited non-environmentally acceptable products. The existence of this *proviso* and the absence of the mandate in the implementing rules have become an excuse not to create the list immediately. In fact, the government has not released a list of non-environmentally acceptable products or packaging or NEAPPs nearly two decades since the enactment of the solid waste management law, despite the calls of various political personalities and non-government organizations for the creation of such list.[72] Lately, however, the Commission has heeded the calls for action from various groups and local governments in the country, and has declared that plastic straws and stirrers will soon be banned as non-environmentally acceptable products.[73] However, some sectors still regard this as inadequate to fully address the plastic waste pollution in the country.[74]

It is clear that the government continues to rely on the exception clause in the law which allows them to withhold the listing of NEAPPs unless the Commission first finds that there are alternatives available to the consumers at no more than 10% greater costs than the disposable product pursuant to Section 29 of the solid waste management law.[75] There also seems to be mixed signals and inconsistencies in government pronouncements. An earlier resolution regarding the phasing out of non-environmentally acceptable products indicates its willingness to implement the legal provision. In 2006, the Commission issued Resolution No. 9 which resolved to create a Technical Working Committee for the phasing out of non-environmentally acceptable products and packaging materials. The Committee is composed of members from relevant national government agencies and non-government organizations that formulate the criteria or guidelines for the selection of non-environmentally acceptable products and packaging materials. In addition, under its 2012-2016 National Solid Waste Management Strategy, the Department of Trade and Industry, one of the members of the NSWMC, was expressly tasked to "prepare a list on non-environmentally acceptable products."

However, it is important to note that the national government, through a latest 2019 National Solid Waste Management Status Report, showed a study commissioned to a third party which found that based on the comprehensive life cycle assessment of the environmental impact of plastic, paper, and non-woven polypropylene carrying bags in the Philippines.[76] It concluded

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[72] Filane Mikee Cervantes, *Solon Urges NSWMC To Provide List of Non-Eco-Friendly Products*, Philippine News Agency (Feb. 27, 2020) https://www.pna.gov.ph/articles/1095063 (last visited December 1, 2020); Dexter A See, *NSWMC Urged to Provide List of Non-Environmentally Acceptable Products*, Herald Express (Sept. 13, 2008) https://www.baguioheraldexpressonline.com/nswmc-urged-to-provide-list-of-non-environmentally-acceptable-products/ (last visited Dec. 1, 2020); Oceana, *31 LGUs sign nationwide petition to ban single-use plastic*, Philippine Information Agency (Nov. 22, 2020) https://pia.gov.ph/news/articles/1059646 (last visited Mar. 10, 2021).

[73] Oceana, *Groups to NSWMC: Plastic Straws and Stirrers in the NEAPP List Most Welcome But Not Enough to Reduce Plastic Pollution*, (February 3, 2021) https://ph.oceana.org/press-center/press-releases/groups-nswmc-plastic-straws-and-stirrers-neapp-list-most-welcome-not (last visited Mar. 10, 2021).

[74] *Id.*

[75] National Solid Waste Management Commission (NSWMC), Res. No. 19, series of 2009 approving the adoption of Guidelines on the Phasing Out of NEAP Materials.

[76] Environmental Management Bureau - Department of Environment and Natural Resources, *National Solid Waste Management Status Report* (2019) at 7, *available* at https://emb.gov.ph/wp-content/uploads/2019/08/National-Solid-Waste-Management-Status-Report-2008-2018.pdf (last visited Dec. 1, 2020).

that: (1) non-woven polypropylene provides the least impact among the options evaluation; (2) the flooding contribution of paper bags compared to plastic is higher, however, the approach adopted is limited in scope due to the availability of cost and waste data; and (3) plastic bags are more environmentally desirable compared to paper in all impact areas due to their lower material quantity used.[77] As an official document, this pronouncement demonstrates the true barrier for the implementation of adequate policy responses, which is the failure to address the adverse impacts on the natural ecosystems by plastics.

Unmistakably, these measures are indicative of the flip-flopping of this government body with respect to the guidelines on managing plastic wastes and other non-environmentally acceptable products. But while the Commission has refrained from issuing clear guidelines as to whether plastics are considered as non-environmentally acceptable, it has provided certain measures to control the use of plastics. What is clear, however, is its avoidance to promulgate issuances that will regulate and/or prohibit the production of plastics and non-environmentally acceptable products.

Another policy gap that requires closer scrutiny is the National Solid Waste Management Framework of the country which is supposed to set out a roadmap for the management of solid wastes, including plastics. Thus far, the National Solid Waste Management Commission have developed in 2004 the National Solid Waste Management Framework (hereinafter, Framework), which provides for the scope of management activities, critical actors and partners in implementing activities, and means for the solid waste management objectives.[78] This Framework is considered as a dynamic document subject to periodic updates (every two years) due to changes in the regulatory framework. In said document, its key findings state that 15.6% of municipal waste composition in the Philippines is plastic, within the top 3 of the wastes generated by an average household in the country.[79] Despite such finding, there were no clear roadmap towards addressing plastic wastes.

Further, no follow-up and updated document to the 2004 Framework can be found. Instead, the Commission with support from GIZ, adopted the 2012-2016 National Solid Waste Management Strategy (hereinafter, Strategy), which was considered as a medium-term plan to address key issues, gaps and restraining forces encountered by solid waste management implementers after more than a decade after the passage of the solid waste management law, and to set the development path for its full implementation.[80] Interestingly, the Strategy presents the same definition of non-environmentally acceptable products found in the implementing regulations, but notes that the Technical Working Committee has yet to assess whether plastic packaging is included in the term. The failure to clarify whether plastics are non-environmentally acceptable presents a gap in solid waste management efforts to reduce or prohibit plastic wastes streams from land-based sources.

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[77] MMDA v. Concerned Residents of Manila Bay, G.R. No. 171947-48 S.C.R.A., (Dec. 18, 2008).

[78] NSWMF, *supra.* note 75, at vi; *See also* http://nswmc.emb.gov.ph/wp-content/uploads/2017/11/NSWMC-FRAMEWORK - PDF.pdf (last visited December 1, 2020).

[79] *Id.* at 6.

[80] Voltaire Acosta, Johannes Paul, Crispian Lao, Emelita Aguinaldo and Maria Delia Cristina Valdez, *Development of the Philippines National Solid Waste Management Strategy 2012-2016*, 16 Procedia Envtl. Sciences 9, (2012).

Nonetheless, the Strategy identifies the existence of open and controlled dumpsites in different parts of the country. Steps must be taken to address this problem. The closure of open and controlled dumpsites in local governments as ordered in solid waste management law[81] provides the current framework towards managing the risks from these land-based sources. It is important, however, that the national government strictly monitor these local governments that are still not complying with the requirement of establishing of sanitary landfills and still maintaining open and/or controlled dumpsites. At the same time, the national government must ensure that local governments have their own local solid waste management plans which are formulated through their local solid waste management boards. This will ensure the long-term management of solid waste, as well as integrate the various solid waste management plans and strategies of the *barangays* (the smallest political unit) in its area of jurisdiction.[82]

Finally, the existing legal lacuna with respect to the elimination of plastics can be address through an amendment of the existing national solid waste management law, the Ecological Solid Waste Management Act (RA 9003), or the passage of a new law by Congress. One of the interesting developments towards adopting a national plastic legislation was the 2018 Senate Bill No. 1948 to eliminate single-use plastic, encourage the government to invest in plastics research and development, and incentivize sustainable business practices. Unfortunately, this Bill was not passed into law. This proposed legislation would have directed the Department of Science and Technology and the National Solid Waste Management Commission to invest in the research and development of plastic packaging alternatives, including but not limited to natural polymers, upcycling, fiber production, life cycle assessments, and other feasibility studies. It would have also provided incentives to industries shifting to alternatives, provided under the Philippine Cooperative Code of 2008, the Barangay Micro-Business Enterprise Act of 2002, the Magna Carta for Micro, Small, Medium Enterprises, the Omnibus Investment Code of 1987, or the Green Jobs Act of 2016, where applicable.

Another Bill that is now pending in Congress is on the institutionalization of Extended Producer Responsibility[83] in waste management which seeks to amend the 20-year-old solid waste management law.[84] Nevertheless, without established national guidelines with respect to plastic packaging, radical solutions that contribute to reducing the amount of plastic wastes, such as Extended Producer Responsibility, are unimplementable.

B. Enhancing the critical role of LGUs in the management of marine plastic debris

Long-term solutions require that actions are implemented locally. This is in line with the essence of the national solid waste management law, the Ecological Solid Waste Management Act. Here, the law provides several measures where local governments at the provincial, city or municipal and barangay levels are tasked to ensure reduction at source, collection and transfer, processing, recycling, composting and final disposal of solid wastes as set out in their local plans. Although there may be a lack of an enabling national policy that directly deals with reduction of

[81] *Supra* note 36, §37.
[82] *Id.*, at §11 and §12.
[83] Extended Producers Responsibility (EPR) Act of 2020, Senate Bill 1331 (Phil.).
[84] Senate of the Philippines 18th Congress. Villar eyes law making manufacturers responsible for plastic products' Press Release, (2020) available at http://legacy.senate.gov.ph/press_release/2020/0218_villar1.asp (last visited Dec. 1, 2020).

plastics usage, production and importation, local governments can ensure that plastic wastes will not end up in the marine environment by setting in place strict measures to reduce, collect and dispose of plastics within their territorial jurisdictions. In accordance with the principle of local autonomy, local government units can exercise powers that are necessary, appropriate, or incidental for its efficient and effective governance, and those which are essential to the promotion of the general welfare.[85] This general welfare provision ensures that local governments can appropriately act on matters of importance within their territory as long as these acts promote the general welfare of the inhabitants.

Thus, in line with the decentralized authority, local governments have enacted ordinances to establish a system of garbage collection, materials recovery as well as incentives and awards to encourage solid waste projects by key stakeholders. Some local government units have also legislated ban on single use plastics. For instance, Cebu City has passed Ordinance No. 2343 or the "No Plastic Saturday Ordinance of the City of Cebu," banning the use of plastic shopping bags within the city every Saturday and requiring establishments to set a recovery system for recycling waste plastics and other waste materials. In Quezon City, SP 2127, series of 2012 was passed to regulate the use of plastic bags and impose an environmental fee for its use. Finally, in the City of San Fernando in Pampanga, the Plastic Free Ordinance was enacted in 2014.[86] It states that "'no store shall utilize or provide free plastic bags as primary and secondary packaging materials on goods to customers except those pre-packed goods by manufacturers,' and mandates all stores 'to make available for sale reusable bags and woven bags for the purpose of carrying out goods from the point of sale'." The Ordinance expressly prohibits the use of plastic and Styrofoam packaging for food products with corresponding penalty. Aside from setting the legal framework, the City is also known as one of the leading cities of the Asia Pacific for its 93 percent smart implementation of the Zero Waste Management.[87]

While local governments have ordinances in place, there are still major limitations because of limited funding and other shortcomings. Oftentimes, the burden of the costs of implementing local solid waste management measures are on the local governments. According to a study by Naz and Naz,[88] local governments at times have to shell out as much as 25% of its development fund to cover the deficit. The research also suggested that requiring a fee for the removal of waste from their location may be a viable method of funding waste management while, at the same time, encouraging waste reduction.[89] Further, these local ordinances are also concentrated mainly on consumer behavior (i.e., ban on single-use plastic), but fails to mandate business to shift to more environmentally-friendly practices.[90] While the local government units have an important role to play to address the marine plastics issue, it is also vital to address inherent difficulties of funding and other resource limitations of these local governments.

III. Improving plastic waste governance in general through coordination and accountability

[85] *Supra* note 55, §16.
[86] Ordinance No. 2014-008 of 2014 (San Fernando City, Philippines).
[87] Romeo Dizon, *San Fernando hailed for work on zero waste*, Manila Standard.Net (Oct. 22, 2019), *available* at https://www.manilastandard.net/lgu/luzon/308094/san-fernando-hailed-for-work-on-zero-waste.html (last visited Dec. 1, 2020).
[88] Antonia Corinthia C. Naz and Mario Tuscan N. Naz, *Funding Solid Waste Disposal: A Study from the Philippines*, EEPSEA Policy Brief pb2006062 (2006), *available* at https://ideas.repec.org/p/eep/pbrief/pb2006062.html (last visited Dec. 29, 2020).
[89] *Id.*
[90] *Id.*

Plastic waste governance needs to be improved in order to overcome the problem of coordination as well as the complex set up of institutions in the country. To improve coordination, it is best to look at Manila Bay, as one particular example in the country where there exists closer coordination among the various governmental agencies. This was a result of a case filed against 13 national government agencies mandated to work in 37 local government units (cities and municipalities) surrounding the bay. The case entitled, *Metro Manila Development Authority, et al. v. Concerned Residents of Manila Bay*,[91] concerns the clean-up of the water pollution in Manila Bay. Here, one of the petitioners, the Metropolitan Manila Development Authority, refused to clean-up the Manila Bay on the ground that in carrying out its mandate, it needs "to make decisions, including choosing where a landfill should be located by undertaking feasibility studies and cost estimates, all of which entail the exercise of discretion." The Court rejected this contention on the ground that while the implementation of the mandated tasks may entail a decision-making process, the enforcement of the law or the very act of doing what the law exacts to be done is ministerial in nature. The Supreme Court issued a writ of continuing mandamus and ruled herein that when government agencies are enjoined, as a matter of statutory obligation, to perform certain functions, they are precluded from choosing not to perform these duties. This ruling likewise triggered the issuance of an Administrative Order issued by the President creating the Manila Bay Task Force, which required not only the concerned government agencies but also all local government units to implement critical environmental laws and other related laws towards the rehabilitation and restoration of the Manila Bay.[92] This case is significant in ensuring coordination among the different government agencies in a specific marine space. Sustainable resource management is likewise feasible when appropriate governance scales, i.e., bay-wide, protected seascapes, etc., are taken into consideration.

In terms of marine plastic pollution, there are fragmented and uncoordinated actions between the policy-making entities and the enforcement agencies. Hence, the essence of regulatory co-opetition according to the theoretical work of Geradin and McCahery[93] finds significance. Bridging the gap through institutional coordination between policy makers, enforcers and non-government actors is important. As indicated in the regulatory co-opetition theory, optimal governance requires a flexible mix of competition and cooperation between governmental actors,[94] such as between the environmental department and other national agencies charged with the enforcement of marine pollution laws, as well as between governmental and non-governmental actors within the National Solid Waste Management Commission.

While implementation seems highly fragmented and distributed among heterogenous actors at the national and local administrative levels, there are plausible ways to address this. To address marine plastic pollution using marine spatial scales in particular, there are standards that can be drawn from the jurisprudence above, such as the *Manila Bay* ruling. Hence, despite the absence of national legislation and guidelines on plastics, this allows the courts to develop common law for better environmental governance and stewardship.

[91] *Supra* note 77.
[92] Admin. Ord. No. 16, series of 2019 (Phil.), §5.
[93] Geradin & McCahery, *supra* note 33.
[94] *Id.*

Accountability is nevertheless as important, and given the experience in the *Manila Bay* ruling, the role of environmental courts cannot be overemphasized. Where there is no formal legislative act to ensure coordination and accountability for marine plastics, it is possible to bring in common law. There have been many opportunities for the Philippine courts to provide guidance for better environmental governance. Two (2) important cases are in point. The landmark decision of *Oposa v. Factoran*[95] allowed the filing of a suit using the principle of intergenerational equity in order to stop the national government from issuing timber license agreements. Through this case, the Constitutional right to a balanced and healthful ecology was recognized as a legally enforceable right and allowed minor litigants in behalf of the present and future generations to bring an action in court to enforce such right. Furthermore, the principle of stewardship is likewise recognized in the seminal case of *Resident Mammals & Dolphins of Tañon Strait, represented by legal guardians, Gloria Estenzo Ramos and Rose-Liza Eisma-Osorio vs. Secretary Reyes, et al.*[96]. By virtue of the Supreme Court's decision, any citizen can bring suit even without proof of personal injury as stewards of the petitioner marine mammals and dolphins against the oil exploration and exploitation activities conducted in an established protected seascape. In this case, responsible national government agencies, the Department of Energy and DENR were required to strictly comply with the requirements of the protected area law especially in the grant of a service contract for oil exploration and exploitation as well as the conduct of environmental impact assessment in relation to these activities.

Administratively, the Philippines has identified environmentally critical marine areas, such as protected seascapes and fisheries management areas.[97] These present opportunities for managing marine areas at appropriate governance scales that can integrate legal responses against marine plastic pollution. Since governance for marine plastic debris is quite fragmented and there seems to be a lack of synergy in the government programs and actions, it is important to utilize feasible governance scales and arrangements that seek to achieve targets within one seascape or other specific management area.

IV. Conclusions

The Philippines has no overarching national plastics legislation. While national laws exist to tackle solid wastes, pollution in general, and aquatic or marine pollution, these are inadequate to address the growing menace of marine plastic pollution in the country. The 20-year-old national solid waste management law, Ecological Solid Waste Management Act (RA 9003) could, however, provide opportunities to set out a clear policy framework to address plastic wastes. On the other hand, there are laws that can penalize acts causing marine pollution, which include the dumping of plastic debris. However, there are gaps in these existing laws. To aid in the analysis of the barriers in the implementation of the legal framework, this paper employed the driver–pressure–state–impact–response-model. Majority of plastic wastes in the Philippines come from land-based sources due to the unregulated use and indiscriminate dumping of plastics to dumpsites and landfills. The lack of an overarching legal framework regulating plastic wastes and incoherence of existing regulations on marine pollution are critical barriers that require appropriate policy responses.

[95] Oposa v. Factoran, G.R. No. 101083 (July 30, 1993).
[96] Resident Marine Mammals v. Reyes, G.R. No. 180771 (Apr. 21, 2015).
[97] *See supra* note 30 and note 26, respectively.

Another barrier is in terms of institutions. Functionally, many governmental agencies may be involved in marine plastic debris governance, and this can result in uncoordinated implementation of laws. There is also an obvious disconnect between responsibilities of agencies to manage solid wastes, which could include plastics, as well as the responsibility on marine and/or aquatic pollution. The institutional framework requires an integrated approach to address marine plastic pollution.

On the bright side, there are some policy and institutional responses that could address these barriers in implementation. The policy gap found in the Ecological Solid Waste Management Act provision, which seeks to prohibit non-environmentally acceptable packaging or products or NEAPPs, requires a positive act of declaring these types of products. The National Solid Waste Management Commission, as the primary governmental body tasked to set out these policy measures must immediately issue the national guidelines setting out the list of NEAPPs. In terms of the institutional barriers, the critical role of local governments must be recognized. Some local government units have stepped up and have enacted local ordinances imposing single use plastics ban pursuant to their devolved powers under the Local Government Code. Finally, coordination among agencies can be made possible using appropriate marine spatial scales in particular. Along with lessons that can be drawn from existing jurisprudence where the court has developed common law for better environmental governance and stewardship, proper coordination between national and local agencies can be required based on their mandates. Indeed, these policy and institutional responses are vital considering the growing necessity of governing the maritime zones against the continuing scourge of plastic pollution.

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Marine Plastic Pollution Regulation in Indonesia

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Abstract

This paper describes the current state of marine plastic pollution in Indonesia and explores the relevant laws and regulations on such pollution. As one of the main contributors to marine plastic pollution, Indonesia produces approximately 3.2 million tons of mismanaged trash annually, with close to 1.3 million tons winding up in the sea. In 2015, Indonesia was also ranked the second-largest marine polluter in the world. Although protection of the marine environment comes in various forms, all such methods employed ultimately rely on legal instruments as a backbone. Over the years, many new legal instruments have been developed and implemented as a result of better research and understanding of the human impact on the marine environment. However, the question of whether such legal instruments are sufficient to prevent marine pollution remains unanswered. As such, this paper seeks to answer the question: To what extent does the existence of legal instruments on marine protection affect marine plastic pollution debris? In attempting to address the effect of legal instruments on marine plastic pollution in Indonesia, this paper will first provide brief outlines of current international laws and Indonesian regulations, followed by a comparative case study on two cities in Indonesia: Jakarta and Surabaya.

Keywords: Marine plastic pollution, legal instruments, ASEAN, Indonesia, Jakarta, Surabaya

I. Introduction

Oceans cover 71% of the Earth's surface, and their vastness is integral to life on Earth. Apart from its role as a principal component in the biosphere, the ocean is also a source of food for the life it helped generate, a bridge for trade and commerce, and a wellspring for adventure and discovery.[1] It directly influences the climate of the planet, the plant and animal world, and evidently the processes of life and human activity.[2] Unfortunately, the increase in plastic dependence and uncontrolled developmental activities over the years has resulted in an exacerbation of marine pollution. As defined by the 1982 United Nations Convention on the Law of the Sea ("UNCLOS"), marine pollution is the "introduction by man, directly or indirectly, of substances or energy into the marine environment…which results or is likely to result in such deleterious effects as harm to living resources and marine life." Statistics show that 10 million tons of litter enter the oceans every year,[3] and such litter comes from land sources such as rivers,

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[1] UN, Oceans and the Law of the Sea, *available at* https://www.un.org/en/sections/issues-depth/oceans-and-law-sea/ (visited Sep. 18, 2020).

[2] Ksenia B. Valiullina & Adel I. Abdullin, International legal regulation of ocean pollution prevention from land-based sources, 5 J. Soc. Sci. Res. 149 (2018).

[3] European Commission, Our Ocean Factsheet, available at https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/eu-acting-for-our-oceans-factsheet_en.pdf (visited Sep. 18, 2020).

sewage, air and landfills.[4,5] To make matters worse, this litter contains plastic, a detrimental material. At least 8 million tons of plastic end up in the oceans every year.[6] The environmental impact of plastic is devastating – 100 million marine animals, more than a million seabirds, and more than 100,000 marine mammals die annually due to plastic pollution.[7] Plastic pollution is the most widespread problem affecting the marine environment.[8] The accumulation of plastic in the oceans, and its adverse impact on marine life, has become a global crisis. Three main sources of marine plastic pollution have been identified: direct discharge as effluents and solid wastes from land or human activities at sea, runoff via rivers, and atmospheric fallout.[9] Amid increasing global concern and public awareness of this crisis, Member States have, one by one, stepped forward to acknowledge that their actions have contributed to this crisis.

Indonesia is one of the main contributors to marine plastic pollution. In 2015, it was the second-largest marine polluter in the world, producing approximately 3.2 million tons of mismanaged trash every year, with close to 1.3 million tons winding up in the sea.[10] Indonesia's unsustainable development has hindered its ability to resolve a plethora of environmental issues and this has ultimately led to marine and coastal pollution in the country. However, in recent years, Indonesia has shown commitment in tackling the problem of pollution and its impacts head-on. Its past achievements include the 2019 ASEAN Coastal Clean Up, and the banning of single-use plastics in Bali. Furthermore, in the recent Our Ocean Conference, Indonesia committed to reduce waste by 30% and to properly manage waste by 70% of total waste generation by 2025. It also budgeted one billion USD to address land-based management of waste.

Nevertheless, beyond the issue of pollution and its impacts, the upstream issue of protection against pollution poses a far greater problem. Although protection of the marine environment can come in many forms, these ultimately rely on legal instruments as the backbone of protection. Over the years, many legal instruments have been developed as a result of better research and understanding of the human impact on the marine environment. However, the question of whether such developments suffice to prevent marine pollution still remains unanswered. As such, this paper raises the question: To what extent does the existence of legal instruments on marine protection affect marine plastic pollution debris? In an attempt to answer this question, this paper will first highlight the current international laws in place. Next, to address the effect of legal instruments on marine plastic pollution in Indonesia, this paper will give a general outline of key national regulations, and a specific analysis and comparison between two cities in Indonesia: Jakarta and Surabaya.

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[4] *Id.*

[5] UNESCO, *Facts and Figures on Marine Pollution*, available at http://www.unesco.org/new/en/natural-sciences/ioc-oceans/focus-areas/rio-20-ocean/blueprint-for-the-future-we-want/marine-pollution/facts-and-figures-on-marine-pollution/ (visited Sep. 18, 2020).

[6] IUCN, Issues Brief on Marine Plastics, *available at* https://www.iucn.org/resources/issues-briefs/marine-plastics (visited Sep. 18, 2020).

[7] *Id.*

[8] *Id.*

[9] Dan Wilhelmsson et al., Managing Ocean Environments in a Changing Climate: Sustainability and Economic Perspectives, 127 (Kevin J. Noone et al. ed., Elseiver 2013) (2013).

[10] Jenna R. Jambeck et al., Plastic waste inputs from land into the ocean, 347 Science 768, 771 (2015).

II. Regulations International Laws

UNCLOS

Known to be the benchmark, UNCLOS has been ground-breaking in the extension of international law to shared water resources. UNCLOS has resolved issues of ocean usage and sovereignty by establishing freedom-of-navigation rights, setting boundaries, creating the International Seabed Authority, and creating other conflict-resolution mechanisms. In 1972, the United Nations Conference on the Human Environment in Stockholm recommended governments to control marine pollution and monitor and prevent such pollution.[11] UNCLOS is the only global instrument that imposes a legally binding obligation upon Member States for the prevention, reduction and control of land-based sources of pollution.[12] The opening provision of Part XII on Protection and Preservation of the Marine Environment, Article 192, provides that "states have the obligation to protect and preserve the marine environment."[13] Article 192 is a general provision that covers all types of harm to the marine environment,[14] and specific focus on the prevention of pollution is addressed in further articles. In fact, many of the provisions in Part XII are explicitly concerned with the prevention, reduction and control of pollution of the marine environment.

Article 194 addresses measures to prevent, reduce and control pollution of the marine environment. The provision provides a broad scope and is applicable to all sources of pollution, including classical contaminants,[15,16] heat and noise.[17,18,19] However, the general obligation in Article 194 is insufficient on its own. Rather, it is supplemented by additional rules requiring Member States to implement national rules and standards in tackling marine pollution.[20] This includes pollution from land-based sources,[21] the atmosphere,[22] dumping,[23] ships,[24] seabed activities within national jurisdiction,[25] and mining.[26] Therefore, UNCLOS sets not only international obligations, but also national obligations for Member States to incorporate.

Other Notable Instruments

[11] UN, Report of the United Nations Conference on the Human Environment, Stockholm, 5-16 June 1972, A/CONF.48/14/Rev.1 (1972).
[12] UN, Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches, UNEP/AHEG/2018/1/INF/3 (2018).
[13] UN Convention on the Law of the Sea, art. 192, Dec. 10, 1982, 1833 U.N.T.S. 397 (1982).
[14] James Harrison, Saving the Oceans through Law: The International Legal Framework for the Protection of the Marine Environment, (Oxford University Press 2017) (2017).
[15] *Id.*
[16] GESAMP, Protecting the oceans from land-based activities, Rep. Stud. GESAMP No. 71 (2001).
[17] James Harrison, Saving the Oceans through Law: The International Legal Framework for the Protection of the Marine Environment, (Oxford University Press 2017) (2017).
[18] Harm M. Dotinga & Alex G. Oude Elferink, Acoustic Pollution in the Oceans: The Search for Legal Standards, 31 Ocean Dev. Int. Law. 151, 158 (2000).
[19] Karen N. Scott, International Regulation of Undersea Noise, 53 Int'l & Comp. L.Q., 287 (2004).
[20] James Harrison, Saving the Oceans through Law: The International Legal Framework for the Protection of the Marine Environment, (Oxford University Press 2017) (2017).
[21] UN Convention on the Law of the Sea, art. 207, Dec. 10, 1982, 1833 U.N.T.S. 397 (1982).
[22] *Id.*, art. 213.
[23] *Id.*, art. 210.
[24] *Id.*, art. 211.
[25] *Id.*, art. 208.
[26] *Id.*, art. 209.

While UNCLOS addresses pollution in general, other notable instruments have elaborated specifically on plastic pollution. These instruments include (a) the International Convention for Prevention of Pollution from Ships ("MARPOL"), (b) the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter ("London Convention") and the 1996 Protocol (London Protocol), and (c) the Convention on Biological Diversity ("CBD").

a. MARPOL

MARPOL serves as the International Maritime Organization's ("IMO") principal convention. It focuses on the prevention of pollution of the marine environment by ships, mainly due to the discharge of harmful substances or effluents.[27] In particular, Annex V of MARPOL prohibits the discharge of plastics. In assessing its effectiveness in dealing with sea-based marine litter,[28] the IMO, together with the Marine Environment Protection Committee ("MEPC"), reviewed and revised Annex V. The revised Annex V has a broader scope that includes the prohibition of all garbage into the sea, including, inter alia, all types of domestic and operational waste, all plastics, cargo residues and fishing gear.[29] Furthermore, plastic mixed with other garbage is to be treated as if it were all plastic, meaning that it would then be subject to stern procedures for handling and discharge.[30,31]

b. London Convention and Protocol

The London Convention and Protocol is another pollution-oriented instrument directed at marine plastic litter and micro plastics from dumping activities of vessels, aircraft, platforms, or other man-made structures at sea. Article 1 of the London Convention and Article 2 of the London Protocol require Parties to "take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea." In 2015, a review was undertaken to evaluate procedures for assessing the litter content of waste streams regulated under the London Convention and Protocol.[32] According to the report, micro plastics are most likely contained in dredged material and sewage sludge, and these occasionally include macro plastics as well.[33] Despite this high probability, the report found that analysis of litter content is not included as a requirement in current authorization procedures, neither in the waste or at the dump site. Thus, the report proposed that standardized procedures for extracting, identifying and quantifying plastics in sludge and sediments should be a focal area for future studies.

c. Convention of Biological Diversity (CBD)

[27] UN, Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches, UNEP/AHEG/2018/1/INF/3 (2018).
[28] UN General Assembly, Resolution 60/30, A/RES/60/30 (2005).
[29] UN, Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches, UNEP/AHEG/2018/1/INF/3 (2018).
[30] *Id.*
[31] International Maritime Organization, 2012 Guidelines For the Implementation of Marpol Annex V, MEPC.219(63) (2012).
[32] International Maritime Organization, Review of the Current State of Knowledge Regarding Marine Litter in Wastes Dumped at Sea under the London Convention and Protocol: Final Report (2016).
[33] *Id.*

Although not directly addressing pollution of the marine environment, another notable convention related to plastic pollution is the CBD. The CBD generally applies to the conservation of biological diversity. Under the CBD, the Aichi Biodiversity Targets were adopted as a set of global targets under the Strategic Plan for Biodiversity 2011-2020. Targets 8 and 10 cover pollution and the ocean and its ecosystem respectively. In support of the Targets, the Parties to the CBD have adopted several relevant decisions, including decision XIII/10. Decision XIII/10 provides voluntary practical guidance on preventing and mitigating the impacts of marine litter on marine and coastal biodiversity.[34,35] Under this decision, Parties, Governments, and international organizations are expected to develop and implement measures, policies and instruments to prevent the discarding, disposal, loss or abandonment of any persistent, manufactured or processed solid material at marine and coastal habitats. In particular, the decision urges Parties to "assess whether different sources of microplastics and different products and processes that include both primary and secondary microplastics are covered by legislation, and strengthen, as appropriate, the existing legal framework so that the necessary measures are applied, including through regulatory and/or incentive measures to eliminate the production of micro plastics that have adverse impacts on marine biodiversity."[36]

It is evident that the CBD encourages the existence of legal frameworks and the application of necessary measures. Against the backdrop of international laws, and with a focus on Indonesia, we now turn to the question of whether, and to what extent, Indonesia has incorporated these international laws at a national level.

III. Indonesia and ASEAN's Marine Plastic Pollution Regulations

As an ASEAN member, Indonesia shares many common international and regional regulations with other ASEAN countries. In 2019, the ASEAN Framework of Action on Marine Debris, which was developed based on recommendations from the 2017 ASEAN Conference on Reducing Marine Debris in ASEAN Region, was welcomed by all ASEAN Member States at the Special ASEAN Ministerial Meeting on Marine Debris.[37] The Framework encourages Member States to implement relevant international laws and agreements related to waste management, such as the MARPOL Annex V ship-generated waste, and the UN Environment Assembly Resolutions 3/7 on Marine Litter and Microplastics.[38]

Apart from the marine plastic pollution regulations shared by all ASEAN countries, Indonesia has adopted several additional regulations by virtue of its membership in other organizations. These include the Group of 20 (G20), Coordinating Body on the Seas of East Asia ("COBSEA"), Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security ("CTI-CFF"), and the Partnerships in Environmental Management for the Seas of East Asia ("PEMSEA"). With

[34] UN, Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches, UNEP/AHEG/2018/1/INF/3 (2018).
[35] UN, Marine and coastal biodiversity: sustainable fisheries and addressing adverse impacts of human activities, voluntary guidelines for environmental assessment, and marine spatial planning, UNEP/CBD/COP/DEC/XI/18 (2012).
[36] UN, Addressing impacts of marine debris and anthropogenic underwater noise on marine coastal biodiversity, CBD/COP/DEC/XIII/10 (2016).
[37] ASEAN, Bangkok Declaration on Combating Marine Debris in ASEAN Region (2019), *available at* https://asean.org/bangkok-declaration-combating-marine-debris-asean-region/ (visited Sep. 18, 2020).
[38] ASEAN, Framework of Action on Marine Debris (2019), *available at* https://asean.org/asean-framework-action-marine-debris/ (visited Sep. 18, 2020).

these additional regulations, Indonesia's marine plastic pollution regulations are undoubtedly on par with its ASEAN peers.

G20 Action Plan on Marine Litter

In 2017, the G20 adopted an Action Plan on Marine Litter, pledging to "take action to prevent and reduce marine litter of all kinds, including from single-use plastics and micro-plastics".[39] The Action Plan also launched a voluntary Global Network of the Committed, a platform for information exchange that is linked to the UNEP Global Partnership on Marine Litter.[40] Notably, Indonesia is the only ASEAN country in the G20.

COBSEA Regional Action Plan on Marine Litter

The revised COBSEA Regional Action Plan on Marine Litter was adopted in 2019 at the 24th Intergovernmental Meeting of COBSEA in Bali, Indonesia.[41] The Action Plan applies to the countries participating in the East Asian Seas Action Plan – with the exception of Brunei, Laos and Myanmar, all ASEAN countries are members of COBSEA. This Action Plan comprises four main actions: preventing and reducing marine litter from land-based and sea-based sources, monitoring and assessment of marine litter, and activities supporting the implementation of the Action Plan itself.[42]

CTI-CFF Regional Plan of Action

The CTI-CFF Regional Plan of Action ("RPOA") was adopted on 15 May 2009 in Manado, Indonesia under the CTI Leaders' Declaration.[43] Among the ten ASEAN countries, only Indonesia, Malaysia and Philippines are involved in the RPOA, which seeks to conserve and sustainably manage coastal and marine resources within the Coral Triangle region. The first RPOA recently concluded in 2019, and the second iteration of the RPOA is currently under development.[44]

PEMSEA SDS-SEA Implementation Plan

In 2003, under the Putrajaya Declaration, the members of PEMSEA adopted the Sustainable Development Strategy for the Seas of East Asia Implementation Plan ("SDS-SEA 2003"), a plan geared towards sustainable development of the oceans and coasts in the region.

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[39] G20, Action Plan on Marine Litter (2017), *available at* https://www.mofa.go.jp/mofaj/files/000272290.pdf (visited Sep. 18, 2020).
[40] *Id.*
[41] OBSEA, Regional Action Plan on Marine Litter (2019), *available at* https://www.unenvironment.org/cobsea/resources/policy-and-strategy/cobsea-regional-action-plan-marine-litter-2019 (visited Sep. 18, 2020).
[42] *Id.*
[43] Coral Triangle Initiative, Leaders' Declaration on Coral Reefs, Fisheries and Food Security (2009), *available at* http://coraltriangleinitiative.org/sites/default/files/resources/Leader%20Declaration%20coral%20triangle%20initiative_0.pdf (visited Sep. 18, 2020).
[44] Coral Triangle Initiative, Joint Ministerial Statement (2018), *available at* http://www.coraltriangleinitiative.org/news/joint-ministerial-statement-7th-cti-cff-ministerial-meeting-mm-7 (visited Sep. 18, 2020).

Subsequently, under the 2015 Danang Compact, an updated version of the SDS-SEA 2003 ("SDS-SEA 2015") was adopted with four main targets, including the target of introducing national coastal and ocean policies and supporting legislation in all PEMSA countries by 2021.[45] To achieve these targets, SDS-SEA Implementation Plans are to be adopted at both regional and national levels. Furthermore, in the 2018 Iloilo Ministerial Declaration, PEMESA countries have specifically pledged to "reducing or preventing marine pollution of all kinds, in particular from land-based and sea-based activities, including marine litter and nutrient pollution."[46] The ASEAN countries in PEMSEA include Cambodia, Indonesia, Laos, Philippines, Singapore, and Vietnam.

IV. Indonesian Laws and Regulations on Marine Plastic Pollution

International laws prove insufficient without Member States subsequently incorporating and implementing them into national laws and regulations. During the 2017 Leaders' Retreat, G20 Summit in Hamburg, Germany, and the 2018 Our Ocean Conference in Bali, President Joko Widodo declared that the Government of Indonesia would commit to reducing waste by 30%, handling waste by 70%, and reducing plastic waste entering the sea by 70% by 2025. Meanwhile, in a recent report on the release of land-derived marine debris in Greater Jakarta,[47] plastics were the "single most dominant debris entering Jakarta Bay."[48] An estimated 2,323 tons of debris is released into Jakarta Bay daily.[49] Putting this into perspective, comparisons will be made between these statistics and the existence of laws in cities in Indonesia, focusing on regional laws, governor regulations, and mayor's regulations. In doing so, possible correlations can be deduced from the laws and the facts.

Thus, as this paper seeks to examine the effectiveness of legal instruments on marine protection, in particular, its effect on marine plastic pollution debris, closer analysis and comparison will be made between (1) national regulations, (2) regulations in Jakarta and (3) regulations in Surabaya.

National Regulations

a. Laws (*Undang-Undang*)

Law No. 32 Year 2014 ("Law No. 32/2014"), concerning the Sea, and Law No. 32 Year 2009 ("Law No. 32/2009"), concerning the Protection and Management of the Environment, are two key Indonesian laws that aim to better protect its oceans.

i. Law No. 32 Year 2014

The definition of marine protection and prevention of marine pollution is similar to that provided in UNCLOS – Indonesia recognizes that the protection of the marine environment

[45] PEMSEA, Da Nang Compact on the Sustainable Development Strategy for the Seas of East Asia (2015), *available at* https://pemsea.org/sites/default/files/Danang%20Compact%202015.pdf (visited Sep. 18, 2020).
[46] PEMSEA, Iloilo Ministerial Declaration (2018), *available at* http://pemsea.org/sites/default/files/Iloilo_Ministerial_Declaration.pdf (visited Sep. 18, 2020).
[47] Muhammad Reza Cordova & Intan Suci Nurhati, Major sources and monthly variations in the release of land-derived marine debris from the Greater Jakarta area, Indonesia, 9 Sci. Rep. 18730 (2019).
[48] *Id.*
[49] *Id.*

includes the prevention and control of pollution. Particularly, in Article 1(11) of Law No. 32/2014, Indonesia defines marine pollution as "[the] entering or inclusion of a living being, substance, energy, and/or other components into the sea environment by human activities that exceed the marine environmental quality standards established."[50] Pollution is mentioned throughout Law No. 32/2014, and is elaborated upon in Article 52.[51] However, on the whole, Law No. 32/2014 only briefly mentions pollution prevention,[52] management,[53] and control;[54] it does not include specific mention of marine plastic pollution.

Although Law No. 32/2014 provides a general understanding, it obliges both the central and local government to "implement a system of prevention and mitigation of pollution and marine environmental damage."[55] Pollution protection thus extends beyond the federal level, and must be elaborated and systemized in accordance with local governments. The government is responsible for achieving this,[56] and is encouraged to work together bilaterally, regionally and multilaterally.[57]

ii. Law No. 32 Year 2009

Law No. 32 Year 2009 concerns the Protection and Management of the Environment, and is the overarching law to combat pollution. It covers matters relating to pollution sources, management, sanctions, duties and authorities of the government, local government and the people. The marine environment is only mentioned in Article 63(1)(l), which provides that the Government's duties and authorities include developing and implementing "policies on the protection of the marine environment."[58] However, Law No. 32/2009 lacks detail on plastic pollution and, more specifically, marine plastic pollution. Similar to Law No. 32/2014, Law No. 32/2009 reinforces and highlights the role of the Government in regulating the protection of the marine environment.

b. Presidential Decrees

As a follow-up to the Government's commitment to reduce plastic waste at sea by 70% by 2025, Presidential Decree No. 83 Year 2018, concerning Sea Waste Management, was enacted. The Decree recognizes the existence of plastics in the biota and marine resources, as well as its difficulty in decomposing.[59] As such, the Decree established the National Action Plan for Handling Marine Waste for 2018-2025 ("National Action Plan). The National Action Plan utilizes "synergistic, measurable, and directed strategies, programs and activities"[60] as a means to reduce the amount of waste in the sea, especially plastic waste. It directs government ministries and institutions to accelerate the management of marine waste.[61]

[50] Indonesia Law No. 32 Year 2014, art. 1(11).
[51] *Id.*, art. 52.
[52] *Id.*, art. 11.
[53] *Id.*, art. 52(4).
[54] *Id.*, art. 50.
[55] *Id.*, art. 55.
[56] *Id.*, art. 56(1).
[57] *Id.*, art. 56(2).
[58] Indonesia Law No. 32 Year 2009, art. 63(1)(l).
[59] Indonesia Presidential Decree No. 83 Year 2018, Preamble.
[60] *Id.*, art. 2(1).
[61] *Id.*, art. 2(2).

The National Action Plan uses a three-pronged approach to handle marine plastic debris. First, coordination between institutions responsible for waste management, second, application of technology to control plastic debris, and third, societal efforts to reduce, recycle and reuse plastic debris. This approach is founded upon five main pillars, which include improving behavioral change, reducing land-based leakage, reducing sea-based leakage, reducing plastics production and use, and enhancing funding mechanisms, policy reform, and law enforcement.

However, although partial national regulations are in place, the effectiveness of these laws depend, in turn, on the effectiveness of local laws.

Regulations in Jakarta

To determine the extent of local participation in combating marine plastic pollution, an assessment on the role of (a) regional regulations, and (b) governor regulations will be conducted. Notably, no mayor regulations are currently in place for handling plastic pollution.

a. Regional Regulations

Regional Regulation of the Special Capital Province of Jakarta No. 3 Year 2013 Concerning Waste Management addresses waste management, administration, collection, and sanctions. The Regulation aids in preventing air, land, and water pollution by mentioning it as a prohibited act by the people,[62] as a negative impact of mismanaged waste,[63] and by way of sanctions.[64] However, apart from the brief mention of plastic bags,[65] goggles,[66] and head protection gear in the elaboration to various Articles,[67] there is no explicit article that addresses the problem of plastic waste. Nevertheless, another possible component from this regulation that aids in reducing marine plastic pollution is its function in educating the people to stop littering in rivers. However, it is evident that the regulation lacks details on marine plastic pollution and merely addresses waste issues in general.

b. Governor Regulations

Jakarta has minimal governor regulations that address marine plastic pollution. While a targeted regulation is non-existent, there are two related regulations that target water pollution and plastic bags respectively. These are the Governor Regulation of the Special Capital Province of Jakarta No. 122 Year 2005 on Domestic Waste Water Management ("*Pergub* No. 122 Year 2005"),[68] and the Governor Regulation of the Special Capital Province of Jakarta No. 142 Year 2019 on the Obligation to Use Environmentally Friendly Shopping Bags at Shopping Centers, Convenience Stores, and Public Markets ("*Pergub* No. 142 Year 2019").[69] *Pergub* No. 122 Year

[62] Regional Regulation of the Special Capital Province of Jakarta No. 3 Year 2013, art. 126.
[63] *Id.*, art. 106(2)(a).
[64] *Id.*, art. 134.
[65] Elaboration of art. 6(2)(b), and art. 19(1)(b).
[66] Elaboration of art. 81(2)(b).
[67] Elaboration of art. 81(2)(a).
[68] Governor Regulation of the Special Capital Province of Jakarta No. 122 Year 2005.
[69] Governor Regulation of the Special Capital Province of Jakarta No. 142 Year 2019.

2005 focuses on the prevention and management of soil and groundwater pollution. Although it does not mention marine pollution, its processes indirectly affect waterways. In contrast, *Pergub* No. 142 Year 2019 directly addresses marine pollution by prohibiting the use of single-use plastic bags. Governor Anies Baswedan, who was possibly motivated by the copious amount of pictures in the media depicting floating plastic bags in the ocean, enacted the law as a means to prevent and reduce the number of plastic bags from ending up in the ocean. Instead, eco-friendly shopping bags are encouraged as an alternative. However, despite its good intentions, the regulation has received some negative feedback. It has been criticized for its insufficiency in handling other forms of plastic that are equally detrimental to the marine environment, such as straws or Styrofoam. Moreover, based on the report on plastic debris in the Greater Jakarta region, Styrofoam constitutes one of the biggest components in plastic waste. Hence, though steps have been made in the right direction, the efficiency and effectiveness of these steps remain questionable, especially since they fail to encompass other major components of plastic waste.

Regulations in Surabaya

Surabaya is the capital city and a port city of East Java. The coastal area is well known to numerous communities and is a tourist hotspot. In the geographic and demographic context, the popularity of this coastal area has had negative impacts on its marine environment. A study entitled Plastic debris in sediments from the east coast of Surabaya, was jointly conducted by the Environmental Engineering departments from Chung Yuan Christian University and Adhi Tama Institute of Technology Surabaya to assess the prevalence of plastic debris in Surabaya.[70] The report identified Bulak as a major district with the highest incidence of plastic debris, followed by Kenjeran, Gunung Anyar and Rungkut.
With the understanding that rapid urbanization has increased Surabaya's susceptibility to marine pollution, it is important to analyze the role of laws and regulations in preventing and managing the impacts of marine pollution. As such, (a) regional regulations, and (b) governor regulations and mayor regulations will be analyzed.

a. Regional Regulations

Surabaya has several regional regulations in place that particularly relate to land-based pollution. These include the Regional Regulation of Surabaya City No. 12 Year 2016 concerning Water Quality Management and Waste Control ("*Perda* No. 12 Year 2016") and the Regional Regulation of Surabaya City No. 5 Year 2014 ("*Perda* No. 5 Year 2014") concerning Waste Management and Cleanliness in Surabaya City. Both regulations address pollution caused by waste that may eventually be deposited into the oceans, with one focusing on household waste and the other on wastewater. The regulations focus on the management and general prevention of pollution to the environment.

However, neither regulation addresses marine plastic pollution specifically. *Perda* No. 5 Year 2014, and the following Regional Regulation of Surabaya City No. 1 Year 2019 ("*Perda* No. 1 Year 2019"), only mentions the reduction of the use of plastic bags, and *Perda* No. 12 Year 2016

[70] A. C. Ni'am et al., Plastic debris in sediments from the east coast of Surabaya, 462 IOP Conf. Ser.: Mater. Sci. Eng. 012050 (2019).

focuses instead on the management of quality water for sustainability,[71] and the restoration and management of wastewater as a means to prevent water pollution and encourage recovery.[72] *Perda* No. 12 Year 2016 is slightly relevant as it concerns waste discharge at water sources. However, the mere mention of water sources, without any links drawn between the wastewater components and its risk to the oceans, is insufficient for the purpose of preventing marine plastic pollution.

b. Governor and Mayor Regulations

Governor regulations of the East Java Province relating to marine plastic pollution are mostly broad and focus on land-based pollution, in particular, pollution from business or industrial activities.[73,74] Both the Governor Regulation No. 10 Year 2009 concerning Quality Standards for Wastewater for Industry and/or Business Activities in East Java, and the Governor Regulation No. 72 Year 2013 j.o. No. 52 Year 2014 concerning Ambient Air Quality Standards and Stationary Emission Sources in East Java, do not address plastic pollution specifically in terms of wastewater.

As for Mayor Regulations, overall environmental protection in Surabaya is enforced,[75,76,77] but regulations on marine plastic pollution are still lacking.

V. Conclusion

It seems that the existence of legal instruments on marine protection affect marine plastic pollution debris to a large extent. Here, highly inadequate legal instruments correlate with high plastic pollution debris. Both Jakarta and Surabaya have high levels of marine plastic pollution debris, and neither city has stringent and adequate laws to prevent and manage such pollution. Most laws in place deal with land-based sources, focusing on overall environmental protection while neglecting targeted protection on the marine environment.

Additionally, there is an imbalance between the international, national, and local laws. The international laws are sufficiently clear and progressive in its efforts to address the rapidly growing concerns of marine plastic pollution and its prevention. Member States have the obligation to further incorporate such laws into national legislation. Indonesia has clearly recognized the pressing need to protect the marine environment from plastic pollution, as evidenced by President Widodo's statement and the subsequent laws that were enacted as a follow-up. However, there is an obvious lack of further follow-ups, as evinced by the minimal efforts taken to shape local laws to conform with international and national laws.

Furthermore, while correlations are evident in Jakarta and Surabaya, a causal relationship cannot be established yet, and further studies and reports are required to confirm causality. Nevertheless, the correlation highlights the need for more laws and regulations on marine plastic

[71] Regional Regulation of Surabaya No. 12 Year 2016, art. 2(1).
[72] *Id.*, art. 2(2).
[73] Governor Regulation of East Java No. 10 Year 2009.
[74] Governor Regulation of East Java No. 72 Year 2013 j.o. No. 52 Year 2014.
[75] Mayor Regulation of Surabaya No. 26 Year 2010.
[76] Mayor Regulation of Surabaya No. 66 Year 2015.
[77] Mayor Regulation of Surabaya No. 74 Year 2016.

pollution to be set in place. A narrow focus on land-based sources does not suffice, and a more holistic approach must be taken for optimal protection and prevention.

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Measures to Counter Marine Plastic Debris in Taiwan: A Holistic Approach

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Abstract

In 2018, on World Environment Day, the UN declared 'Beat Plastic Pollution' as the main theme. This was symbolic of the seriousness of plastic pollution in oceans. However, prior to the UN's declaration, the Taiwanese government already had a holistic approach to tackle the plastic debris issue in place, which included the prevention of import or usage at the source (e.g. plastic straw ban), adoption of polluter pays principle when using plastic bags, cleaning beaches to avoid pollutants from flowing into the ocean, and cleaning or monitoring marine plastic debris. Additionally, a 'Marine Debris Governance Platform' was created by the Environmental Protection Administration and NGOs in 2017, and the first edition of a five-year plan, i.e. 'Action Plan of Marine Debris Governance in Taiwan' was announced in February 2018. The platform held 12 meetings since the first one on 7 August 2017. This action plan intended to reinforce the following four key aspects of marine debris governance: (1) source reduction, (2) prevention and removal, (3) monitoring and surveying, and (4) outreach and public participation (enhance multi-party collaboration and expand civic participation).

This article provides an overview of the related institutional designs, policies, and measures to counter marine plastic debris in Taiwan as well as the efforts made towards handling plastic debris.

I. Introduction

On World Environment Day in 2018, the UN declared 'Beat Plastic Pollution' as the main theme.[1] António Guterres, the UN Secretary-General, stated, 'Reject single-use plastic. Refuse what you can't re-use. Together, we can chart a path to a cleaner, greener world.' This symbolized the seriousness of plastic pollution.

Prior to the UN's declaration, the Taiwanese government already developed a holistic approach to tackle the plastic debris issue, which included the prevention of import or usage at the source (e.g. plastic straw ban), adoption of polluter pays principle when using plastic bags, cleaning beaches to avoid pollutants from flowing into the ocean, and cleaning or monitoring marine plastic debris.[2]

Additionally, a 'Marine Debris Governance Platform' was created by the Environmental Protection Administration and NGO Alliance in 2017,[3] while the first edition of a five-year plan,

* Acknowledgement: This article was completed with the Funding support of the Ministry of Science and Technology, Taiwan: 109-2410-H-007 -038 -MY2; 109-2627-M-011-00.1

[1] UN, Our planet is drowning in plastic pollution: https://www.unenvironment.org/interactive/beat-plastic-pollution/ (visited on 11 September 2020).

[2] Taiwan Today, EPA gets tough on marine debris, plastic waste in Taiwan, 14 February 2018 : https://taiwantoday.tw/news.php?unit=2,6,10,15,18&post=129553 (visited on 11 September 2020).

[3] Taiwan EPA, special website for Marine Debris Governance Platform (海廢治理平台專區),

i.e. 'Action Plan of Marine Debris Governance in Taiwan (2018 Action Plan)' was announced in February 2018.[4] The platform held 12 meetings since the first one on 7 August 2017.[5] The most recent 12th meeting was held on 30 August 2019.[6] This action plan intended to reinforce the following four key aspects of marine debris governance: (1) source reduction, (2) prevention and removal, (3) monitoring and surveying, and (4) outreach and public participation (enhance multi-party collaboration and expand civic participation).[7]

This article provides an overview of the related institutional designs, policies, and measures to counter marine plastic debris in Taiwan as well as the efforts made towards handling plastic debris. Thus, this article elaborates on the legal regime on source reduction and the potential contribution. Subsequently, it elaborates the institutional design for tackling marine debris for the phases of 'prevention and removal,' 'monitoring and surveying,' 'outreach and public participation.' Finally, part IV summarizes Taiwan's efforts.

II. Legal Measures on Source Reduction

Despite the holistic approach towards dealing with marine debris, more legal measures were adopted for 'source reduction' compared to the other stages of 'prevention and removal,' 'monitoring and surveying,' and 'outreach and public participation.' Hence, this section only focused on the legal regime in place for 'source reduction' and excluded the non-legal or voluntary measures to tackle marine debris issues of the other three stages.

A. Restriction on the Use of Plastic Shopping Bags and Disposable Utensils in 2002, Expanded in 2017

This measure was launched in 2002 and expanded in 2017.

1. Plastic Shopping Bags

Article 21 of the Waste Disposal Act provides legal basis for regulating the prohibition of use or the restriction of manufacturing, import, sales; and use of, or the packaging and containers

https://www.epa.gov.tw/SWM/BC66B5DD749AF063 (visited on 11 September 2020).

[4] EPA, Action Plan of Marine Debris Governance in Taiwan (1st edition) (臺灣海洋廢棄物治理行動方案(第一版)-英文版), February 2018, https://www.epa.gov.tw/DisplayFile.aspx?FileID=C434A8EB6704AFC1&P=7e57ca93-38e7-47fe-896e-a0aa329ba447 (visited on 11 September 2020).

[5] EPA, the meeting minutes of Marine Debris Governance Platform (海廢治理平台會議紀錄), https://www.epa.gov.tw/SWM/530925308E15D5B0 (visited on 11 September 2020).

[6] EPA, the 12th meeting minutes of Marine Debris Governance Platform, 30 August 2019, (海廢治理平台」第 12 次會議紀錄，時間：108 年 8 月 30 日: https://www.epa.gov.tw/DisplayFile.aspx?FileID=C733FE55EDF4088B&P=d2a9b285-cae4-43c4-9b62-35d68a0a0211 (visited on 11 September 2020).

[7] Yang Chung-han Forging alliances for plastic-free oceans - Taipei Times 02 March 2018, https://www.taipeitimes.com/News/editorials/archives/2018/03/02/2003688511 (visited on 11 September 2020).

of articles considered to seriously pollute the environment.[8] Further, the Environmental Protection Administration (EPA) promulgated the Ordinance on the Restriction of the Use of Plastic Bags.[9]

Under this, the following 14 locations are not allowed to provide plastic for free, with only a few exceptions, such as plastic drug packages with a medicine manual on the plastic and plastic in direct contact with fresh food:

1. Public sector
2. Private schools
3. Department stores and shopping malls
4. Wholesale malls
5. Supermarkets
6. Convenience store chains
7. Fast food chains
8. Drug stores and pharmaceutical store chains
9. Medical device stores
10. 3C retailing
11. Book stores and stationery stores
12. Laundry stores
13. Bubble tea stores
14. Bakeries

Achievement: after this was introduced, plastic bag usage declined from 3.43 billion to 1.43 billion, with the average annual reduction of 2 billion plastic bags. After the new measures in 2018 were introduced post expansion in 2017, the measures were adopted by 100,000 entities, leading to a total annual reduction of 4.5 billion plastic bags.[10]

2. Disposable Utensils

Similar to the legal basis for plastic shopping bags (Art. 21 of the Waste Disposal Act), the Ordinance on the Restriction of the Use of Disposable Utensils was promulgated in 2005 and recently revised in August 2019.[11] Since July 2002, the public sector, private schools, department stores, shopping malls, wholesale malls, supermarkets, convenience store chains, fast food chains, and restaurants with physical stores (not vendors) have been *prohibited* from providing 'plastic' disposable utensils. This ban covers 'all types' of disposable utensils in government buildings and school canteens. Since August 2019, this ban has been imposed on department stores, shopping malls, and wholesale malls.

[8] Waste Disposal Act, Amended Date: 2017-06-14, available at: https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=O0050001 (visited on 11 September 2020).

[9] EPA, Ordinance on the Restriction of the Use of Plastic Bags (購物用塑膠袋限制使用對象、實施方式及實施日期), published on 9 June 2006, latest revision on 15 August 2017: https://oaout.epa.gov.tw/law/LawContent.aspx?id=GL006482 (visited on 11 September 2020).

[10] EPA, shopping plastic bags: regulations and achievement (購物用塑膠袋，管制規定與成果), https://hwms.epa.gov.tw/dispPageBox/onceOff/onceOffDetail.aspx?ddsPageID=EPATWH73 (visited on 11 September 2020).

[11] Ordinance on the Restriction of the Use of Disposable Utensils (**免洗餐具限制使用對象及實施方式**), promulgated on 9 June 2006, latest revision on 8 August 2019 https://oaout.epa.gov.tw/law/LawContent.aspx?id=GL006481 (visited on 11 September 2020).

Achievement: Such command and control approach is helpful in plastic reduction. The compliance situation of such measure is promising. Implementing these measures reduced the usage of disposable utensils by about 2 billion (reduction of 85.54%), with a weight reduction of approximately 19,899 metric tons per year (reduction of 86.87%). For disposable utensils in government buildings and school restaurants, the usage declined by about 320 million (87% reduction), with a weight reduction of about 3,856 metric tons per year (87% reduction).[12]

B. Restriction on Overpackaging in 2005

Based on the legal provisions in the Resource Recycling Act, the EPA was conferred with the authority to announce the restriction or prohibition of the use of goods, packaging or containers.[13] This implied that the production and sale of products must avoid excessive packaging to reduce waste generation and mitigate environmental loading.[14] This applies to imported products as well.[15] The Ordinance on the Restriction of Overpackaging was promulgated in 2005.[16] A special website was created to help companies calculate whether they were overpackaging or not:[17]
(https://hwms.epa.gov.tw/dispPageBox/pubweb/pubwebCP.aspx?ddsPageID=CALPACK&)

The designated products include pastry gift boxes, cosmetics gift boxes, wine gift boxes, processed food gift boxes, computer software CDs.[18] Certain products are exempted from such regulations, including export products, packages for insulation, cardboard boxes for transportation, etc.[19]

To facilitate the implementation of this scheme, media plays certain role in broadcasting the overpackaging issues in the shops or department stores. One can also report the violation to the EPA. Thus, thought there is no official statistic to evaluate the packaging reduction from this measure, this author can see the positive results from the market products.

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[12] EPA, disposable utensils: regulations and achievement (免洗餐具 管制規定與成果), https://hwms.epa.gov.tw/dispPageBox/onceOff/onceOffDetail.aspx?ddsPageID=EPATWH93 (visited on 11 September 2020).

[13] Art. 13 of Resource Recycling Act.
Resource Recycling Act, Amended Date: 2009-01-21, available at: https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=O0050049 (visited on 11 September 2020).

[14] Art. 14(1) of Resource Recycling Act: 'When importing the specified products in paragraph 1 or products possessing similar or identical performance, importers shall comply with the regulations of paragraph 1 at the time of sale.'

[15] Article 14(2) of the Resource Recycling Act.

[16] EPA, Ordinance on the Restriction of overpackaging (限制產品過度包裝), promulgated on 1 July 2005, https://oaout.epa.gov.tw/law/LawContent.aspx?id=GL006490 (visited on 11 September 2020).

[17] EPA, online trial calculation of overpackaging (限制產品過度包裝線上試算), https://hwms.epa.gov.tw/dispPageBox/pubweb/pubwebCP.aspx?ddsPageID=CALPACK& (visited on 11 September 2020).

[18] Art. 2 of Ordinance on the Restriction of Overpackaging.

[19] Art. 4 of Ordinance on the Restriction of Overpackaging.

C. Restriction on the Use of Plastic Trays and Packaging Boxes in 2007

According to article 13 of the Resource Recycling Act, the EPA adopted rules for restricting the use of plastic trays and packaging boxes.[20] As per these rules, the designated businesses, mainly shopping malls and supermarkets,[21] are required to reduce the use of designated containers with PET, PS, PVC, PE, PP, etc.,[22] such as plastic trays and packaging boxes for eggs. The annual reduction rate for 2011 and 2012 was 35% and 40%, respectively. Since 2013, the containers for packed eggs, pastries, bread, vegetables, and fruits should be reduced by 80%.[23] Such clear quantitative goals in the regulation contributes to the implementation of the measures.

D. Reduce Disposable To-go Cups in 2011

Since Taiwan is famous for its take-away bubble tea, the plastic waste generated by these types of take-away tea shops is voluminous. Since 2011, based on the legal basis of article 22 of the Waste Disposal Act,[24] the incentive for the to-go cups scheme was further elaborated in the Ordinance on Source Reduction or Recycling Awards for To-go Cups.[25] This applies to take-away tea shops, convenience stores, and fast food chains. The recycling award was set at 2 cups for NTD 1. The chains can provide incentives plan for not using to-go plastic cups, such as discounts to encourage customers to use their own vacuum cups or mugs.

After such measures were implemented, the take-away tea shops, convenience stores, and fast food chains adopt ambitious scheme to follow. The to-go cups usage reduced from 1.5 billion units per year by about *10%* (150 million) per year.[26]

E. Restrictions on Personal Care and Cosmetic Products Containing Plastic Microbeads in 2017

Based on the legal authorisation by article 21 of the Waste Disposal Act, an ordinance to restrict the manufacturing, import, and sales of personal care and cosmetic products containing plastic microbeads was promulgated.[27] Since 1 January 2018, there has been a general ban of the

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[20] Ordinance on Restricting the Use of Plastic Trays and Package Boxes (限制塑膠類托盤及包裝盒使用), promulgated on 28 March 2007, latest revision on 23 December 2011 https://oaout.epa.gov.tw/law/LawContent.aspx?id=GL006484 (visited on 11 September 2020).

[21] Art. 1 of Ordinance on Restricting the Use of Plastic Trays and Package Boxes.

[22] Art. 2 of Ordinance on Restricting the Use of Plastic Trays and Package Boxes.

[23] Art. 3 of Ordinance on Restricting the Use of Plastic Trays and Package Boxes.

[24] Art. 22 of the Waste Disposal Act: 'The central competent authority may designate and officially announce categories of regulated recyclable waste to be recycled through recycling incentive methods and the monetary amounts of recycling incentives. A vendor shall pay consumers in accordance with the officially announced monetary amounts of recycling incentives, and may not refuse.'

[25] EPA, Ordinance on Source Reduction or Recycling Awards for To-go Cups (一次用外帶飲料杯源頭減量及回收獎勵金實施方式), promulgated on 4 January 2011, https://oaout.epa.gov.tw/law/LawContent.aspx?id=GL006479 (visited on 11 September 2020).

[26] EPA, to-go cups: regulations and achievement (一次用飲料杯，管制規定與成果), https://hwms.epa.gov.tw/dispPageBox/onceOff/onceOffDetail.aspx?ddsPageID=EPATWH83 (visited on 11 September 2020).

[27] EPA, ordinance to restrict the manufacturing, import, and sales of personal care and cosmetic products containing plastic microbeads (限制含塑膠微粒之化粧品與個人清潔用品製造、輸入及販賣), 3 August 2017, https://oaout.epa.gov.tw/law/LawContent.aspx?id=GL006976 (visited on 11 September 2020).

manufacturing and import of personal care and cosmetic products containing plastic microbeads. Since 1 July 2018, the ban extends to sales.

Plastic microbeads are particles with a size of less than five millimeters, used for human body exfoliation or cleaning, with contents, such as nylon, PE (Polyethylene), PP (polypropylene), PS (polystyrene), acrylic, etc. The products include shampoos, face wash, make-up removers, bath soaps, body scrubs, and toothpastes. Violation of the ban can result in an administrative fine for manufacturing and importing, ranging between NTD 60-300 thousand and NTD 1200-6000 for sales ban violation.

Taiwan does not work on this issue along. Such ban on manufacturing, import, or sales were adopted all over the world, including US,[28] UK, France, Japan, South Korea, Italy, etc. Therefore, such global initiative combining Taiwan local measures would make the inability for consumers to buy such products on the market.

F. Restricting Use of Plastic Straw in 2019

Article 21 of the Waste Disposal Act was the legal basis for formulating the Ordinance on the Restriction of the Use of One-time Use Plastic Straws.[29] Since 7 July 2019, the public sector, schools, department stores/shopping malls, and fast food chains have been prohibited from using one-time use plastic straws for 'non-take-away' food or drinks.[30] However, exceptions include biodegradable straws with eco-labeling and products already containing fixed plastic straws.[31]

Despite lack of official implementation data, the measure does reduces the availability of one-time use plastic straws. Some shops replace the plastic straw with paper straw, while the other shops redesign the cups by replacing straw hole with drinking hole. According to my observation, the implementation situation is quite promising.

G. Future Actions 1. Banning Plastic Items by 2030

Taiwan's Environmental Protection Agency put forward a 12-year plan that officially began in 2019 with a blanket ban on plastic straws in stores and restaurants.[32] The average Taiwanese citizen uses roughly 700 plastic bags a year. The new plans intend to reduce this number to 100 by 2025 and 0 by 2030. Further, Taiwan announced plans to ban plastic items to reduce plastic pollution.[33]

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[28] Microbead-Free Waters Act, 2015, available at: https://www.fda.gov/cosmetics/cosmetics-laws regulations/microbead-free-waters-act-faqs

[29] EPA, Ordinance on the Restriction of the Use of One-time Use Plastic Straws, promulgated on 8 May 2019, https://oaout.epa.gov.tw/law/LawContent.aspx?id=GL007530 (visited on 11 September 2020).

[30] Art. 2 of Ordinance on the Restriction of the Use of One-time Use Plastic Straws.

[31] Art. 3(2) of Ordinance on the Restriction of the Use of One-time Use Plastic Straws.

[32] Taiwan Today, EPA gets tough on marine debris, plastic waste in Taiwan, 14 February 2018, https://www.taiwantoday.tw/news.php?unit=15&post=129553 (visited on 11 September 2020).

[33] EPA, Plastic-free Ocean Promoted in Response to International Trend, 2018-06-28, https://www.epa.gov.tw/eng/F7AB26007B8FE8DF/fea08fd0-3afe-4ba9-a9c2-d5f6efd337d8 (visited on 11 September 2020); Eco-watch, Taiwan Sets Aggressive Timeline to Ban Straws and Other Single-Use Plastics, 15 February 2018. https://www.ecowatch.com/taiwan-plastics-ban-2535001646.html (visited on 11 September 2020); World Economic Forum, Taiwan has committed to banning plastic items by 2030, 26 February 2018, https://www.weforum.org/agenda/2018/02/taiwan-commits-to-banning-plastic-items-by-2030 (visited on 11 September 2020).

Starting from 2019, food and beverage stores have been restricted from providing plastic straws for in-store use. Last year (2020) witnessed the ban on free plastic straws in all food and beverage establishments. From 2025, even plastic straws for take-aways will be banned, and customers will need to pay a fee to use them. In 2030, the goal is to have a blanket ban on the use of plastic straws in all establishments in Taiwan.

As for plastic shopping bags, the EPA implemented a ban on all stores that issue uniform invoices in 2020. In 2025, the price of plastic shopping bags will be increased, and by 2030, such bags will be completely banned.

2020 onwards, food and beverage businesses have been prohibited from providing customers with disposable utensils inside their establishments. In 2025, a price system will be implemented on disposable tableware, and by 2030, a complete ban will be imposed on disposable utensils.

2020 witnessed restrictions on plastic beverage cups. By 2025, users will have to pay an extra fee to use them. By 2030, take-away beverage cups will be completely banned.

2. Action Plan for 2030

The Action Plan of Marine Debris Governance in Taiwan of 2018 had the following five policy initiatives for future policy planning:[34]

1. Reduction or restriction of SUP (Single Use Plastic): announcement of a timeline regarding reduction or removal of SUP (e.g. bubble tea cups, plastic straws, disposable utensils, plastic bags, etc.) and steps to push for relevant policies to reduce plastic use. Develop measures to promote reusable containers and utensils; establish a reusable-friendly environment. Proposed timeline to remove SUP: four plastic items (plastic bags, to-go cups, plastic straws, and disposable utensils) to be discussed for expanding the scope of restricted measures and materials in 2020. Straws will be the first to be limited in 2019. Next, there will be a charge for to-go purchases of these four items in 2025. In 2030, these four items will be totally banned.

2. Promotion of the hotel ecolabel criterion: reduction of single use toiletries in hotels. Invite NGOs to public hearings for the hotel ecolabel criterion revision.

3. Increase the efficiency of public drinking fountains: EPA to supervise all cities and counties to maintain the facilities and the quality of water; develop plans to increase the use of drinking fountains. Based on these measures, the EPA will then evaluate the need to increase facilities in potential areas.

4. Promotion of ‘reduce plastic’ zones: subsidise local governments in promoting policies on ‘reduce plastic’ commercial zones.

[34] See EPA, above n.4 (2018 Action Plan).

5. Alternatives to aquaculture equipment: styrofoam is used in oyster farming. Alternatives should be developed to prevent it from becoming marine debris.

It remains to be seen whether such ambitious targets and measures would be realized. From the positive side, the business and stores in Taiwan respond to the new plastic regulations in a very fast and timing way, even for those relatively voluntary ones. They do care about the fine for non-compliance, but also the company imagine of sustainable development or cooperation social responsibility. Yet the main challenge is related to the take-away and dine out culture of Taiwan citizens from the demand side, not to mention the recent worsening situation of using Urber Eat and Food Panda during the pandemics. Without dramatic life style change, it is unlikely to meet these targets.

III. Institutional Design for the Holistic Approach of Marine Debris

In addition to the legal regime to regulate the 'source reduction' stage, a wide of range of (non-legal) works needs to be carried out by different parties concerned, including officials (EPA, other ministries, local government), industries, and NGOs. The information on the works and activities of different players is usually dis-organised and disseminated through different information sources. However, thanks to the establishment of Marine Debris Governance Platform, The 2018 action plan collects and provides information. Yet, the information in the 2018 Action Plan is based on the 'works' instead of the players. Thus, this article tried using this plan and approached the marine debris governance from the perspectives of institutional design and distribution of works. This further enhances the present article's value.

A. Main Competent Authority: EPA

Apart from the dominant role of EPA in the 'source reduction' phase, the EPA could play an important role in adopting measures on 'prevention and removal (phase II),' 'monitoring and surveying (phase III),' and supplementary issues of 'outreach and public participation.'

1. Prevention and Removal Works

As a key part of this stage, the EPA conducted the cleaning of riverine litter and collected information. It also conducted regular checks on waste management facilities in coastal areas and riverbanks.[35]

There is a need to educate and engage the public in the prevention and removal works.[36] Therefore, the EPA also set up a coastal cleanup website to simplify the procedure of coastal cleanup-related administrative work and attract volunteers.

[35] 2018 Action Plan, p.5.
[36] Page 6, Action Plan.

Figure 1. EPA's Coastal cleanup website
(source: https://ecolife2.epa.gov.tw/coastal/)

2. Monitoring and Surveying Phase

The key strategy of this phase includes monitoring pollution along Taiwan's coastline and in nearby oceans as well as educating and engaging the public. For the former, the Water Resources Agency of EPA would conduct research on the source of coastal waste and on mass dumping in rivers. The latter would reflect in EPA's continued efforts to engage the public to monitor marine debris.[37]

3. Outreach and Public Participation Phase

The first strategy- enhance relationships among multiple stakeholders- is to create a marine debris management platform in 2017 and hold regular workshops in and outside the country to exchange experiences (e.g. 2017 marine debris forum). Other works include:[38]

1. Active participation in exchanging experiences and forums in Southeast Asia.

2. Participation in global forums.

3. Dialogue with marine waste management in China (e.g. through APEC, RCEP, city-to-city MoUs or exchanges between civil society organisations).

4. Empower government and civil servants through their awareness of the urgency and seriousness of the issue.

With a view to raise public awareness and attention in society, the EPA sponsors education programmes on marine debris and subsidises environmental education programs on marine debris.[39]

[37] See Action Plan 2018, at p.8-9.
[38] See Action Plan 2018, at p.10.
[39] Id., at 10.

B. Other Competent Authorities or Institutions

1. Prevention and Removal (Phase II)

With a view to effectively remove debris from hotspots (phase II), the **Maritime Bureau** as Port authority shall assume the responsibility of cleaning up waste, purchase necessary equipment or remove floating marine debris. **Fisheries Agency, Fishermen's Association, and EPA** would assist this bureau. Additionally, **Ports Cooperation, Fishermen's Association** already conducted mechanical or manual waste removal in certain ports.[40]

To prevent waste from entering oceans, local governments may assist the EPA in regular checks on waste management facilities in coastal areas and riverbanks.[41] The **Ministry of National Defense, Coastal Guard,** Fisheries Agency, EPA would jointly enhance waste management on boats and ships, including the navy, coast guard, and fishing sector to bring waste back to the shore.[42] The Ministry of Interior Affairs would assist the EPA in developing a plan to reduce litter in and remove litter from waterways.

2. Monitoring and Surveying (Phase III)

To monitor pollution along the Taiwanese coastline and in nearby oceans, **National Parks or Scenic Area Administration, Forestry Bureau** would collaborate with the EPA to conduct research on the source of coastal wastes.[43] **Forestry Bureau, National Park Administration, Fisheries Agency** would conduct research on marine debris and its influence on the biology and ecology.[44]

The **local government's** role would be vital in this stage as well. For instance, they are required to continue coastal cleanup and report basic data, identify one spot and research the components and sources of marine debris.[45]

3. Outreach and Public Participation

Almost all authorities mentioned above (and the rest of the players like NGOs and corporations) were encouraged to enhance relationships among multiple stakeholders and raise public awareness and attention in society.[46]

Such distribution of works among different institutions on plastic has its pros and cons. On the one hand, it is helpful to clarify the competence and responsibilities of different authorities and NGOs, and would make it easier to identify the passive and irresponsible institutions. However, on the other hand, involving too many institutions would be problematic as well. Put extremely, the daily work of every institution or competent authority is related to certain type of marine debris.

[40] Id., at 5.
[41] Id., at 5.
[42] Id., at 6.
[43] Id., at 8.
[44] Id., at 8.
[45] Id., at 8.
[46] Id., at 10.

The priorities of different institutions are also different as well. Therefore, continuing monitoring and raising the awareness of plastic issues from the civil society is important. Certain NGOs, such Greenpeace,[47] have special initiative to push the government to review its plastic policy. Fighting plastic is a long journey. certain extent of public and private partnership is necessary to ensure success.

C. NGOs: Invisible Hero Turns Visible?

In most of Taiwan's policy papers, such as National Environmental Protection Plan,[48] usually the role of the governmental actions is emphasized. In spite of mentioning the role of private organization in National Environmental Protection Plan, the name of these organizations are usually not specified and usually plays "supportive" or" supplementary "role in related environmental issues. Unlike the ordinary action plan focusing on government agencies or public institutions' role in combating marine debris, this action plan also extensively mentioned the role of NGOs, except in case of works requiring legislative or regulatory powers. **The name of the NGOs were specified**.

At the 'source reduction (phase I)' stage, **Wild at Heart Legal Defense** shall collaborate with the EPA and Tourism Bureau of the Ministry of Transportation to promote the hotel ecolabel criterion and reduce single use toiletries in hotels.[49] **Green Peace** shall assist the EPA and local governments in increasing the efficiency of public drinking fountains[50] to educate and engage the public.[51] The works are dominated by different NGOs, including not just **Green Peace/Wild at Heart Legal Defense**, but also the **Kuroshio Ocean Education Foundation**, **The Society of Wilderness, and Environmental Information Center**.[52]

At the 'prevention and removal (phase II)' stage, to effectively remove debris from hotspots, two NGOs (**Environmental Information Center and I-Ocean Foundation海洋公民**) would train volunteers with scuba diving skills and encourage them to assist in underwater wastes removal in a correct and safe manner.[53] To educate and engage the public, different NGOs are responsible for the following:

- Coastal cleanup (**HiiN and Tse-Xin Organic Agriculture Foundation)**
- Xiaoliuqiu beach money (**HiiN, Green Peace)**
- Strawless March (**The Society of Wilderness)**

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[47] Greenpeace, Plastics, available at : https://www.greenpeace.org/taiwan/%E6%B8%9B%E5%A1%91/

[48] Article 7 of Basic Environment Act:" The central competent authority shall draft environmental protection laws and regulations, draw up national environmental protection plans, establish sustainable development indicators and promote and implement such laws and regulations, plans and indicators."

[49] Id., at 2.

[50] Id., at 2.

[51] # plastic-free September
100 plastic-free school fairs (Aug 2017 to July 2018).
No bottled water during the Universiade (Aug 2017).
Sustainable shops map.
Million-dollar green action.
Campaigns carried out by different environmental NGOs.
Plastic-free primary schools

[52] 2018 Action Plan, at p.4.

[53] 2018 Action Plan, at p.5.

- Street cleanups (**Tse-Xin Organic Agriculture Foundation)**

Except for the funding for monitoring and surveying provided by the government, NGOs play a key role in this phase as well. For instance, all initiatives under Strategy I (monitor pollution along Taiwanese coastline and in nearby oceans) are conducted by different NGOs.[54] They also participate in educating and engaging the public (Love the ocean trip - marine debris platform for collecting and publishing database of the ICC, i.e. International Coastal Cleanup by The Society of Wilderness).[55]

Table 1. Different NGOs' Role in Monitoring Pollution along the Taiwanese Coastline and in Nearby Oceans

3.1.O-1	Civil society organisations to regularly monitor marine debris on certain coastlines	Environmental Information Center The Society of Wilderness Kuroshio Ocean Education Foundation I-Ocean
3.1.O-2	Research on wildlife (whales and dolphins) affected by marine debris	Kuroshio Ocean Education Foundation
3.1.O-3	From land to ocean: cross-continental research plan	The Society of Wilderness
3.1.O-4	Global research project on micro-plastic pollution in salt	Green Peace
3.1.O-5	Survey on the use of disposable plastics in Taiwan, Hong Kong, and Korea	Green Peace

(Source: 2018 Action Plan, p. 8)

Similarly, the role of NGOs is important when it comes to 'outreach and public participation.' Again, NGO's play a key role in raising public awareness and attention in society.

Table 2. Different NGOs' role in raising public awareness and attention in society

No.	Ongoing Actions	Lead Agency/Partner
4.2.O-1	Screening of 'A Plastic Ocean' from Aug 2017 to Aug 2018	Green Peace
4.2.O-2	Tour of plastic creatures	Kuroshio Ocean Education Foundation
4.2.O-3	'Find back the waste' tour	Kuroshio Ocean Education Foundation

(Source: 2018 Action Plan, p. 10.)

One may wonder why the NGOs in Taiwan are able to involve so deep in dealing with marine debris issues. In addition to the donations, these NGOs could receive project-based funding

[54] 2018 Action Plan, at p.8.
[55] 2018 Action Plan, at p.9.

from the government to conduct these events. Usually, the government launches call for tender under the Public Procurement Act. [56]For those who wins the bid, they are qualified for enforcement of these projects. As these NGOs are specialized in certain marine debris issues, wining the bid is not a problem for them.

D. Industry: Voluntary Actions

1. Corporate Responsibility

Despite the EPA's command and control scheme in the source reduction stage, encouraging corporation's voluntary initiatives could also be equally important. The EPA also promotes corporations' voluntary reduction of plastics and promotion of biodegradable plastic packaging.[57] For instance, the wholesale mall RT-Mart launched a voluntary scheme to stop the sales of shopping plastic bags since 1 July 2017, expecting the annual reduction of 7.3 million plastic bags on the market.[58] In 2019, The Green Peace conducted a monitoring report on 'corporations' plastic reduction performance report of Taiwan's nine retail channels in 2019 (《2019臺灣零售通路企業減塑評比報告》)' on nine important sales channels, such as Costco, 7-11, Family-Mart.[59]

2. E-commerce Platform and Package Reduction

With a flourishing e-commerce platform, Online transactions result in the shipping of 80 million packages/bags per year. To reduce tis number, the EPA published 'Guidelines on online shopping package reduction (網購包裝減量指引).'[60] These mainly deal with the size, material, and weight of the package. For instance, it was intended that by the end of 2019, the weight of the package should not exceed 10% of total package weight, and by the end of 2020, the package materials should use single recyclable materials (paper or PE) or 100% recyclable paper mixed with more than 25% recycled plastic.

An 'online-shopping package reduction label' would be provided for qualified e-commerce platforms. So far, 16 received this label, including 10 B2C platforms and 6 B2B2C/C2C platforms.[61]

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[56] Government Procurement Act, availabe at: https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=A0030057

[57] Action Plan of Marine Debris Governance in Taiwan, on page 3.

[58] RT-Mart, CSR, (大潤發-企業社會責任 - 大潤發(RT-Mart), https://news.rt-mart.com.tw/main/CSR-66 (visited on 11 September 2020).

[59]Green Peace-cooprated plastic reduction performance report of Taiwan's nine retail channels in 2019, https://issuu.com/greenpeace_eastasia/docs/2019 (visited on 11 September 2020).

[60]EPA, Guidelines on online shopping package reduction (網購包裝減量指引), https://enews.epa.gov.tw/DisplayFile.aspx?FileID=38B54412DBE191B5 (visited on 11 September 2020).

[61] EPA, e-commerce platform and package reduction: achievement (網購包裝減量:推動成果), available at: https://hwms.epa.gov.tw/dispPageBox/onceOff/onceOffDetail.aspx?ddsPageID=EPATWH126 (visited on 11 September 2020).

Table 3. Qualified e-commerce platforms for package reduction

B2C platforms	B2B2C/C2C platforms
1. Pchome 24h購物 https://24h.pchome.com.tw/ 2. MOMO, https://www.momoshop.com.tw/ 3. Yahoo!奇摩購物中心 https://tw.buy.yahoo.com/、 4. 博客來 https://www.books.com.tw/ 5. 蝦皮https://shopee.tw/ 6. IKEA https://www.ikea.com.tw/zh、 7. 神腦生活https://online.Senao.com.tw/、 8. 台塑購物網 http://www.Fpgshopping.com.tw/、 9. 東森購物https://www.Etmall.com.tw/、 10. 直接跟農夫買 www.Buydirectlyfromfarmers.tw	1. Pchome 商店街 https://www.pcstore.com.tw/ 2. 奇摩超級商城 3. Yahoo 奇摩拍賣 https://tw.bid.yahoo.com/ 4. 生活市集 https://www.buy123.com.tw/ 5. 台糖易購網 https://www.ego888.com.tw/ 6. 露天拍賣 https://www.Ruten.com.tw/

Due to the lack of warehouse for B2B2C/C2C platforms, the EPA only conducted the survey on the achievements of B2C platforms. The 2019 average weight was 0.322 kg/pc, but in the first season of 2020, it reduced to 0.303, with total reduction of 277.8 tons;[62] in season 2 of 2020, reducing it further to 0.281 and the total reduction of 618.4 tons was intended. The aggregated reduction was 896.2 tons in the first 2 seasons of 2020.

It seemed coincidental that the measures in 2019 influenced such reduction during the COVID-19 pandemic, wherein many people rely on e-commerce platforms to procure daily necessities.

IV. Conclusion

Taiwan made extensive efforts in tackling marine debris, long before the UN announcement in 2018. Many measures were taken recently owing to the establishment of the Marine Debris Governance Platform in 2017 and Action Plan of Marine Debris Governance in Taiwan in 2018. Apparently, raising/prioritising such issues in the political agenda seemed to be the driving force for further measures. Perhaps this is the first time Taiwan has such a 'de-plastic' plan for 2025 and 2030.

Taiwan adopted a *holistic* approach to counter marine plastic debris from source reduction to marine cleaning. Yet, in terms of the legal regime, it seems that the main legal regime to deal with marine debris focuses on the very early stage of 'source reduction.' The main reason for such high intensity of rule of law at this stage may be related to the nature of such measures in restraining the freedom or rights of individuals or business. As the measures elaborated in Part II, they can be

[62] EPA, E-commerce platform and package reduction: achievement (網購包裝減量:推動成果), available at: https://hwms.epa.gov.tw/dispPageBox/onceOff/onceOffDetail.aspx?ddsPageID=EPATWH126 (visited on 11 September 2020).

all classified as "stick" and "Restriction". According to Taiwan's constitutional law, there is a need to pass the tests of mainly legal reservation and proportionate principle.[63]

Thus, in the following stage, it relies on the actions of the concerned parties to participate in the subsequent stages of 'prevention and removal,' 'monitoring and surveying,' and 'outreach and public participation.' Due to the lack of legal regime regarding these three stages, progress heavily depends on the willingness of each concerned party to take action. Also, the nature of these actions may not be suitable to adopt the form of legal instruments, as these actions are usually related to the routine works of the government, certain institutions' or organizations' actions. Yet, due to the inter-ministerial nature of these issues, it is difficult to establish a regular working agenda for the government and NGOs to continue the works. To remedy this, the 2018 Action Plan takes a unique approach by involving **NGOs' activities** in the plan. The explicit actions and role of NGOs in a government policy or programme seem extraordinary. However, with NGOs' push and collaboration with the related ministries and local governments, it would be particularly useful to push forward the bothersome and routine removal and monitoring works.

The lessons of Taiwan could be summarized as follows:

- A holistic approach should be adopted at the policy planning level.
- Such policy actions should involve the key interested parties, particularly NGOs, to ensure the implementation of these further bothersome actions.
- At the 'source reduction', the legal measures on the restriction or bans for the use of certain plastics should be adopted. Appropriate penalties for violators could ensure the compliance of these regulations.
- For the stages of 'prevention and removal,' 'monitoring and surveying,' and 'outreach and public participation.', the proper distribution of works among different ministries, local governments, and NGOs is very important.

However, the current policy focus is on COVID-19. There remains an uncertainty about the progress towards the targets and works scheduled for 2025 and 2030. For instance, since 2017, regular meetings of the Marine Debris Platform were held: four meetings in 2017, four in 2018, five in 2019. However, there has been *no meeting* this year, thus far. Further, owing to the COVID-19 pandemic, the use of single use plastic has become inevitable, which is accentuated by the extensive use of the same by take-away food services like Uber Eats and Food Panda. This poses a challenge. Thus, future strategy must be planned after duly analysing the trends of plastic usage this year.

[63] Article 23 of Constitution of the Republic of China (Taiwan):" All the freedoms and rights enumerated in the preceding Articles shall not be restricted by law except by such as may be necessary to prevent infringement upon the freedoms of other persons, to avert an imminent crisis, to maintain social order or to advance public welfare."

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Fixing Liability for Marine Plastic Pollution: Legal and Policy Challenges in the Indian Context

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Abstract

India's per capita consumption of plastics is among the lowest in the world: yet its total waste generation is high and expanding at a rapid rate. The extremely poor waste management and recycling facilities leads to significant amount of plastics being dumped into the sea. Law and policy for management of plastic waste have not kept pace with the enormity of the problem. In addition, existing environmental regulation, standards and institutions tend to focus on land and rivers while neglecting the oceans. The 'land and river' focus has led to the oceans becoming a dumping ground for plastics waste. The pollution also has trans-boundary context given the fact that significant amount of plastics within the territorial waters of India originate from other countries. Fixing liability for polluting the sea with plastic waste is difficult since it is challenging to identify individual polluter. Reduction at source; limiting production of plastics and restricting non-essential use of plastics assumes greater significance. In such a scenario the 'precautionary principle' has greater relevance as opposed to overemphasis on 'Extended Producer Responsibility'. This paper focuses on the existing legal regimes and locates key limitations of the legal framework in dealing with the issue of marine plastic pollution. It identified the necessity to focus on the 'Precautionary Principle' since excessive reliance on the Extended Producer Responsibility is unlikely to have the desired outcome. Most importantly, it highlights the necessity to restrict the production of plastics specially those which are difficult to recycle. Finally, it recommends that there is a need to bring about a new comprehensive legislation to deal with the issue of marine plastic pollution.

I. Introduction

No material has become so ubiquitous with modern life as 'plastics'. Over the last few decades, it has replaced every other material be it glass, steel and aluminum. Truly, as one music band in the 1990's famously sung 'Life in Plastics, it's Fantastic'. It is therefore no surprise that the group of materials now known collectively as *plastics* has played a definitive role in delivering much of the socio-economic advantages of modern life, and their production has outpaced that of almost every other material since the 1950s (Gomez et al 2019[1]).

The exponential increase in the use of plastic in modern society and the inadequate management of the resulting waste have led to its accumulation in the marine environment. There is increasing evidence of numerous mechanisms by which marine plastic pollution is causing effects across successive levels of biological organization. This will unavoidably impact ecological communities and ecosystem functions. Marine Plastic Pollution (MPP) is now firmly considered to be a planetary environmental problem and expected to be around for many generations to come no doubt, there are advantages to plastic. Yet, there is consensus that the ecological footprint of

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[1] Gomez, F and S Rima (2009) ' Setting the Facts Straight on Plastics' https://www.weforum.org/agenda/2019/10/plastics-what-are-they-explainer/

plastic far outweighs that benefit arising out of the use of plastics. There is also no doubt, that never in the earth's history has a material become so widespread in such a short period of time as plastics. Yet, there is a lag: a legal and policy lag where existing legal and policy framework is unable to keep pace with technological changes. Domestic legal instruments as well as international law today are largely out of tune with the seriousness and urgency of the problem of plastic pollution. The issue becomes even more complicated when one is looking at marine plastic pollution, where the polluter liability is diffused.

II. Indian Context

Though, India's per capita use of plastics is among the lowest in the world, the sheer volume is a cause of serious concern:

> According to a submission by the government re in parliament, India's 60 major cities generate around 25,940 tonnes of plastic a day. Of this, some 60% is recycled, mainly by the informal sector, while the rest – averaging 9,400 tonnes – ends up in the environment. Experts believe these figures are highly conservative. Plast India Foundation, a leading plastic industry body, has estimated that India consumed 16.5 million tonnes of plastic in 2017-18; 43% – or 7 million tonnes – was as single-use and packaging plastics with no recycling value. (Shah 2020)

The use and consumption of plastics has a strong correlation to the state of economic development: it has been observed that higher the level of GDP, higher the per capita use of plastics. Similarly, there is an exponential growth of plastic production and consumption as economic growth and urbanization. In India, it is also observed that coasts of heavily urbanized states such as Karnataka and Gujarat and tourism-based states such as Goa are more polluted with plastic debris than less urbanized state such as Odisha (Kaladharan et al., 2017)

A detailed study titled 'Assessing Marine Plastic Pollution in India' (IEG 2020) gives a comprehensive picture of marine plastic pollution in India from a local area perspective. The study showed that unlike terrestrial pollution due to plastics where the waste materials would generally be found in proximity to the area where they have been used, with respect to marine plastic pollution, there is no linkage between marine debris and the use of plastics in the adjoining land. In fact, it has just been the opposite: The shore and coastal 6 regions of Andaman and Nicobar and Lakshadweep Islands in India have higher levels of pollution and substantial amount of marine plastic debris than the mainland coastal states, which imply that marine litter is coming from neighbouring nations like Sir Lanka, Maldives, Singapore, Malaysia, Indonesia and other East Asian Countries. The share of plastics in marine debris was 40 percent for Lakshadweep and 47 percent for Andaman and Nicobar islands, whereas the national average stood at 14 percent. The study notes that 'While anthropogenic pollution is mostly local near the point source, marine debris at a place depends on movement of sea currents. Distant locations, even uninhabited areas are seen to have piling of marine debris'.

The problem of marine plastic pollution is further aggravated by the fact that solid waste management itself is infancy. Despite the existence of laws, there is no system in place for management of waste. Commenting on the status of solid waste in India, Lahiri (2019) writes:

With rapid urbanisation, the country is facing massive waste management challenge. Over 377 million urban people live in 7,935 towns and cities and generate 62 million tonnes of municipal solid waste per annum. Only 43 million tonnes (MT) of the waste is collected, 11.9 MT is treated and 31 MT is dumped in landfill sites. Solid Waste Management (SWM) is one among the basic essential services provided by municipal authorities in the country to keep urban centres clean. However, almost all municipal authorities deposit solid waste at a dumpyard within or outside the city haphazardly. Experts believe that India is following a flawed system of waste disposal and management.

Jambeck, et al (2015) report that 87% of the plastic waste is mismanaged in India per year, of which, 0.09 - 0.24 million metric tons goes into the ocean ranking India the 12th in the world in plastic marine debris generation. However, marine plastic pollution is an under-researched area in India with little information on how, from where and what type of plastic waste is entering the sea and what consequences it has on marine life.

One of the main reasons for India's plastic crisis is that the country's plastic industry uses different tactics to distract, delay, dilute and derail progressive legislations on plastic control that are unfavourable to them (Talking Trash: The Corporate Playbook of False Solutions to the Plastic Crisis. 2020).

Dealing with plastics pollution in general and marine pollution in particular need a multidimensional approach – policy, administrative, legislative, legal and citizens action. The role of law and legal institutions is critical in dealing with the problem arising out of marine plastic pollution. The legal approach assumes more importance in the Indian context where the judiciary has played a crucial role in devising innovative ways of protecting the environment and recognizing citizens' right to clean environment. One important innovation of the Indian courts has been in incorporating international environmental law principles in its judicial decisions. This paper focus on India's legal regime with respect to controlling plastic pollution in general and specifically marine plastic pollution. In addition, the paper also examines to what extent environmental law principles could help deal with the issue of marine plastics pollution.

III. India's Environmental Principles

It is around the 1990's that the Supreme Court of India while dealing with a plethora[2] of environmental cases felt that existing statutory laws by itself will not be able to deal with the complex set of environmental problems facing India. Article 142 empowers the Supreme Court to pass any order to do 'complete justice'. This empowers the supreme court to pass orders which are sometimes beyond the scope envisaged in the statute. Exercising this power, judicial innovation and creative interpretation of constitutional provisions, international environmental law principles became part of domestic law.

[2] India's Supreme Court has played an important role in shaping the environmental jurisprudence in the Country. Through liberal locus standi and doing away with procedural formalities, the Supreme Court has played a pivotal role in giving new meaning to environmental rights.

This innovation was necessary, given the new problems arising as a result of a predominantly agricultural country transitioning itself into an industrial nation. The Court had to unshackle itself from the hangover of the colonial past. This new approach and the break from the past is best exemplified in the Judgment of the Supreme Court in *M.C Mehta Versus Union of India*[3] (1986).

> The court cannot allow judicial thinking to be constricted by reference to the law as it prevails in England or in any other foreign country. Though the court should be prepared to receive light from whatever source it comes but it has to build up its own jurisprudence. It has to evolve new principles and lay down new norms which would adequately deal with the new problems which arise in a highly industrialised economy. If it is found that it is necessary to construct a new principle of liability to deal with an unusual situation which has arisen and which is likely to arise in future on account of hazardous or inherently dangerous industries which are concomitant to an industrial economy, the court should not hesitate to evolve such principle of liability because it has not been so done in England.

The Supreme Court has made international environmental law principles which include the Precautionary Principle, the Polluter Pay Principle, Public Trust Doctrine as part of the law of the land. Later, through judicial innovation, it included principles which are not part of the international law principles also as part of Indian law. These include the Species Best Interest Standard, the eco-centric approach and the Principle of non –regression. It is imperative to deal with some of them in terms of their relevance in dealing with the issue of marine pollution. It is important to highlight that these principles became part of the domestic law on the ground that they are part of the international customary law as well as common law. This was made clear in the context of environmental law in 1996 by the Supreme Court in the *Vellore case*[4].

> It is almost an accepted proposition of law that the rules of Customary International Law which are not contrary to the municipal law shall be deemed to have been incorporated in the domestic law and shall be followed by the courts of law. To support we may refer to H.R. Khanna, J.s' opinion in *ADM, Jabalpur* v. *Shivakant Shukla* [*ADM, Jabalpur* v. *Shivakant Shukla*, (1976) 2 SCC 521] , *Jolly George Varghese case* [*Jolly George Varghese* v. *Bank of Cochin*, (1980) 2 SCC 360] and *Gramophone Co. case* [*Gramophone Co. of India Ltd.* v. *Birendra Bahadur Pandey*, (1984) 2 SCC 534 : 1984 SCC (Cri) 313] .
>
> The constitutional and statutory provisions protect a person's right to fresh air, clean water and pollution-free environment, but the source of the right is the inalienable common law right of clean environment. …"

Precautionary Principle and Reversal of Burden of Proof India's Supreme Court has made the 'precautionary principle' as part of India's jurisprudence as well as statutory laws. The genesis of the Precautionary Principle in India are judgments of the Supreme Court. There are a plethora of Supreme Court cases through which the Supreme Court of India has made the Precautionary

[3] 1987 AIR 1086, 1987 SCR (1) 819

[4] Vellore Citizens Welfare v Union of India (1996) 2 SCC 647

Principle an integral part of India's environmental jurisprudence as well as part of domestic laws. The principle received judicial recognition from the apex court in 1996 in Vellore case where J. Kuldip Singh penned down-

> "**11.** Some of the salient principles of "Sustainable Development", as culled out from Brundtland Report and other international documents, are Inter-Generational Equity, Use and Conservation of Natural Resources, Environmental Protection, the Precautionary Principle, Polluter Pays Principle, Obligation to Assist and Cooperate, Eradication of Poverty and Financial Assistance to the developing countries. We are, however, of the view that "The Precautionary Principle" and "The Polluter Pays Principle" are essential features of "Sustainable Development". The "Precautionary Principle" — in the context of the municipal law — means:
>
> (i) Environmental measures — by the State Government and the statutory authorities — must anticipate, prevent and attack the causes of environmental degradation.
>
> (ii) Where there are threats of serious and irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
>
> (iii) The "onus of proof" is on the actor or the developer/industrialist to show that his action is environmentally benign."
>
> "**13.** The Precautionary Principle and the Polluter Pays Principle have been accepted as part of the law of the land. Article 21 of the Constitution of India guarantees protection of life and personal liberty. Articles 47, 48-A and 51-A(g) of the Constitution are as under:.."

Elaborating on this issue further, the Supreme Court in *A.P. Pollution Control Board v. Prof. M.V. Nayudu*[5], the Supreme Court emphasized on reversal of burden of proof.

> It is to be noticed that while the inadequacies of science have led to the "precautionary principle", the said "precautionary principle" in its turn, has led to the special principle of *burden of proof* in environmental cases where burden as to the absence of injurious effect of the actions proposed, — is placed on those who want to change the status quo [Wynne, *Uncertainty and Environmental Learning*, 2 Global Envtl. Change 111 (1992) at p. 123]. This is often termed as a reversal of the burden of proof, because otherwise in environmental cases, those opposing the change would be compelled to shoulder the evidentiary burden, a procedure which is not fair. Therefore, it is necessary that the party attempting to preserve the status quo by maintaining a less polluted state should not carry the burden of proof and the party who wants to alter it, must bear this burden. [See James M. Olson: "*Shifting the Burden of Proof*", 20 Envtl. Law, p. 891 at p. 898 (1990).] [Quoted in Vol. 22 (1998), Harv. Env. Law Review, p. 509 at pp. 519, 550.]

[5] (1999) 2 SCC 718 at page 734

In *Arjun Gopal v. Union of India*[6], the Supreme Court highlighted the significance of Precautionary Principle:

> In environmental law, "precautionary principle" is one of the well-recognised principles which is followed to save the environment. It is rightly argued by the petitioners that this principle does not need exact studies/material. The very word "precautionary" indicates that such a measure is taken by way of precaution which can be resorted to even in the absence of definite studies.

IV. From Strict to Absolute Liability

Core to the issue of environmental law is the issue of liability – who is responsible for the damage caused to the environment. The traditional principle of Strict Liability wherein 'act of God' and 'act of stranger' and other exceptions limited the liability of the offender, the Supreme Court introduced the concept of strict liability.

In *M.C. Mehta* v. *Union of India*,[7] a Constitutional Bench has held that the rule in *Rylands* v. *Fletcher* [(1868) 3 HL 330 : (1861-73) All ER Rep 1, 626 : 19 LT 220] laid down the principle of liability that if a person who brings on to his land and collects and keeps there anything likely to do harm and such thing escapes and does damage to another, he is liable to compensate for the damage caused. The offender however could escape liability on the ground that it happened as a 'act of god' or unintended escape and other reasons would is no longer relevant in today's technological age. These exceptions were too broad and would entitle violators to escape liability under one reason or the other.

The Supreme Court heighted this aspect in the *Oleum Gas Leak case (year)*, where it emphasized on the need to move from the rather lax standard of strict liability to absolute liability.

> Though the court should be prepared to receive light from whatever source it comes but it has to build up its own jurisprudence. It has to evolve new principles and lay down new norms which would adequately deal with the new problems which arise in a highly industrialised economy. If it is found that it is necessary to construct a new principle of liability to deal with an unusual situation which has arisen and which is likely to arise in future on account of hazardous or inherently dangerous industries which are concomitant to an industrial economy, the court should not hesitate to evolve such principle of liability because it has not been so done in England. An enterprise which is engaged in a hazardous or inherently dangerous industry which poses a potential threat to the health and safety of the persons working in the factory and residing in the surrounding areas owes an absolute and non-delegable duty to the community to ensure that no harm results to anyone. The enterprise must be held to be under an obligation to provide that the hazardous or inherently dangerous activity in which it is engaged must be conducted with the highest standards of safety and if any harm results to anyone on account of an accident in the operation of such activity resulting, for example, in escape of toxic gas the enterprise is strictly and absolutely liable to compensate all those who are affected by the accident as a part of the social cost

[6] (2019) 13 SCC 523 : (2019) 4 SCC (Cri) 598 : 2018 SCC OnLine SC 2118 at page 545
[7] [(1987) 1 SCC 395 : 1987 SCC (L&S) 37]

> for carrying on such activity, regardless of whether it is carried on carefully or not. Such liability is not subject to any of the exceptions which operate vis-à-vis the tortious principle of strict liability under the rule in *Rylands* v. *Fletcher* [(1868) 3 HL 330 : (1861-73) All ER Rep 1, 626 : 19 LT 220] . If the enterprise is permitted to carry on a hazardous or inherently dangerous activity for its profit, the law must presume that such permission is conditional on the enterprise absorbing the cost of any accident arising on account of such activity as an appropriate item of its overheads. The enterprise alone has the resource to discover and guard against hazards or dangers and to provide warning against potential hazards.

The progression from strict to absolute liability is an important jurisprudential development. The exceptions in *Rylands versus Fletcher* would have greatly restricted the liability of polluters. The principle of absolute liability is now part of the law of the land and is applied not only by the Constitutional Courts such as the High Courts and the Supreme Court but also by the National Green Tribunal.

The concept has relevance with respect to marine plastic pollution. Given the harm that is caused to the marine ecology due to plastic pollution, there is a need to fix both individual and joint liability on manufacturers for the damage caused. This is important given the fact that 'accidental escape' and other reasons could be used by producers of plastics to escape the liability. In the Indian context it is important to highlight that existing governmental action on dealing with pollution is focussed more on 'consumers' of plastics as opposed to manufacturers of plastics. The aim is to address the problem at the 'end of the pipe' as opposed to 'at the source'. This 'end of the pipe' solution ensures that the actual producer of the goods, who takes no liability for the safe disposal of the goods, goes scot free while the burden falls solely on the consumer of the goods.

V. The Public Trust Doctrine

In *M. C. Mehta v. Kamal Nath*[8], the Supreme Court enunciated the doctrine of "public trust", the thrust of that theory is that certain common properties such as rivers, seashores, forests and the air are held by the Government in trusteeship for the free and unimpeded use of the general public. The resources like air, sea, waters and the forests have such a great importance to the people as a whole, that it would be totally unjustified to make them a subject of private ownership. This approach was however found to be more anthropocentric. The expression 'public' limited it to only human being as a species, without reference to non –human species. This lacunae in the judgment was corrected by the Supreme Court in a subsequent decision in *Centre for Environmental law v Union of India*[9], where Justice Radhakrishnan wrote:

> The State, as a custodian of the natural resources, has a duty to maintain them not merely for the benefit of the public, but for the best interest of flora and fauna, wildlife and so on. The doctrine of 'public trust' has to be addressed in that perspective.

[8] (1997) 1 SCC 388
[9] (2013) 8 SCC 234

In India, the Courts have taken judicial notice of the harmful impact dues to plastics. The Rajasthan High Court in ***Indian Asthama Care Society v. State of Rajasthan***[10] held:

> Undoubtedly plastic plays the villain right from the stage of its production. The major chemicals that go into the making of plastic are highly toxic and pose serious threat to living beings of all species on earth. Some of the Constituents of plastic such as benzene and vinyl chloride are known to cause cancer, while many others are gases and liquid hydrocarbons that vitiate earth and air. Plastic resins themselves are flammable and have contributed considerably to several accidents worldwide. Like in the case of all other chemical substances 'disposal' of plastic is a myth. Once plastic is produced, the harm is done once and for all. Plastic defies any kind of attempt at disposal-be it through recycling, burning or land-filling. Since plastic does not undergo bacterial decomposition, land-filling using plastic would mean preserving the poison forever when burned, plastic releases a host of poisonous chemicals into the air, including dioxin, the most toxic substance known to science. Recycling of plastic is associated with skin and respiratory problems, resulting from exposure to and inhalation of toxic fumes, especially hydrocarbons and residues released during the process. What is worse, the recycled plastic degrades in quality and necessitates the production of more new plastic to make the original product. Plastic waste clog the drains and thus hit especially urban sewage systems. The plastic waste being dumped into rivers, streams and seas contaminate the water, soil, marine life and also the very air we breathe. Choked drains provide excellent breeding grounds for disease causing mosquitoes besides causing flooding during the monsoons. Any attempt to get rid of plastic through landfills is also dangerous. Apart from toxic seepage from the landfill resulting in the contamination of precious water sources, the waste mass impedes the flow of ground water as well and obstructs the movement of roots-thereby badly affecting the soil's biological balance and organic process. Landfills are also prone to leaks. The wastes-especially cadmium and lead in the wastes-invariably mix with rainwater, then seep through the ground and drain into nearby streams and lakes and other water bodies. Thus, the water get poisoned.

The High Court further held:

> The problem of plastic pollution is serious. Public nuisance, because of plastic pollution to the detriment of the people, is a challenge to the social justice component of the rule of law. It is well settled that all human beings have the fundamental right to unpolluted environment, pollution free water and air. The State is obliged to preserve and protect the environment. It is mandatory for the State and its agencies to conceive, anticipate, prevent and attack the causes of environmental degradations.

Given this background, there is a need to implement legislation aimed at dealing with the growing threat of plastic waste. There is a need for binding laws and regulations to deal with this problem. Understanding the legal regime with respect to marine plastics debris, invariably would require us to focus on the domestic legislations for control of plastic wastes.

[10] 2007 SCC OnLine Raj 729 : (2008) 1 RLW 742 : (2008) 6 WLC 422

VI. Domestic Statutory Framework

India introduced first law for regulating the use of plastic in the year 1999 to restrict manufacture and use of recycled plastic, carry bags and containers. This Rule was called the Recycled Plastics Manufacture and Usage Rules, 1999. By this rule manufacture of any plastic carry bags less than 20 microns was stopped. This rule also prevented the use of recycle plastic bags for packaging food items. Amendment was brought in the 1999 Rules by the Amendment Rules of 2003. By this Amendment Rules of 2003 Government introduced process of registration of manufacturer of carry bags or container of virgin plastic or recycled plastic. The 2003 Rules also confined to carry bags.

In the year 2009 Government introduced draft Plastics (Manufacture, Usage and Waste Management) Rules, 2009 to replace the earlier plastic rules. The 2009 draft rules were relatively ambitious, as it was the government's first attempt at regulating the unrestricted use of multi-layered plastics for packaging[11]. A committee was formed by the Ministry of Environment & Forest (MoEF) to examine these comments and to suggest economic instruments. The report of the Expert Committee record that:

> "The Committee recognized that lack of organized system for segregation, collection of plastic waste is a matter of concern and that without proper waste management, the objectives of the Rules would not be achieved. Such a system has to take into account the entire lifecycle of plastic and requires cooperation of municipalities, manufacturers, retailers and consumers of plastic products."

The committee also suggested for introduction of Extended Producer's Responsibility (EPR) for recycling plastic waste.[12] The committee also deliberated upon multilayered plastic however no restrictions were put following the representation of Indian Institute of Packaging (IIP). The IIP is an autonomous body under the Ministry of Commerce and Industry but it solicits members from the plastic industry[13].

Following the recommendation of the Expert Committee the Government published and notified The Plastic Waste (Management and Handling) Rules, 2011. By this 2011 rules government put restriction on manufacture and distribution of plastic carry bags less than 40 microns thickness. The ban was also extended to plastic sachets for packaging tobacco. [14] The expert committee who made the recommendations on the 2011 rules, focused on the management of waste and introduced Advisory Bodies for monitoring the implementation of the Rules. The municipal authorities were made responsible for setting-up, operationalization and co-ordination of waste management system and performing associated functions. These functions included

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[11] ASWACHCH BHARAT, Why India can't beat the plastics crisis without the cooperation of corporations. An addendum to 'Talking Trash - The corporate playbook of false solutions. http://changingmarkets.org/wp-content/uploads/2020/09/TT-INDIA_FINAL.pdf

[12] Report of the Expert Committee to examine the comments and suggestions including economic instruments in the draft Plastics (Manufacture, Usage and Waste Management) Rules, 2009

[13] ASWACHCH BHARAT, Why India can't beat the plastics crisis without the cooperation of corporations. An addendum to 'Talking Trash - The corporate playbook of false solutions. http://changingmarkets.org/wp-content/uploads/2020/09/TT-INDIA_FINAL.pdf

[14] Rule 5, The Plastic Waste (Management and Handling) Rules, 2011

collection, storage, segregation, transportation, processing and disposal of plastic waste. The municipality was also required to ensure that no burning of plastic is happening.

The 2011 Rules were further amended by Plastic Waste Management Rules 2016 which was again amended in 2018. Plastic is also treated as waste and as a process of management of waste plastic is also controlled or managed through Waste Management Rules. There is no direct law on marine pollution of plastic but Water Act of 1974 talks about pollution of streams and Coastal Regulation Zone Notification prohibits dumping of waste.

Even After amending the old Rules and bringing out the amendments, there was not much changes on the ground. The implementation of the 2011 Rules[15] remained superficial. The Central Pollution Control Board of India came out with a report in November 2015 about status of implementation of Plastic Waste Management. This report clearly showed huge gaps in the implementation of the 2011 Rules by municipalities and also by several State Government. Some of the key findings were:

- No organised/systematic system has been developed by concerned municipal authorities for collection, segregation, transportation and disposal of plastics waste. The so-called, rag-pickers are not authorised by any agency or department, they voluntarily for their own interest, pick-up only value added plastics waste, however, municipal authority has no data that how much & what-type of plastics waste is picked-up by them and where it goes? Besides, the rag-pickers leave the littered waste including non-recyclable & low value plastics waste.
- Indiscriminate littering and non-biodegradability of plastic waste raise several environmental issues; such as choking of drains, making land infertile & on ingestion by cattles lead to death;
- Open burning of plastic waste is very common phenomenon in the cities/towns, which generates toxic emissions, such as; Carbon Monoxide, Chlorine, Hydrochloric Acid, Dioxin &Furans, Amines, Nitrides, Styrene, Benzene, 1, 3-butadiene, CCL4, and Acetaldehyde are emanates and pollute the environment.
- Unregistered plastic waste recycling industries operating in non-conforming areas (Residential) are posing threat to environment due to unsound recycling practice.
- Despite having the Legislations and Guidelines in place, the illegal manufacturing of unauthorized plastic carry-bags <40µis going on. Despite Rules for collection, segregation, transportation and disposal of plastic waste, it is going uncollected.

This report made aware of the fact that the State Governments and Municipalities have miserably failed to implement the provision of the Plastic Rules of 2011 which was causing large scale pollution of land and water. This report of CPCB nowhere suggested about any gap in the Plastic Waste Rules but pointed out failure of the implementing agencies. The non-implementation of 2011 Rules was also recorded by National Green Tribunal in its orders[16]. In a later order[17] of has recorded about disposal of plastic waste in River Ganga saying that, "*Plastic waste and other*

[15] Status of Implementation of Plastic Waste Management (PWM), Central Pollution Control Board, November 2015. http://www.indiaenvironmentportal.org.in/files/file/Status%20of%20Plastics%20Waste%20Managementin%20India.pdf

[16] *Indian Council for Enviro-Legal Action Vs. National Ganga River Basin Authority & Ors order dated 02.07.2015.*

[17] Order dated 02.07.2020

municipal waste is being thrown directly into the river Ganga and its banks are full of such waste," and passed order imposing complete ban in two districts from where river Ganga is flowing.

Without addressing the implementation issues of 2011 Rules, Government of India in 2016 came out with another set of Plastic Rules. The Plastic Waste Management Rules 2016 was notified on 08.03.2016 in supersession of 2011 Rules. By this Rule carry bags less than 50 microns were completely prohibited, however this was not applicable on compostable plastic[18]. The 2016 Rules put more emphasis on the producers, importers and brand owners of plastic and also elaborated the scheme of Extended Producer Responsibility(EPR). The concept of EPR is based on "polluters pays principle', and in the case of plastic the producer of the plastic has to be responsible for the waste, but it fails to adopt precautionary principle.

This Rule elaborated the role of the local bodies[19] and for the first time even Gran Panchayat[20] (Village body) was given responsibility of waste management. The Panchayats are required to ensure segregation, collection, storage, transportation of plastic waste. For the generator of plastic waste, responsibility was placed to comply with the Waste Management Rules, in which segregation is one of the requirements.[21]

One of the methods suggested in 2016 Rule is to use of plastic for road construction, preferably which cannot be further recycled, as one of the measures for management of plastic.[22] This can be a source for contamination of land and water of micro plastic.
One of the progressive and ambitious provision in the 2016 rule was about phasing out non-recyclable multilayered plastic in two years' time[23]. The rule has defined multilayered packaging as any material used or to be used for packaging and having at least one layer of plastic as the main ingredients in combination with one or more layers of materials such as paper, paper board, polymeric materials, metalised layers or aluminium foil, either in the form of a laminate or co-extruded structure[24].

As per this provision non-recyclable multilayered plastic has to be completely phased out by March, 2018. Explicit pricing of carry bag was also introduced by this Rule, which required for the shopkeeper and vendors register with local body if they want to use plastic carry bags for dispensing commodity. Also, the bags can be provided only on payment[25].

The 2016 Rule was considered as strong legislation by environmental groups, but not by plastic industries. Several representations were sent to Ministry of Environment and Forest about implementation of the plastic rules. A committee was constituted in September 2017 for providing its recommendations on the issues related to the PWM Rules, 2016 and SWM Rules, 2016. In their deliberations, the committee considered one of the provision of 2016 Rules, 9(3) about non-

[18] Rule 4 of Plastic Waste Management Rules, 2016
[19] Rule 6 of Plastic Waste Management Rules 2016
[20] Rule 7 of Plastic Waste Management Rules 2016
[21] Rule 8 of Plastic Waste Management Rules 2016
[22] Rule 5 (b) Plastic Waste Management Rules, 2016
[23] Rule 9(3) of Plastic Waste Management Rules 2016
[24] Rule 3(n) of Plastic Waste Management Rules, 2016
[25] Rule 15 of Plastic Waste Management Rules 2016

recyclable multi layered plastic. The provision in 2016 Rules that phasing out of non-recyclable multilayer plastic was recommended to be amended. The committee recorded in the discussion:

> "Representations mentioned that there is lack of clarity on categorization of items CPCB guidelines treat MLP used for packaging as non-recyclable plastic waste and hence needs to be phased out though it is considered as recyclable product by the industry. Other countries are developing technologies that can be used to recycle MLP e.g. Pyrolysis. If there are solutions for reuse like cement manufacture/ waste to energy/ use (brick kilns etc.), there would be little justification for phase out in view of utility of the products. The Committee noted that MLP is a very important product and it will be very difficult to phase out MLPs. However, it was also mentioned that the MLP cause lot of nuisance by blocking the drains and littering in the streets. It was suggested that regulations can be made prescribing thickness of the MLP and size of the MLPs for better management of MLPs.
> …
> In the stakeholders meeting is was suggested that only non-recyclable and non-energy recoverable plastic should be banned. However, practically there is no plastic which is not recyclable or non energy recoverable. Therefore, there is no need to ban MLP. However, the rules need to be implemented properly."
> …
>
> The committee recommended:
>
> "The committee noted that MLPs are used world over and it is not banned anywhere. The committee also noted that MLPs perform a very important function, especially in the food processing industry. The committee was of the view that we should remove the Rule regarding banning of MLPs from the PW Rules. MLPs waste should be regulated and its use in WE plants, cement plant etc. be promoted."[26]

The committee also recommended for removal of explicit pricing provision from 2016 rules. The reason for removal of Rules 15 of 2016 is stated that "this rule should be dropped as it is very difficult to keep record of the shopkeepers and vendors. Further, taking action against the defaulters is a herculean task for the regulating agency. Further, it would create an unnecessary regulatory burden on shopkeepers and street vendors, since they are already required to fill up other Govt. forms."

The Rule of 2016 was amended by the Government by diluting some of the key provisions as recommended by the committee. The provision related to ban on non recyclable multilayered plastic was amended in amendment in 2018[27] to, "Manufacture and use of multi-layered plastic which is non-recyclable or non-energy recoverable or with no alternate use of plastic if any should be phased out in Two years time". The Amendment Rule also removed the provision about explicit pricing on carry bags. It has been said that the 2018 amendment was the result of intense and

[26] Report on Recommendations of the Committee On Issues/challenges faced by Municipalities related to Implementation of Solid Waste Management Rules, 2016 and Plastic Waste Management Rules, 2016, November, 2017, Hazardous Substance Management Division, MoEFCC http://moef.gov.in/wp-content/uploads/2017/06/Final-Report-on-the-Issues-related-to-SWM-and-PWM-Rules-2016.pdf

[27] Plastic Waste Management (Amendment) Rules, 2018 https://mpcb.gov.in/sites/default/files/plastic-waste/rules/plastic_waste_rules_updated_29062020.pdf

effective lobbying by the plastic industry bodies like All India Plastic Manufacturers Association (AIPMA) and the PET Packaging Association for Clean Environment (PACE)[28]. Commenting on the changes in the 2016 Rules a magazine[29] reports that:

> "But while the implementation of the rules were poor and still being figured out, the government came up with an amendment to the rules earlier this year which has gone quite a way in diluting the effect of the 2016 rules. For one, the rule on explicit pricing of carry bags which required vendors to register and pay an annual fee to urban local bodies was removed. The complete ban on "non-recyclable multilayered plastic" which was implied in the 2016 rules was removed through some clever word play. The term "non-recyclable multilayered plastic if any" has been substituted by "multi-layered plastic which is non-recyclable or non-energy recoverable or with no alternate use" giving producers an escape route by claiming that products can be put to some other use, if not recycled. This type of plastic was supposed to be banned by March 2018, but it is nowhere near a phase-out. While the government has claimed several times that it wants to shut down all small and illegal plastic producing plants, the amendment to the rules seems to dilute this as well."

Another recommendation by the committee about revoking EPR provision from the Rules of 2016 go on to show the influence of plastic lobby. The Committee recommended that:

> "The Committee noted that the responsibility of waste collection and segregation rests solely with the ULBs. Handing over this responsibility to the producers would be very impractical and inefficient. We would have a situation wherein there would be multiple channels for waste collection leading to large inefficiencies. Similarly, if the waste segregation is not done at source, it would be difficult to expect producers to implement EPR. Further, the committee noted that collection and segregation of household waste is basic responsibility of the ULBs. Shifting them to producers is neither desirable nor feasible."

However, this recommendation was not accepted and EPR provision was kept intact, but the Guidelines proposed for implementation of EPR by way of draft Guidelines[30] will fail to meet the objective of EPR provision.

Solid Waste Management Rule, 2016

The Solid Waste Management Rules[31] deals with management of solid waste management and disposal. It has some overlapping provisions with respect to plastic. The Plastic Rules also talks about compliance of Solid Waste Rules for waste generators[32] and for segregation. The Solid

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[28] ASWACHCH BHARAT, Why India can't beat the plastics crisis without the cooperation of corporations. An addendum to 'Talking Trash - The corporate playbook of false solutions. http://changingmarkets.org/wp-content/uploads/2020/09/TT-INDIA_FINAL.pdf

[29] India's plastic consumption increases at over 10 per cent year-on-year, Down to Earth https://www.downtoearth.org.in/news/waste/breaching-the-threshold-60748

[30] Guideline Document, Uniform Framework for Extended Producers Responsibility (Under Plastic Waste Management Rules, 2016) Ministry of Environment, Forest and Climate Change June, 2020

[31] Solid Waste Management Rule, 2016 http://bbmp.gov.in/documents/10180/1920333/SWM-Rules-2016.pdf/27c6b5e4-5265-4aee-bff6-451f28202cc8

[32] Rule 8 of Plastic Waste Management Rules, 2016

Waste Rule also has provision for Extended Producer Responsibility. It would be important to look at Rule 17 of the Solid Waste Management Rule, 2016, which provides:

> "(1) All manufacturers of disposable products such as tin, glass, plastics packaging, etc., or brand owners who introduce such products in the market shall provide necessary financial assistance to local authorities for establishment of waste management system.
> (2) All such brand owners who sell or market their products in such packaging material which are non-biodegradable shall put in place a system to collect back the packaging waste generated due to their production."

Whereas the Plastic Rules talks about collection of plastic waste by producer of the waste, the Solid Waste talks about providing financial assistance to local authorities. The MSW rule has a provision which prohibits setting up of landfill within 100 meter from river and also prohibits setting up of landfill on a flood plain[33].

Bio Medical Waste Rules

Medical facility is another place where plastic waste is generated and to deal with such waste Bio Medical Waste Management Rules, 2016 has been notified by Government. This rule is applicable on institution and the premises generating bio-medical waste, which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank, health care facility and clinical establishment who are termed as 'Occupier'[34] in the Rules. The rules provides that the occupier will phase out chlorinated plastic bags, gloves and blood bags within two years from the date of notification of these rules[35]. But this has not been done yet[36].

Coastal Regulation Zone (CRZ) Notification

CRZ Notification[37] is the only law which talks about plastic pollution is Ocean. The CRZ notification is a legislation to conserve and protect the unique environment of coastal stretches and marine areas. This notification prohibits dumping directly of plastic and other waste in ocean, however no provision of dealing of waste reaching through river and streams. As per the notification Dumping of city or town wastes including construction debris, industrial solid wastes, fly ash for the purpose of land filling is prohibited[38]. About disposal of plastic the notification states that In order to safeguard the aquatic system and marine life, disposal of plastic into the coastal waters shall be prohibited and adequate measures for management and disposal of plastic materials shall be undertaken in the CRZ[39].

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[33] Schedule 1 A(vii) of Solid Waste Management Rules, 2016
[34] Rule 3(m) of Bio Medical Waste Management Rules, 2016 https://dhr.gov.in/sites/default/files/Bio-medical_Waste_Management_Rules_2016.pdf
[35] Rule 4 of Bio Medical Waste Management Rules, 2016 https://dhr.gov.in/sites/default/files/Bio-medical_Waste_Management_Rules_2016.pdf
[36] There's utter confusion on plastic waste regulation in the country, Financial Express, 22.10.2019 https://www.financialexpress.com/opinion/theres-utter-confusion-on-plastic-waste-regulation-in-the-country/1742333
[37] Coastal Regulation Zone Notification 2019, https://www.mczma.gov.in/sites/default/files/CRZ%20Notification%202019.pdf
[38] Rule 4(vi)Coastal Regulation Zone Notification , 2019
[39] Rule 4(x) Coastal Regulation Zone Notification , 2019

Water Act

The Water Act of 1974 prohibits dumping of any polluting material in any stream, river, water course, sea or tidal water. Water Act is one of the oldest law of the land framed for prevention and control of water pollution and also for maintaining and restoration of wholesomeness of water. This legislation is also important for the fact that it create Central Pollution Control Board and State Pollution Control Boards[40]. The function of Central Board is mostly of advisory to the government, developing policies and manual for prevention and control of pollution[41]. The State Boards is required to be constituted in each State and requires to advice State Government matter concerning water pollution, Conducting and encouraging investigations and research relating to different aspects of water pollution., Inspecting trade ,laying down the standards. The State Boards also responsible for granting or rejecting setting up of any unit which proposes to generate trade effluent

VII. Extended Producer Responsibility (EPR) in Indian Legal Regime

EPR was formally defined by the Swedish Ministry of the Environment and Natural Resources in the following manner:

> Extended producer responsibility is an environmental protection strategy to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product responsible for the entire life cycle of the product and especially for the take back, recycling and final disposal of the product.

This was an outcome of a report and analysis done on various Swedish and foreign recycling and waste management schemes, as well as policies used by these companies for promoting cleaner production It was introduced in various European countries viz. Austria, Germany, Netherlands, Switzerland, and the Scandinavian countries, when they were planning and commencing the implementation of various policy instruments to improve the management of end-of-life products. Soon it spread to most of the OECD countries and several developing countries in past few years (Mishrat 2009).

The extended producer responsibility entails three liabilities and the extent of these liabilities is determined by legislation. These three liabilities of EPR has been described in detail:

- *Economic responsibility* means that the producer will cover all or part of the expenses, for example, for the collection, recycling or final disposal of products he is manufacturing. These expenses could be paid for directly by producer or by a special fee.
- *Physical responsibility* is used to characterize the systems where the manufacturer is involved in the physical management of the products and/or their effects. The manufacturer may also retain ownership of his product throughout the product's lifecycle and therefore be responsible for environmental damage caused by it.

[40] Section 3 and 4 of Water (Prevention and Control of Pollution) Act, 1974
[41] Section 16 of Water (Prevention and Control of Pollution) Act, 1974

- *Informative responsibility* signifies several different possibilities to extend responsibility for the products by requiring the producers to supply information on the environmental properties of the products they are manufacturing.

In India, EPR finds place in Plastic Waste Management Rules, 2016 and E-Waste (Management) Rules 2016. However, these Rules simply puts the manufacturer liable for the waste generated by their product. The idea of EPR is extremely critical to waste management. Today, India's recycling sector is mostly informal and consists of waste picker and *Kabaddiwallahas.* With little help from municipal bodies, they are able to recycle almost 80% of the type of Plastics called Polyethylene Terephthalate (PET). But the system is still inefficient, and almost half of the estimate 7-0 million tons of plastics do not get picked up by the informal sector (Pulla 2018).

Writing on the need for an effective EPA, Shah (2020) observes 'corporate behaviour is key when it comes to the plastic crisis, and in this context, the concept of EPR has proven to be a strategic tool for policymakers across the world when articulating the fact that manufacturers are ultimately responsible for their products *throughout their lifetime*. Effective EPR legislations have ensured that manufacturers remain connected to the eventual fate of the objects they make, and ensure that they 134nternalize the full costs of materials over their lifecycle. The ultimate aim of EPR is to help companies design products or delivery systems that result in zero waste'

It is clear that EPR is part of the polluter pay principle. The polluter has to pay for the damage caused and remedy the situation.

In *Research Foundation for Science (18) v. Union of India*[42], the Supreme Court observed**:**

> "29. The polluter-pays principle basically means that the producer of goods or other items should be responsible for the cost of preventing or dealing with any pollution that the process causes. This includes environmental cost as well as direct cost to the people or property, it also covers cost incurred in avoiding pollution and not just those related to remedying any damage. It will include full environmental cost and not just those which are immediately tangible. The principle also does not mean that the polluter can pollute and pay for it. The nature and extent of cost and the circumstances in which the principle will apply may differ from case to case."

In a country like India with extremely poor track record so far as implementation of environmental law is concerned, the over reliance on EPR is unlikely to give the desired result. In such a situation, recourse could be made to the 'Precautionary Principle'. This is especially relevant given the fact that it is rather impossible to fix liability when it comes to marine plastic pollution. One of the major constraints in implementing EPR regime is the difficulty in locating the producer. Given the fact labelling is rarely done, it is next to impossible to identify where the plastic waste originated. In addition, over the last few years, the enhanced production of both smaller plastic containers (e.g., 100 ml for water) makes it difficult for recycling to take place. As such, implementing EPR becomes cumbersome in such a situation.

[42] (2005) 13 SCC 186 at page 200

There is another serious concern with respect to domestic environmental framework in India – the fact that bulk of them are delegated legislation or subordinate legislation. The various Rules which have been issued under the parent legislations have no penal provisions. The reason is that the parent Act itself does not empower the statutory authorities to impose penalty and direct for compensation and restitution of the environment. Despite, a simplified process of filing as well as liberal locus standi, India's statutory laws have not been able to deal with the crisis facing the environment. The reason is not difficult to locate – the parent laws i.e Water Act, the Air Act and the Environment (Protection) Act are all the product of the 1970's and 80s where the major industries and operations were owned and operated by the government under a socialist regime. The liberalisation of the economy in the 1990's freed the economy from state control. Under the state-controlled regime, a direction by the statutory authority was considered serious enough to comply with the legal regime. Financial penalty on state run industries would mean that it is the taxpayers who will ultimately pay the fine. However, this legal framework is incapable of dealing with the present-day market driven economy where privatisation of profit and socialisation of costs has become the order of the day. The cost of non-compliance is far less compared to the financial benefit arising out of defiance of environmental laws.

VIII. The Way Ahead

Marine Plastic pollution is a complex environmental problem that requires innovative legal approaches. The current legal framework as well as judicial decisions are more focussed on land and river systems where the territorial boundaries are very well defined. India's extensive environment jurisprudence is also geared to dealing with point sources of pollution as opposed to 'non-point sources' of pollution. Combatting pollution especially marine plastic pollution would require dealing with pollution at the source itself. Environmental law framework should focus on limiting the production and generation of plastics to reduce the generation of waste. This is essential given the failure of waste management in India.

India needs a comprehensive new legislation which is able to deal with the issue of plastic waste from cradle to grave. Such a legislation must factor in the real ecological cost of plastic pollution. Unfortunately, this is easier said than done. Despite political announcement about the ban on 'single use plastic', no substantive legal and policy decision has been taken to restrict the production and use of plastics. On the other hand, the Covid 19 pandemic has led to increase in both production and use of plastics. The consequence on the ecology in general and marine areas in particular is yet to be assessed.

There is a need to frame new legislation keeping in view the complex nature of the problem around plastic waste. As stated, the existing legislation are outdated and amending the same will not serve the purpose. There is a need to ensure that new legislations has adequate emphasis on the principle of 'avoidance', i.e., avoid the production and use of plastics. This principle is a part of the Precautionary Principle. The role is EPR in limiting plastic waste is of limited relevance in India. In addition, there must be an effective liability regime which ensures that the polluter is liable to pay for the damages caused which includes the cost of clean-up. Finally, the focus must be on ensuring that whatever plastics are produced are 'recycled'. This is possible if plastics products which are difficult to recycle such as multi-layered packaging are actively discouraged through specific legislations.

The need for effective regulation becomes important if one considers the fact that the per capita consumption in India is still low compared to more industrialised countries. According to estimates Indians consume 11 kg of plastic per year in comparison to 109 kg by an average American[43]. However, this figure is estimated to rise in the coming years. This will have catastrophic impact on the marine ecology.

At the end, it must be appreciated that the issue of marine plastic pollution is not only an environmental issue – rather it is a livelihood issue given the large number of communities that depend directly on marine fishery for their livelihoods. Plastics in the ocean clearly will lead to an impoverished nation.

Clearly, life in plastics is *not* fantastic.

[43] https://www.downtoearth.org.in/news/waste/an-indian-consumes-11-kg-plastic-every-year-and-an-average-american-109-kg-60745

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Marine Plastic Governance through International Law in China: International Commitment and State Practice

Peixuan Shang*

Abstract

Marine plastic pollution is a global problem with transboundary nature. A sound management not only counts on the establishment of an international regulatory framework, but also requires the effective implementation by States. China has been identified as one of the world's major marine plastic polluters. The main challenges faced by China are the rapid increase in domestic consumption, the high volume of imported plastics, and the mismanagement of plastic waste. The interaction of marine plastic governance and international law in China could be understood from three perspectives: Firstly, China has participated in most of the international treaties and soft law instruments that are applicable for MPP. Secondly, in implementing its international commitments, China has adopted a series of relevant domestic policy and legislation including the import ban, it has been actively engaged in multilateral cooperation in combating marine plastic debris. Thirdly, as for international law-making, China prefers to enhance and complement the existing international legal architecture without negotiating a new international agreement. Nevertheless, when it comes to the development of a specific rule under a specific treaty regime, China would make decisions taking into consideration its domestic industrial interests and capacity. China turns out to be prudent for changes when it comes to the domestically generated plastic wastes, and it is rather iron-handed towards imported plastic wastes with the target of "zero waste import". In conclusion, China is keeping pace with, if not leading, the latest development of the norms and standards for MPP governance at the international and regional level in accordance with its national circumstances and interests.

Key words: Marine Plastic Pollution; International Law; State Practice; China

I. Introduction

Marine plastic pollution (MPP) negatively affects the health of oceans and marine biodiversity around the globe.[1] MPP knows no border, which means that the plastic debris originating from one country will impose environmental threats to the others. Such a transboundary nature determines that no country could be left out of the combat against marine plastic pollution (MPP). China has the world's biggest coastal population. A scientific study shows that, as of 2016, China ranked as the fourth largest plastic waste generator, after the US, EU and India; and it also has the fifth largest volume of the mismanaged plastic waste generated by the coastal population.[2] Although still considerable, the absolute volume is much lower than five years ago, compared with the statistics published by the same team of scientists in 2015.[3] It has been argued that the management of marine plastics is especially difficult for countries with rapid

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1 UNGA, The Future We Want, A/Res/66/288 (2012), ¶ 163.

2 Law et al.,The United States' Contribution of Plastic Waste to Land and Ocean, 6 Science Advance (2020), eabd0288.

3 Jenna R. Jambeck et al., Plastic Waste Input from Land into the Ocean, 347 Science 769 (2015).

economic development and population growth,[4] whose plastic consumption often grows rapidly. Indeed, MPP has become a prominent threat to marine ecology and the environment of China. According to statistics from the Ministry of Ecology and Environment of China, in 2019, plastic items accounted for 84.1%, 81,7%, and 92.6% respectively of the total amount of the litter in surface waters, the beach litter and the seabed litter.[5] China does not only face the international pressure to improve its marine plastic governance, but also has the domestic demand for solving this marine ecological and environmental problem.

MPP is a global problem with regional and national hotspots. On the one hand, international law serves as the regulatory framework to harmonise rules and standards at the international level. On the other hand, States play a pivotal role in the international law-making process and the effective implementation of established rules. Although there is no internationally binding agreement dealing with MPP in particular, States' behaviours are not immune from the existing rules under international law. There are pollution-oriented, biodiversity-oriented as well as chemical and waste-oriented agreements containing provisions applicable for MPP from different aspects. It is, therefore, necessary to identify States' international obligations, and to examine what efforts have been made by States in order to prevent, reduce, and control MPP.

In addition to the scholarship examining *lex lata* and discussing *lex ferenda* at the international level,[6] or conducting case study of certain States at sub-national and local level,[7] this article is intended to examine the interaction between international law and China's State practice in tackling MPP. State practice in this article has twofold significance: the subsequent practice applying and implementing the established rules on the one hand; and the State practice in contribution to international law-making regarding marine plastic governance on the other. The focus on State practice also means that the article will only analyse the practice in the name of State government. Therefore, the practice at sub-national level or by private entities, NGOs will not be discussed. Section II examines China's participation in international legal instruments that are relevant to marine plastic governance, which includes both treaties with legally binding force and soft law documents. It will identify the substantive commitments that China has made in relevance to marine plastic governance. Section III assesses China's implementation of its international commitments, and special attention will be paid to its domestic legislation in recent decades. Moreover, since the rules and standards regarding MPP are still developing, as the world's major marine plastic polluter, China's practice is of great significance for the formation of new rules. Therefore, Section IV discusses China's engagement in the process of international law-making in the field of marine plastic governance. Following that, Section V provides further

[4] Amy L. Brooks, Shunli Wang and Jenna R. Jambeck, The Chinese Import ban and its Impact on Global Plastic Waste Trade, 4 Science Advances (2018), eeat0301.

[5] Bulletin of Marine Ecology and Environment Status of China in 2019, 27, *available at* http://www.mee.gov.cn/hjzl/sthjzk/jagb/202006/P020200603371117871012.pdf (visited September 16, 2020).

[6] *See*, for example, Stephanie B. Borrelle et al., Why We Need an International Agreement on Marine Plastic Pollution, 114 PNAS 9994-9997 (2017); Karen Raubenheimer, Alistair McIlgorm, and Nilufer Oral, Towards an Improved International Framework to Govern the Life Cycle of Plastics, 27 Review of European, Comparative & International Environmental Law 210-221 (2018); Karen Raubenheimer, Alistair McIlgrom, Can the Basel and Stockholm Conventions Provide a Global Framework to Reduce the Impact of Marine Plastic Litter?, 96 Marine Policy 285-290 (2018); Elizabeth A. Kirk and Naporn Popattanachai, Marine Plastics: Fragmentation, Effectiveness and Legitimacy in International Law Making, 27 Review of European, Comparative & International Environmental Law 222-233 (2018).

[7] *See*, for example, Beatriz Garcia, Mandy Meng Fang and Jolene Lin, Marine Plastic Pollution in Asia: All Hands on Deck!, 3 Chinese Journal of Environmental Law 11-46 (2019).

analysis on how China balances the need of combating MPP on the one hand, and its domestic industrial interests and capacity on the other. The article concludes that China is endeavouring to keep pace with the international efforts in combating MPP, in spite of the multiple challenges it faces. China plays the role as a prudent revisionist regarding the emerging international rules and standards on marine plastic governance. It is inclined to strengthen the existing international legal framework on a case-by-case basis, without adopting another new international plastic agreement. In this process, China is making contributions at its own pace based on its national priority, capacity and domestic industrial interests.

II. China's Participation in the Existing International Legal Architecture

The sources of marine plastics can be divided into the land-based and the ocean-based. The former includes urban and storm runoff, sewer overflows, beach visitors, inadequate wastes management, industrial activities, construction and illegal dumping; and the later are mainly related to the fishing industries, nautical activities and aquaculture.[8] There is not, so far, an integrated universally binding instrument that particularly deals with MPP from all kinds of sources. Instead, the existing international legal architecture tackles MPP in a rather fragmented and sectoral approach. The rules applicable to marine plastic governance are scattered in a set of international treaties varying in scope and objectives. In 2018, the UNEP Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics prepared a report mapping out the existing international legal instruments that are applicable to combating marine plastic litter and microplastics.[9] The report categorises the instruments according to their designations and legally binding force, namely, pollution-oriented treaties, chemical and waste oriented treaties, biodiversity-related treaties, and soft law instruments.[10] This Section will provide an overview of China's participation in the international legal instruments of each category.[11]

A. Pollution-Oriented Treaties

1. United Nations Convention on Law of the Sea

As "a constitution for the oceans",[12] the United Nations Convention on the Law of the Sea (UNCLOS) prescribes the fundamental legal obligations for the protection and preservation of marine environment from pollution of any source.[13] Although the UNCLOS does not expressly mention plastic pollution, its definition of pollution logically covers plastics and microplastics that are introduced by man, directly or indirectly into the ocean.[14] It also contains provisions covering different sources of marine pollution, namely pollution from land-based sources, by dumping and

[8] IUCN, Plastic Debris in the Ocean: The Characterization of Marine Plastics and Their Environmental Impacts, Situation Analysis Report, 43 (Florial Thevenon, Chris Carroll and João Sousa eds., 2017).
[9] UNEP, Combating Marine Plastic Litter and Microplastics: An Assessment of the Effectiveness of Relevant International, Regional and Subregional Governance Strategies and Approaches, UNEP/AHEG/2018/1/INF/3 (2018).
[10] *Id.*, at 41-43.
[11] For sake of clarification, unless otherwise indicated, the legal instruments mentioned below are applicable to mainland China, the Hong Kong and Macau Special Administrative Regions (SAR).
[12] *See* Tommy Koh, A Constitution for the Oceans, Remarks by Tommy Koh, President of the Third United Nations Conference on the Law of the Sea on 6 and 11 December 1982 at the final session of the Conference at Montego Bay, *available at* https://www.un.org/Depts/los/convention_agreements/texts/koh_english.pdf (visited September 17, 2020).
[13] United Nations Convention on the Law of the Sea, Article 194.
[14] *Id.*, Article 1(4).

from vessels.[15] By becoming a Party to the UNCLOS since 1996, China is under the obligation to take necessary measures including adopting and enforcing domestic laws and regulations, and cooperating through competent international and regional institutions, in order to prevent, reduce and control marine pollution.[16] The UNCLOS does not provide uniformed rules and standards regarding the measures taken by States, instead, it refers to the internationally-accepted rules and standards. It is noteworthy that, when the UNCLOS makes such reference in respective provisions, the wordings are slightly different. As for the land-based pollution, Article 207 requires States to "take into account internationally agreed rules, standards, and recommended practices and procedures".[17] Such an expression prescribes the weakest qualification for the obligations of States in respect of in internationally agreed measures.[18] The drafters of the UNCLOS were aware that the territorial sovereignty of States is dominant for land-based pollution, which the UNCLOS is restrained to touch upon.[19] Moreover, there are, when the UNCLOS was negotiated and even until the present time, few "internationally agreed rules, standards, and recommended practices and procedures" that are applicable to land-based marine pollution.[20] There is no particular international or regional organization having the exclusive competence to deal with the land-based sources of pollution.[21] Therefore, the discretion is left for States to the largest extent to adopt domestic measures in tackling land-based marine pollution. The requirement becomes stricter with regard to the pollution by dumping and from vessels, and the intention of the drafters to promote the harmonisation of the laws and regulations is manifested.[22] According to Article 210, the measure taken by States in preventing, reducing and controlling pollution by dumping shall be "no less effective…than the global rules and standard".[23] When it comes to the pollution from vessels, the domestic laws and regulations "shall at least have the same effect as that of generally accepted international rules and standards established through the competent international organization or general diplomatic conference".[24] It is because the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matters (London Convention on Dumping) and the International Convention for the Prevention of Pollution from Ships (MARPOL) precedes the UNCLOS in providing detailed rules and standards that have been widely accepted by States; on the other hand, the International Maritime Organization (IMO) could serve as the principal "competent international organization" to establish applicable global rules and standards.[25] In spite of such nuances, what is obvious is that when taking relevant domestic measures, China needs to have due regard to the rules, standard, practices and procedures that have been accepted by the international community and coordinate with other States through international and regional organizations and diplomatic conferences.

[15] *Id.*, Article 207, 210, 211.
[16] *Id.*, Article 197, 207, 210, 211, 213-221.
[17] *Id*., Article 207(1).
[18] *See* Commentary to Article 207, 132 United Nations Convention on the Law of the Sea 1982, Volume IV (Nordquist, Myron H., Neal R. Grandy, Shabtai Rosenne, and Alexander Yankov, eds., 1990).
[19] *Id.*
[20] *Id.*, at 133.
[21] *Id.*
[22] *Id.*, at 193.
[23] *Id.*, Article 210(6).
[24] *Id*., Article 211(2).
[25] *See id*., at 166 and 201.

2. MARPOL Annex V

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention regulating the prevention of ship-based pollution of the marine environment. MARPOL contains six technical Annexes, and Annex V completely bans the disposal of all forms of plastics from ships into the sea.[26] When China accessed MARPOL in 1983, it made a declaration that it is not bound by Annexes III, IV and V of the Convention.[27] China became a Party to Annex V in 1989. A series of amendments to Annex V have been made overtime, and China has accepted all of the amendments without raising any objection.[28] According to the latest version of Annex V, garbage including plastics, synthetic ropes, fishing gear, plastic garbage bags, lining and packing materials, and bottles are prohibited from discharging into the ocean.[29] The prohibition also applies to the garbage that is mixed with or contaminated by plastics.[30] To ensure the compliance with the discharge requirements, China is also obliged to provide adequate reception facilities at ports and terminals for the reception of garbage without causing undue delay to ships.[31] Moreover, the placard, garbage management plan and garbage record book are required in accordance with the scale of the ships.[32] Meanwhile, China has the right to authorise its officers to conduct port State control "where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of pollution by garbage".[33] The Ministry of Transport serves as the focal point for MARPOL and its Annexes in China.

3. London Convention on Dumping

The objective of the London Convention is to prevent pollution of the sea by dumping of wastes and other matter from vessels, aircraft, platforms or other man-made structures by ships.[34] The 1996 Protocol was adopted with the view to eventually eliminate the pollution of sea by dumping.[35] Therefore, a more restrictive approach called "reverse list" is adopted in the 1996 Protocol, which means all dumping activities are prohibited unless otherwise permitted.[36] China accessed the London Convention and the 1996 Protocol respectively in 1985 and 2006. Notably, both the Convention and the Protocol are not applicable to the Macau SAR.[37] As a Contracting

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[26] *Available at* https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx (visited September 17, 2020).

[27] IMO, Status of IMO Treaties: Comprehensive Information on the Status of Multilateral Conventions and Instruments in Respect of Which the International Maritime Organization or Its Secretary-General Perform Depositary or Other Functions, *available at* http://www.imo.org/en/About/Conventions/StatusOfConventions/Documents/Status%20-%202020.pdf (visited September 17, 2020).

[28] For the conditions for the entry into force of an Amendment, *see* International Convention for the Prevention of Pollution from Ships, Article 16(2)(f) and (g).

[29] Simplified overview of the discharge provisions of the revised MARPOL Annex V which entered into force on 1 March 2018, *available at* http://www.imo.org/en/OurWork/Environment/PollutionPrevention/Garbage/Documents/Simplified%20overview%20of%20the%20discharge%20provisions%20of%20the%20revised%20MARPOL%20Annex%20V.pdf (visited September 17, 2020).

[30] *Id.*

[31] MARPOL Annex V, Regulation 8.

[32] *Id.*, Regulation 10.

[33] *Id.*, Regulation 9.

[34] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Article 1 and 3(1).

[35] 1996 Protocol to Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Article 2.

[36] *Id.*, Article 4.

[37] *Supra* note 17.

Party, China has the obligations to designate an appropriate authority or authorities to issue permits, keep record and monitor the condition of the sea, and the relevant information and enforcement shall be reported to the IMO.[38] To ensure the enforcement, China shall take appropriate measures domestically and through international or regional cooperation, including rule-making, technical cooperation and assistance, information sharing, and scientific research.[39] The designated departments responsible for matters concerning the dumping of wastes are the National Oceanographic Bureau and its agencies.[40]

B. Chemicals and Waste Oriented Treaties

1. Basel Convention

The Convention on the Transboundary Movements of Hazardous Waste and Their Disposal (Basel Convention) is intended to prevent, reduce, manage, and restrict the transboundary movement of hazardous wastes, as well as to provide a regulatory system for the permissible transboundary movement.[41] The Basel Convention does not distinguish wastes by source (land-based or ocean-based). Instead, the Convention groups wastes in its Annexes for differentiated treatment based on their hazardousness. In addition to the hazardous waste as listed in Annexes I and II, the Convention leaves the legislative discretion to States Parties for national definitions of hazardous wastes.[42] The core principle under the Basel Convention is prior informed consent (PIC) procedure, which means that the transboundary movement of hazardous waste may only proceed with the import State's prior written consent.[43] China ratified the Basel Convention in 1991, and the focal point of the Convention in China is the Ministry of Ecology and Environment. The functioning of the PIC principle is especially meaningful for China's struggle with plastic waste import, which will be further elaborated in the following Sections. As a State Party, China is required to take appropriate legal, administrative measures, and put in place adequate facilities to ensure the reduction and sound management of wastes.[44]

Certain types of plastic wastes are characterised as hazardous under the Convention.[45] In 2002, the Conference of Parties adopted a non-binding Technical Guidelines for the Identification and Environmentally Sound Management of Plastic Wastes and for Their Disposal. According to the Guidelines, all polymer and plastic types, not limited to those listed in Annex I are regarded as hazardous waste.[46] It is also noteworthy that the Conference of Parties in 2019 adopted an Amendment to the Basel Convention (Plastic Waste Amendment) with the objectives of enhancing the control of the transboundary movements of plastic waste and clarifying the scope of the

[38] *Supra* note 25, Article 9.
[39] *Id.*, Article 10, 12-14.
[40] Regulations of the People's Republic of China on Control over Dumping of Wastes in the Ocean, Article 4.
[41] *See* the official website of the Basel Convention, *available at* http://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx (visited September 22, 2020).
[42] *Id.*, Article 3.
[43] Basel Convention, Article 6, 7.
[44] *Id.*, Article 4.
[45] *Id.*, Annex I and VIII.
[46] Technical Guidelines for the Identification and Environmentally Sound Management of Plastic Wastes and for Their Disposal, UNEP/CHW.6/21, 7 (August 23, 2002).

Convention as it applies to such waste.[47] According to Article 18 of the Convention, a Party may notify the Depositary in writing if it cannot accept an amendment to the Convention.[48] China, Canada and Turkey are the only 3 State Parties who had submitted the notification of non-acceptance when the Amendment was adopted, but China and Canada withdrew their notifications by the end of 2020. Therefore, the Plastic Waste Amendment has entered into force for all State Parties except Turkey.[49]

2. Stockholm Convention on Persistent Organic Pollutants

The objective of the Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention) is to protect human health and environment from persistent organic pollutants (POPs).[50] As the name of the Convention suggests, it deals with plastics to the limit of POPs regardless of their land-based or sea-based origin. According to the Convention, States Parties shall 1) prohibit and/or eliminate the production and use, as well as the import and export, of the intentionally produced POPs that are listed in Annex A; 2) restrict the production and use, as well as the import and export, of the intentionally produced POPs that are listed in Annex B; [51] and 3) reduce or eliminate releases from unintentionally produced POPs that are listed in Annex C.[52] There are twelve initial POPs that have been recognised as causing adverse effects on humans and the ecosystem. POPs that are related to plastic production such as the mirex and polychlorinated biphenyls (PCBs) are listed in the original Annex A. Any State Party to the Convention may propose amendment to the Annex, which is subject to the adoption by the Conference of Parties.[53] To implement the Convention, each State Party shall adopt a national plan and cooperate through global, regional and subregional organizations.[54] China ratified the Stockholm Convention in 2004, and its designated focal point is the Ministry of Ecology and Environment. China has made a declaration in accordance with Article 25 (4) that any amendment to Annex A, B or C shall enter into force only upon the deposit of its instrument of ratification, acceptance, approval or accession with respect thereto.[55] China has ratified most of the amendments to the Annexes, except for the amendments regarding Hexachlorobutadiene (Annex A), Pentachlorophenol and its salts and esters, Polychlorinated naphthalenes, Decabromodiphenyl ether, Short-chain chlorinated paraffins, and Hexachlorobutadiene, which are important materials for plastic production.[56] Section IV will present a comparison of China's attitude towards the amendments to the Basel Convention and the Stockholm Convention in detail.

[47] *See* Report of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal on the Work of Its Fourteenth Meeting, 57-58 UNEP/CHW.14/28 (May 11, 2019).
[48] *Supra* note 41, Article 18 (2)(b), (3)
[49] *Id.*, Article 18 (2)(c), (3).
[50] Stockholm Convention, Article 1.
[51] *Id.*, Article 3.
[52] *Id.*, Article 5.
[53] *Id.*, Article 21-22.
[54] *Id.*, Article 7.
[55] *Available at* http://chm.pops.int/Countries/StatusofRatifications/PartiesandSignatoires/tabid/4500/Default.aspx#CN (visited September 22, 2020).
[56] *Available at* http://chm.pops.int/Countries/StatusofRatifications/Amendmentstoannexes/tabid/3486/Default.aspx (visited November 17, 2020).

C. **Biodiversity-Oriented Treaties**

The study on the impact of marine plastic debris on biodiversity can be traced back at least to the 1960s.[57] The most troubling impact is the ingestion, suffocation and entanglement of hundreds of marine species.[58] Therefore, in addition to the foregoing treaties that directly target at the source of MPP, the biodiversity-oriented treaties are also indispensable for the integrated international legal architecture concerning marine plastic debris.

1. Convention on Biological Diversity

The Convention on Biological Diversity (CBD) is a framework convention for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources".[59] In 2010, the Conference of the Parties adopted the Strategic Plan for Biodiversity 2011-2020, which sets out 5 strategic goals (20 Aichi Biodiversity Targets) to be achieved through national strategies and actions plans, with supporting actions at the regional and global levels.[60] China ratified the CBD in 1993, and it is also a State Party to the Cartagena Protocol and the Nagoya Protocol. The capacity and biological conditions are different among State Parties. Therefore, the implementation of the CBD is highly dependent on national actions. As a Contracting Party, China shall adopt its own national strategies, plans or programme in line with the Convention, and establish protected areas to conserve biodiversity.[61] Indeed, the CBD does not explicitly address MPP. It is worthy of mentioning that in 2016, the Conference of the Parties adopted a Decision to address the impacts of marine debris on marine and coastal biodiversity, which recognises the issue caused by plastics and microplastics in particular.[62] The Decision also consists of a Voluntary Practical Guidance on Preventing and Mitigating the Impact of Marine and Coastal Biodiversity and Habitats.[63] Moreover, in a Remark made on the occasion of the World Ocean Day the Executive Secretary of the CBD links the Aichi Biodiversity Target 8 to the comate against marine plastic debris.[64]

2. United Nations Fish Stock Agreement

The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and

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[57] *See* Peter G. Ryan, A Brief History of Marine Litter Research, 3-5 Marine Anthropogenic Litter (Melanie Bergmann, Lars Gutow, and Klages Michael eds., Springer, 2015).
[58] *Supra* note 8, at 5.
[59] Convention on Biological Diversity, Article 1.
[60] Strategic Plan for Biodiversity 2011-2020, *available at* https://www.cbd.int/sp/elements/ (visited September 21, 2020).
[61] *Supra* note 47, Article 6, 8.
[62] Decision Adopted by the Conference of the Parties to The Convention on Biological Diversity, CBD/COP/DEC/XIII/10, ¶ 3-10 (December 10, 2016).
[63] *Id.*, Annex.
[64] Message of the Executive Secretart of the Convention on Biological Diversity on the Occasion of World Oceans Day (June 8, 2018) available at https://www.cbd.int/doc/speech/2018/sp-2018-06-08-wod-en.pdf (visited September 21, 2020). Aichi Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (United Nations Fish Stock Agreement) sets out principles for the conservation and management of those fish stocks and requires States to minimize pollution, waste, as well as abandoned, lost or discarded fishing gear (ALDFG), etc., which are considered as the major source of MPP generated from fishing activities.[65] China signed the Agreement in 1996 but has not yet ratified it. However, this does not necessarily mean that China is totally exempt from the obligation under the Agreement. According to the Vienna Convention on the Law of Treaties, a State is required to refrain from acts which would defeat the objects and purpose of a treaty when it has signed the treaty subject to ratification.[66] Therefore, China is under the obligation to refrain from taking activities that will negatively affect the long-term conservation and sustainable use of the straddling fish stock and highly migratory fish stocks.[67] Moreover, the implementation of the Agreement highly relies on the regional and sub-regional fisheries organizations and arrangements. China has joined several regional fisheries organizations including ICCAT, IOTC, WCPFC, IATTC, SPRFMO, NPFC and CCAMLR, and most of them have adopted binding measures to prevent and remediate ALDFG.[68]

C. Soft Law

Although soft legal instruments are generally without binding force, they sometimes could serve as alternatives to treaties, or even complement and amplify treaties.[69] These functions especially hold true for tackling international environmental issues, since the adoption of soft law is simpler, faster and more inclusive, and it could often be used to give content to the terms of treaties.[70] The scope of the non-binding instruments is too broad to be exhausted, this article will introduce a few of them with high relevance and wide participation. The overarching soft law instrument is the United Nations 2030 Agenda. Among the 17 Sustainable Development Goals (SDGs) adopted in the United Nations 2030 Agenda for Sustainable Development, Goal 14.1 states that "by 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution".[71] The Agenda was adopted unanimously by the General Assembly, which signifies the consensus shared by the UN members (including China) that the combat against marine debris including plastics is indispensable to achieve the SDGs. With regard to the land-sourced MPP, the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) has been adopted by 108 Governments (including China), and the European Commission in 1995. Led by the UNEP, GPA serves as a voluntary, action-oriented intergovernmental mechanism to counter the issue of land-based pollution.[72] In 2006, China hosted the Second Intergovernmental Review Meeting of GPA in Beijing. Moreover, the Fifth International Marine Debris Conference brought States together to

[65] The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, Article 5(f).
[66] Vienna Convention on the Law of Treaties, Article 18(a).
[67] *Supra* note 53, Article 2.
[68] Eric Gilman, Status of International Monitoring and Management of Abandoned Lost and Discarded Fishing Gear and Ghost Fishing, 60 Maine Policy 229-231 (2015).
[69] *See* Alan Boyle, The Choice of a Treaty: Hard Law versus Soft Law, 101-120 The Oxford Handbook of United Nations Treaties (Simon Chesterman, David M. Malone, and Santiago Villalpando, eds., OUP, 2019).
[70] *Id.*
[71] UNGA, Transforming Our World: The 2030 Agenda for Sustainable Development, A/RES/70/1, 23 (September 25, 2015).
[72] *Available at* https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/addressing-land-based-pollution/governing-global-programme (visited 22 September, 2020).

develop the outcome document known as Honolulu Strategy and the Honolulu Commitment, which serve as planning and monitoring tools, as well as a framework for global efforts to prevent and manage marine debris.[73] Representatives from Chinese government attended the Conference and joined the other 64 Governments as well as the European Commission to endorse both of them.[74]

It can be concluded from the above analysis that China has become a State Party to the major international agreements applicable to marine plastic management since 1980s, and most of the ratification or accession took place from 1990s to 2000s. In general, China does not fall behind others to engage in the international legal architectures consisting of hard law and soft law, making no less commitments than the other States in combating MPP.

III. China's Implementation of Its International Commitments

Normally, the plastic pollution is not directly generated by State actors, but by the individuals or private entities within the jurisdiction of a State. Based on the analysis above, the international commitments that China has made can be divided into the following categories: 1) taking appropriate domestic measures such as policy and legislation to prevent, reduce and control MPP directly or indirectly; 2) cooperating with other States; 3) reporting to the treaty body about the progress of implementation. This Section will provide an overview of what China has done in carrying out its international commitments.

A. Domestic Laws and Regulations

Similar to the current international legal architecture, China does not have a single legislation dealing with marine plastic debris in particular. Nevertheless, there exists a series of laws and regulations that can be applied to marine plastic governance. The two-pillar domestic legal instruments applicable for MPP are the Marine Environmental Protection Law and the Solid Waste Law, accompanied with the supporting Regulations and policy instruments. With regard to MPP, the former focuses on the protection of the marine environment in general, and the latter is more relevant to the upstream source of plastic pollution and the downstream management.

1. Marine Environment Protection Law and Relevant Regulations

The Standing Committee of the National People's Congress adopted the Marine Environment Protection Law in 1982, even earlier before China's participation in any of the abovementioned international legal instruments, and it serves as the overarching legal framework for the protection of marine environment. According to the latest version of the law, all entities and individuals bear the obligation to protect the marine environment.[75] It regulates the prevention and control of pollution to the marine environment caused by land-based pollutants, coastal construction projects, marine construction projects, dumping of wastes and by vessels.[76] The Law also has a separate Chapter that stipulates the legal consequences for the violation of the Law

[73] *See* Honolulu Strategy, Executive Summary.
[74] *Id.*, at 3.
[75] Marine Environment Protection Law of the People's Republic of China (Amendment 2017), Article 4.
[76] *Id.*, Chapter IV-VIII.

including both administrative penalty and criminal responsibility.[77] The measures adopted in the Law are in line with the relevant treaties. For example, the dumping of wastes under the jurisdiction of China is permit-based, in accordance with the "reverse list", procedures and standards made by the State Oceanic Administrative Department.[78] With regard to pollution from vessels, the Law requires that the vessels must possess sufficient capacity to deal with the pollutant, including pollution prevention facilities and equipment, as well as relevant certificates.[79] Moreover, the Law explicitly upholds the primacy of international treaties by prescribing that:
where an international treaty regarding marine environment protection concluded or acceded to by the People's Republic of China contains provisions differing from those contained in this Law, the provisions of the international treaty shall apply; however, the provisions about which the People's Republic of China has made reservations shall be excepted.[80]

This is the most common method that China adopts in addressing the relationship between its domestic legislation and international law, and this provision was inserted in the 1999 Amendment. Notably, the original version of Law in 1982 only contains 48 provisions, and the language is rather general and vague. The present version of the Law is, to a large extent, based on the 1999 Amendment in 1999, after China has become a State Party to most of the treaties mentioned above. The 1999 Amendment almost doubled the number of the provisions in the original version, and absorbed much of the elements contained in international treaties.

Pursuant to the Marine Environmental Protection Law, the State Council has adopted five Regulations in order to facilitate the effective implementation of the Law, which contain more specific definitions and practical guidance. The five Regulations are corresponding to the sources of pollutants as covered by the Law, namely, the Regulations on the Prevention of Pollution Damage to the Marine Environment by Land-Sourced Pollutants, the Regulations on the Dumping of Wastes at Sea, the Administrative Regulation on the Prevention of Environmental Pollution by Ship Breaking, the Administrative Regulation on the Prevention and Treatment of the Pollution and Damage to the Marine Environment by Marine Engineering, and the Regulation on the Prevention and Control of Vessel-induced Pollution to the Marine Environment.

2. Law on the Prevention and Control of Environment Pollution Caused by Solid Wastes

The Marine Environment Protection Law and its relevant Regulations tackle MMP from the pathway it enters into the ocean, and the Law on the Prevention and Control of Environment Pollution Caused by Solid Wastes (Solid Waste Law) focuses more on the side of generation and management. China adopted its Solid Waste Law in 1995, and its Fifth Amendment has just come into force on September 1, 2020, which has great significance for the country's marine plastic governance. The new Solid Waste Law, for the first time, stipulates a strict plastic ban in the form of national legislation. Article 69 prescribes that:

> 1) The state shall prohibit and restrict the production, sale, and use of non-degradable plastic bags and other disposable plastic products according to the law.

[77] *Id.*, Chapter IX.
[78] *Id.*, Article 55-56.
[79] *Id.*, Article 62-64.
[80] *Id.*, Article 96.

2) The owners of goods retail sites, e-commerce platform enterprises, express delivery enterprises, and food delivery enterprises shall report the use and recovery of disposable plastic products such as plastic bags to the commerce, post and other departments in accordance with the relevant provisions issued by the state.

3) The state shall encourage and guide the reduced use and active recovery of plastic bags and other disposable plastic products and promote the application of recyclable, easily recyclable and degradable alternative products.[81]

Under the Solid Waste Law, any entity or individual have the obligation to reduce solid waste,[82] whereas Article 69 especially stresses the State's obligation to reduce plastic products. Meanwhile, certain internationally-recognised principles and recommended practices can be found in the Solid Waste Law, such as the polluter pays principle,[83] extended producer responsibility (EPR),[84] and environment impact assessment (EIA).[85] In addition, the Law establishes the legal obligation of waste-sorting,[86] strengthens the capacity of monitoring,[87] enhances public outreach,[88] increases penalties,[89] and provides incentives for scientific research, technological innovation and whistle-blowers.[90] Reading together with the Honolulu Strategy, much of the policy and legislation tools as suggested in the Strategy are reflected in the new Solid Waste Law.[91]

It is also worth noting that the Fifth Amendment applies to the "prevention and control of environmental pollution by solid waste",[92] whereas the previous version of the Law confined the scope of application "within the territory of China".[93] Such a change in language seems to indicate China's intention for the extraterritorial applicability of the Law. A contextual reading reveals that the new Solid Waste Law not only deals with the plastic wastes generated within the jurisdiction of China, it also introduces an ambitious ban targeting on solid wastes from outside: dumping, piling up or treatment of any solid waste from abroad is forbidden within the territory of China;[94] and the State shall gradually achieve zero solid waste imports.[95] However, it still needs time to tell to what extent the new Solid Waste Law could exert its extraterritorial effects.

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[81] Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes (Amendment 2020), Article 69.
[82] *Id.*, Article 4.
[83] *Id.*, Article 5, "The prevention and control of environmental pollution by solid wastes shall be in adherence to the polluter pays principle".
[84] *Id.*, Article 66, "The state shall establish an extended producer responsibility system for electrical and electronic products, lead storage batteries, and automotive traction batteries".
[85] *Id.*, Article 17, "The construction of projects that produce, store, use, and treat solid wastes shall be performed with environmental impact assessment conducted as legally required and in compliance with the relevant provisions issued by the state concerning the management of environmental protection in respect of construction projects.".
[86] *Id.*, Article 49, 50, 52, 53.
[87] *Id.*, Article 57.
[88] *Id.*, Article 11, 43.
[89] *Id.*, Chapter 8.
[90] *Id.*, Article 12, 31, 98.
[91] *See, supra* note 61, Strategy A1-A7.
[92] *Supra* note 70, Article 2.
[93] Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes (Amendment 2016), Article 2.
[94] *Id.*, Article 23.
[95] *Id.*, Article 24.

3. 2020 Guidance on Further Strengthening Plastic Pollution Governance

In early 2020, the National Development and Reform Commission and the Ministry of Ecology and Environment jointly issued the Guidance on Further Strengthening Plastic Pollution Governance.[96] It sets forth a detailed roadmap for prohibiting and restricting the production, sales and use of certain types of plastic products, promoting alternative options, regulating the recycling of plastic wastes. According to the Guidance, the products that are forbidden to produce and sell include: the ultra-thin plastic shopping bags with a thickness of less than 0.025 mm, polyethylene agricultural mulch film with a thickness of less than 0.01 mm, plastic products made from medical wastes, disposable foamed plastic tableware and disposable plastic cotton swabs, and daily chemical products containing plastic microbeads is prohibited. [97] The products that are forbidden or restricted to use include: non-degradable plastic bags, single-use plastic tableware, disposable plastic products in hotels and hotels, and plastic packaging for express delivery.[98] The Guidance adopts a step-by-step approach accompanied by a set of quantified targets to be achieved by 2020, 2022 and 2025. The major cities and coastal provinces, as well as the plastic-intensive industries are designated as the pilot of the implementation.[99] Although the Guidance is not legally binding, with the clear-cut timetable and standards, it will play an important role in guiding the behaviours of the relevant industries and individuals.

B. Waste Import Ban

1. Evolving Waste Import Bans

China has been the world top destination of plastic waste export for decades. Since 1992, China and Hong Kong have imported 106 million tonnes of plastic waste, making up 72.4% of all cumulative imports around the globe.[100] Most of the exporters are from the developed countries.[101] In recent decades, China has been engaged in a gradual process to restrict the import of plastic wastes. In 2008, the Ministry of Environmental Protection, the Ministry of Commerce, the National Development and Reform Commission, the General Administration of Customs and General Administration of Quality Supervision, Inspection & Quarantine made a Joint Announcement, according to which the used plastic bags, films and nets, as well as waste parings and scrap of plastics are forbidden to import in China.[102] In 2013, China initiated the "Green Fence Operation" to enhance the implementation of the relevant domestic laws and regulations, with the aim to improve the quality of the imported wastes and curtail the illegal waste trading.[103] It was

[96] *Available at* https://www.ndrc.gov.cn/xxgk/zcfb/tz/202001/t20200119_1219275.html (visited September 10, 2020). The official text is only available in Chinese, and the translation is provided by the author.
[97] *Id.*, paragraph 2.4.
[98] *Id.*, paragraph 2.5.
[99] *Id.*
[100] *Supra* note 4.
[101] *Id.*
[102] Announcement on Releasing Catalogue of Solid Wastes Forbidden to Import, Catalogue of Restricted Import Solid Wastes That Can Be Used as Raw Materials, and Catalogue of Automatic-Licensing Import Solid Wastes That Can Be Used as Raw Materials, *available at* https://english.mee.gov.cn/Resources/Policies/policies/Solidwastes/200806/P020080620471882399901.pdf (visited September 22, 2020).
[103] *See* Will Flower, What Operation Green Fence has Meant for Recycling, *available at* https://www.waste360.com/business/what-operation-green-fence-has-meant-recycling (visited September 22, 2020).

reported that almost 70 percent of all incoming containers loaded with recyclables were subjected to thorough inspections in the first year of the Operation.[104] In 2017, the five State Departments issued another Joint Announcement, adding totally 24 solid wastes under four categories into the Catalogue of Solid Wastes Prohibited from Import, including non-industrial plastic waste.[105] The most recent step taken by China is accompanied by the "zero import target" as prescribed in its new Solid Waste. Following the entry into force of the new Solid Waste Law, in November 2020, the Ministry of Commerce, the Ministry of Ecology and Environment, the National Development and Reform Commission and the General Administration of Customs has made a Joint Announcement on the Complete Ban of Solid Waste Import. According to the Announcement, it is prohibited to import any solid waste by any means. It is also forbidden to dump, pile up or treat any solid waste from abroad within the territory of China. These are corresponding to Article 23 and 24 of the new Plastic Waste Law. On top of that, the Ministry of Ecology and Environment will not accept any new application for the import permit of solid wastes that can be reused as raw materials. The Announcement will enter into force from January 1, 2020, and it will replace all the previous Catalogues of the Solid Wastes Prohibited from Import.[106] It takes around 12 years for China to completely prohibit all kinds of solid waste import in terms of legislation and supportive policies.

2. Legality under the Basel Convention and the Far-Reaching Impacts

According to the Basel Convention, any State Party is entitled to adopt a national definition of hazardous wastes and any procedural requirements concerning the transboundary movement of such wastes, in addition to what has been prescribed in the Annexes I and II to the Convention.[107] Moreover, the Convention further grants States Parties with the autonomy to impose additional requirements in order to better protect human health and the environment, as long as they are consistent with the Convention and the international law.[108] In light of this, China's progressive waste import ban including the recently introduced "zero import target" can possibly be justified under the Basel Convention. China is endeavouring to maximizing the rights it enjoyed under the Convention. The transboundary movement of hazardous wastes either defined in the Convention or by the import State is not allowed to commence without China's prior written consent.[109] Technically speaking, with the joint effects of the Basel Convention and national legislation, it is not impossible for China to deter the wastes it does not want from entering into its jurisdiction.
The measures taken by China are also changing the geographical landscape of the global plastic trade. The major former plastic exporters for China are forced to find alternative outlets for their plastic wastes, namely, countries in Southeast Asia. According to the Greenpeace's Report, the ASEAN region saw plastic waste imports grow by a staggering 171%, from 836,529 tons to

[104] *Id.*
[105] Joint Announcement No.39, 2017 on Solid Wastes Import Control Catalogs, *available at* http://www.e-to-china.com/tariff_changes/Policy_Focus/2017/0901/113481.html (visited September 22, 2020).
[106] Joint Announcement No. 53, 2020, on the Complete Ban of Solid Waste Import, available at http://www.mee.gov.cn/xxgk2018/xxgk/xxgk01/202011/t20201125_809835.html (visited November 27, 2020). The official version is only available in Chinese, and the translation is provided by the author.
[107] *Supra* note 41, Article 3(1).
[108] *Id.*, Article 4(11).
[109] *Id.*, Article 6(3),(5)(b).

2,265,962 tons, between 2016 and 2018.[110] It has placed countries in the region at the crossroad of either becoming the world top dumpsite or following China to 'declare war' against plastic wastes. Although the situation of MPP has been serious enough in Southeast Asia, China's import ban serves as another catalyst for countries in the region to take solid actions. For instance, Thailand has announced its intention to ban plastic waste imports by 2021. Malaysia and Vietnam have stopped issuing new permits for importing plastic waste.[111] Moreover, ASEAN has adopted several non-binding documents regarding marine plastic debris, including the Bangkok Declaration on Combating Marine Debris in ASEAN Region and ASEAN Framework of Action on Marine Debris.

C. Multilateral Cooperation

The transboundary nature of MPP determines that no country can solve the problem on its own. As is prescribed in most of the existing treaties, the effective implementation shall be achieved through the cooperation under international and regional organizations and arrangements. In addition to the universal arrangements under the UN framework, China has also joined the other countries to make efforts in reducing plastic wastes through regional organizations, and multilateral mechanisms such as G20, APEC, ASEAN+, and the trilateral cooperation with Japan and the Republic of Korea (TEMM).

1. Cooperative Arrangements under the UN Framework

The United Nations Environmental Programme (UNEP) is the leading environmental authority under the UN framework, whose working areas covers every aspect of environmental protection. The main governing body of the UNEP is the Environmental Assembly (UNEA), and all the 193 UN members are also members of the UNEA. From 2014 to 2019, the UNEA has adopted four Resolutions concerning marine plastic debris and microplastics.[112] The Third Session of the UNEA decides to establish an ad-hoc open-ended expert group (AHEG) with the mandate to examine the barriers to and options for combating marine plastic litter and microplastics from all sources, especially land-based sources.[113] PEI Xiangbin from the Ministry of Ecology and Environment of China was nominated as a member of the Advisory Group for the report prepared by the AHEG in discharging the mandate.[114] The UNEA Resolutions repeatedly emphasize the role of international and regional organizations, as well as the relevant conventions, and encourage them to take more solid actions within their mandates.[115]

The relevant regional arrangement under the UNEP for marine plastic governance is the Regional Seas Programme. The Programme is aimed to address marine environmental problems

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[110] Greenpeace Southeast Asia, Policy Brief: Southeast Asia's Struggle against the Plastic Waste Trade, *available at* https://www.greenpeace.org/southeastasia/publication/2559/southeast-asias-struggle-against-the-plastic-waste-trade/ (visited September 22, 2020).

[111] *Id.*

[112] *See* UNEP/EA.1/Res.6 (2014); UNEP/EA.2/Res.11 (2016);UNEP/EA.3/Res.7 (2018); UNEP/EA.4/Res. 6 (2019).

[113] UNEP/EA.3/Res.7, ¶ 9 (2018).

[114] *Supra* note 8, at 2.

[115] UNEP/EA.1/Res.6, ¶ 9 , 10, 13, 15 (2014); UNEP/EA.2/Res.11, ¶ 4, 5, 14, 16, 21 (2016); UNEP/EA.3/Res.7, ¶ 8 (2018); UNEP/EA.4/Res.6, ¶ 6 (2019).

by engaging neighbouring countries through comprehensive and specific actions.[116] Currently, there are eighteen Regional Seas Programmes across the globe, and China is a member of two programmes namely the North-West Pacific Action Plan (NOWPAP),[117] and the East Asian Seas.[118] In 2008, the NOWPAP launched the Regional Action Plan on Marine Litter, which is the key cooperation framework of tackling marine litter and microplastics in the region.[119] The Actions Plan mainly focuses on preventing the input on marine litter into the ocean, monitoring the quantities and distribution of marine litter, and removing the existing litter.[120] In 2019, the Coordinating Body on the Seas of East Asia (COBSEA) adopted the latest Regional Action Plan on Marine Litter, with the goal to consolidate, coordinate, and facilitate cooperation, and implement necessary measures for management of marine litter in the region.[121] It provides four sets of main actions to achieve the goal, which includes developing legal and economic instruments, regional and national monitoring programmes, national planning and policy frameworks to address land-based and sea-based pollutants including plastic debris.[122] The two Regional Seas Programmes serve as an important platform for China to cooperate with its neighbouring countries in combating MPP.

2. Other International and Regional Mechanisms

Outside the UN framework, China is also cooperating with other countries under several international and regional mechanisms. Although most of these mechanisms are not environment-specialised, they have the advantage to convene countries with shared interests or similar backgrounds to tackle MPP.

China is a member of G20 and APEC, whose premier function is to promote international or regional economic cooperation. The 2017 G20 Hamburg Summit adopted the G20 Action Plan on Marine Litter, and launched a voluntary Global Network of the Committed (GNC) to serve as the platform for information sharing and knowledge exchange among the members.[123] Following that, the G20 Implementation Framework for Actions on Marine Plastic Litter was adopted at the 2019 G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth. The Framework is intended to complement the work of UNEP and encourages voluntary actions for effective implementation of the G20 Action Plan.[124] In the same year, the Third Senior Officials' Meetings of APEC adopted a Roadmap on Marine Debris, which provides guidelines for actions including policy development and coordination, capacity building, research and innovation, financing and private sector engagement.[125]

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[116] *Available at* https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/why-does-working-regional-seas-matter (visited September 23, 2020).

[117] The other members of the North-West Pacific Region are Korea, Japan and Russia.

[118] The other members of the East Asian Seas are Cambodia, Indonesia, Republic of Korea, Malaysia, the Philippines, Thailand, Singapore and Vietnam.

[119] *Available at* https://www.unenvironment.org/nowpap/what-we-do/prevent-and-reduce-pollution/marine-litter-and-microplastics (visited September 24, 2020).

[120] *Id.*

[121] COBSEA, Regional Action Plan on Marine Litter, 3 (2019).

[122] *Id.*, Appendix 2.

[123] G20 Action Plan on Marine Litter, 6 (2017).

[124] G20 Implementation Framework for Actions on Marine Plastic Litter, 1 (2019).

[125] APEC Roadmap on Marine Debris (2019), *available at* https://www.apec.org/Meeting-Papers/Annual-Ministerial-Meetings/2019/2019_AMM/Annex-B (visited September 23, 2020).

Since 1999, China has been in cooperation with its two neighbours, Japan and Korea, under the framework of the Tripartite Environment Minister Meeting (TEMM). Following the environmental milestones that have been made at the international and regional level, the Joint Communiqué of the 21st TEMM adopted the new TEMM priority areas for the period from 2020 to 2024.[126] At least two of the eight priority areas are directly relevant to marine plastic governance, namely, marine and water environment management, and chemical management and environmental emergency response.[127] Activities to tackle marine plastic litters will be promoted under the framework.[128] Meanwhile, these three countries are engaged in cooperation with the Southeast Asian countries under the "ASEAN+" mechanism. In 2018, the Thirteenth East Asia Summit Conference on Combating Marine Plastic Debris adopted the East Asia Summit Leaders' Statement on Combating Marine Plastic Debris.[129] The sixteen Heads of States declared to take concrete actions to 1) improve the management of plastic wastes and resource efficiency; 2) promote awareness, research and education on marine plastic debris; 3) enhance cooperation in policy reform and law enforcement; 4) engage private sectors; 5) strengthen international and regional cooperation.[130]

In addition, China is also conducting bilateral cooperation in combating MPP. For instance, in 2018, Chinese Premier Li Keqiang and Canadian Prime Minister Justin Trudeau issued the Joint Statement between the Government of Canada and the Government of the People's Republic of China on Marine Litter and Plastics. The two countries agree to share best practices, cooperate on technology and research, and promote awareness and actions in relevant multilateral fora.[131]

IV. China's Engagement in International Law-making

Currently, the existing international legal architecture does not contemplate marine plastic debris *per se*. The drafters of the UNCLOS may not precisely foresee the severity of MPP as today, nevertheless, there is space left for the international and regional norms to evolve in order to adapt to the new challenge of marine environmental pollution. Under the UNCLOS, States shall develop such rules, standards and recommended practices through competent international and regional organizations or diplomatic conferences, and "such rules, standards and recommended practices shall be re-examined from time to time as necessary".[132] The international legal norms regarding MPP are still undergoing development. States could make their contribution to the international law-making process according to its own understanding and consideration. This Section firstly examines where and how the current international legal architecture should be improved based on the available literature. Following that, it analyses China's engagement in the international law-making process and its background rationale.

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[126] Joint Communiqué, The 21st Tripartite Environment Ministers Meeting among Japan, Korea and China, 6 (2019).
[127] *Id.*
[128] *Id.*
[129] Members of the East Asia Summit include the Member States ASEAN, Australia, China, India, Japan, Korea, New Zealand, Russia, and the US.
[130] East Asia Summit Leaders' Statement on Combating Marine Plastic Debris, 3-4 (2018).
[131] Canada-China Joint Statement on Marine Litter and Plastics (2018), *available at* https://www.canada.ca/en/environment-climate-change/corporate/international-affairs/partnerships-countries-regions/asia/canada-china-statement-marine-little-plastic.html (visited September 23, 2020).
[132] *Supra* note 11, Article 207(4), 210(4), 211(1).

A. Is International Law Silent on MPP?

International law is not absolutely silent on the issue of marine plastic governance. Firstly, based on the textual and contextual analysis in Section II, the relevant treaty obligations are applicable to tackling marine plastics as well. Moreover, in the ICJ judgement, the approach of "evolutionary interpretation" has been confirmed by the Court: "the international instrument has to be interpreted and applied within the framework of the entire legal system prevailing in the time of the interpretation".[133] Secondly, being an environmental problem of global concern, MPP is not a fresh phenomenon. It is logically and reasonably covered by the 'pollution of marine environment' as defined under the UNCLOS: "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".[134] The strained relationship between the issue and international law is caused by the rapid increase of MPP and the urgent need for a more effective solution. Under the current trend of plastic production and management, the cumulative quantity of plastic wastes entering into the ocean is predicted to increase by an order of magnitude by 2025.[135] A successful management of MMP is dependent on good communication between science and technology, policy and law, as well as the society.[136] International law plays a pivotal role as a regulatory framework, which prescribes the legally binding obligations for States, and harmonises the measures taken by each State. Therefore, the question that needs to be addressed is not whether there are international rules applicable to marine plastic governance, but whether the current international law fulfills its mandate in dealing with MPP. In other words, is the existing international legal architecture sufficient to respond to the urgent need for a solution?

B. Do We Need a New Treaty on Marine Plastics?

To answer the forgoing question, the AHEG conducted an assessment of the effectiveness of the relevant international, regional and subregional governance strategies and approaches. Its Report in 2018 concludes that the current international legal framework is fragmented and insufficient, since it does not provide a comprehensive global strategy that adapts to industry innovation and emerging scientific evidence and does not provide a collaborative platform for all stakeholders and polluters.[137] For example, there is lack of harmonised binding standards for mitigation, monitoring and reporting, and the legally binding instruments are inadequate in the key regions such as the East Asia Seas.[138] It provides States with three options for international law-making in the next step: 1) maintaining the *status quo* and strengthening the implementation; 2) revising and strengthening the existing framework; or 3) developing a new international legally binding architecture.[139] Prior to the Report, the academic debate over international law-making on

[133] Legal Consequence for States of the Continued Presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 76 (1907), Advisory Opinion, 1971 I.C.J. Rep. 16, ¶ 53 (June 27).
[134] *Supra* note 11, Article 1(4).
[135] *Supra* note 4, at 770.
[136] Youna Lyons, Theresa Linting Su and Mei Li Neo, A Review of Research on Marine Plastics in Southeast Asia: Who Does What?, 84 (2019).
[137] *Supra* note 8, at 105.
[138] *Id.*, 11-12.
[139] *Id.*, 12.

marine plastic governance has already started. There seems to be an overwhelming call for a new international plastic treaty, corresponding to Option 3.[140] Whereas some other scholars believe that creating MPP is already against international law, and there is no need to draft a new convention. What matters for the next step is how to enforce the existing law, which is corresponding to Option 1.[141]

Obviously, adopting a new marine plastic treaty is the boldest pathway. The bitter experience of the international law-making on climate change proves that the treaty negotiation is time-consuming, and its effectiveness to a great extent depends on the political will of States. Whereas Option 2 is more moderate as it builds on the international legal architecture which already exists and receives wide participation and support by States. Both of the two options offer States the opportunity to present their opinions and make contributions to the formation of new rules in accordance with their own national circumstances and priority. This is especially important for the countries affected by MPP such as China and countries in Southeast Asia.

C. China as a "Prudent Revisionist"

Member States of the UNEA were invited to present their views on the three options at the First Meeting of the AHEG held in 2018, Nairobi.[142] The outcome of the meeting shows that States are extremely cautious when they examine the three options, and most of them are reluctant to express premature support for any specific option. The minimum consensus, if there is any, is that further consideration is necessary with regard to national circumstances; the gaps in meeting SDGs; the challenge in implementation of the existing framework; global coordination; and the need for immediate action.[143] Unlike many other participating States, China did not submit a position paper directly expressing its view on the three options. Instead, it only made a brief Statement on item 4 of the Agenda at the Meeting, namely, barriers to combating marine litter and microplastics, including challenges related to resources in developing countries.[144] The Statement says:

> "1) the international community has realised the impacts and damage caused by marine litters and microplastics. Various policies and measures have been taken at national, regional and international level. China has also adopted multiple measures in dealing with marine litters and microplastics. 2) As for the barriers to combating marine litter and microplastics, China concurs with Canada that we need to identify the barriers by priority.

[140] *See*, for example, Elizabeth A. Kirk and Naporn Popattanachai, Marine Plastics: Fragmentation, Effectiveness and Legitimacy in International Law Making, 27 Review of European, Comparative & International Environmental Law 222-233 (2018), 222-233. Nils Simon and Maro Luisa Schulte, Stopping Global Plastic Pollution: The Case for an International Convention, 43 Heinrich Böll Foundation Publication Series Ecology 44-45 (2017). Stephanie B. Borrelle et al., Why We Need an International Agreement on Marine Plastic Pollution, 114 PNAS 9994-9997 (2017). *See also* Mark Gold et al., Stemming the Tide of Plastic Marine Litter: A Global Action Agenda, Policy Brief No. 5, Pritzker Environmental Law and Policy Briefs 6-22 (2013).

[141] Oliver Tickell, International Law and Marine Plastic Pollution-Holding Offenders Accountable (2018), *available at* http://apeuk.org/wp-content/uploads/2018/02/OPLI-online-final.pdf (visited September 24, 2020).

[142] AHEG First Meeting, Annotated Provisional Agenda, UNEP/AHEG/2018/1/ Add. 1 (2018), Item 7.

[143] Report of the First Meeting of the Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics, UNEP/AHEG/2018/1/6, ¶ 21-22 (2018).

[144] *Id.*, Item 4.

As for the key barriers, China suggests discussing the solution under the framework of sustainable development."[145]

In the author's view, the Statement sends out a message that China is not intended to take the lead in setting a progressive and revolutionary agenda in international law-making regarding marine plastic, but it is willing to carry out solid actions to reduce marine litter and plastic wastes under the current international framework.

China's approach to international law-making can also be extracted from the soft law adopted by the regional and international mechanism as mentioned in Section III, which indicates that China is making a *de facto* endorsement to Option 2. The AHEG suggested measures under Option 2 include expanding the mandate of an existing international body to include coordination of existing institutions, strengthening the measures specific to MPP, improving implementation at national level, and adopting a voluntary agreement on marine litter.[146] For example, many elements of Option 2 can be found in the G20's approach to marine litter. The primary focus of G20 is the governance of the global economy, whereas its agenda is expanding to implement the UN 2030 Agenda for Sustainable Development.[147] In the G20 Action Plan on Marine Litter, the members are determined to complement the existing initiatives and work to incorporate them into the G20 approach.[148] The G20 members are also encouraged to take voluntary actions in accordance with their national policies, approaches and circumstances.[149] Moreover, as a regional economic forum, the APEC also includes marine plastic governance in its agenda. In the same vein with the G20, the APEC Roadmap on Marine Debris encourages the member economies to take voluntary steps while taking into account that APEC economies have diverse policy objectives and priorities as well as domestic laws and regulation.[150] The similar expressions can also be found in the East Asia Summit Leaders' Statement on Combating Marine Plastic Debris, which is voluntary in nature and values national circumstances.[151] With regard to the Regional Seas Programme, the Programmes that China has participated in (COBSEA and NOWPAP) are among the few exceptional cases who do not have a binding instrument for marine environmental protection in place but prefers a non-binding Action Plan.[152]

In addition, the "Option 2-oriented" attitude favoured by China is in sharp contrast with the Nordic countries, which have been actively promoting a legally binding architecture not only within the Nordic region, but also on the international fora. In 2019, the Nordic Council of Minister for the Environment and Climate adopted a Declaration calling for the development of a global agreement to more effectively and comprehensively deal with the issue of marine plastic litter and microplastics on a global level in an integrated manner.[153] In this Declaration, Denmark, Finland,

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[145] Original version in Chinese is *available at* https://papersmart.unon.org/resolution/uploads/statement_by_china-item_4.pdf (visited September 24, 2020), the English translation is provided by the author.
[146] *Supra* note 8, at 13.
[147] *Available at* https://www.g20.org/Webs/G20/EN/G20/Agenda/agenda_node.html (visited September 25, 2020).
[148] *Supra* note 103. at 1.
[149] *Supra* note 104.
[150] *Supra* note 105.
[151] "Strengthening the coordination and cooperation among EAS participating countries in preventing and reducing marine plastic debris, in accordance with their domestic laws and bilateral or multilateral agreements that they are party to", *supra* note 110.
[152] *Supra* note 9, at 53-55.
[153] *Available at* https://www.norden.org/en/declaration/nordic-ministerial-declaration-call-global-agreement-combat-marine-plastic-litter-and (visited September 25, 2020).

Iceland, Norway and Sweden are inviting other like-minded countries to join the call and are committed to take the lead to work towards an ambitious outcome at the Fifth Session of the UNEA in 2021.[154]

Notably, in the latest meeting held virtually by the AHEG during the Covid-19 pandemic in December 2020, more countries from both the north and the south submitted statements in support of a new global agreement.[155]By contrast, China made no submission at all. Instead of being a revolutionist or reformist, China inclines to be a prudent revisionist by upholding the existing framework while adopting necessary measures on a voluntary basis to strengthen the mechanism with the view to combat MPP.

V. China's Approach: Making Contributions at Its Own Pace

The abovementioned stance that China took at the international fora reflects China's attitude toward international law-making regarding marine plastic debris in a general way. In addition to looking at what China has said, it is of the same importance to examine what China has been doing in supporting the Option 2-oriented approach. The basic rationale behind international law-making is that, States would hardly accept to be bound by the obligations, targets, or standards that it is incapable or unwilling to implement.[156] While strengthening the existing international framework, China has to strike a fine balance between the need to address MPP as a global concern and its own national circumstances, capacity and priority interests. Therefore, when a treaty regime adopts certain measures in relevance to the management of plastics, China would scrutinise them in a case-by-case manner. Besides the land-based and sea-based sources, there is another taxonomy for MPP: the domestically-generated and the imported. The second taxonomy is highly relevant to the approaches that China adopts to the development of international rules and standards. This Section presents case studies of China's approach to MPP when it comes to the change of specific rules.

A. Concerns of Domestic Capacity and Industrial Interests

China's attitude towards the Amendments to the Stockholm Convention is a typical reflection of how the concerns of domestic capacity and industrial interests will affect China's decision. With the evolving concerns over the plastic pollution, in addition to the POPs as listed in the original Annexes of the Stockholm Convention, several other POPs that are relevant to the production of plastics have been added by decisions of the Conference of Parties. However, China has not agreed on any of them. For instance, the Eighth Conference of Parties decided to add short-chain chlorinated paraffins (SCCPs) and decabromodiphenyl ether (BDE) into Annex A,[157] which are often applied as flame retardants in the process of plastic production. Up to now, China has not yet deposited its instrument of acceptance to the Amendments.[158] Scientific research shows that

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[154] *Id.*

[155] *See* Submissions on Potential Options for Continued Work for Consideration by the United Nations Environment Assembly (Provisional Document), UNEP/AHEG/4/INF/10 (2020).

[156] *See* Scott Barrett, An Economic Theory of International Environmental Law, 250 The Oxford Handbook of United Nations Treaties (Simon Chesterman, David M. Malone, and Santiago Villalpando, eds., OUP, 2019).

[157] Listing of Short-Chain Chlorinated Paraffins, SC-8/11 (2017); and Listing of Decabromodiphenyl Ether, SC-8/10 (2017).

[158] The information of China's ratification status to the amendment the Annexes is *available at* http://chm.pops.int/Countries/StatusofRatifications/Amendmentstoannexes/tabid/3486/Default.aspx (visited April 20, 2021).

China is the world largest producer and consumer of chlorinated paraffins (CPs). Only very few enterprises are capable of reducingthe portion of SCCPs in their high-end products to 0.2%. And there is no regulation in China limiting the application of SCCPs.[159] Similarly, China also has a large consumption and emission of BDE, and 99% of decaBDE is used as a plastic additive.[160] If China accepts the Amendments, it will be obliged to prohibit and/or take necessary legal and administrative measures to eliminate the production and use of SCCPs and BED; and to restrict their import and export,[161] which will have a tremendous impact on China's relevant industry. Obviously, China is not prepared for adapting such changes at the present time. But it does not mean that China will not accept the Amendments in the future. As the largest producer and exporter of plastic product,[162] when China is making its decisions on the relevant change of rules under an existing treaty, it has to take the domestic industrial interests as well as its own capacity of implementation into consideration. Domestic industrial interests determine to what extent China is willing to be bound by an additional international obligation; and the capacity is relevant to whether China is able to implement the additional international obligation.

B. Iron-Handed Towards Imported Plastic Wastes

Making contributions according to its own national circumstances does not necessarily mean that China always tends to commit and implement less than the other State Parties to a treaty. In China's case, it means making contributions at its own pace, and sometimes the domestic legislation and policy even takes steps further than the international law. The new Solid Waste Law is a typical example of how China balances its international obligations and domestic circumstances. The new Solid Waste Law deliberately deletes the provision regarding the application of international treaties, which states that:

If an international treaty regarding the prevention and control of environmental pollution by solid wastes concluded or acceded to by the People's Republic of China contains provisions differing from those contained in this Law, the provisions of the international treaty shall prevail, with the exception of the provisions that the People's Republic of China has announced reservation.[163]

This provision has been existing in China's Solid Waste Law for over twenty years since the original version of the Law was adopted in 1995. It can also be found in most of China's environmental legislation. The legislative authority does not provide sources open to the public explaining why this provision is deleted in the new Solid Waste Law. Nevertheless, certain clues are indicating at least one reason behind: China is determined to adopt stricter measures than what is prescribed under international treaties. Logically, when the domestic law is stricter than the international treaties, the domestic law shall prevail, although the new Solid Waste Law does not explicitly say so. As is introduced in Section III, the new Solid Waste Law sets forth an ambitious

[159] Xu Chun, Xu Jianhua, Zhang Jianbo, Emission Inventory Prediction of Short Chain Chlorinated Paraffins (SCCPs) in China, 50 Acta Scientiarum Naturalium Universitatis Pekinensis 371 (2014).
[160] Boya Zhang et al., Emission Inventory and Environmental Distribution of Decabromodiphenyl Ether in China, 599-600 Science of the Total Environment 1075 (2017).
[161] *Supra* note 51, Article 1(1)(a).
[162] *Available at* http://www.mee.gov.cn/xxgk2018/xxgk/xxgk15/201910/t20191029_739774.html (visited November 9, 2020).
[163] Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes (2016 Amendment), Article 90.

target of "zero solid waste import". Such a target has not been included in any of the relevant international treaties binding on China.

The Basel Convention adopted its Plastic Waste Amendments in 2019, which is a significant step taken under the existing Basel regime to tackle the transboundary movement of plastics, in an Option-2 model. The major content in the Basel Plastic Waste Amendments is clarifying the scope of the Convention applicable to plastic wastes by categorising different kinds of plastic wastes into the Annexes. Comparing the Basel Plastic Waste Amendments with China's latest Catalogue of Solid Wastes Prohibited from Importation in force, one could find the latter is stricter than the former. According to China's Catalogue of Solid Wastes Prohibited from Import, plastic debris and scraps from non-industrial sources are prohibited from import, especially the PE, PS, PVC, and PET.[164] However, under the Basel Plastic Waste Amendment, plastic waste almost exclusively consisting of PET, and the mixtures of plastic waste, consisting of PET and PE provided they are destined for separate recycling of each material and in an environmentally sound manner, and almost free from contamination and other types of wastes are not subject to the PIC procedures.[165] As a victim of the imported plastic wastes for decades, China has taken a step further than the development of the Convention. As mentioned in Section II, China had submitted its notification of non-acceptance when the Basel Plastic Amendment was adopted, but finally accepted it less than a month before its entry into force. Although there is no accessible official document from China explaining its changing attitude towards the Amendment, the author observes that it is related to China' s campaign on waste import ban in recent years. The exceptions contained in the Amendment does not meet with China's objectives of cutting off all the (plastic) waste imports as prescribed in its national legal and policy instruments.[166] In other words, the notification of non-acceptance might be aimed to demonstrate that China was expecting a more severe restriction on the transboundary movements of plastic wastes at the international level.

In fact, the changes taking place in China's domestic law and regulations are serving the same purpose of restricting the transboundary movement of plastic wastes, but in a stricter manner. Without doubt, China itself is the direct beneficiary of its tough measures for plastic wastes imports. It has been estimated that 111 million metric tonnes of plastic waste will be displaced by 2030.[167] Meanwhile, such actions taken by China could cause chain-effects around the globe: the other alternative destinations such as Southeast Asia are forced to adopt the similar waste import ban, and the former exporter in the global north has to manage the rejected wastes on their own. In the long-run, it will serve as an impetus for the development of international rules and standards of regulating plastic trade, as well as reducing and managing the quantities of nonrecyclable plastic wastes.

It can be seen from the analysis above that China is taking different approaches in the international law-making process, with regard to the domestically generated and imported plastic wastes. Such a difference is caused by the consideration of China's specific national

[164] *Available at* https://www.mee.gov.cn/gkml/hbb/bgg/201708/W020170817360129429735.pdf (visited September 26, 2020).
[165] *Available at* http://www.basel.int/Implementation/Plasticwaste/PlasticWasteAmendments/FAQs/tabid/8427/Default.aspx (visited September 26, 2020).
[166] This includes China's Fifth Amendment of its Solid Waste Law adopted in 2020, the 2020 Guidance on Further Strengthening Plastic Pollution Governance, and the 2017 Catalogue of Solid Wastes Prohibited from Importation. For detailed discussion, see Section V of this article.
[167] *Supra* note 4.

circumstances: the domestic influence that the proposed changes will have on its domestic industries; and its capacity of plastic wastes management. The management of plastic wastes generated domestically will have more impacts on the interests of relevant industries, and is more dependent on the available infrastructures and technologies. For example, China needs more incentives in order to restrict the production and the in-export of SCCPs and BED, such as the subsidies for the manufactures and cost-effective alternatives, which requires financial support and technological advancement. That may explain why China is taking a more conservative stance to the development of relevant treaties before it believes the conditions permit otherwise. Whereas for the imported plastic wastes, China turns out to be rather iron-handed, taking bolder steps than the international law-making process, which can be considered as a cost-effective and legitimate short-cut. From the economic perspective, the cost for the management of the plastic waste including the capital expenditures and the operation expenditures.[168] Such cost that is used to be borne by China will thus be transferred to the export State or the other States. From the legal perspective, what China has been doing is to fully leverage its legislative discretion as granted under the Basel Convention to keep out the plastic wastes from the other countries.

VI. Conclusion

The combat against MPP requires all hands on deck.[169] States, international and regional organizations, treaty bodies, NGOs, individuals and enterprises all have an irreplicable role to play. The joint efforts, on the one hand, need international law to set forth the regulatory framework, harmonised procedures and standards; on the other hand, the international law-making and effective implementation are influenced by the choice of each individual State. After all, States play the primary role as authors, addressees and guardians of the international legal norms.[170]The Sections above provide an overview of the interaction of international law and China's approach for marine plastic governance. The author is of the view that State practice is reflecting both how the States is implementing the commitments it has made under the existing international legal framework (*lex lata*), and what commitments the States is capable and willing to make in the formation of new rules and standards (*lex ferenda*).

From the perspective of *lex lata*, China has participated in most of the international treaties that are relevant to marine plastic governance. China has assigned multiple State Departments as focal points to the treaties, which means the domestic implementation requires cross-sectoral coordination. Meanwhile, the treaty obligations are absorbed into China's domestic law through two methods: translating the content of the treaty into specific provisions, and stipulating the supremacy of international treaties when there are conflicts with domestic law. The two methods are not mutually exclusive. International cooperation is also an international legal obligation as prescribed in treaties. China has joined the international community under the UN framework and other international and regional mechanisms in cooperation to deal with MPP. Instead of adopting legally binding instruments, China prefers to endorse soft law in forms of voluntary Action Plans or Joint Declarations.

[168] World Bank Group, What A Waste 2.0: A Global Snapshot of Solid Waste Management to 2050, 103 (Slipa Kaza et al., 2018).
[169] *Supra* note 7.
[170] *See* Thilo Maruhn, Changing Role of the State, 733-735 The Oxford Handbook of International Environmental Law (Daniel Bodansky, Jutta Brunnée, Ellen Hey eds., OUP, 2007).

From the perspective of *lex ferenda*, the international community has been aware of the insufficiency of the existing international architecture and are willing to change the *status quo*. However, disagreements exist among different interest groups regarding Option 2 and Option 3 as suggested by the AHEG Report. Based on the analysis of the stances China takes on the international fora, the author argues that China inclines to take Option 2 by strengthening the existing international legal framework without adopting another new agreement. However, when it comes to the specific measures undertaken by the respective treaty regime, China is rather prudent when making decisions. In the case of the Amendments to the Stockholm Convention, China appears to be conservative to the newly-added obligations that will bring about shocks to the domestic industries or it has not acquired the capacity to fulfil the obligations. In sharp contrast, China is rather ambitious in eliminating imported plastic wastes. It is unsatisfactory with what is taking place under the Basel Convention, and has adopted strict prohibition of plastic imports under domestic law.

Back to the beginning of this article, the major challenges for China in marine plastic governance are the large volume of imported plastics, the rapid increase in domestic consumption, and the mismanagement of plastic waste. Actions at international, regional, and national level could only partially solve the problems. It still needs actions at sub-national or local level in order to totally overturn the MPP situation in China. According to the Fourteenth Five-Year Plan (2021-2025) adopted by China's top legislator, an ecological and the environmental governance under the principle of land-sea coordination will be established. Meanwhile, China is determined not only to actively participate in but also lead the international cooperation on ecological and environmental protection.[171] There is sound reason to expect more solid efforts made by China at the local, domestic, regional and international level in combating MPP.

[171] *See* The Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and the Long-Range Objectives Through the Year 2035 (original in Chinese).

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Status, Trends and Best Management Practices for Abandoned, Lost or Otherwise Discarded Fishing Gear (ALDFG) in Asia and the Pacific

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Abstract

Marine debris derived from Abandoned, Lost or Otherwise Discarded Fishing Gear (ALDFG) is considered as one of the most serious threats to marine ecosystems and fisheries, and thus warrants strong international cooperation and effective national responses to properly address. This paper examines international and national legal approaches that seek to address ALDFG, either directly or within the wider framework of fisheries or marine litter management. It analyzes the development of principles and standards in dealing with ALDFG and specifically examines the status and trends of ALDFG in Asia Pacific while surveying its causes and impacts. Building on the analysis of the region's response, the paper looks at the issues and challenges specific to developing Asian and Pacific Island countries. Best management practices and corresponding implementation mechanisms as applied to local conditions are identified and discussed, with a particular focus on prevention measures as well as applicable mitigation and curative interventions. Accordingly, the study investigates case studies in the region, which include appropriate regulations and civil society initiatives. Finally, the paper provides recommendations for potential adoption in developing countries of specific rules, economic incentives and research pathways to support enabling environments for ALDFG management. This research supports the overarching framework for combating marine litter through behavioral, regulatory and system changes, to address marine pollution specifically originating from the fisheries sector.

Key words

ALDFG, fisheries, ghost gear, marine debris, marine pollution, plastic pollution

I. Introduction: Marine Plastic Pollution

Plastic has tremendously grown in usage over recent decades owing to its broad utility, durability and resistance to biological processes of degradation. However, this latter quality has also made it a key pollutant in the natural environment, with plastic material persisting even long after its useful life has come to an end[1]. Plastic has been identified as the most abundant type of marine debris, with average proportions varying between 60 to 80% of the total and with some areas reaching as much as 90 to 95%[2]. Worryingly, global estimates of plastic litter in the oceans

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[1] Alsopp, M., Walters, A., Santillo, D., Johnston, P. Plastic Debris in the World's Oceans. Greenpeace International (2006).

[2] Derraik, J.G.B., The pollution of the marine environment by plastic debris: a review. Marine Pollution Bulletin, 44: 842-852 (2002). See generally Velis, C.A.,. Plastic waste in marine litter: action now and at the source. Waste Manag. Res. 32 (4), 251–253 (2014).

range from around 27 to 66.7 million tons, with 12.2 million tons entering the marine environment every year[3].

It is difficult to identify the sources of marine debris as the oceans are faced with such a staggering magnitude of plastic pollution[4]. However, sources of litter can generally be identified from either land-based or oceanic activities. Land-based inputs contribute the majority of marine litter with annual estimates of 4.8–12.7 million metric tons being dumped to the sea based on 2010 data[5]. On the other hand, oceanic pollution may be attributable to waste generated from shipping, fisheries, aquaculture and offshore platforms[6]. Such activities contribute to approximately 10% of global marine debris[7].

Marine plastic litter accumulates in the five ocean gyres areas, forming extensive floating garbage patches[8]. Furthermore, plastic buildup is known to occur in remote coastal areas[9], with small islands particularly vulnerable as they have higher plastic debris accumulation rates compared to continental areas[10]. Field data suggest that plastic pollution in many islands is primarily of non-local origin[11], and are commonly from continental sources or wastes from ship and fishing vessels[12]. In addition to the adverse impacts to the marine ecosystem, plastic pollution poses a significant threat to food safety, tourism, and is an identified contributor to climate change[13]. Of particular concern is the breakdown of plastic debris into microplastic which can enter the food web, thereby presenting a risk to environmental and human health. Alarmingly, human intake of microplastics from seafood has been estimated to range from 1 particle to 30 particles per day[14].

As such, addressing marine pollution is considered as a matter of high international priority and the United Nations Sustainable Development Goals specifically call for a significant reduction of marine pollution of all kinds, including marine debris, by 2025[15].

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[5] Jambeck et al., *supra.*

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[14] Lusher, A.L., Hollman, P.C.H., Mendoza-Hill, J.J., Microplastics in fisheries and aquaculture: Status of knowledge on their occurrence and implications for aquatic organisms and food safety. FAO Fisheries and Aquaculture Technical Paper. No. 615. Rome, Italy (2017).

[15] United Nations Sustainable Development Goals Target 14.1

This paper focuses on reviewing the status, trends and issues of plastic pollution derived from the fisheries sector, with a primary focus in the Asia Pacific region. The findings are built on a combination of desktop research and interviews for identified case studies. The review also seeks to provide a thorough inventory and analysis of the legal instruments and management measures which have evolved in response to the challenges surrounding waste from the fisheries sector. Based on the global and regional trends on pollution from the fisheries sector, this study identifies existing best management practices with recommendations for potential adoption in Asia and the Pacific.

II. Global Status and Trends: Marine Plastic Pollution from the Fisheries Sector

The fisheries sector contributes a substantial amount of plastic pollution in the oceans. Marine debris derived from Abandoned, Lost or Otherwise Discarded Fishing Gear (ALDFG) has been identified by the UN Environment Programme (UNEP) as one of the most significant threats to marine ecosystems[16], and can be especially damaging to sensitive coastal habitats. Although fishing gear have been abandoned, lost or discarded ever since humans started to fish, the issue of ALDFG has become more problematic in recent decades due to the increase in magnitude of fishing operations and innovations in fishing technologies. These developments have led to an unprecedented growth in fishing capacity and effort, leading to fishing operations in more distant and deeper parts of the oceans[17].

The pervasive use of plastic as a low-cost and durable synthetic material for fisheries gear has exacerbated the impact of ALDFG to the marine environment. Plastic is considered an excellent material for use in aquatic environments as it is highly resistant to abrasion, rust and is recognized for its longevity. It is also lightweight which reduces handling and associated costs[18]. Because of these characteristics, plastic-based fisheries equipment has greatly accelerated since the 1960s[19]. It is employed not only for netting materials, but also for traps, floats, dredges and lines, as well as for boat construction and maintenance, fish hold insulation and fish crates[20].
ALDFG comprises a significant amount of global marine plastic pollution, with an estimated 640,000 tons introduced to the marine environment each year[21]. Although at a global scale, ALDFG is estimated to compose less than 10% of total marine debris by volume, the degree of occurrence can be highly variable at smaller spatial scales and based on locality[22]. ALDFG are regularly reported in surveys of marine debris on beaches, at the seafloor and floating on surface

[16] United Nations Environment. Accessed at https://www.unenvironment.org/news-and-stories/press-release/research-highlights-true-impacts-plastics-our-planet-ecosystems (visited Sep 23, 2020)
[17] Global Ghost Gear Initiative, A Response to the Best Practice Framework for the Management of Fishing Gear: 2017 Results from a consultation with the fishing industry and other stakeholders. Accessed at https://static1.squarespace.com/static/5b987b8689c172e29293593f/t/5bb64b6a71c10baf92d653ba/1538673516254/wap_gear_bp_framework_consultation-doc-2017.10.25-web.pdf (2017)
[18] Huntington, T., Marine Litter and Aquaculture Gear – White Paper. Report produced by Poseidon Aquatic Resources Management Ltd for the Aquaculture Stewardship Council. 20 pp plus appendices (2019).
[19] Macfadyen, *supra*.
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[21] Richardson, K., Gunn, R., Wilcox, C., Hardesty, B., Understanding causes of gear loss provides a sound basis for fisheries management. Marine Policy 96 278–284 (2018).
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waters[23]. Studies suggest that fisheries activities contribute a large proportion of the marine debris on UK beaches, particularly in areas situated near or adjacent to fishing grounds[24]. Moreover, marine debris from coastal states surrounding the North Sea, such as Germany, the Netherlands and Belgium, has been largely attributed to shipping and fishing activities[25]. The impacts of marine debris derived from fisheries are particularly concerning in remote areas and islands, where the fishing and shipping industries are typically responsible for approximately 50% to 90% of marine debris[26]. For example, reports from Northern Pacific Patagonia show that majority of plastic pollution come primarily from industrial fisheries and aquaculture activities in the surrounding area[27]. Similarly, other remote locations such as the Faroe Islands have seen ALDFG representing more than 75% of marine debris[28].

When fishing gear is lost, abandoned or discarded in the ocean, it can continue to capture or entangle marine organisms which may come in its way. This attribute has made ALDFG to be more commonly known as 'ghost gear', or as engaged in 'ghost fishing'. In general, most ALDFG will float because the density of plastics is less than seawater. This is evident in the rafts of assorted debris in the ocean gyres or convergence zones where ALDFG tend to accumulate[29]. A study from the 'Great Pacific Garbage Patch' in the North Pacific Ocean revealed that ALDFG represented 46% of the 79,000 tons of plastic observed within the 1.6 million km^2 area surveyed[30]. However, derelict fishing gear can also be entangled in the seabed where they are more likely to ghost fish. Studies on marine debris on the seabed of the Mediterranean Sea and Northeast Atlantic, for example, estimated that 34% of debris consisted of ALDFG, second only to assorted plastics which comprised of 41% of the total[31].

Aside from ghost fishing, microplastic from fisheries due to fragmentation caused by direct ultraviolet light, wave action and abrasion also pose a threat to the environment and human health[32]. Numerous studies have shown high levels of plastic contamination of fish caught, and certain forms of microplastic have been linked to local fisheries sources such as ingested synthetic fibers similar to those typically used in fishing gears[33]. With the extent of occurrence of ALDFG expected to increase in the future, especially in light of climate change-induced extreme weather events, the adverse impacts of ALDFG are projected to further intensify.

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[23] Lusher *et al., supra.*

[24] Unger, A, Harrison, N., Fisheries as a source of marine debris on beaches in the United Kingdom. Marine Pollution Bulletin 107 52–58 (2016).

[25] Galgani, F., Leaute, J.P., Moguedet, P., Souplets, A., Verin, Y., Carpentier, A., Goraguer, H., Latrouite, D., Andral, B., Cadiou, Y., Mahe, J.C., Poulard, J.C., Nerisson, P., Litter on the sea floor along European coasts. Mar. Pollut. Bull. 40 (6), 516–527 (2000).

[26] Faris, J. & Hart, K., Seas of Debris. A Summary of the Third International Conference on Marine Debris. Alaska Fisheries Science Center, Seattle, Washington, USA. 54 pp (1994).

[27] Hinojosa, I.A., Thiel, M., Floating marine debris in fjords, gulfs and channels of southern Chile. Mar. Pollut. Bull. 58, 341–350 (2009).

[28] Pham, C.K., Ramirez-Llodra, E., Alt, C.H., Amaro, T., Bergmann, M., Canals, M., Davies, J., Duineveld, G., Galgani, F., Howell, K.L. & Huvenne, V.A., Marine litter distribution and density in European seas, from the shelves to deep basins. PLoS One, 9(4) (2014).

[29] Macfadyen *et al, supra*

[30] Lebreton, L.C.M. & Borrero, J.C., Modeling the transport and accumulation floating debris generated by the 11 March 2011 Tohoku tsunami. Mar. Pollut. Bull., 66(1): 53-58 (2013).

[31] Pham et al., *supra.*

[32] Lusher *et al., supra.*

[33] *Ibid.*

A. Sources of Waste

Although its abundance is highly variable, ALDFG is considered as the main source of marine debris and plastic pollution from the fisheries sector. For the purpose of this paper, the term ALDFG encompasses capture fishing gear, Fish Aggregating Devices (FADs), and associated packaging and other fisheries equipment.

In terms of capture fishing gear, passive types such as gillnets, trammel nets and fishing traps/pots are the most common type of ALDFG[34]. These gears are often used by artisanal and small-scale fishers. Approximately one fifth of global marine fisheries landings comes from gillnet and trammel net fisheries[35]. Passive gear has been identified to be more problematic in terms of ghost fishing, as the capture process and design of the gear itself relies on the movement of organisms into the equipment. However, ghost fishing has also been observed in ALDFG from active gears, such as seine nets and trawls[36].

Fish Aggregating Devices (FADs), which are permanent, semi-permanent or temporary structures designed to attract and aggregate pelagic fish such as tuna, also contribute to ALDFG. These artificial objects can either be anchored or set adrift on ocean currents. They are usually made of synthetic material and buoys with subsurface netting or palm fronds. FADs are frequently lost to a fishery and may occasionally be deliberately abandoned in the oceans[37].

Lastly, fish packaging material and other related equipment may also be a source of marine debris. These include discarded plastic fish boxes and industrial packing crates on vessels for transportation and distribution of catches. Other fisheries equipment such as avoidance devices, pingers and streamer lines[38] may also become a source of marine litter if not properly managed or disposed of.

While beyond the scope of this paper, aquaculture is important to note for future study on plastic pollution. Although the present contribution of aquaculture to global plastic debris is not of the same magnitude as that from fisheries, it is expected to become a significant source of plastic pollution in the future given its accelerated pace of growth worldwide.

B. Causes of Abandoned, Lost or Otherwise Discarded Fishing Gear (ALDFG)

There may be different reasons why fishing gear are abandoned, lost or otherwise discarded. This ranges from unintentional, to deliberate but unavoidable acts[39]. This section describes the key causes of ALDFG as follows:

1. Enforcement factors. Illegal, unreported and unregulated (IUU) fishing vessels are known to abandon gear to avoid apprehension. As such, hotspot areas for IUU fishing can yield higher amounts of ghost gear. In particular, fishing gear may be abandoned

[34] Macfadyen *et al*, *supra.*
[35] Gilman, *supra*
[36] *Ibid.*
[37] Macfadyen et al, *supra.*
[38] Lusher et al, *supra*.
[39] Macfadyen *et al*, *supra.*

to destroy evidence, evade inspection, conceal illegal gear, and to avoid denial of entry to ports[40]. Illegal operations during the night and improper fishing methods may also provide difficult work conditions which are likely to cause ALDFG[41]

2. Operational conditions. Operational factors may provide an economic reason to discard fishing gear. Gear are sometimes abandoned when there are time constraints in fishing operations and are inadvertently left. They may also be discarded because of lack of space in vessels and as the preferred alternative to onshore disposal. Although the substantial investment on fishing gear provides disincentives for the loss of gear[42], some fishers may opt to discard if it proves too difficult to retrieve them.

3. Spatial pressure. Spatial issues arise when multiple marine users compete to operate in an area, which results in damaged or misplaced gear due to gear conflicts. Consequently, damaged gear are often discarded while misplaced gear are lost. ALDFG incidence due to spatial pressure ordinarily happens when passive gear conflicts with passing vessels or active gear. This commonly happens to static traps and pots which are accidentally or intentionally towed away by trawlers.

4. Environmental conditions. Poor seabed conditions and extreme weather events contribute to the loss of fishing gear. A common cause for lost gear is a combination of rough bottom environments and strong currents which result to snagging of gear[43]. Tsunamis and typhoons have been reported to cause tremendous losses of fishing gear which may be dangerous or otherwise difficult to retrieve. For example, substantial amounts of coastal fishing gear were lost during the Indian Ocean tsunami in 2004[44].

C. Ecosystems Impacts

ALDFG as a serious threat to marine ecosystems is mainly attributed to its physical damage to sensitive habitats and ghost fishing. However, it causes several other ecological impacts, from the benthic environment up to coastal areas. The impacts are further described as follows:

1. Continued catch of target and non-target species. Ghost fishing is one of the most significant impacts of ALDFG. Its ability to capture marine organisms depends on the gear type and state of the gear lost and the physical conditions such as currents or depth. It is reported that passive gear such as gillnets and pots/traps are the most likely gear to ghost fish. However, other gear such as trawls and longlines may also cause entanglement of marine organisms[45]. Aside from target species, ALDFG can attract and entangle non-target groups such as sharks. A recent global review shows that

[40] See Global Ghost Gear Initiative. Accessed at https://www.ghostgear.org/news/2017/5/31/iuu-and-ghost-gear-what-are-the-links (visted Sep 23, 2020)
[41] Gilman, E., Chopin, F., Suuronen, P. and Kuemlangan, B., Abandoned, lost and discarded gillnets and trammel nets: methods to estimate ghost fishing mortality, and the status of regional monitoring and management, FAO. FAO Fisheries and Aquaculture Technical Paper No. 600. Rome. Italy (2016).
[42] Macfadyen et al, *supra*
[43] *Ibid.*
[44] *Id.*
[45] *Id.*

ALDFG constitutes 74% of entanglement incidents of sharks and rays[46]. Entangled species usually die from starvation, cannibalism, infection, or prolonged exposure to low dissolved oxygen in water[47]. Dead marine organisms in ALDFG are also known to attract scavengers which are further trapped[48], resulting in a vicious cycle of entanglement and mortality.

2. Interactions with threatened species. ALDFG can impact marine organisms through entanglement, where the gear entraps marine organisms; and ingestion, where ALDFG or its components are intentionally or inadvertently consumed[49]. Many species which can be adversely affected may be threatened or endangered. Studies have shown ALDFG as a significant source of entanglements on a wide range of marine fauna such as sea birds, turtles, seals, cetaceans and other marine mammals. Notably, it is estimated that over one million birds die each year because of ALDFG[50], mostly from entanglement but also due to ingestion of offal which contain hooks, thereby causing esophageal damage or heavy metal poisoning[51].

3. Physical alteration of benthic environment. ALDFG causes changes in the physical benthic environments through smothering, abrasion, and the translocation of seabed features. Dragged ALDFG can scour bottom communities, with sensitive habitats such as coral reefs and seagrass beds particularly at risk. Furthermore, ALDFG may cause the accumulation of fine sediment that cover benthic communities and obstruct water flow. This has been known to create anoxic areas or "dead zones"[52] in the oceans, setting off areas of substantial mortality.

4. Introduction of synthetic material into the marine food web. Synthetic compounds, including microscopic plastic material and toxic chemicals derived from fishing gear, can accumulate in marine food webs[53]. Alarmingly, a study examining the levels of plastic archived in plankton collected regularly since the 1960s found a significant microplastic which may be partly attributed to ALDFG[54].

[46] Parton, KJ, Galloway, T., Godley, B., Global review of shark and ray entanglement in anthropogenic marine debris. Endangered Species Research, 39 (2019).
[47] Van Engel, W.A., Blue crab mortalities associated with pesticides, herbicides, temperature, salinity, and dissolved oxygen. In H.M. Perry & W.A. Van Engel, eds. Proceedings Blue Crab Colloquium, pp. 187–194. Gulf States Marine Fisheries Commission Publication 7 (1982).
[48] Macfadyen *et al.*, supra
[49] Shomura, R.S. & Yoshida, H.O., eds., Proceedings of the Workshop on the Fate and Impact of Marine Debris, 26–29 November 1984, Honolulu, Hawaii, USA, NOAA Technical Memorandum NMFS, United States Department of Commerce (1985).
[50] Laist, D. & Liffman, M., Impacts of Marine Debris: Research and Management Needs. In N. McIntosh, K. Simonds, M. Donohue, C. Brammer, S. Manson and Carbajal S., 2000. Proceeding of the International Marine Debris Conference on Derelict Fishing Gear and the Ocean Environment, 6-11 August 2000, Honolulu, HI. Hawaiian Islands Humpback Whale National Marine Sanctuary, US Department of Commerce: 344-357 (2000)
[51] Macfadyen, *supra.*
[52] Gilman, *supra.*
[53] *Id.*
[54] Lusher et al, *supra.*.

5. Redistribution of litter. As some ALDFG are washed ashore, it can pollute beaches and coastal zones with plastic litter[55]. ALDFG may smother organisms living on the seashore, especially in remote areas and islands. Moreover, ALDFG can provide the nuclei for sand dune formation[56] in coastal areas, thus changing their natural structure and processes.

6. Transport of invasive alien species. ALDFG can serve as a vector of marine invasive species, as they provide solid platforms for species to attach. Invasive species may then be transported to new distributions where such introduction may disrupt the community structure[57].

D. Socioeconomic Impacts

Aside from impact on ecosystems, ALDFG also has a number of socioeconomic impacts on marine users such as navigational hazards and associated safety issues in coastal and offshore areas. Perhaps the seminal case of risks caused by ALFDG occurred in the Republic of Korea (ROK) in 1993, when the propellers of the passenger ferry Seo-Hae was entangled in a 10 mm derelict nylon fishing rope. This caused the vessel to capsize and sink, with 292 persons onboard perishing[58]. More recent studies reveal that from 2010 to 2015, the ROK navy recorded approximately 170 incidents associated with propeller entanglement by ALDFG on their ships[59]. Other socioeconomic impacts are further described as follows:

1. Direct economic costs. Aside from the direct costs of marine accidents and navigational hazards, these include the cost of time spent disentangling and clearing the debris from vessels, engines, propellers, shafts or rudders, as well as the corresponding maintenance or replacement costs. Public cost can also be entailed for government-led or assisted retrieval consisting of expenses for divers and equipment for emergency rescue operations, fuel for searching, etc.[60] Such hazards also directly result in less fishing time for fishing vessels.

2. Indirect economic costs. Catch mortalities due to ALDFG cause wastage, thereby reducing the sustainable production of resources and depriving further economic opportunities from the fishery[61]. Fishers may lose revenue from catching target species which are often affected by ghost fishing. ALDFG can also endanger specific fisheries down the line if the mortality comprises a significant fraction of the population. This

[55] Food and Agriculture Organization (FAO), Report of the 2019 FAO Regional Workshops on Best Practices to Prevent and Reduce Abandoned, Lost or Discarded Fishing Gear in Collaboration with The Global Ghost Gear Initiative. (Port Vila, Vanuatu, 27–30 May 2019, Bali, Indonesia, 8–11 June 2019, Dakar, Senegal, 14–17 October 2019. Panama City, Panama, 18–23 November 2019). FAO Fisheries and Aquaculture Report FIAO/R1312 (2019).
[56] Macfadyen *et al*, *supra.*
[57] Gilman, *supra.*
[58] Cho, D., Case Study of derelict fishing gear in Republic of Korea. Paper presented at the APEC Seminar on Derelict Fishing Gear and Related Marine Debris, 13–16 January 2004, Honolulu, Hawaii, USA (2004).
[59] Hong, S., Lee, J., Lim, S., (2017). Navigational threats by derelict fishing gear to navy ships in the Korean seas. Marine Pollution Bulletin 119 10.1016/j.marpolbul.2017.04.006 (2017).
[60] Poseidon (2008). As cited in Abandoned, lost or otherwise discarded fishing gear by Macfadyen, G., T. Huntington and R. Cappell 2009. Rome, UNEP/FAO (2008).
[61] Gilman, *supra.*

exerts pressure on the sustainability of the fishery which adversely affects dependent fishing and coastal communities[62]. Individual fishery studies of ALDFG economic impacts are usually calculated either as the percentage of the catch of commercially valuable species in an area, or the proportion of the commercial catch of specific species[63]. These losses range from 4–5% of commercial fish catches in the Baltic Sea[64], to 20-30% of Greenland halibut catch in Norway[65]. Aside from fisheries, particularly affected are areas where ALDFG impacts coral reefs, beaches and coastal zones that are the basis for ecotourism economies. Indirect costs also include reduced income and the negative multiplier effects due to decreased spending. Other costs consist of the disruption to enjoyment of coastal recreational areas[66], and research expenses for the prevention and recovery of ALDFG[67].

3. Social costs. ALDFG contributes to decreased catch levels which in turn may reduce employment in fishing communities[68]. Other impacts include diminished tourism or diving value of coral reefs and coastal areas, reputational risk of erring fishers, and heightened safety risks for fishers and the public[69].

III. The Asia Pacific Context: Status and Trends

The high levels of plastic pollution in Asia and the Pacific pose significant threats for the regional and global marine environment. Using 2018 data, an estimated 11.1 billion pieces of ocean plastic trash are caught in coral reefs alone across the region, and this is projected to increase to 15.7 billion by 2025[70]. The spike in plastic pollution levels in recent decades has been attributed to various factors such as rapid economic development and increased coastal population, combined with unsustainable plastic production and consumption patterns, poor awareness of proper disposal behaviors, and weak waste management systems[71]. The region is therefore considered as a major hotspot for marine debris and plastic pollution, hosting 8 out of the top 10 countries with mismanaged plastic waste polluting the ocean[72].

In terms of ALDFG, there is very little information available in the regional seas of Asia. Data from onboard observer programs yield that ALDFG appears to have increased in the Pacific from 1992 to 2002[73]. However, there are few studies attempting to quantify the magnitude and study the causes of ALDFG in the developing countries of Asia and the Pacific. Moreover, among

[62] NOAA Marine Debris Program, Report on the impacts of "ghost fishing" via derelict fishing gear. Silver Spring, MD. 25 pp. (2015).
[63] *Ibid.*
[64] Tschernij, V., and Larsson, P. O., Ghost fishing by lost cod gill nets in the Baltic Sea. Fisheries Research 64, 151–162 (2003).
[65] Humborstad, O.-B., Løkkeborg, S., Hareide, N.-R., and Furevik, D. M., Catches of Greenland halibut (Reinhardtius hippoglossoides) in deepwater ghost-fishing gillnets on the Norwegian continental slope. Fisheries Research 64, 163–170 (2003).
[66] Macfadyen *et al, supra.*
[67] Poseidon, *supra.*
[68] FAO, *supra.*
[69] Poseidon, *supra*
[70] United Nations Environment Program, Plastics and shallow water coral reefs. Synthesis of the science for policy-makers. Sweet, M; Stelfox, M. Lamb, J. (Authors) (2019).
[71] Jang, Y.C., Hong, H., Lee, J., Lee, J.S., Hong, S.S., Shim,W.J., Thiel, M., Shigeru, F., Chang, T.-d., Kosavisutte, K., Ha, T.T., (2014). Results and lessons learned from joint beach debris surveys by Asian NGOs. PICES, Yeosu, Korea (2014).
[72] Jambeck *et al, supra*
[73] Macfadyen *et al, supra.*

the research clusters reviewed in a recent gap analysis on science, legal and policy efforts of marine debris in Southeast Asia, one of the weakest research clusters identified was the contribution of plastics from marine fisheries[74].

Within the region, studies on ALDFG have been conducted mostly in the Republic of Korea (ROK), Japan and Australia, where ALDFG has been identified as a significant marine pollution issue[75]. Most of these studies examined the extent of ALDFG recorded from coastal areas, with a few seeking to identify their origins[76]. In Australia, studies have been conducted in the Gulf of Carpentaria, where more than 85% of nets are presumed to originate from foreign fishing vessels operating outside the country, specifically those operating within Indonesian waters[77]. It is estimated that up to 1,000 tons of ALDFG are recovered every year from the Sea of Japan, which are predominantly pots and gillnets of apparent non-Japanese origin[78]. Surveys in the ROK reveal that 83% of marine litter in certain fishing grounds was composed of fishing nets, ropes and related materials[79]. Furthermore, there are several reports reviewing the Korean government's efforts to remove derelict fishing gears from the seabed of the East Sea through bottom trawling, which is characterized by its inefficiency and high risk for the recovery crew[80]. Beyond these countries and especially among developing countries in the region however, there is a paucity of research on the status and extent of occurrence of ALDFG.

There are also studies showcasing positive developments in the reduction and management of ALDFG in the same countries. The Northern Prawn Fishery in Australia is considered a model in terms of implementing fisheries management measures which have also addressed ALDFG through a combination of spatial closures and restrictions on certain gear, coupled with improvements in waste management practices and education among fishing crew[81]. In ROK, the Ministry of Maritime Affairs and Fisheries (MOMAF) has been purchasing fishing gear waste returned to port by fishers through the Waste Fishing Gear Buy-back project since 2003 to a considerable success. The government pays approximately 10 USD per 100-liter bag to encourage fishers to bring collected litter ashore, with the budget for the program shared between the local and central governments[82]. From the period of 2004 to 2008, the program collected a total of 29,472 tons of ALDFG at a cost of 19,417 USD[83]. Evaluations of the program backed the cost-effectiveness of the intervention. Comparative analyses reveal that the cost entailed was substantially lower relative to projected expenses if the litter were recovered directly by the

[74] Lyons, Y., Neo, M.L., Lim, A., Tay, Y. L. and Vu Hai, D. Status of Research, Legal and Policy Efforts on Marine Plastics in ASEAN+3: A Gap Analysis at the Interface of Science, Law and Policy, COBSEA and NUS (2020).
[75] Raaymakers, S., (2007). Regional Review: Marine Litter in the East Asian Seas region. Report to the East Asian Seas Regional Coordinating Unit, United Nations Environment Programme. 34 pp. plus appendices (2007).
[76] Macfadyen *et al, supra.*
[77] Richardson, *supra*
[78] Inoue, K. & Yoshioka, S., Japan's approach to the issue of derelict and drifting fishing gear and marine debris. In Derelict Fishing Gear and Related Marine Debris: An Educational Outreach Seminar Among APEC Partners. APEC Seminar on Derelict Fishing Gear and Related Marine Debris, 13–16 January 2004, Honolulu, Hawaii, USA (2002).
[79] Cho, *supra.*
[80] Cho, D., Removing derelict fishing gear from the deep seabed of the East Sea. Marine Policy 35 (2011) 610–614 (2011).
[81] Richardson, *supra*
[82] Cho, *supra.*
[83] Morishige, C. (ed.), Marine Debris Prevention Projects and Activities in the Republic of Korea and United States: A compilation of project summary reports. NOAA Technical Memorandum NOS-OR&R-36 (2010).

government, which typically entail fleet of vessels, equipment and fuel costs[84]. Furthermore, the program also provides supplementary income to fishers.

The FAO along with the Global Ghost Gear Initiative (GGGI), a cross stakeholder alliance of fishing industry, private sector, NGOs, academia and governments, has been conducting a series of workshops for southeast Asia and the southwest Pacific on best practices to prevent and reduce ALDFG, the last of which was held in 2019. Workshop results in southeast Asia show that gillnets, traps and FADs as the significant contributors to ALDFG, while trawls cause substantial losses due to gear conflict with passive gear such as crab pots[85]. It is important to note that specifically in Southeast Asia, artisanal small-scale fisheries were identified as the most significant source of ALDFG, with lack of education opportunities on its prevention and impacts cited as a contributing factor[86]. Major causes for ALDFG include entanglement with bottom features such as corals, and severe weather conditions. Operational issues including difficulty of retrieval were also recognized, as well as the practice of discarding to avoid enforcement against IUU fishing. For both southeast Asia and the southwest Pacific, the lack of disposal facilities for recovered or end-of-life gear was considered as a major challenge in the proper management and disposition of ALDFG[87]. Notably in the Pacific Small Island Developing States (SIDS), the lack of port reception facilities for fishing operations, of which 90% are foreign-flagged, is considered a primary environmental issue[88]. This led the Secretariat of the Pacific Regional Environment Programme (SPREP) to conduct studies for the provision of adequate regional waste reception facilities for foreign ship and fishing vessels[89], which have yet to be fully scaled up in the region.

There is an acute lack of specific country research on ALDFG from developing countries in Asia Pacific, but further studies have been supported in recent years through the assistance of environmental NGOs and global networks such as the GGGI. In Myanmar, a series of expeditions in the Myeik archipelago was undertaken in 2019 that led to the retrieval of 1,821 kgs of ALDFG and its documentation at 95% of the 80 dive sites surveyed. An unsettling finding from the expeditions is the relatively elevated levels of ALDFG found in the Langann Locally Managed Marine Area (LMMA), signifying challenges in enforcement even for marine protected areas. In contrast to many studies that identify weather conditions as the predominant reason for gear loss, the Myanmar expeditions revealed that deliberate discarding to save on boat space and fuel before returning to port as the major cause in addition to gear conflict. Furthermore, observations from previously cleaned dive sites indicate rapid rates of accumulation and quick replacement of ALDFGs which range from four to five weeks[90]. In Thailand, a study on coastal debris distribution demonstrated that prevalence of ALDFG in beaches is related to economic activities in the vicinity,

[84] *Ibid.*
[85] FAO, *supra.*
[86] *Ibid.*
[87] *Id.*
[88] Kiessling, I., Finding Solutions: Derelict fishing gear and other marine debris in Northern Australia. Charles Darwin University, National Oceans Office, Australia. 58 pp (2003).
[89] See Secretariat of the Pacific Regional Environment Programme (SPREP). Accessed at https://www.sprep.org/attachments/Publications/WMPC/reception_facilities_plan_final.pdf (visited Sep 24, 2020)
[90] Myanmar Ocean Project, Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG) report in Myeik Archipelago, Myanmar. Report In partnership with Global Ghost Gear Initiative, Ocean Conservancy, Fauna and Flora International, Department of Fisheries and Istituto Oikos (2020).

specifically in the area of Angsila where fisheries and aquaculture activities are common[91]. Government data also uncovered that ALDFG caused up to 89% of deaths of dugongs and 50% of deaths of sea turtles in 2018[92], highlighting the threat that ALDFG poses to threatened species under the International Union for the Conservation of Nature (IUCN) red list. In Malaysia and the Philippines, there have been efforts by the government to establish a national inventory of fishing gear, but the effectiveness of such measures in relation to the incidence of ALDFG have not been studied. There has been very little research and baseline studies on the trends and status of ALDFG in the Pacific Island countries, which is unfortunate as fisheries and coastal tourism are important sectors of many Pacific Island economies.

A study comparing ALDFG and fishers' behavior in Australia and Indonesia found that most Australian fishers repair or replace their nets at a minimum of once annually, as opposed to Indonesian fishers which did so less frequently and reported more frequent incidents of loss[93]. This important finding bolsters the need to address economic factors that affect the underlying causes of ALDFG in the region. Furthermore, ALDFG threatens important industries that support the local livelihoods of many communities in the developing countries[94], specifically small-scale fisheries and marine ecotourism. It is therefore important to conduct further baseline studies on the occurrence of ALDFG, as well as its ecosystems and socioeconomic impacts, to provide a basis of sound fisheries and waste management measures. Promisingly, there are initiatives since 2019 to assess annual rates and levels of global marine capture fisheries being supported by the IUCN[95]. This could fill in the gaps of many data-deficient areas and provide much-needed evidence for future programs and policies.

IV. Issues and Challenges in Asia Pacific

The management of ALDFG in Asia Pacific remains complex and is characterized by its ties to local conditions that link to development issues. Oftentimes, the magnitude largely depends on the socioeconomic status of fishing sectors involved[96]. Although ALDFG are commonly caused by environmental and extreme weather conditions, there is much more incidence of ALDFG related to economic and social equity factors in the region. Notably, major issues include illegal fishing and operational issues to save on costs. In comparison to developed countries, the lack of infrastructure and enabling environment are major challenges as well. The issues are further detailed as follows:

1. IUUF and enforcement issues. Although there are numerous international and regional conventions that seek to prevent and deter ALDFG, enforcement mostly lies within the ambit of the fishing vessels' flag state, and in some cases the coastal and port state authorities. Violators often avoid apprehension mainly because states do not have the

[91] Thushari, G., Chavanich, S., Yakupitiyage, A., Coastal debris analysis in beaches of Chonburi Province, eastern of Thailand as implications for coastal conservation Marine Pollution Bulletin 116 (2017) 121–129 (2017).
[92] Data from the Department of Marine and Coastal Resources (Thailand) (2018)
[93] Richardson, *supra.*
[94] Myanmar Ocean Project, *supra.*
[95] See IUCN. https://www.iucn.org/news/commission-ecosystem-management/201812/derelict-fishing-gear-worlds-marine-capture-fisheries (visited at Sep 23, 2020)
[96] Matsuoka, T., Nakashima, T., and Nagasawa, N., A review of ghost fishing: scientific approaches to evaluation and solutions. Fisheries Science 71, 691–702 (2005).

resources to patrol and monitor their waters. Furthermore, without measures such as gear marking it is very difficult to trace ALDFG back to a specific fisher or vessel[97].

2. Overallocation of licenses. Overallocation of licenses has been identified as a driver of diminishing fisheries resources that lead to reduced catches. The overcapacity effectively pushes fishers to increase fishing effort to maintain at least the same level of catch, resulting in overcrowding of fishing grounds and higher incidence of gear conflict[98]. Moreover, increased competition may also push vessels to go farther to riskier grounds, where loss of gear is more likely due to physical and environmental conditions.

3. Operational issues. ALDFG occurrence in developing countries are often related to the socioeconomic conditions of the fishing sector, and in particular, the artisanal small-scale subsector. In developing country contexts, fishers may be economically unable to invest in upgrades or repairs, and thus the use of old or damaged gear may contribute to an increased prevalence of ALDFG. Furthermore, fishing gear are also deliberately discarded to save on vessel space or weight, and therefore fuel costs.

4. Lack of waste management infrastructure. Port reception and disposal facilities entail costs to build and maintain, which may prove challenging to developing countries. Many small ports have limited space or logistical limitations for handling waste. Moreover, prohibitive costs to access such facilities would encourage illegal disposal of litter into the sea instead, especially if there are no existing incentives in place[99].

5. Lack of policy framework. There are no enabling policy environments to address ALDFG in many developing countries. This includes the lack of clear rules or guidelines for gear marking, reporting, proper marine spatial planning and mechanisms for port reception. There is also a dearth of market-based mechanisms such as economic incentives for gear manufacturers, buy-back schemes, as well as local waste management policies that seek to prevent and reduce ALDFG.

6. Lack of human and technological capacity. When fishing operators do not make money due to overcapacity of fishing grounds, it is often difficult to maintain well-trained crew and reliable fishing technologies[100]. Many developing countries also lack capacity to implement tracking systems or electronic means of gear marking which would simplify and expedite the reporting and recovery processes.

7. Difficulty of monitoring. There are no standards of monitoring and reporting ALDFG that could be comparable within and between regions[101]. There is a need to standardize fishing gear units, reporting methodologies and minimum data requirements to ensure proper data analysis and responsive action. There are also substantial costs

[97] Unger, *supra.*
[98] Richardson, *supra.*
[99] Carpenter, A., MacGill, S.M., Charging for port reception facilities in North Sea ports: putting theory into practice. Mar. Pollut. Bull. 42 (4), 257–266 (2001).
[100] Richardson, supra
[101] Huntington, supra

involved in patrolling and monitoring across huge areas, which may prove challenging in countries with limited resources.

V. Legal and Policy Framework of ALDFG

As in most marine environmental issues, the occurrence of ALDFG is a transboundary problem which warrants strong international and regional cooperation to properly address. The issue has been raised at the level of the United Nations General Assembly (UNGA) on several occasions[102], with resolutions issued calling for more action to address ALDFG and related marine debris. As such, the international and regional legal regimes on the environment and fisheries have developed competencies that seek to address ALDFG, either directly or within the wider framework of fisheries or marine litter management.

A. International Legal Regime of ALDFG

1. Marine Pollution Governance Framework

Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL)[103] prohibits certain discharges of ship-generated garbage, including from fishing vessels. This has further been revised in 2013 to generally prohibit the discharge of all garbage into the sea and particularly identifies plastic waste to include synthetic ropes and fishing nets[104]. MARPOL Annex V also requires adequate port reception facilities and governments to ensure its provision at ports and terminals. The International Maritime Organization (IMO) has published accompanying guidelines for the application of MARPOL Annex V, the latest version of which was adopted in 2017. The guidelines include provisions requiring fishing vessel operators to record the discharge or loss of fishing gear in the Garbage Record Book or the ship's official log-book, and the reporting of accidental loss or discharge of fishing gear which poses a significant threat to the marine environment and navigation[105]. Furthermore, IMO adopted the Action Plan to Address Marine Plastic Litter from Ships [106] in 2018, which includes provisions linking the marking of fishing gear with the IMO Ship Identification Number, as well as the development of best management practice for recovery and port reception facilities of ALDFG, in cooperation with the Food and Agriculture Organization (FAO).

The International Maritime Organization (IMO) London Dumping Convention[107] or the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter specifically requires preventative action to be taken when there is reason to believe that wastes introduced into the marine environment are likely to cause harm[108].

2. Fisheries Governance Framework

[102] These include Resolution A/RES/60/30 of 2005, Resolution A/RES/60/31 of 2005, A/RES/61/222 of 2006 and Resolution A/RES/61/105 of 2006
[103] Entered into force in 1988
[104] Regulation 3.2, Revised MARPOL Annex V (entered into force in 2013)
[105] 2.2.1 Resolution MEPC 295 (71). (Adopted on 7 July 2017)
[106] Resolution MEPC.310(73) (adopted on 26 October 2018)
[107] Entered into force in 1975
[108] Article 3, 1996 Protocol to the Convention

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) provides the universal framework for marine environmental protection which largely reflects customary international law. Under Part XII on the 'Protection and preservation of the marine environment', the general obligation is that states have to protect and preserve the marine environment[109]. It also requires states to take, individually or jointly as appropriate, all measures consistent with UNCLOS which are necessary to prevent, reduce and control pollution of the marine environment from any source[110].

Since UNCLOS, there have been a multitude of international legal instruments and initiatives to manage fisheries and combat IUUF. Instruments focused on curbing IUUF are particularly important to arrest ALDFG because of the strong association between them. Among the first binding agreements that cover gear management is the United Nations Fish Stocks Agreement (UNFSA)[111] or the Agreement for the Implementation of the UN Convention on the Law of the Sea (UNCLOS) relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. The UNFSA identifies the marking of fishing vessels and fishing gear as a flag state responsibility, and as a measure to reduce the incidence of ALDFG. The agreement includes reference to reducing the impact of fishing gears, gear marking and the retrieval of ALDFG.

More recently, numerous states have acceded to the FAO Port State Measures Agreement (PSMA)[112]. The PSMA promotes measures to counter illegal, unreported and unregulated (IUU) fishing committed by foreign vessels by preventing them from using ports and landing catches. This covers IUU vessels and those employing prohibited gear, which are more susceptible to abandon or discard their fishing gear.

Aside from the foregoing binding agreements, there are also a number of voluntary or soft law instruments which cover ALDFG. The FAO Code of Conduct of Responsible Fisheries (CCRF)[113], which aims to promote responsible fishing practices and encourage states to address issues on fisheries with adverse impacts on the marine environment is among the first codes of conduct that encourages states to take appropriate measures to minimize waste, discards, catch by lost or abandoned gear. It also encourages states to ensure that fishing gear should be marked in accordance with national legislation. Furthermore, it contains provisions concerning marine litter with reference to MARPOL requirements on garbage management[114], and the development of technologies, materials and operational methods that minimize the loss of fishing gear[115].

To further implement the gear marking requirement, the Commission on Fisheries (COFI) recommended exploring cost-effective technologies and practices for marking, and subsequently the FAO convened an Expert Consultation on the Marking of Fishing Gear to develop the Draft Guidelines for the Application of a System on the Marking of Fishing Gear. The resulting final

[109] Art. 192, UNCLOS
[110] Art. 194, *ibid.*
[111] Entered into force in 2001
[112] Entered into force in 2016
[113] Issued 1995
[114] 8.7.1, CCRF
[115] 8.4.6, CCRF

FAO Voluntary Guidelines for the Marking of Fishing Gear (VGMFG)[116] was issued in 2019 and is an important tool to guide States in preventing and reducing ALDFG through gear marking. The guidelines provide the necessary steps to implement the system, including details on reporting, recovery and disposal. It also contains provisions on capacity building for developing states and small-scale fisheries. The VGMFG also complements other voluntary instruments such as the International Guidelines on Bycatch Management and Reduction of Discards[117] which seeks to reduce the impacts of lost fishing gear. Such non-binding instruments have been incorporated as part of the CCRF to provide guidance for states, regional fisheries bodies and stakeholders to implement measures to address ALDFG.

B. Regional Instruments

The UNEP, as part of the Global Partnership on Marine Litter, includes ALDFG in the development of regional action plans in the 18 existing UN Environment Regional Seas Programs. Programs publish documents on the state of marine litter and develop Regional Action Plans on Marine Litter[118], and secretariats are established to monitor, assess and undertake outreach and activities on marine litter at the regional level.

Regional Fisheries Bodies (RFBs) and Regional Fisheries Management Organizations (RFMOs) also play a key role in the management of ALDFG. RFMOs, are particularly important, as these intergovernmental regional fishery bodies are empowered to establish binding conservation and management measures, usually over straddling fish and highly migratory fish stocks. Some RFMOs have enacted measures that address ALDFG, including spatial and temporal restrictions, prohibition of gillnet and trammel net gear, and gear marking, among others[119].

Lastly, Regional Plans of Action (RPOA) on Illegal, Unreported and Unregulated Fishing (IUUF) which aim to strengthen regional fisheries management by providing guidance and support for responsible fishing practices, scientific research and management of capacity also provide sound bases for regional collaboration on issues that underlie the causes of ALDFG[120].

C. Review of the International Legal Regime for ALDFG

The international regime for ALDFG management has been an important driver of national interventions that seek to improve the framework from waste disposal and pollution to fisheries management. Notably, soft law through voluntary guidelines and action plans have been key in the development of best management practices for ALDFG. However, international law, guidelines and frameworks for marine pollution and fisheries governance require further translation into implementation mechanisms to ensure effective rollout into national initiatives. More importantly, guidance and best management practices need to be further made into tailor-made actions which would depend on the conditions of different localities such as the source of marine debris, industries involved, etc.

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[116] Endorsed for adoption in 2018, published in 2019
[117] Issued 2011
[118] Macfadyen *et al, supra.*
[119] Gilman, *supra.*
[120] Richardson, *supra*

The evolution of the legal regime has also addressed the lack of global standards for ALDFG management. Aside from the binding agreements such as the UNFSA and PSMA which provide general mandates for national governments to act against illegal and destructive fishing practices, the most impactful legal instruments have been non-binding soft-law instruments. The VGMFG, in particular, seeks to fill in the gaps in the global marine pollution and fisheries governance framework by providing technical guidance and adaptive management measures in order for national governments to effectively implement gear marking practices. The VGMFG takes cue from the development of many national fisheries regulations and legislative reforms to address IUU fishing, which have been guided by FAO International Plans of Action (IPOA) such as the IPOA- IUUF. Soft law instruments such as the VGMFG not only complement the general legal frameworks for ALDFG, i.e., UNCLOS and MARPOL, but further implement other voluntary guidelines such as the CCRF, specifically on the provisions referring to reduction of discards[121], minimizing loss of gear[122], among others.

However, there is a pressing need for these instruments to be incorporated into national law and implementing regulations. In the case of ALDFG, voluntary guidelines such as the VGMFG as well as IPOAs and RPOAs provide a clear advantage in assisting states, regional fisheries bodies as well as industry itself as the guidelines are designed not to be overly prescriptive. Such instruments resort to providing minimum criteria for implementation. As such, national governments and regional authorities have the flexibility to implement stricter regimes, in accordance with the prevailing situation in the fishery. To illustrate, the VGMFG contains provision on risk assessment, and applicability to needs of the reality on the ground for each locality. This ensures that gear marking implementing mechanisms are appropriate and interventions are proportional with the risks involved. Specifically, such guidelines provide authority and technical guidance for policy makers to decide on the suitability of the system, its applicability on specific fisheries and gear, as well as conditions or exemptions, when necessary.
Overall, the binding agreements and voluntary instruments form part of the legal regime which seeks to provide guidance as well as flexibility within which states and other stakeholders may act and tailor fit necessary action. In practice, it is important for governments to implement the legal mandates and guidance for the effective management of ALDFG not just through legislation and regulation, but also through incentives and national action plans that would provide the pathways for better means of implementations such as market-based instruments, certifications etc. to reduce ALDFG. Furthermore, collaboration with other states and key stakeholders and relevant organizations will also be helpful in ensuring that there are coordinating and monitoring mechanisms in place to measure compliance.

VI. Best Management Practices

In order to address the issue of ALDFG, best practices must be put in place and firmly implemented. Such practices may be categorized into three main categories, along with the last set of initiatives on awareness and education. The first group of measures seek to prevent the occurrence of ALDFG in the first place. These interventions are preferable as against all other measures that are predicated on ALDFG's introduction in the environment. Mitigation measures

[121] 8.4.5, CCRF.
[122] 8.4.6, CCRF.

aim to reduce the impact of ALDFG, while curative measures target their recovery, removal and disposition. It is important to note that some measures may be best supported by regulatory tools, while for others voluntary arrangements and market-based instruments may suffice. The implementation mechanisms are further discussed in the succeeding section.

A. Prevention Measures

1. Gear Traceability

Gear marking consists of placing a unique identifier in fishing gear that allows relevant authorities to discern responsible parties for fishing gear. It is a good practice to clarify ownership and avoid intra-fishery conflict and is particularly important for recovery efforts[123]. International standards for gear marking are found in the FAO VGMFG, and common gear tag material used include metal, plastic or wood, while bamboo and other biodegradable tags have been explored[124]. Gear marking effectively provides a disincentive for the deliberate abandonment and discarding of fishing gear, while promoting reporting[125]. It can also increase the visibility of passive gear that would reduce navigational risks of other marine users, thereby avoiding accidental gear loss. Marking may be integrated in the supply chain process to involve gear designers and manufacturers to streamline the requirement.

Gear location technology also ensures traceability of fishing gear. Such technology entails the installation of GPS or tracking devices on fishing gear, thus reducing the likelihood of loss while improving its subsequent recovery. The use of transponders on gear has become more accessible as more tracking technologies are introduced for fisheries monitoring processes. Notably, ALDFG can be better managed through electronic tracking along with marking as a prerequisite for registration[126]. However, the use of location technology by small-scale fishers may prove challenging due to cost and technological constraints.

2. Port Interventions

The weakness of port state control has been identified as one of the contributory factors in IUU fishing[127]. Effective port state measures and inspections pursuant to the PSMA or regulations of the port state are known to deter IUU fishing vessels utilizing a port state's facilities. A thorough examination of nets to verify compliance with relevant conservation and management measures, especially those preventing ALDFG, may reduce further incidence of abandonment.

Furthermore, onshore reception is a vital measure among port interventions. Appropriate collection facilities can reduce the chances of fishers discarding gear at sea. However, there must be appropriate incentives through convenient access or recycling buy-back schemes for fishers to

[123] Macfadyen *et al*, *supra*.
[124] Dixon, C., Satria, F., Wudianto, Nurdin, E. Utama, A., Mahiswara, Toole, J. He, P., Gear marking pilot study in Indonesian small-scale gillnet fisheries with reference to FAO's draft Guidelines on the Marking of Fishing Gear Committee on Fisheries. Draft Fisheries and Aquaculture Technical Paper. FAO COFI/2018/SBD.18 (2018).
[125] Gilman, *supra*.
[126] Huntington, *supra.*
[127] Macfadyen *et al*, *supra.*

participate. To be deemed more practical for fishers to dispose unwanted gear, the onshore facility should strive to be free of costs or already integrate minimal costs into general landing charges[128]. This may be supported by other programs such as mandatory deposit on new gear to be returned upon delivery to the facility.

3. Spatial Management

Spatial management that allocates zones for marine users are particularly helpful to avoid gear conflict. A zoning scheme would better ensure that users are aware of the presence of fishing gear in specific areas which have been established through agreements or consultations among fishers[129]. Separating passive and mobile gear through spatial management, as well as disallowing certain fishing methods and gear in high-risk areas where snagging may be likely, would significantly reduce gear loss.

4. Design and Manufacturing Interventions

Involvement of gear manufacturers and designers, where they bear responsibility in facilitating the responsible disposal of their products, ensures a circular approach in the disposition of ALDFG. This may be possible through buy-back schemes of old gear to be recycled into new ones, alongside deposit schemes to incentivize their return. Manufacturers may also support the implementation of responsible gear disposal programs and designers may reduce risk of losses through better design[130]. A more practical approach to reduce gear loss is to require fishing vessels to have on-board storage facilities, where gear retrieval, packaging and waste storage solutions are incorporated in the fishing vessel design[131].

To promote longevity and reuse of fishing gear, it is important to maximize reuse of plastic. High specification materials are preferable, as opposed to cheaper single-use alternatives. Fishing operators may also educate crew to refit fishing gear while at sea and conduct circular planning in procurement of materials for fisheries equipment and packaging[132].

5. General Fisheries Management Measures

The overall fisheries management regime can determine the likelihood of ALDFG occurrence in a given fishery. Management measures that prevent the overallocation of fishing licenses and overcrowding of fishing grounds would reduce incidence. In addition to seasonal closures and spatial restrictions, quotas and limitations of licenses per area or fish stock may also prevent gear losses as a subordinate effect[133]. ALDFG may also be prevented by reducing the amount of gear left in the water (soak time), and by monitoring the number of soak time hours. Improved transparency is also an important deterrent for IUU fishing and consequently gear abandonment or discarding. Stronger flag state measures such as vessel monitoring systems and more comprehensive observer coverage for fishing vessels may help in reducing its occurrence.

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[128] *Id.*
[129] *Id.*
[130] Huntington, *supra.*
[131] *Id.*
[132] Huntington, *supra* (2019).
[133] Richardson, *supra.*

B. Mitigation Measures

Biodegradable gear may be promoted to ensure gear decompose when lost at sea. Some synthetic gear materials such as polyhydroxyalkanoates (PHAs) have been developed to be completely biodegradable and capable of being broken down by microbes and ultraviolet light when submerged in water[134]. Other innovations include low-risk FADs that use biodegradable cloth attractors instead of mesh panels, and biodegradable escape panels in traps that may reduce incidence of ghost fishing[135].

Some technologies may also be used to reduce ghost catch. Acoustic beacons, pingers and reflectors can be used to reduce capture of certain non-target species, particularly marine mammals and sea turtles, even when the gear is abandoned, lost or discarded[136].

C. Curative Measures

1. Reporting

Direct reporting from the gear operator should provide a more accurate picture of the circumstances of the loss. Reporting to publicly available gear recovery programs which are facilitated through online reporting, apps or hotlines, are especially effective in reaching out to wider stakeholders. Such reporting complements adoption of location services for ALDFG to accurately determine their position.

2. Recovery

Gear recovery programs usually utilize creeper or grapnel to remove ALDFG from the oceans or seabed. These may involve local dive clubs and coastal communities for coordinated information sharing on the quantity, magnitude and likely locations of ALDFG, Sensitive habitats and biodiversity-rich sites should be prioritized, and targeted surveys in coordination with government and other stakeholders may prove to be effective. This includes using patrol or fishing vessels chartered by fishers' organizations for recovery operations[137], or voyages led by the government in collaboration with industry.

Land and sea-based surveys to locate ALDFG may also be tapped. Existing technology consists of towed-diver surveys, Side Scan Sonar and sea-bed mapping programs[138]. Traps and other static gear in particular can be easily located through remote sensing. Studies identifying hotspots for likely locations where ALDFG are situated may also be conducted through similar technology[139].

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[134] Gilman, *supra.*
[135] Huntington, *supra* (2017).
[136] Gillman, *supra.*
[137] Inoue and Yoshioka, *supra.*
[138] Huntington, *supra.*
[139] Macfadyen, *supra*.

3. Collection and Recycling

Collection and clean-up drives are important activities to remove ALDFG from the marine environment. The sensible next step to the systematic collection of ALDFG in collection facilities would be to recycle them for other productive uses. Other "upcycled" products made from ALDFG components include fencing for agriculture and aquaculture, fillers for roads and coastal tracks, soccer nets, masks and keychains[140]. Upcycling and value adding to products derived from ALDFG also create economic incentives to collect, and may be a valuable source of livelihood in coastal communities.

D. Awareness, Education and Research Initiatives

In general, fishers are aware of their role in conserving the marine environment and managing fisheries to ensure the sustainability of their livelihoods. Due to the investments involved, they also typically exert effort to recover lost gear where possible. However, further education could expand fishers' and other relevant stakeholders' knowledge on the issue of ALDFG and guide them on the implementation of best management practices[141]. Research initiatives must also be prioritized in response to the paucity of quantitative data, especially in the developing parts of Asia and the Pacific. This would help in baselining and providing science-based evidence for future programs on ALDFG in the region.

Specifically, training opportunities for good gear design and appropriate fishing methods to reduce the likelihood of gear loss are expected to improve management of ALDFG[142]. Awareness raising of, and knowledge sharing between, government officials and policymakers are beneficial to elevate and mainstream best management practices and successful cases.

For mandatory regulations such as zoning schemes, the government must involve all relevant stakeholders that would be directly affected, particularly those within the fishing sector itself. The engagement of a broader range of users is crucial to ensure the effectiveness of any intervention, and users' inputs are valuable in designing proposed policy. Moreover, regulations are generally more accepted and easily implemented with high engagement from involved stakeholders[143].

Fisheries observer programs may also be tapped to determine the magnitude of ALDFG as they are most exposed to the extent of its occurrence at sea. Integrating gear reporting, research and recovery processes (e.g. logbook recording and informing local navy or coastguards) in observer program trainings may be beneficial for recovery efforts[144].

Moreover, engaging interested citizen scientists, scuba divers and snorkelers to collect data and report incidence of ALDFG can be a potent tool in putting together a clearer picture of the extent of its occurrence. Collaborating with different organizations such as diving organizations

[140] Macfadyen, *supra.*
[141] Huntington, *supra.*
[142] Gilman, *supra.*
[143] Huntington, *supra.*
[144] FAO, *supra.*

and marine mammal rescue centers to access data about ALDFG and its impacts may also be useful to fill knowledge gaps[145]. User-friendly and innovative apps that provide avenues for reporting and recording data on ALDFG may reveal important information on the scope and magnitude of ALDFG. Apps are also capable of reaching out to a wider range of stakeholders that could be engaged to combat ALDFG.

E. Review of Management Measures

It should be noted that as far as practicable, the above measures are best taken in combination with each other to form a suite of effective schemes for ALDFG management. Among the three categories, prevention measures are generally considered to be most cost-effective. Therefore, in the range of possible interventions, priority should be given to ensuring the avoidance of gear waste being introduced to the marine environment. Moreover, some mitigation methods such as alterations in gear may compromise economic viability and practicality through increased costs and reduced gear effectiveness[146]. On the other hand, curative measures tend to be less effective and entail greater expenses in comparison to avoidance. However, recovery may still be cost-effective using efficient approaches; and from an economic lens, mitigation or curative measures would still be preferable due to its positive effects rather than inaction. Importantly, such measures should be introduced within the broader fisheries and waste management frameworks to spur behavioral change across all relevant stakeholders.

In terms of avoidance measures, it is necessary to design the intervention to target the commercial operators and small-scale fishers through different methods. Artisanal fisheries will require measures that consider social equity considerations. The disparity in costs involved (e.g. gear marking and tracking) make it even more important to have customized strategies for each subsector. As such, the best management practices provide a general guide for authorities to adopt best applicable measures for different types of fisheries. On the other hand, most mitigation and recovery efforts benefit the whole fisheries industry, as well as related activities in coastal zones such as tourism and community-based recycling projects. Thus, implementing such measures can be more easily scaled up.

Another important note is the importance of investing more into research and awareness for ALDFG management. The dearth of data in global assessments for ALDFG, and particularly in Asia Pacific, highlight the pressing need for supporting research to provide the evidence required as basis for decision making. Such data is necessary to craft and implement appropriate policy and responsive measures to adapt to specific conditions of a locality or fishery. Furthermore, a challenge that will have to be surmounted is the how to work with different stakeholders across the value chain and related industries, from fishers, consumers to recyclers, in order to implement appropriate action and fill gaps in ALDFG management.

Lastly, management measures implemented nationally should be consistent with technical guidance and further enforce the mandates provided for in the legal regime governing ALDFG management. For instance, binding instruments such as the PSMA and voluntary guidelines such as the VGMFG provide important interventions that would tremendously help in improving

[145] Richardson, *supra.*
[146] Gilman, *supra.*

fisheries management and reducing lost gear. Other soft instruments such as plans of action on marine litter and fisheries management are also instrumental for governments to craft national actions plans and provide a potent starting point for which governments may act to ensure proper management of ALDFG.

VII. Implementation Mechanisms

Best management practices are not mutually exclusive and would ostensibly work well in combination with other compatible measures. However, some measures may be best introduced through differing mechanisms, such as regulation or market-based instruments, depending on the goal and actors involved. Accordingly, implementing ALDFG measures can take the following forms:

1. Voluntary actions. Voluntary arrangements for fishing management measures can be an effective means to forward action on ALDFG. In such cases, the fishers' direct involvement may fuel their incentives to act. Voluntary actions can cover spatial measures, gear and vessel design, gear marking, and employing mitigation measures, among others[147].

2. Third-party fisheries certification. Ecolabelling and accreditation provide incentives such as better market access or price premiums which can spur improvements in fisheries management. It is an established market-related tool that seeks to fill gaps in regulation, such as measures that address ALDFG[148]. Third-party certification can include participation in onshore disposal facilities, gear and vessel design, mitigation measures and best practices for reporting and recovery of ALDFG[149].

3. Regulation or legislation. Conventional command and control measures can effectively change fishers' and other stakeholders' behavior to better manage ALDFG. As this approach requires compliance under pain of punishment for violation, it may be difficult to implement without sufficient enforcement systems and may possibly be counterproductive. However, if properly executed, it can effectively control spatial management, gear marking, port state and general fisheries management measures, as well as gear design and onshore facilities. It can also include the range of mitigation and recovery measures, particularly the process of reporting and recovery of ALDFG[150].

4. Information, education and communication campaigns. Improved stakeholder awareness is crucial in ALDFG management. Thorough information dissemination campaigns can promote rules and best management practices for proper avoidance, mitigation or recovery. Strategies can be employed to target specific groups such as fishers and manufacturers, as well as the general public or coastal communities at large.

[147] Huntington, supra.
[148] *Id.*
[149] Unger, *supra.*
[150] Huntington, *supra.*

These activities can also bring about more engagement especially on reporting and recovery of ALDFG[151].

The effectiveness of different implementation schemes largely depends on ensuring that they are applicable to the context in which they are applied. As such, a contributing factor to the success of an intervention is tailoring solutions to the needs of the different subsectors in capture fisheries. It is therefore recommended to adopt and implement distinct management practices to address the issues and challenges of small scale and commercial fisheries, respectively, particularly on avoidance measures.

VIII. Case Studies: National Initiatives

A. Prevention: Fishing Gear Marking in Indonesia

The FAO and GGGI conducted a pilot project on gear marking in Indonesia in 2017 to support the then-draft Voluntary Guidelines for Marking of Fishing Gear. The project focused on small-scale gillnet fisheries, and the aim was to test low-cost and easily applicable methods of marking gillnets. Gillnets were marked using various methods such as metal, plastic, bamboo, coconut shell and fibrecode tags, and the study concluded that small-scale fishers were generally cooperative although there is a need to better understand the linkage of marking and retrieval of ALDFG. Issues identified include the limited incentive to retrieve lost nets due to its low cost and the existence of a government subsidy program, as well as the cost and technical constraints of applying certain types of technology to small-scale fisheries. Another challenge cited was the availability of eco-friendly materials for markers and their attachments.

The Indonesian experience shows that gear marking in small-scale gillnet fisheries is possible provided that a holistic implementation plan is in place. This should encompass data collection, capacity building, fisher education, as well as incentives. The issues on costs may be partly addressed through marking at the point manufacture and adding value to end-of-life gear, which can be achieved through increased collaboration among government, fishers and the private sector. As to the availability of marking materials, further guidance within the gear marking guidelines itself may be useful. Overall, gear marking must be carried out within the context of broader fisheries management measures, as marking on its own may be insufficient to address ALDFG. Moreover, raising awareness and capacity are vital for future interventions on gear marking. As such, findings from this case study apply to gear marking interventions as applied to small scale fisheries, while commercial fisheries may explore other established marking technology.

B. Prevention: FAD Location Technology in Vanuatu

Pacific Island countries have recently started to invest more in anchored FADs, which are designed to enable artisanal fishers to harvest in nearshore areas. While these FADs are designed to be stationary, reports of breaking free from the moorings are not unusual, causing them to drift farther offshore and become marine debris. In response, the Vanuatu Fisheries Department (VFD) pilot-tested low-cost technology to track the location of anchored FADs that break free from their

[151] *Id.*

moorings and allow for their speedy retrieval. This is particularly important for Pacific Island countries as the main issue deterring the use of tracking devices is costs. Most monitoring technology in the market are priced higher than most fishers and government agencies can afford. The project aimed to assess an effective tracking device that would amount to less than 10% of the cost of anchored FADs, which typically cost up to 2,000 USD. No location tracking devices have been deployed in Vanuatu prior to the project.

The case showcases the reliability of tracking devices in providing accurate and real-time location data, provided that the anchored FAD remains within cellular range. In cases of FADs breaking away and drifting, it is important to promptly deploy retrieval vessels before the lost FADs are able to drift beyond the network range. Available technology such as cellular data, satellite networks, or any other compatible and reliable data system may be tapped. The specifications must require the device to be waterproof and solar-powered with a long-lasting battery life. Development of further low-cost tracking technology options is critical, as numerous available alternatives would also drive costs for technology down to cater to small island developing states and small-scale fisheries. Furthermore, agreements with local fishers and other stakeholders to retrieve lost FADs may be entered into for their quick and timely recovery. Overall, findings from this case study could benefit both commercial and artisanal subsectors which rely on FADs for pelagic fisheries.

C. Prevention and Mitigation: Forecasting and Biodegradable Fishing Gear

ALDFG is an emerging issue in Philippine fisheries. However, the existing policy framework in response to the problem mostly involves general fisheries management and does not directly address ALDFG. The suite of measures employed by the Philippine government, primarily through the Bureau of Fisheries and Aquatic Resources (BFAR), include: (1) gear swap programs which promote biodegradable or hybrid materials such as *buri* palm fronds; (2) cash incentives for local governments implementing good fisheries and waste management programs; (3) spatial management through "no FAD" and closed zones, and marine protected areas (MPAs). The main challenge identified was weather disturbances, as some coastal areas suffer from several typhoons a year; while gaps cited were the absence of clear processes for reporting and the need to coordinate with local governments for small scale fisheries projects.

Lessons from the implementation of the above measures highlight the pressing need to improve forecasting capacity and invest in early warning systems at the local government level to address weather-related challenges. Pilots for early warning systems could be explored to assist small scale fisheries in storing gear in anticipation of extreme weather events. Second, a combination of spatial planning and promotion of biodegradable or hybrid fishing gear are effective to prevent and reduce ALDFG. However, better coordination between the BFAR and local governments for rollout and zoning of municipal waters is warranted. Third, although the general solid waste management law requires the establishment of materials recovery facilities, most ports do not have them; and thus, such investments must be prioritized. Learnings from the Philippine case could benefit the whole fisheries sector in terms of preparedness to extreme weather events, while biodegradable gear and local government coordination are targeted towards small-scale fisheries.

D. Curative: Gear Recovery in Myanmar

ALDFG poses a threat to Myanmar's budding marine tourism and diving sector centered around the Myeik Archipelago on the southern coast. As quantitative data about ALDFG do not exist, divers from the NGO Myanmar Ocean Project (MOP) conducted the first systematic underwater surveys that seek to determine locations where ALDFG accumulate and examine the extent and types of gear involved. The expeditions revealed that 31% of sites surveyed can be classified as hotspots, which is defined as areas where regular intentional discarding of old nets by resting boats were recorded, or where multiple layers of lost nets covered reefs or were found to be ghost fishing. Issues that arose from the surveys consist of the difficulty in identifying potential hotspots due to the lack of information and reporting, and the challenges in accessing sites where lost gear accumulate for recovery operations.

The Myanmar case highlight the importance of focused efforts to remove ghost gear from identified hotspots are crucial, and that priority operations should be undertaken in sensitive habitats and sites where marine megafauna are known to frequent[152]. The identification of hotspots could involve both fishers and the diving industry to provide information on discard locations for targeted clean-up initiatives[153]. Because of difficulty of access to most hotspots, immediate gear loss reporting by local fishers through a clear and expedient system for communicating incidents should be promoted. Reporting systems could be piloted across the fisheries and tourism sectors, with fishers' accounts to be shared with dive shops, liveaboards and sailing boat companies with capacity for easier retrieval of ALDFG. Proper coordination across relevant government agencies for quick response assistance and grants of permits for surveying and retrieval would also be advantageous[154]. Lessons from this case study show that recovery efforts benefit the whole fishing, tourism and other related industries in coastal areas, and are easily scalable with collaborative action and use of technology.

E. Curative: Recycling and Value Adding in Thailand

The Net Free Seas Project of the Environmental Justice Foundation (EJF) Thailand aims to encourage local fishing communities to properly collect and recycle end-of-life gear and ALDFG, with a view of eventually integrating them in the market supply chain. The project trains communities to collect and clean nylon gillnets for recycling partners that "upcycle" them into new products. EJF has partnered with the design brand Qualy to produce face shields, bottle openers, push-sticks and headbands, with the products typically commanding a price premium. The project's main challenge is how to make the business model profitable by reducing costs of production such as logistics and transport from far-flung areas. There are also current technological limitations on recycling nets consisting of mixed materials as each type of plastic has a different melting point.

The Thai experience uncovers the need to improve efficiency in technology, specifically on the recycling facilities' capability to compress materials. Future interventions must seek to fill technological gaps and remove the limitations for mixed materials, which cover the vast majority

[152] Myanmar Ocean Project, *supra.*
[153] *Ibid.*
[154] *Id.*

of ALDFG beyond gillnets. The next steps would be to expand from artisanal crab gillnets to eventually include other commercial fishing gear ALDFG such as purse seine nets and trawls. To further build a successful business model, measures must be put in place to minimize costs in terms of logistics, cleaning and transport. Linkages with recyclers and logistics companies should also be expanded, while the corporate sector may be tapped for collection activities such as recovery dives and beach cleanups. The Thai experience advises against subsidizing the cost for fishers to replace nets as it reduces incentives to reuse and recover nets. Instead, other options intangible benefits may be offered, such as membership to groups and preferential access to renewal of licenses and permits. This case shows that recycling efforts benefit across industries in coastal zones and are highly scalable in coastal communities with the proper policy support and an enabling environment.

IX. Recommendations

ALDFG presents a major threat to the marine environment and global fisheries through a range of ecosystems and socioeconomic impacts. Consequently, urgent measures need to be taken to address the problem. Interventions will largely seek to change human behavior as well as promote innovations in technology[155]. For policy formulation, steps forward would involve translating best practices into appropriate implementation mechanisms to build the enabling environment for ALDFG management.

Governments evidently play a key responsibility on the success of any intervention. However, stakeholders such as fishers and related industries wield considerable influence in the outcome in terms of voluntary action and certification. Overall, support should be galvanized across various sectors, including but not limited to fisheries regulators and managers, port authorities and operators, the fishing industry and seafood companies, as well as fishing gear manufacturers and designers. Interested third parties such as ecolabelling programs and NGOs also hold crucial roles in monitoring and sustaining gains, whereas support for scientists and researchers is vital for the development and innovation of technology solutions for ALDFG.

A. Global and Regional Responses

Relevant international organizations must develop a coordinated response to ALDFG. The international response framework should include relevant members agencies of the UN such as the FAO, IMO and UNEP, Regional Fishery Bodies (RFBs) such as RFMOS and advisory councils, and regional bodies which implement ALDFG-inclusive marine litter action plans.

For international initiatives, governments must work with stakeholder networks which include NGOs and fisher groups for a more holistic approach in responding to ALDFG. Organizations such as the GGGI can be tapped for support and technical advice. The FAO, IMO and RFMOs should collaborate in implementing a clean harbors program for small-scale ports, particularly targeting ALDFG, fishing sector waste, and providing onshore reception facilities. International cooperation at all levels should be further strengthened, including in multi-stakeholder initiatives such as the Global Partnership on Marine Litter, to deliver programs under action plans for marine litter.

[155] Macfadyen *et al*, *supra.*

Importantly, efforts must be taken to promote international legal instruments, including soft law measures such as the FAO Voluntary Guidelines on the Marking of Fishing Gear, albeit non-binding. This requires a collaboration among regional environment programs and fisheries bodies to ensure such management practices are incorporated into national action plans for marine litter and fisheries, as well as rules for implementation.

B. National Management Measures for Asia Pacific

The Asia Pacific region is characterized by its unique local conditions which could largely influence the effectiveness of interventions to manage ALDFG. Thus, interventions should be tailor-fit to enable the reduction and disposition of ALDFG considering local conditions. These measures can be undertaken through voluntary arrangements, strong regulatory frameworks, or effective market-based instruments. Actions can be carried out through mandatory or voluntary means, or through a combination of both. Education and awareness initiatives are vital to complement policy instruments and spur behavioral change.

The following recommendations are identified from best management practices and the lessons learned from case studies which respond to issues on ALDFG within the region as a lens for suggesting management measures. Such recommendations for potential adoption in Asia and the Pacific comprised of specific rules, economic incentives and research pathways that would support enabling environments for ALDFG management in the region.

1. Prevention Measures

a. Gear Traceability

Asia Pacific countries must enact regulation for gear marking and unique identification by integrating the requirement as a condition for the grant of fisheries licenses. The system should be consistent with the FAO Voluntary Guidelines for the Marking of Fishing Gear. The process of adoption may be facilitated further by making gear marking and unique identification an intrinsic feature of gear at the point of manufacture. Guidance on recommended eco-friendly materials for gear marking may also be included in future guidelines and options to scale the requirement for small scale fisheries should also be explored.

Requiring tracking devices on fishing gear must also be developed, possibly through a phase-in arrangement as practical options are introduced to cover more fishing vessels. Location and tracking data of fishing gear should be regularly transmitted to relevant authorities to ensure proper disposition.

b. Port Interventions

States must conduct regular port inspection of fishing gear in accordance with the procedures set out in the Port State Measures Agreement (PSMA) or by specific regulations from the port state. In line with this, states should be encouraged to accede to the PSMA as one of the deterrent measures against IUUF and consequently, ALDFG.

Investing in green ports that provide adequate and accessible reception facilities for fishing gear is also vital to properly manage ALDFG. Where cost recovery is necessary, charges should be included in general fees rather than as a stand-alone payment. For small-scale fisheries, collection points can be established at village landing sites where the local government can provide in terms of staffing and space. Onshore disposal of fishing gear may be supported through intangible benefits such as preferential access to renewal of licenses or better port access.

c. Spatial Management

Implementing spatial management measures is critical to avoid gear conflict. Such interventions must be undertaken through rigorous consultations of different stakeholders and zoning schemes strictly enforced by them . Conversely, coordination between fisheries agencies and local governments must be ensured for proper zoning of near-shore waters.

d. Manufacturing and Design Responsibility

Gear manufacturers may buy back old gear for recycling or facilitate responsible gear disposal and end-of-life refund programs. In this regard, manufacturers should be capacitated to conduct life cycle analyses of gear and seek to include responsible use and disposal in its corporate and social responsibility. Vessels may also be designed or reconfigured to have more on-board storage facilities for gear to discourage discarding.

e. Incentives for Gear Maintenance

Incentives that promote gear maintenance in low socioeconomic and developing fisheries may be introduced. This includes retooled government subsidies for recycling old gear and supporting gear recovery, instead of giving payments to simply replace them or providing money for new gear.

f. Early Warning Systems

An early warning system for weather disturbances must be developed, especially in calamity-prone areas. This includes improving forecasting capacity at the local government level to address weather-related challenges.

g. Improved Fisheries Management

Fisheries conservation and management measures that positively affect management of ALDFG must be implemented, such as restrictions in soak time and days at sea. Monitoring, Control and Surveillance (MCS) systems of fisheries operations may be strengthened by requiring vessel monitoring systems, expanded observer programs, and enhanced enforcement operations from sea to ports.

2. Mitigation Measures

Mitigation measures in the region may include promoting the use of biodegradable fishing gear and FADs and conducting pilot tests of new innovations in eco-friendly gear. Initiatives for gear innovation and encourage industry efforts may be supported though incentives and inclusion in certification schemes.

3. Curative Measures

a. Reporting

Easily understandable reporting systems for ALDFG and gear deployed without gear marking must be established. The reporting process should be clearly communicated to government enforcers and across stakeholders in the fisheries and tourism sectors. Moreover, extending the reporting of ALDFG to existing reportorial requirements such as catch documentation systems and observer programs may be helpful.

b. Recovery

Concentrated efforts to remove ghost gear from identified hotspots must be undertaken. Priority sites should cover sensitive habitats such as coral reefs and seagrass beds, as well as areas where marine megafauna are found. Relevant government agencies must coordinate to allow for quick response assistance and permits to survey and retrieval areas. Marine tourism businesses such as dive shops may be involved to expeditiously report ALDFG in existing and potential dive sites. The corporate sector may also be tapped for collection activities such as clean-ups.

c. Collection and Recycling

Local recycling should be promoted, and linkages facilitated for local communities to connect with recyclers and logistics companies. The business cases for ALDFG recycling through measures that minimize costs in terms of logistics, cleaning and transport must be further developed to enable scaling up success stories.

4. Awareness, Education and Research

Awareness and education activities include information campaigns through workshops for spatial management and seminars on ALDFG causes and impacts open to all interested marine users, particularly those with gear conflict, e.g. trawlers and trap/pot operators. Gear marking and other relevant guidelines must be translated and localized for outreach and communications materials to raise awareness among fishing stakeholders. Templates for policymakers, especially at the local level, for the implementation of international and national fisheries guidelines or regulations may be helpful to facilitate the implementation process. This may include providing outlines and sample wording that can be translated into policy instruments such as legislation, ordinances, or fisheries management plans.

Other activities include trainings for fishing vessel crew on proper gear storage and disposal methods, maintenance of record books and formulation of waste management plans; general coastal community waste management trainings and seminars, which include ALDFG as a key issue; and integrating ALDFG management practices into professional maritime and observer program trainings, with priority to government bodies which enforce fisheries and environmental laws and regulation.

As to research initiatives, priority themes and topics in relation to ALDFG include quantification of the extent, magnitude, and characteristics of ALDFG beyond gill nets, the review of ecosystems and socioeconomic impacts, including valuations of impact focused on the local fisheries and tourism sectors for baselining and policy support at the local and national level, and a gap analysis of existing legislation and regulations to determine further policy needs in relation to ALDFG. Scientific research to identify hotspots, sensitive habitats, key biodiversity areas through modelling and simulations using best available technologies are also important for recovery activities.

Research and development on technology and innovation may focus on developing low-cost and practical methods for gear marking and tracking, especially for small-scale fisheries; recycling technology and efficiency improvements, specifically on compressing capability and limitations for mixed materials; cost-effective and practical biodegradable and eco-friendly materials for fishing gear, as well as survey and remote monitoring systems to locate ALDFG.
The applicable implementation mechanism for each of the above measures, along with the responsible parties, costs entailed, subsector applicability and notes on implementation are further detailed in Annex I.

C. Specific Policy Developments

In light of the foregoing recommendations, governments must prioritize the establishment of an enabling legal and regulatory framework to implement management measures for ALDFG. This includes developing specific rules or guidelines on best management practices adapted for local conditions and types of fisheries. Economic incentives to reduce, mitigate and recover ALDFG and industry incentives to require gear marking at the point of manufacture and spur innovation in technology for mitigation and recovery methods must also be promoted. Furthermore, a national reporting mechanism using a standard framework that is compatible across the region should be developed and where applicable, plans of action on marine litter which should include measures that seek to address ALDFG.

Overall, governments must adopt policies promoting the circular economy approach that seek to achieve behavioral and system changes on marine litter. These include promoting sustainable production and consumption patterns, as applied to the fisheries sector.

X. Conclusion

ALDFG poses a major threat to the marine environment and global fisheries. Consequently, urgent measures need to be taken to address the problem. Interventions seek to change human behavior as well as promote innovations in technology. There are a number of

international binding and soft law instruments that seek to help governments and relevant stakeholders manage ALDFG, and the legal regime has been instrumental in developing management measures for states and regional bodies to take, particularly through voluntary instruments which provide flexibility and capabilities for adaptive management in implementing appropriate interventions. However, the steps forward would involve translating best practices into appropriate implementation mechanisms to build the enabling environment for ALDFG management.

The government, industry and civil society all play a major part in creating enabling policy and regulatory frameworks to implement management measures for ALDFG. This can be achieved by developing specific rules or guidelines, economic incentives for management, industry incentives to involve manufacturing and supply chains, and research and development for cost-effective technology and recycling processes. Ultimately, these recommendations would contribute to the overarching circular economy framework on marine litter. Through behavioral and system changes, such policies are envisaged to contribute to addressing marine pollution originating from the fisheries sector in Asia and the Pacific.

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Private Sector Participation in Solid Waste Management Services in Vietnam

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Abstract

Plastic waste in the ocean is becoming more and more serious in the world, especially in developing countries such as Vietnam. The inadequate service provision of solid waste management (SWM) on the mainland in such countries is one of the main reasons to explain why plastic volume discharged into ocean has been increased dramatically. At the same time, plastic waste is also considered the key priority towards circular economy and it requires a real reform in SWM for foundations to a new plastic economy that plastic products fully respect reuse, repair, and recycling needs[1]. In other words, plastic waste pollution as well as circular economy requires governments to build an efficiency SWM.

Due to the advantages of private provision such as flexibility management of their resources, more accountability to their customers, one of the policies to enhancing the efficiency of SWM is encouraging private sector involvement in this field. Basing on textual analysis, the paper will provide information on the status of private sector participation in SWM services in Vietnam throughout presenting a case study in Hanoi city. From this status, the paper tries to figure out the challenges in current polices and legal framework that the private investors must face. Finally, the paper will propose some implications for enhancing private sector participation in SWM in Vietnam.

Key words: Solid Waste Management, PPP, Private Sector Participation, Private Investor, Foreign Investor.

I. Introduction

Marine plastic waste is becoming more and more serious in developing countries such as Vietnam. According to statistics, Vietnam ranks among the top 5 countries polluting the ocean[2], more than 80% of marine waste in Vietnam is from the mainland annually[3] and about 73% of plastic waste is inadequately managed[4]. In practice, the uncovered plastic waste in the large number of small, poorly located landfills or dumpsites together with the waste discarded by households and incorrectly recycled in craft villages being blown by the wind over the rice fields, into canals and rivers and ending up on Vietnam's beaches and in the ocean[5]. The others are the

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[1] *See also:* A European Strategy for Plastics in a circular Economy https://ec.europa.eu/environment/circular-economy/pdf/plastics-strategy-brochure.pdf (Visited at 16 Dec, 2020)

[2] *See also:* https://www.statista.com/chart/12211/the-countries-polluting-the-oceans-the-most/ (visited Nov 26, 2020)

[3] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 16 (Hong Duc Publishing House) (2018)

[4] F. Alpizar, F. Carlsson, G. Lanza, B. Carney, R.C. Daniels, M. Jaime, T. Ho, Z. Nie, C. Salazar, B. Tibesigwa, S. Wahdera; A framework for selecting and designing policies to reduce marine plastic pollution in developing countries, 109, 25-35, Environmental Science and Policy (2020)

[5] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 16 (Hong Duc Publishing House) (2018)

presence of plastic waste closely related to tourism services in coastal areas, beaches, and other tourism destinations near or on the sea.

The main sources of plastic waste in Vietnam generated from domestic waste of households, shopping malls, and traditional markets[6]. In addition, plastic waste is discarded by commercial entities at sea, including fisheries, tourism activities, and transportation activities... In Vietnam, there is not any data on volume of plastic waste collected[7]. It is shown partly in statistics on collected solid waste in general, including plastic waste and plastic packaging. For example, in 2018, the plastic waste and packaging rate in Hanoi was 3% in the total of solid waste while the rate of other cities was from 3.4% to 10.6%[8].

However, there is a trend in term of an increasing volume of plastic waste over the years. The statistics of solid waste in Ho Chi Minh city in the period from 2009 to 2017 shows that percentage of plastic waste in solid waste increased from 5.5% in 2009 to 13.9% in 2017. This figure closely matched the increasing trend in plastic consumption rate per person in Vietnam due to the convenience and cheap price of plastic products, from 33 kilograms/year in 2010 to 41 kilograms/year in 2015[9].

Furthermore, due to the increasing demand for plastic products, there is also a trend in increasing production of the plastic industry in Vietnam. According to statistics, the plastic industry is one of the sectors which has the highest growth rate in Vietnam, from 16% to 18% per year. In 2018, production of such industry reached at 8.3 million tons, in which the percentage of plastic packaging was the highest rate, that accounting for 36%. There are 450 plastic packaging production enterprise in the total of 2000 units in plastic industry[10]. As the result, we can see that there was a large amount of plastic packaging which normally is free in shop in Vietnam. Like other countries, in Vietnam, it likely is about 50% of plastic products that are made for the purpose of using one time and then being discarded.

There are some studies which mentioned the relationship between the status of marine plastic waste and Solid Waste Management (SWM). They show that a large amount of marine plastic waste comes from developing countries since SWM in such countries is inadequate with no classification of waste at source, low recycling rates, outdated treatment technologies, and illegal disposal[11]. In Vietnam, there is not any data on amount of collected plastic waste. There is only data on collected solid waste in general. Sorting and collecting of plastic waste is mainly based on the voluntary work of individuals, households and commercial activities done by the informal sector (waste pickers). Plastic waste will be treated with other collected solid waste. A

[6] *Id*. at 23-46
[7] Ministry of Natural Resource and Environment (MORNE), National Report on Environment in Vietnam, 47 (Dan Tri Publishing House)(2020)
[8] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 46 (Hong Duc Publishing House) (2018)
[9] *Id*. at 23-46
[10] *Id*. at 23-46
[11] F. Alpizar, F. Carlsson, G. Lanza, B. Carney, R.C. Daniels, M. Jaime, T. Ho, Z. Nie, C. Salazar, B. Tibesigwa, S. Wahdera; A framework for selecting and designing policies to reduce marine plastic pollution in developing countries, 109, 25-35, Environmental Science and Policy (2020)

small rate of plastic waste is recycled by craft villages using outdated technologies[12]. Thus, one of the targets to reduce marine plastic waste pollution in Vietnam is improving SWM on the mainland[13].

Moreover, basing on circular economy approach, plastic waste is the key priority in EU Action Plan for a circular economy[14]. It requires increased cooperation across the value chains, from plastics manufacturers to public and private waste management companies. It also requires to expand and improve the separate collection of plastic waste and modernize sorting and recycling capacity. Therefore, improving SWM is the beneficial option for Vietnam to access closer to circular economy.

Furthermore, practices on circular economy in Japan showed that waste incineration plants always need strong financial resources to make large-scale investment, but local state budgets are not adequate. Therefore, it requires governments to mobilized investment from private sector. And PPP is considered the potential model to develop solid waste management. As a result, many policy settings are introduced to encourage private sector participate on PPP model such as financial incentives scheme for investment related to waste disposal fee or capital expenditure incentive. The model from Japan also showed that contracting or operating waste treating services should be responsible for private entities. They receive garbage as the raw material for treating or converting to power. It means that PPP model always requires a stable collection system. On the other hand, the local governments should be responsible for collecting waste and final disposal due to it is difficult for private companies to access to landfill[15]. However in developing countries like Vietnam where waste collecting is done by informal sector, so in order to increase rate of recycle plastics waste, it requires to improve formal collection through privatizing waste collection service in some big cities or converting informal sector into waste picker cooperative to improve their working conditions[16]. Thus, it can be seen that PPP is a flexible model for encouraging private sector involvement in collecting, treatment and disposal services, and from that the rate of plastic waste recollected, recycled, reused will be increased.

However, in practice, the participation of private sector in SWM in Vietnam is poor[17]. Financial resources mobilized in SWM infrastructure are mainly based on the State's budget and provided by State-Owned Enterprises (SOEs), but they do not satisfy the practical demand. At the same time, investment of non-public financial resources is limited due to the lack of comprehensive polices to attract private investor, including low rate of environment charges paid by consumers/taxpayers; different policies on the price of services issued by different local

[12] Ministry of Natural Resource and Environment (MORNE), National Report on Environment in Vietnam, 46-47 (Dan Tri Publishing House)(2020)

[13] F. Alpizar, F. Carlsson, G. Lanza, B. Carney, R.C. Daniels, M. Jaime, T. Ho, Z. Nie, C. Salazar, B. Tibesigwa, S. Wahdera; A framework for selecting and designing policies to reduce marine plastic pollution in developing countries, 109, 25-35, Environmental Science and Policy (2020)

[14] *See also:* A European Strategy for Plastics in a circular Economy https://ec.europa.eu/environment/circular-economy/pdf/plastics-strategy-brochure.pdf (Visited at 16 Dec, 2020)

[15] Hongo, T., Circular Economy Potential and Public-Private Partnership Models in Japan, in Anbumozhi, V and J.Kim (eds.), Towards a Circular Economy: Corporate Management and Policy Pathways. ERIA Research Project Report 2014-44, Jakata: ERIA 17-29 (2014) Available at https://www.eria.org/RPR_FY2014_No.44_Chapter_2.pdf (Visited on 28 Jan, 2021)

[16] Tze Ni Yeoh, Going Circular: A Roadmap for Plastics Recycling in Vietnam, Harvard Kennedy School, 39 (2020)

[17] Ministry of Natural Resource and Environment (MORNE), National Report on Environment in Vietnam, 48 (Dan Tri Publishing House) (2020)

governments; uncompleted legal framework of investor selection; and the layout for sites of treatment facilities encountered local citizen's disagreement.

The research as follow will focus on providing information on the current status of private sector participation in SWM services in Vietnam throughout presenting the case study of Hanoi city. From this status, the paper tries to figure out the challenges in current polices and legal framework that the private investors must face. Finally, the paper will propose some implications for enhancing private sector participation in SWM in Vietnam.

There are some conceptual frameworks on SWM, Public – Private Partnership (PPP), private sector participation in infrastructure in the context of developing countries will be applied. Specifically, the research uses the guidelines of OECD on principles for private sector participation in infrastructure in 2007 as the theoretical basic in order to assess the state of solid waste management infrastructure in Vietnam. Relating to context of a developing economy, the study will use the output of research "Private Participation in Infrastructure in Developing Countries – Trends, Impacts, and Policy Lessons" of Clive Harris in 2003. The latter study emphasizes fundamental challenges in infrastructure whether public or private sector provide such as price matter, competition, the politics matter…
The questions of study will be what is the status of private sector involvement in SWM in Vietnam? What are challenges in current policies and legal framework for private sector participation in SWM? And what implications for the Vietnamese government to help the private sector to overcome such challenges?

The hypothesis of the study is that there are a range of challenges in policies and legal framework for private sector participation in SWM in Vietnam. The definition of "Private sector participation" in this research refers to all kinds of service providers related to SWM which are not funded by the State budget, including private companies, community-based organization, informal sector.

This study is devided into three parts. First, it will look at the status of private sector participation in SWM by analysing a case study of Hanoi city as it is one of cities in Vietnam which have a high discharge rate of solid waste[18] and availability of literature. Next, the author will investigate some challenges in current policies and legal framework for private sector participation in SWM. Finally, author will propose some implications for supporting private sector participation could overcome such challenges. Through enhancing efficiency of SWM by policy settings attracting private investors in SWM in general, the rate of plastic waste recollected, recycled and reuse will be increased in Vietnam. It also means that the rate of plastic waste mismanaged will be decreased, and from this, the status of marine plastic pollution will be improved in practice.

[18] *Id*. at 23-46

II. Private participation in plastic waste management system in Hanoi city

A. Hanoi city

Hanoi is one of the biggest capital cities in the world with an area of about 335,000 ha and with a population of over 8 million[19]. There are 30 districts and towns level, and 584 communes, wards, and towns. It is ranked as the fastest growing city in Vietnam with urbanization rate of 47.55% in 2015 which was 1.42 times higher than the national average urbanization rate (1.89%).

The population of Hanoi is predicted to be approximately 10 million in 2030[20]. Regarding the status of solid waste, the volume of solid waste in Hanoi has increased from 5,515 tons/day in 2015 to 6,500 tons/day in 2019[21]. According to statistics on the waste flow of Hanoi towards 2030, the rate of collected waste is going to be from 2.5 million in 2016 to 5.2 million in 2030[22]. Hanoi is ranked at the second highest solid waste volume nationwide, just below Ho Chi Minh city. Furthermore, the percentage of plastic waste in Hanoi is about 3.0%[23].

B. The status of plastic waste management services and private sector participation in Hanoi city

Plastic waste may be leaked into the environment through the operation of waste collection, transportation and in disposal sites. Therefore, providing effective and adequate plastic waste management services could signifincantly reduce quantities of plastic wates leaked into the marine environment.

1. Sorting at source, collecting and transporting plastic waste

In Hanoi as well as in the whole of Vietnam, plastic waste is not sorted at source. Although the Vietnamese government has already regulated responsibility of emission source owner in classifying solid waste at source and attached specific penalties, sorting solid waste at source has been yet become a popular practice in Vietnam. In practice, sorting plastic waste at source is mainly based on the voluntary participation of households. It is also sorted by waste pickers. Sorting solid waste at source has also been carried out in some specific projects funded by international organizations. For example, in 2007, the subnational government of Hanoi city implemented a pilot project sorting solid waste at source in Phan Chau Trinh commune, which was funded by JICA. However, due to underdeveloped infrastructure and unsystematic management, separated wastes have been collected and disposed together, it reduced the effectiveness of these programs[24]. Moreover, this sorting was not maintained after the project was ended. Also, plastic waste is not collected and transported separately. In general, collected waste

[19] *See also:* https://www.gso.gov.vn/ (visited at Nov 27, 2020)
[20] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 61 (Hong Duc Publishing House) (2018)
[21] Ministry of Natural Resource and Environment (MORNE), National Report on Environment in Vietnam, 23-46 (Dan Tri Publishing House) (2020)
[22] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 65 (Hong Duc Publishing House) (2018)
[23] Ministry of Natural Resource and Environment (MORNE), National Report on Environment in Vietnam, 23-46 (Dan Tri Publishing House) (2020)
[24] *See Also* https://www.uncrd.or.jp/content/documents (Visited at Dec 16, 2020)

will be transported to transfer stations and then, continue to be transported to treatment facilities by trucks because the disposal areas are normally far from residential areas.

Due to the lack of at source segregation infrastructure as well as individual collection and transportation system, there no any data of plastic waste sorted at source in Hanoi. A study in 2018 showed that at a country level, it was about 20% of plastic waste generated is collected and recycled, and there was about 8-16% plastics waste to go into landfill[25]. It can be seen that the rate of collected and recycled plastic waste is relatively low and the percentage of plastic waste which is mismanaged was relatively high. Providers in waste collection and transportation included formal collection and informal collection.

Formal collection

In Hanoi, formal waste collection is monopolized by a majority-state owned waste company, namely Hanoi Urban Environment Company (HURENCO). HURENCO is set up since 1960 and has operated under the model of one-member limited liability company owned by Hanoi People's Committee. Currently, HURENCO is responsible for providing waste collection service in the area of 4 downtown districts.

While local private entities are responsible for collection and transportation of solid waste in geographic areas which do not belong to HURENCO. They are mostly under the model of joint stock companies. They will have contracts with Hanoi People's Committee through a bidding process or investor assignment (Contracting Model). Most of them are in the scale of small and medium size. According to statistic from the National Center of business registration, there were about 144 companies in the field of municipal environment service[26], however, the statistics in 2018 showed only 30 local units[27] to have contracts with the Hanoi People's Committee to provide solid waste collection and transportation services.

In practice, there were some challenges that formal collection service market has to face. Firstly, the main problems is efficiency of such collection system. In other word, this is the lack of formal collection infrastructure. The collection and transportation system is dramatically complicated as involving many companies in all of types and having no guidelines to facilitate the transport system. The limitation of such transport system is the fixed transport routes. The transition stations often have traffic jams because trucks normally arrive at the same time or the participation of waste-pickers makes the transportation process delayed. Due to narrow roads, there is a large number of small trucks used for solid waste transportation while there is no special license required for solid waste transportation (except hazardous waste), therefore such trucks are outdated. Also, noise and air pollution at transfer stations causes discomfort for local citizens. Furthermore, the transfer stations system is inadequate as the treatment sites are often long distances which results in high transportation costs. As a result, this system raises issues related to the environment and public health as well as being a waste of natural resources (renewable energy for example). Furthermore, inhabitants are used to a frequent waste collection service since

[25] Tze Ni Yeoh, A Roadmap for Plastic Recycling in Vietnam, Mossavar-Rahmani Center, Harvard Kennedy School, 5 (2020)
[26] *See also* https://dichvuthongtin.dkkd.gov.vn/inf/Forms/Searches/EnterpriseSearchList.aspx?h=1340f (visited at Nov 27, 2020)
[27] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 60-64 (Hong Duc Publishing House) (2018)

their waste is regularly collected from streets, in house or public place. This requires intensive labor and leads to environment problems which counteracts the efficiency of such collection system.

Secondly, the dominance of HURENCO is in competition with the private sector. HURENCO 's revenue from providing public services related to SWM is generated from sanitation fees and subsidies from Hanoi People's Committee. In practice, revenue from the provision of SWM services accounts for 59.4% of total revenue, in which revenue from sanitation fees account for 6.6% and from subsidies of Hanoi People's Committee is 45.2%[28] . From here, the sanitation fee in Hanoi is quite low (less than 0.5% of individual income) and SWM services in Hanoi depend much more on State's subsidies. Thus, HURENCO's operational efficiency is still questioned due to relatively high costs for transportation and labor as well as competition with non-public service providers.

Informal collection

Collecting and transporting plastic waste is also done by the informal sector. Recyclable plastic waste will be self-sorted and collected by households, then sold to waste-pickers who then again sold to wholesalers or to recycling units or individuals. They also scavenge for recyclables from dumps or landfills. The number of recycler and waste pickers in Hanoi was approximately 6,000[29], but there is not any specific regulations on working conditions for them.

2. Plastic waste recycling service

After collection, plastic waste is divided into two types, namely recyclable plastic, and non-recyclable plastic. In which, non-recyclable plastic waste normally makes up of the highest percentage in the total of plastic waste discarded. This waste is collected with other solid waste and dumped in landfills. In Hanoi, the rate of recycling was about 10% of the solid waste[30]. This is a very low recycling rate to compare with developed countries which were around 30%. Providers in recycling services included formal recyclers and informal recyclers.

Formal recyclers

Recycled plastic product market in Vietnam in general is considered the untransparent market due to the lack of a centralized platform of information on market players in the recycle plastics industry[31]. It causes the high cost of market entry as well as barriers in securing high quality supply.

[28] *Id.* at 41
[29] Tze Ni Yeoh, A Roadmap for Plastic Recycling in Vietnam, Mossavar-Rahmani Center, Harvard Kennedy School, 28 (2020)
[30] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 63 (Hong Duc Publishing House) (2018)
[31] Tze Ni Yeoh, A Roadmap for Plastic Recycling in Vietnam, Mossavar-Rahmani Center, Harvard Kennedy School, 29 (2020)

Informal recyclers

Currently, plastic recyclers are dominated by the informal sector. Most recycling entities are in craft villages which are around Hanoi city. For example, in Trieu Khuc, there is about 129 individuals and households taking part in a plastic waste collection and recycling system[32]. Appearance of such informal sector in Trieu Khuc and another area (Trung Van) has contributed to reducing about 13%-15% of volume of solid waste in Hanoi[33].

However, recycling solid waste in craft villages is criticized some problems. Firstly, it is environmental problems and public health concerns. Most units are under small and medium size. Recycling activities are done at sites without any environment standards, or labor security standards. Labor live among the plastic waste. According to statistics, Tan Trieu commune discharges about 10 tons of solid waste per day and over 10 thousand m3 of wastewater[34]. They are also not regulated by any specific laws or regulation and have low quality and production efficiency[35].

Moreover, the interesting thing is that material of plastic industry is mainly based on imported material, estimated about 50% of plastic demand and Vietnam must pay over 2.5 billion USD to import plastic material per year[36]. There is no data on access of the local plastic industry to recyclable plastic waste domestically.

3. Disposal sites

Also, plastic waste can leak into the marine environment from disposal sites. In developing countries like Vietnam, most disposal sites are opened dumpsites, which are located near to low-lying areas or waterways. A study in 2017, about 38 of the world's largest dumpsites are located less than 20 km from the coastline and contribute an estimated 30% of the plastic waste disposed of into the ocean[37].

Solid waste treatment in Vietnam is mainly done by landfilling (63%). Vietnam has about 660 landfills, of which only 30% are legal[38]. There is not official data on illegal dumpsites in Hanoi, but in practice, there existed a large number of garbage dumps with small and medium size, especially along the rivers running around Hanoi city.

In Hanoi, nearly all solid waste after collected is transported to Nam Son landfill. The rate of treated solid waste by added to landfill was 89% and disposed of by burning without electricity generation was 11% in 2017. In term of management institute, although the landfill (in Nam Son

[32] *See:* Trần Hoài Lê, Nguyễn Thị Kim Thái, Hiện trạng hoạt động của làng nghề tái chế nhựa phế liệu tại Triều Khúc, Hà Nội: Những lợi ích kinh tế-xã hội và rủi ro môi trường, Volume 20 (Tạp chí khoa học công nghệ xây dựng 2014), *available at:* http://stce.nuce.edu.vn/ (visited Nov 27, 2020)
[33] *Id.*at 27
[34] *Id.* at 27
[35] Tze Ni Yeoh, A Roadmap for Plastic Recycling in Vietnam, Mossavar-Rahmani Center, Harvard Kennedy School, 28 (2020)
[36] Huynh Trung Hai, Industrial Standards and Role of Stakeholders in 3R implementation in Vietnam, 145, in Kojma, M (ed.), 3R Policies for Southeast and East Asia, ERIA Research Report (2010)
[37] UN, Strategies to Reduce Marine Plastic Pollution from Lan-based Sources in Low and Middle-Income Countries, 14 (2019)
[38] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 38 (Hong Duc Publishing House) (2018)

commune) is owned and operated by HURENCO, collection & transportation companies do not have to pay a gate fee because it is paid by Hanoi People's Committee.

The main problem of Nam Son landfill is overload capacity. The total area of Nam Son landfill is approximately 84 ha, but it is over capacity. It's designed capacity is 1,000 ton/day, but in fact, it has to serve up to 5,000 ton/day[39]. This status is the same in Xuan Son landfills, another landfills in Hanoi. Moreover, the drawbacks of the landfills are the outdated design, the unsanitary environment, no pressing machines, no gas collection system, and the lack of wastewater treatment system at landfills. It also requires Hanoi authority to invest more in extending capacity and technology innovation in Nam Son landfills as well as encouraging to develop more in alternative waste treatments such as composting, incineration. However, the limited state budget of Vietnamese government and non-efficiency of SOEs which has run the landfill is the big challenges.

Overall, from above status of the private sector participation in SWM, it seems to be that the private sector has not found it attractive to invest in SWM services due to numerous reasons. One of them is uncertainties related to legal framework, and lack of reliable data. Another one is lack of comprehensive national privatization plan for SWM services as well as inconsistent enforcement of regulations[40]. It also criticized on the control of public entities, who own the majority of the shares as well as the competition of the monopoly currently held by SOEs[41]. These challenges will be clarified in the Part III as follows.

III. Some challenges in policies for encouraging the private sector in solid waste management

A. Non-clear objectives in encouraging private sector participation

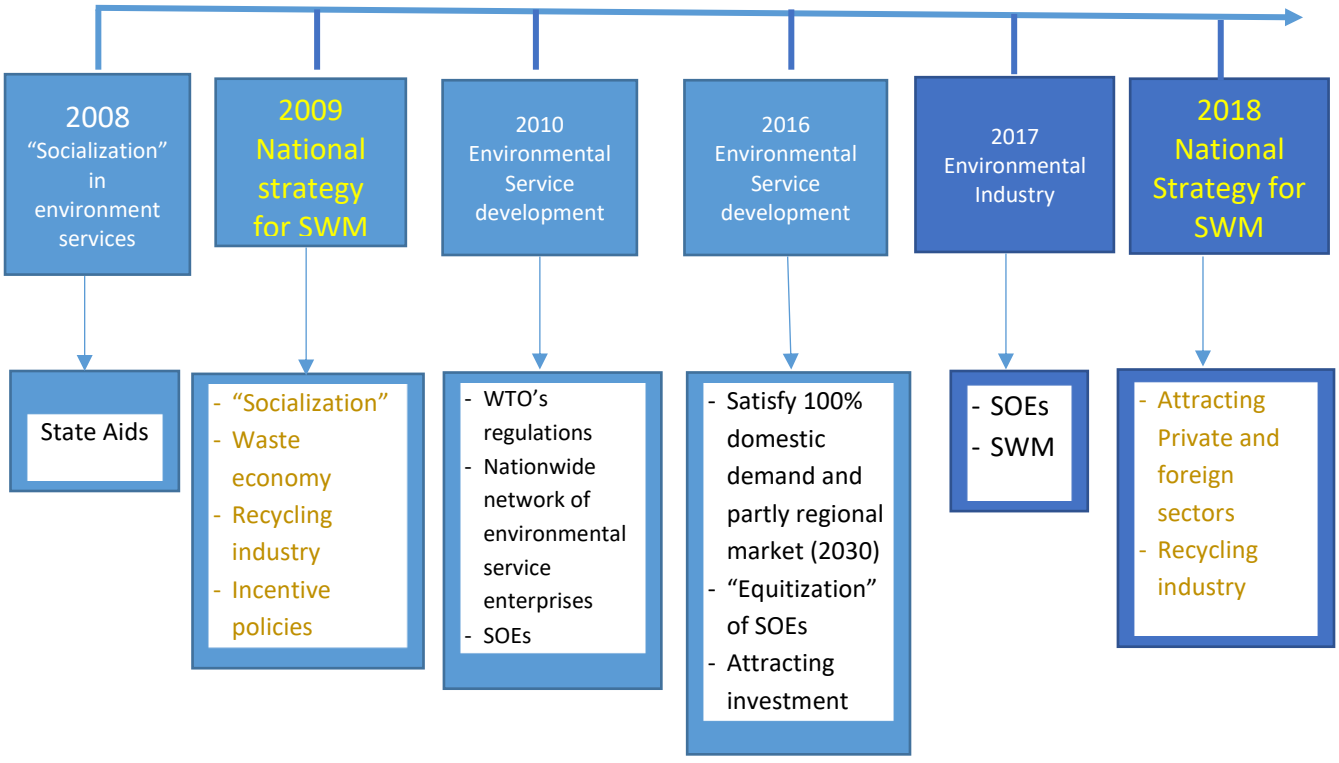
In general, strategies for encouraging private sector involvement in inclusive services such as SWM need to clarify their objectives because there could be many results which can be expected by private sector involvement, including immediate results or long-term results[42]. Also, SWM in developing countries are related closely to the interest of the informal sector, small enterprise, and low-income communities, therefore, it is important for governments to consider the interests of stakeholders which are the main reason for private sector involvement. In addition, clear objectives will help governments to choose the right options. A report by the GTZ in 2005 states that: "*There is a very large range of variations within private sector participation, and many issues that should be considered in choosing the most appropriate arrangement*". For example, based on relationship between the service providers and the relevant governmental departments, there are many models of service provision, including commercialized utility of governments, or joint public -private venture, or a contractor, a franchisee, a concessionaire, or an enterprise which has been licensed to provide these services. Moreover, objectives and options for attracting private sector to SWM

[39] *See:* https://vietnamnet.vn/en/sci-tech-environment/hanoi-s-landfills-overloaded-685456.html *(Visited at 5 Feb 2021)*
[40] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 34 (Hong Duc Publishing House) (2018)
[41] *Id.* at 115
[42] Adrian Coad, Private Sector involvement in solid waste management: Avoiding problems and building on successes, 11 (CWG) (2005)

needs to be widely recognized at all levels of government and among relevant public institutions[43] because infrastructure projects could have negative consequences beyond their authorities and therefore it requires coordination among them. Also, government policy is one of factors which is influence FDI flow[44]. Thus, in principle, in order to attract the private sector participation in SWM, governments often enact an overall strategy in which they clarify objectives and options for development of SWM services.

National level

In Vietnam, at national level, the policy of attracting the private sector to SWM in general and in plastic waste management is mentioned in many different strategies with different objectives and options. The maps below show the process of policy promulgation related to the role of the private sector in SWM in Vietnam.



Map 1. Policies related to SWM over years

[43] *See:* OECD, Principles for Private Sector Participation in Infrastructure, 20 (Edition, OECD Publishing, Paris 2007), *available at* https://www.oecd.org/daf/inv/investment-policy/ppp.htm (visited Nov 27, 2020)
[44] *See:* Alvin G.Wint, Densil A. Williams; Attracting FDI to developing countries: A changing role for government?, (International Journal of Public Sector Management) *avaiable at* https://www.emerald.com/insight/content/ (visited Nov 27, 2020)

We can see that, at the central level, regarding objectives and options, the most common idea for private sector participation in SWM is the process of "socialization" of SWM services. "Socialization" is the term which mostly mentioned in strategies on SWM in Vietnam. Although it is not explained officially in any legal documents, its meaning refers to the process where the Vietnamese government mobilizes all capital resources of individuals and organizations (not from public sector) in providing some public services such as education services (participation of schools, colleges, universities are invested in by private investors); hospital services (private hospitals). In reality, "Socialization" refers to the involvement of the private sector in some service markets which are only delivered essentially by public institutions. The "Socialization" process usually includes incentive policies of the Vietnamese government for the private sector to push this process happen quickly. In other words, socialization in SWM is a policy system of the Vietnamese government to encourage participation of the private sector in providing SWM services. Also, the government mentioned the "Equitization" which refers to the transition from SOEs into joint stock companies and ownership of shares would be transferred from State to private investors through commercial transactions. Through this way, the private investors would become the shareholder of SOEs and have the chances to take part in the management activities of SOEs. In general, the objectives that above polices are towards is to push formation of a SWM services market which the private sector will take the main role in providing services competitively. However, also according to above policies, the Vietnamese government has continuously maintained some SOEs in SWM by reforming their operation more efficient. In fact, one of the most concerns related to SOEs in Vietnam is co-exist with private enterprise in competitive market and even though SOEs in SWM normally take a predominant position in such market before[45].

Regarding plastic waste, the national government issued Decision No.1746/QD-TTg dated 4 December 2019 on the National Action Plan on plastic marine waste management towards 2030. One of methods mentioned is enhancing capacity in collection, classification, storage, transportation and treatment of solid waste and plastic waste from areas near the ocean and on the ocean. However, this plan does not show any concrete methods to get this target.

Thus, in general, at the national level, the Vietnamese government do not have any comprehensive national strategies in which clearly identifies objectives and options for encouraging private sector involvement in SWM in general and plastic waste management in particular. Unclear objectives and options make the legal system become more inconsistent and unpredictable. It also impacts negatively on the implementation of such policies.

Subnational levels

At the subnational level, the provincial People's Committee is responsible for the operation of the local solid waste management. Policies to attract the private sector participation in SWM have been implemented in some big cities such as Hanoi, Da Nang, Ho Chi Minh, and Can Tho ... In rural areas, regarding some simple SWM services such as waste collection, street sweeping, waste transportation is continuously decentralized to district and commune governments.

[45] *See:* OECD, Multi-dimensional Review of Vietnam: Towards an Integrated, Transparent and Sustainable Economy, OECD Development Pathways (OECD Publishing, Paris) (2020) *available at* http://www.oecd.org/publications/multi-dimensional-review-of-viet-nam-367b585c-en.htm (visited Nov 24, 2020)

However, there is not any consistent guidelines from central government or subnational governments for lower governmental levels to implement such policies. Even some local government at rural areas have already set up a master plan on SWM, but this plan is rarely implemented. Thus, there is no clear and detailed guidance on private sector involvement in SWM at the local level[46].

Regarding plastic waste, Hanoi People's Committee issued the Plan No.232/KH-UBND dated 25 October 2019 on preventing plastic waste and plastic bags towards 2020, the vision towards 2025 in Hanoi city. This plan mentioned some solutions related to improvement of solid waste management in general. For example, the plan focused on building support and incentive polices for plastic segregation at source, plastic collection, plastic recycling activities and plastic treatment as well as enhancing the participation of communities in collecting, sorting plastic waste. However, up to now, there is not any detailed regulations on support and incentives for plastic waste management projects in Hanoi.

B. The challenges in privatization and divestment process in SOEs in SMW

Inefficiency of SOEs in SWM is the main motivation for the Vietnamese government to implement privatization and divestment in such SOEs. The private sector participation in such SOEs in Vietnam is expected to improve efficiency of business activities through applying advanced technology and equipment in service provision and management, especially relating to segregation of plastic waste at source, collecting, transport, recycling plastic waste separately. Up to now, there is not data to assess the influence of privatization and divestment in SWM due to this programme has been running, but it emerged barrier in legal framework which can be predicted to influence negatively to get the target of this programme after privatization or divestment.

The ratio of share which can be purchased by private investors is an example. In the process of equitization of SOEs in SWM, private investors seem to be entitled to own the ratio of share from 35% to 50% of the total amount of shares, and after equitization, the State could continuously divest its shares in such joint stock companies (divestment). The ratio for each case will be mentioned detailed in domestic regulations. The table as follows mentioned the sharing holding ratio of shares that the private sector could own in the equitization process in the period from 2016 to 2020[47] as well as divestment of State in some SOEs in SWM in the end of 2020 in Vietnam[48]:

[46] World Bank, Solid and Industrial Hazardous waste management assessment: Option and Actions area to implement the national master plan, 34 (Hong Duc Publishing House) (2018)
[47] Decision on criteria on classification of SOEs and list of SOEs equitzed in the period from 2016 to 2020, 58/2016/QĐ-TTg
[48] Decision on approval of List SOEs divested to the end of 2020, 908/QĐ-TTg

Table 2. Privatization and Divestment in SWM by 2020

No.	Name of Companies	The Ratio investors can purchase	The Ratio of Divestment of State
1	Corporation on Natural Resource and Enviroment	0%	
2	One member Limited Liability Company on Natural Resources and Enviroment in the South	0%	
3	One member Limited Liability Company on Urban Environment in Hai Phong province	35%-50%	
4	One member Limited Liability Company on Urban Environment in An Giang province	50%	
5	One member Limited Liability Company on Urban Environment in Bac Ninh province	50%	
6	One member Limited Liability Company on Urban Environment in Ca Mau province	50%	
7	One member Limited Liability Company on Development Investment and Urban Environment in Cao Bang province	50%	
8	One member Limited Liability Company on Urban Environment in Dak Lak province	50%	
9	One member Limited Liability Company on Water Provision and Urban Environment in Dong Thap province	50%	
10	One member Limited Liability Company on Urban Environment in Hanoi city	50%	
11	One member Limited Liability Company on Urban Environment in Ho Chi Minh city	50%	
12	One member Limited Liability Company on Urban Construction and Environment in Hung Yen province	50%	
13	Joint Stock Company on Enviromental services and urban construction in Vung Tau province		29%
14	Joint Stock Company on Urban Environment in Ha Dong province		25,49%
15	Joint Stock Company on Enviromental services and urban construction in Ha Tinh province		43,55%
16	Joint Stock Company on Urban Environment in Hong Linh		36%
17	Joint Stock Company on Urban Environment in Nha Trang Province		10,68%
18	Joint Stock Company on Urban Environment in Lai Chau Province		29,76%
19	Joint Stock Company on Urban Environment in Lao Cai		15%
20	Joint Stock Company on Environment in Nam Dinh Province		15,04%
21	Joint Stock Company on Enviromental services and urban construction in Nghe An province		45,74%
22	Joint Stock Company on Enviromental services and urban construction in Ninh Binh province		66%
23	Joint Stock Company on Environment in Tam Diep		66%

24	Joint Stock Company on Urban Environment in Viet Tri	93,25%
25	Joint Stock Company on Urban Environment in Quang Nam province	11,93%
26	Joint Stock Company on Urban Environment in Ha Long	86,06%
27	Joint Stock Company on Urban Environment in Son La province	62,64%
28	Joint Stock Company on Enviromental services and urban construction in Thanh Hoa province	52,45%
29	Joint Stock Company on Enviromental services and urban construction in Phuc Yen province	85,46%
30	Joint Stock Company on Urban Environment and Service in Vinh Yen	35%

As we can see that the ratio of shares that can be sold for private investors could be in the range from 35% to 50% and after privatization, the State has continuously divested its shares in some joint stock companies and the ratio of shares divested may be differentiated significantly, even in some cases, the ratio of the State after divestment will be nearly 0% (Joint Stock Company on Urban Environment in Viet Tri).

However, in practice, although the number of shares sold to foreign investors can reach up to 50%, it usually ranges from 10% to 35%[49]. It means that the State still holds the controlling right to make business decisions in such companies after privatization. Therefore, the implementation of ownership of private investors totally depends on the cooperation and trust of the State as a shareholder. Otherwise, after equitization, corporate governance will not be able to introduce significant reforms when the State's representative offices are often weak in management skills and implementation capacity. In addition, if foreign investors are strategic investors, they are also limited in doing some business, for example, they must continue to maintain the main business lines and trademarks of the equitized enterprise for at least 3 years and do not transfer their shares within 03 years from the date of being granted the business registration certificate. Therefore, limitations of share ownership and the freedom of private investors are disadvantages that makes privatization and divestment process not attractive to domestic investors as well as foreign investors in Vietnam[50].

C. The challenges in attracting FDI in SWM

Foreign Direct Investment in SWM services are considered one type of "Green FDI" or green finance which refers to all investment that applies higher environmental standards required by host-country law or goes in production of environmental goods or services[51]. To attract "Green FDI", host-countries have faced a range of challenges in promoting policies to eliminate legal barriers to investment. In Vietnam, foreign investors can participate in the privatization process as an ordinary investor at the public sale of shares or a strategic investor in direct negotiation with

[49] ADB, Assessment of Public-Private Partnership in Vietnam: Constraints and Opportunities, 9 (2012)

[50] *See* Pham Thi Tuong Van, Equitilization of SOEs in Vietnam in the period from 2016-2020: Current practices and recommendations, (Online Financial Journal 2020) *available at* http://tapchitaichinh.vn/tai-chinh-kinh-doanh/co-phan-hoa-doanh-nghiep-nha-nuoc-giai-doan-2016-2020-thuc-trang-va-mot-so-khuyen-nghi-323115.html (visited Sep.15, 2020)

[51] *See* UN, Green Foreign Direct Investment in Developing Countries, (UN Environment 2017), *available a*t http://unepinquiry.org/wp-content/uploads/2017/06/Green_Foreign_Direct_Investment_in_Developing_Countries-input-paper.pdf (visited 24 Nov 2020)

the target SOEs and in specific field such as SWM, foreign investors have to follows specific regulations and the WTO commitment of Vietnam related to environmental services.

Regarding classification of services, in order to attract foreign direct investment in SWM, it is important that national legislation should regulate classification of SWM services[52]. However, there is differences in classification of SWM services between the WTO's commitments and Vietnamese legislation. The Schedule of Commitments on Services of Vietnam only mentions one code of waste management related service namely, "waste treatment services" (CPC 9402), which includes garbage collection activities, transportation, waste treatment activities and waste reduction activities. It also proposes "waste recycling services and disposal services" but they are mentioned in other codes (62118, 62278) [53]. However, according to business line system of Vietnam, it regulates three kinds of waste management service, including waste collection services (381); waste treatment services (382); waste recycling services (383)[54]. Moreover, in Vietnamese legislation, the solid waste collection, sorting, and treatment services are also classified into the group of "public services"[55].

Regarding the ratio of shares which can be owned by foreign investors, in terms of market access or commercial presence of foreign investors, Vietnam does not currently have any restrictions on the maximum number of shares that foreign investors are entitled to invest in or purchase in a Vietnamese enterprise. In the field of SWM, the restrictions of percentage of shares sold normally relates to the purchasing of SOE's privatization as mentioned above. Furthermore, Vietnam has additional commitments that foreign investment companies are not allowed to invest in setting up domestic waste collection systems directly from households, and they are only entitled to provide waste treatment services at collection sites designated by subnational governments. In term of foreign providers, they can do business in Vietnam under the form of BOT and BTO, however in some cases for public interest, Vietnam can reserve exclusive rights or privileges to the private sector, and thus, foreign providers may not be allowed to participate such markets. In these cases, approvals will depend entirely on the Vietnamese government's demand which creates uncertainty for the legal environment and invisible legal barriers for foreign investors.

D. Uncompleted legal framework for Public – Private partnership (PPP) in SMW

SWM services are considered the "public services", and PPP is one of models to encouraging private sector to invest in SWM due to the apparent relationship between service private providers and responsibility of local government in ensuring waste management services for local people[56]. There is not data to assess the influence of PPP model in SWM in Vietnam because the legal framework for this model is in process of building with introduction of act on

[52] *See* Alvin G.Wint, Densil A. Williams; Attracting FDI to developing countries: A changing role for government?, (International Journal of Public Sector Management 2002) *availble at* https://www.emerald.com/insight/content/ (visited at Nov 22, 2020)
[53] *See:* Ministry of Industry and Trade, Cam kết về dịch vụ gia nhập WTP – Bình luận của người trong cuộc *available at:* https://trungtamwto.vn/(visited at Sep 8, 2020)
[54] Decision on The economic system of Vietnam, 27/2018/QD-TTg
[55] Decree on Production and provision of public services, 130/2013/ND-CP
[56] Adrian Coad, Private Sector Involvement in Solid Waste Management – Avoiding Problems and Building on Success, Collaborative Working Group on Solid Waste Management in Low- and Middle-Income Countries, 17-18 (CWG) (2005)

PPP in 2020[57] (came into force in 2021). However, the legal framework for PPP has emerged some disadvantages.

Pricing mechanism of services

A pricing mechanism of service is essential in the PPP model. In particular, governments often set a price for public services below the rate that commercial investment would be able to satisfy and even though in some cases it likely below the rate consumers would expect. This explains that why the infrastructure services often receive State subsidies in order to balance cost recovery and social goals. The disadvantage of a pricing mechanism is that it does not put pressure on service providers in increasing turnover as well as quality of services.

The best approach is that the government should recognize the role of the end consumer or taxpayer who pays for infrastructure services. And, the revenue from citizens needs to increase through increasing the price of services as well as improving the quality of service[58]. Furthermore, in cases where the revenue from service prices is not enough to cover the costs of services, governments need to design a suitable subsidy system[59]. In developing countries, this approach is particularly important since the budget in these countries is inadequate to pay the subsidies for the infrastructure system.

Currently in Vietnam, the cost of SWM services is calculated based on a specific volume of daily-life solid waste and includes operating and maintenance costs; depreciation costs, machinery, factories and works as prescribed by law and other fees, taxes[60]. In principle, the pricing of SWM must be based on infrastructure conditions, context, and affordability of the local budget, but at the same time, it must be associated with service quality and technology in accordance with environmental standards and technical regulations to ensure the improvement of environmental quality and protection of public health[61]. In principle, the pricing mechanism of SWM services in Vietnam is consistent with international practices in that there is a balance between economic and social goals.

However, in practice, the price of SWM services is strictly controlled by subnational governments. Specifically, if solid waste treatment facilities are supported by non-state funds, the investors have the right to prepare and submit to Provincial People's Commitee. Department of Finance which is responsible for assessment and then such an authority will submit to the Provincial People's Committee for approval. In some cases, competence of assessment is the responsibility of the Ministry of Finance if SWM facilities are set up in inter-regional areas. In other words, in all cases, the price of SWM services will be approved by the Provincial People's Committee on the basis of the proposal of the private investors.

[57] Before 2021, PPP is governed by the Decree No.15/2015/ND-CP and the Decree No.63/2018/ND-CP on public private partnership

[58] *See:* World Bank, Private Participation in Infrastructure in Developing Countries, 31 (2003) *available at:* https://openknowledge.worldbank.org/ (Visited at Sep 10, 2020)

[59] *See:* OECD, Principles for Private Sector Participation in Infrastructure, 13 (Edition, OECD Publishing, Paris 2007), *available at* https://www.oecd.org/daf/inv/investment-policy/ppp.htm (visited at Sep 10. 2020)

[60] Decree on Management of waste and scrap, 38/2015/ND-CP §25

[61] Decree on Management of waste and scrap, 38/2015/ND-CP §26

Furthermore, a subsidy system from the State budget for SWM services is also built in Vietnam. In practice, revenue from SWM services includes environmental sanitation fees paid by taxpayers and the fees of other services. The remaining proportion of costs will be compensated for the local budget. For example, if we look closely at the revenue structure of HURENCO, revenue from SWM services accounts for 59.4% of total revenue (the rest is revenue from other activities). In which, revenue from environmental sanitation fee accounts for 6.6%, from other service contracts is 7.6%, and the subsidy of the People's Committee of Hanoi is approximately 45.2%[62]. The revenue from household sanitation fees is particularly low while the percentage of revenue from subsidies is likely high. In other words, in Vietnam, the pricing mechanism for SWM services mainly depends on State subsidies and does not come from consumers/taxpayers.

Risk Sharing Mechanism

According to the OECD principles, the regulations relating to risk allocation between state and private sector in the PPP model is the main factor in motivating private sector participation. The selection of risk sharing mechanism should be based on assessments of public interest[63]. The PPP model needs to ensure that all parties can control their own risks. If these are the risks related to performance of projects, they should be controlled by the private party and if the risks are in the nature of public interest, they should be controlled by the state party.

In Vietnam, the revenue-sharing mechanism has already been mentioned in the new version of Law on Investment in the form of Public-Private Partnerships in 2019 (Article 82). Accordingly, when the practical revenue is more than 125% or less than 75% of the revenue estimated in the financial plan in a PPP project, the risk sharing mechanism will be 50%-50%. However, the sharing ratio will be only implemented if other methods such as adjusting prices, fees and adjusting the duration of the PPP contract have been already applied but they do not help private investors to reach the minimum revenue as estimated before.

Moreover, risk sharing ratio in case of decreasing revenue will be only applied when the PPP project meets a number of requirements, including:

- The project applies the type of BOT contract, BTO contract, BOO contract.
- Relevant plans, policies and laws have changed which are the main cause for reducing revenue.
- Measures to adjust prices, fees for services, adjust the duration of PPP contracts have already applied but they have not ensured the minimum revenue.
- The revenue reduction has been audited by the State Audit.
- The risk sharing mechanism related to revenue decrease must be determined in the investment approval decision at the beginning of the project.

Although a risk sharing mechanism is considered a new provision in PPP legal framework in Vietnam, there is a significant amount of controversy. Many politicians believe that the ratio of 50% -50% should not be fixed because the decrease in revenue of PPP projects can be caused by

[62] World Bank, Solid and industry Hazardous Waste Management Assessment, 20 (Hong Duc Publishing House)(2018)
[63] *Id.* at 14

many reasons, possibly due to changes in legal policies but also possible not. If the reasons are from investors, the reduced revenue sharing ratio may be different in each case and each project.

Sites for SWM facilities

Sites for the transition stations and waste disposal complexes under the Solid Waste Management Plan are designed by national or subnational governments. In which, the Prime Minister or Minister of Construction are responsible for planning SWM facilities in key economic zones, inter-provincial areas, inter-urban areas…while, at the local level, sites for SWM facilities will be designed and approved by the Chairman of the Provincial People's Committee. Thus, in all cases, sites for SWM facilities will be strictly limited to planned locations. The following table shows the identified locations for SWM facilities in Hanoi for the period from 2030 to 2050[64]:

Table 3. Sites for SWM facilities in Hanoi planned from 2030 to 2050

Area	Location	Estimated Volume (tons per day)		
The north of Hanoi	**Transition Stations:**			
	1 Thanh Lam, Me Linh district, Vinh Phuc province	750-1000		
	2 Tay Mo, Nam Tu Liem district	850-1000		
	3 Others with Small and medium sizes in inner of Hanoi	2.500-3000		
	Treatment facilities:	**2020**	**2030**	**2050**
	1 Nam Son, Bac Son, Hong Ky, Soc Son district	4.500	6.000	7.000
	2 Viet Hung, Dong Anh district	300	600	600
	3 Kieu Ky, Gia Lam district		550	1000
	4 Phu Dong, Gia Lam district	550	850	1200
	5 Cau Dien, Tu Liem district	450	800	1000
The South of Hanoi	**Transition Stations:**			
	1 Thanh Oai, Thanh Tri district	800-1000		
	2 Others near treatment facilities in area II			
	Treatment Facilities:	**2020**	**2030**	**2050**
	1 Chau Can, Phu Xuyen district	450	800	1000
	2 Cao Duong, Thanh Oai district	400	500	750
	3 Hop Thanh, My Duc district	150	450	850
	4 My Thanh, My Duc district	150		200
	5 Dong Lo, Ung Hoa district	150		200
	6 Van Dinh, Ung Hoa district	150		200
The West of Hanoi	**Transition stations:**			
	1 Chuc Son, Chuong My district	500-700		
	2 Quoc Oai, Quoc Oai district	500-700		
	Treatment Facilitities:	**2020**	**2030**	**2050**
	1 Xuan Son, Ba Vi district	700	1600	2500

[64] Approval Desision of solid waste treatment plant in Hanoi to 2030, with a vision to 2050 of Hanoi's People Commitee, 609/QD-TTg (2014)

2	Phuong Dinh, Dan Phuong district	150		300
3	Tan Tien, Chuong My district	200	450	450
4	Lai Thuong, Thach That district	300	450	700
5	Dong Ke, Chuong My district	350	600	1200
6	Tay Dang, Ba Vi district	100		100

We can see that sites for transition stations and treatment facilities in Hanoi have already been in specific areas. This bring up many advantages for private investors. Specifically, SWM facilities enjoy investment incentive policies of the Vietnamese government, including access to land. Accordingly, sites for SWM facilities will be prioritized to access to technical infrastructures, including roading systems, electricity, water supply and drainage, communication, and energy which are available and connected to such region's general technical infrastructure system. Moreover, the State will support private investors in site clearance activities in order to handed over "clean land" to investors. In other words, indentification of sites for SWM facilities will create a comprehensive technical infrastructure system to facilitate the operation of SWM facilities.
However, in practice, the site clearance process is often slow due to procedures and unreasonable compensation. In some cases, people disagree with the amount of compensation which may lead to a long-term lawsuit. Furthermore, in treatment facilities in Nam Son, Hanoi, people prevented garbage trucks from entering the waste disposal area for the purpose of creating pressure on local authories to pay compensation relating to site clearance.

Lack of clear criteria for bidding

In order to decrease many conflicts and frictions between clients and contractors, a useful way is clearly suggesting how the performance of services will be taken and monitored[65]. A clear description of service is not only a beneficial method for the local government to assess quality of the services but also an important legal basis for bidders to prepare their proposals.

In Vietnam, in principle the selection of investors is now in compliance with the provisions of the Law on Bidding. Accordingly, investor selection is mainly based on the principle of competition, fairness, transparency, and efficiency. To ensure these principles, it requires the government to set up a standard system for SWM service providers.

However, at present, the national government does not have any unified guidelines for SWM service providers. Although the provincial People's Committee is responsible for building such guidelines through the creation of regulations, there is no general guidelines for SWM service providers at subnational government level. In practice, subnational governments will only issue a set of criteria for service providers for a specific project[66]. As a result, private investors must wait

[65] Adrian Coad, Private sector involvement in solid waste management: Avoiding problems and building on successes, Collaborative Working Group on Solid Waste Management in Low- and Middle-Income Countries, 12 (CWG)(2005)
[66] Approval Decision of criteria set on society-economy-environment-technology for investment of domestic debris waste treatment facilities at debris waste treatment complexes in Hoa Khanh Nam commune of Danang's People Commitees, Lien Chieu district, Da Nang city, 4365/QĐ-UBND (2019).
Approval Decision of criteria set on investor selection for investment of debris waste treatment facilities at Bac Quang Nam, 2257/QĐ-UBND (2020).

for the issuance of such standards if they want to prepare bidding documents for certain SWM projects.

The following table compares two sets of criteria issued by Quang Nam People's Commitee in relation to a treatment facility project in the north of Quang Nam province[67] and Da Nang People's Commitee in relation to a treatment facilitity project in Lien Chieu district, Da Nang province[68]:

Table 4. Set of criteria for investor selection in two provinces

	Quang Nam in 2020	**Da Nang in 2019**
Estimated Volume:	**300 tons/day**	**1.000 tons/day**
Investment Methods:	BOT	PPP
Time period:	Building: 12 months Operation: 30 years	25 years
1.Technology		**1.Technology**
	- Certified by authorities - Mixed treatment technologies - Use less energy - Complex facility (classification and treatment - Landfill rate < 5% - National Technical Standards/National Standard/Standard G7 - New equipment (No or at least ~~to~~ use manual labours)	- Satisfying natural conditions - Satisfying characteristic, natures of SWM in local - New 100% - Origin: EU, G7 - Certified by authorities - Automation (None, at least to use manural labour - Resource circulation - Use less energy - Equipment localization - Landfill rate < 5% - Secondary waste treatment methods - Rate to recycle waste water: 100% - Technology transition contract under Vietnamese law.
2.Enviroment and Society		**2.Environment**
	- Vietnamese environmental Standards - Vietnam standards for recycling products - Treatment methods to secondary waste - Treatment facilities designed to ensure Vietnamese environmental Standards (methods reduces the rate of moisture < 30%) - The ratio of collecting, treating, recycling waste water = 100%	- Vietnam environmental Standards (Strictly) - International environmental Standards (encouraging) - Preventation methods for environment problems

[67] Decision on approval of set of criteria on investor selection in treatment facilitiy project in the north or Quang Nam province, 2257/2020/QĐ-UBND

[68] Decision on approval of set of criteria on investor selection in treatment facilitiy project in Lien Chieu district, Da Nang province, 4365/2019/QĐ-UBND

- Use local labours **3.Finance and Implementation Capacity**	**4. Implementation Capacity, experience of Investors**
- Technology owner certificate or technology transition contract; - Total of investment capital: 500.000.000.000 VND - 50% investment capital owned by Investors (exclude capital of investors in other projects) - Guarantee of commercial banks for remaining capital amount - Time for operation trial: 03-06 months	- Capacity in building feasility study for the project - Experience in implementing project with estimated volume 500 tons/day - Investor is the owner of technology or having technology transition contract. - Time for building and operation trial: < 2 years
4. Ecomomy - Service Price: < **400.000 VND/ton** (include VAT) - Cost for site clearance paid by investors (included incentives policies of local government) - Finance Schedule: NPV, IIR, B/C, ROE - Schedule for trading recycling products	**3. Economy and Society** - Ensuring capital rate owned by investors - Price of Service **<25 US/ton**

If looking closely at the table, we can see some common points in general standards of investor selection issued by subnational governments. They both include criteria related to technology, environment, economy, society, and implementation capacity of investors. These criteria are particularly important for investors when preparing their bidding dossiers as well as they are legal basis for the People's Committee to select appropriate investors for specific projects. However, there are also many differences in investor selection standards issued by different local governments. For example, regarding finance and implementation capacity, the project in Quang Nam requires the ratio of capital owned by investors to be 50% of total of investment capital while there is not any detailed requirement in the project in Da Nang. Therefore, the set of criteria in specific projects will prevent investors estimating risks of such projects and creates uncertainty in the legal environment in the bidding market in Vietnam. Also, it leads to difficulty in ensuring fair treatment among investors in the application process of such criteria. In practice, a set of a certain criterion may be higher than general standards for the purpose of eliminating some investors who meet some requirements or may be also lower than general standards in order to facilitate some investors who do not meet such requirements.

IV. Some implications for Vietnam to enhancing private sector in SWM

Reducing marine plastic waste through improving SWM in mainland is the general solution which are mentioned in many studies. Through this solution, it contributes to decrease the rate of mismanaged plastic waste which can leak into marine environment. However, improving system of SWM in developing countries is not easy with many huge challenges such as limited state budget, weak institution capacity of public sector as well as private sector, uncompleted SWM service market. All factors created many barriers for the process of SWM reform in developing countries. There are many advantages as well as disadvantages for private sector participation in

SWM[69], but at least in term of legal framework, countries should promogulate a clear legal basis to encourage private sector participation as well as prevent the possible disadvantages. Basing on analysis of above challenges, there are some implications should be noticed to improve legal framework for private sector participation in SWM in Vietnam as follows:

A comprehensive master plan

The above analysis shows that Vietnam has lacked an overall strategy for the involvement of the private sector in SWM. A comprehensive strategy not only provides a concrete roadmap for the privatization of an economic sector, but it also demonstrates the strong commitment of the Vietnamese government to a safe and stable legal environment for private investors, especially foreign investors. There should be a change in the State's perception of an area such as SWM that was previously under the monopoly of the state to a sector with participation of the private sector. State intervention in SWM must harmonize the social and economic goals in a healthy and fair competitive environment.

Empower private investors in post-equitization of SOEs

Maintaining a dominant share of the state in environmental services firms after privatization ensures that the State can still influence the decisions of enterprises to be line with public interests. The presence of public shareholders in such sectors is essential; however, assessment and transparency of sector-specific goals needs to be reviewed[70]. Therefore, the requirement for public shareholder participation and the rate from 50% to 65% of the total amount of shares in environmental services firms after equitization needs to be carefully considered. Although an ownership rate of over 50% of contributed capital or voting shares will ensure that the State proactively promulgates the majority of ordinary decisions of enterprises and for important decisions, this ownership ratio still ensures the right to dominate other important decisions of the business. But, in reality, it is the concern of the investor for projects which requires high investment of capital in SWM.

Enhancing consistency in enforcement of policies attracting FDI in SWM

It seems that Vietnam is maintaining a policy of restricting market access for foreign investors while capital from FDI is considered extremely important for key infrastructure sectors such as SWM. In the context of limited government budgets and low financial capacity of domestic investors, the expansion of market access by foreign investors is extremely necessary.

Completing the legal framework for PPP in SWM

In addition to making clear commitments to open markets to environmental services in order to attract foreign investors, Vietnam needs to improve the legal framework of the PPP model.

[69] Adrian Coad, Private sector involvement in solid waste management: Avoiding problems and building on successes, Collaborative Working Group on Solid Waste Management in Low- and Middle-Income Countries, 6 (CWG)(2005)
[70] *See* OECD, Guidelines on Corporate Governance of State-Owned Enterprises, 17 (Edition, OECD Publishing, Paris 2015), *available at* http://dx.doi.org/10.1787/9789264244160-en (visited Sep 13, 2020)

With regard to the pricing mechanism of services, it is important to identify the funding sources to help offset the financial deficit for the projects. Since the preparation of a project proposals requires a lot of funding and resources, the lack of clear regulations on funding sources to offset financial deficits will create a barrier for the competent authority or the investors' interest in project preparation. The State also forms a PPP Project Development Fund with the functions of allocating state capital and providing guarantees. This fund can mobilize capital from a variety of sources such as the state budget, government bonds, ODA, repayment by investors upon successful signing of contracts, sale proceeds, franchising to exploit assets, infrastructure, and pre-sale of public assets after reallocation. It also means that the government needs to take more drastic action, including the introduction of specific mechanisms to develop a PPP project pilots successfully in areas with urgent demands, such as SWM.

Special features of the public-private partnership (PPP) scheme, including the long-term nature of franchising and risk-sharing contracts, multi-party participation, and sensitive issues politically and socially has created a lot of opportunities for disputes, especially between investors and authorites. In a PPP, public sector behavior will determine the response and participation of the private sector. The private sector has the right to decide whether or not to participate in a PPP project. If the policies of the public sector project implementation agencies are not really transparent and are not in line with market principles, investors will be afraid and not want to participate. Moreover, risks in public-private relations can come from both the state side and the investor side. Specific legal risk changes in the Law on Investment, public investment, land, budget, construction, environment; risks of mechanisms for management, monitoring and valuation of BOT and BT projects; financial and tax risks, all these factors require the state to have a flexible and complete legal framework for the PPP model.

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Closing the GAP between the National and the Global: A Regional and Market-Based Approach to End Plastic Pollution

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Abstract

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was recently amended to treat plastic waste as hazardous. Further, an amendment to the Convention has recently come into force, prohibiting the export of hazardous waste from participating developed countries to participating developing countries. While this is all good, and adds to the legal arsenal against the scourge of plastic waste, it does not stop the proliferation of plastic waste. The Convention of the Law of the Sea does include some basic principles for the protection of the marine environment, but its reliance on incorporation by reference has meant that regulations on marine pollution have effectively only been adopted for ship-source pollution, and not land-based pollution.

The United Nations Environment Assembly (UNEA) has also been seized of the issue. Informed by the principles of common but differentiated responsibility (CBDR) and the polluter pays principle, this working paper builds on the UNEA's Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics (AHEG)'s proposal for a "Global Architecture for Marine Plastic" (GAMP). This paper proposes a Global Architecture for Plastics Plus (GAP+) consisting of a global framework agreement, supported by regional plastic treaties and regionally determined plastic waste elimination commitments, plus a global market-based crediting mechanism (MBCM) to deliver and implement appropriate technology development and transfer (TDT) in each region, as well as funding environmental and ecological restoration efforts. The GAP+ should therefore catalyse and accelerate the efforts and ambitions of states and regions, as well as the private sector, in adopting the necessary actions and technologies to eliminate plastic waste, especially in the marine environment.

Keywords: Plastic pollution, marine plastic, Global Architecture for Marine Plastic

I. Introduction

Globally, in the 65-year period between 1950 and 2015, 8300 million tonnnes, or megatonnes (MT) of plastic was produced as virgin plastic. Of this, 5800 MT were single-use, and 4600 MT was discarded. 700 MT was incinerated, and 500 MT was recycled at least once. Only 100 MT of the total is still being recycled, and another 2500 MT is still in use.[1]

Looking at the question from another perspective, we produced 270 MT of virgin plastic and created 275 MT of plastic waste in 2010. Of this, 8 MT, or 3% of all plastic waste enters the

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[1] Hannah Ritchie and Max Roser, 'Plastic Pollution' (*Our World in Data*, 2018) <https://ourworldindata.org/plastic-pollution> accessed 20 April 2020.

oceans,.[2] In turn, plastic makes up 80% of all marine debris.[3] This causes significant harm for marine wildlife as the plastic waste may entangle or be injured (collision, abrasion, etc) by the plastic waste, or they may ingest the plastic, affecting their health by inhibiting nutrient intake or causing internal organ damage.[4] At current rates, it is estimated that overall plastic production will reach 1124 MT in 2050, and would exceed the total weight of fish in the ocean by then (currently, the total weight of marine plastic debris is one-fifth of the total weight of fish in the ocean).[5]

Even if the annual addition of 8 MT of plastic waste is stopped from reaching our seas, the pre-existing plastic waste will still exist – and for hundreds of years.[6] New plastic waste will likely be diverted to landfills, where they continue to pile up, possibly for eternity. The landfilling of plastic waste has been observed to cause water contamination, respiratory illnesses, and crop death.[7]

In 2019, the parties to the Basel Convention[8] adopted new restrictions on the import and export of plastic waste.[9] These followed reports of various Southeast Asian countries rejecting imports of plastic scrap, ostensibly for recycling.[10] In turn, China had earlier effectively banned imports of plastic scrap as part of its "National Sword" policy, beginning in 2017.[11] As such, the global recycling system for plastics has collapsed.[12]

Further, the Basel Ban Amendment, which bans hazardous waste flows from developed countries to developing countries for the purposes of disposal, recovery, and recycling, entered into force on 5 December 2019.[13] While stopping the export and offshoring of plastic waste management problems in practice, the Amendment has created complications for global governance of plastic. It acts as a blunt tool, stopping almost all North-South plastic flows. Any plastic waste that is not clean, uncontaminated, sorted by polymer type, *and* "destined for recycling"

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[2] Ibid.

[3] International Union for Conservation of Nature (IUCN), 'IUCN Issues Brief: Marine Plastics' (*International Union for Conservation of Nature*, May 2018) <https://www.iucn.org/sites/dev/files/marine_plastics_issues_brief_final_0.pdf> accessed 20 April 2020.

[4] Kara Lavender Law, 'Plastics in the Marine Environment' (2017) 9 Annual Review of Marine Science 205.

[5] World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, 'The New Plastics Economy — Rethinking the future of plastics' (*Ellen MacArthur Foundation*, 2016) <https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics> accessed 20 April 2020 [*New Plastics Economy*].

[6] *New Plastics Economy* (n 5), 29.

[7] Hannah Ellis-Petersen, 'Treated like trash: south-east Asia vows to return mountains of rubbish from west' (*Guardian*, 28 May 2019) <https://www.theguardian.com/environment/2019/may/28/treated-like-trash-south-east-asia-vows-to-return-mountains-of-rubbish-from-west> accessed 20 April 2020.

[8] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (adopted 22 March 1989, entered into force 5 May 1992) 1673 UNTS 57 [*Basel Convention*].

[9] Amendments to Annexes II, VIII and IX to the Basel Convention, Decision BC-14/12, UN Doc EP/CHW.14/28.1 (11 May 2019) [*Basel Plastic Waste Amendment*].

[10] Hannah Alcoseba Fernandez, 'If the Philippines banned waste imports, why is it still the world's dumping ground?' (*Eco-Business*, 11 March 2020) <https://www.eco-business.com/news/if-the-philippines-banned-waste-imports-why-is-it-still-the-worlds-dumping-ground/> accessed 20 April 2020.

[11] Hannah Koh, 'China's waste ban 'an opportunity for innovation'' (*Eco-Business*, 25 October 2017) <https://www.eco-business.com/news/chinas-waste-ban-an-opportunity-for-innovation/> accessed 20 April 2020.

[12] Vivienne Walt, 'Plastic That Travels 8,000 Miles: The Global Crisis in Recycling' (*Fortune*, 16 March 2020) <https://fortune.com/longform/plastics-global-recycling-problem/?plokij> accessed 20 April 2020.

[13] Secretariat of the Basel Convention, 'Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal: Status of Ratifications' (*Basel Convention*, 2019) <http://www.basel.int/Countries/StatusofRatifications/BanAmendment/tabid/1344/Default.aspx> accessed 20 April 2020.

will be affected, regardless of prior informed consent.[14] Some countries intend to go further, and ban all imports of plastic waste entirely.[15] While this bluntness is necessary to prevent circumvention of controls by falsely declaring waste plastic as recyclable/reusable,[16] it also means that the North will have less incentive going forward to help the South build their capacities to resolve the legacy issues of existing plastic waste.

Other than the parties to the Basel Convention, the United Nations (UN) Environment Assembly (UNEA) is also considering the issue, having set up an Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics (AHEG).[17] The UNEA AHEG is currently studying various governance strategies and approaches for consideration, including a "new global architecture with a multi-layered governance approach", which they have described as a "Global Architecture for Marine Plastic" (GAMP).[18] However, the emphasis on "marine" plastic pollution is telling – the focus of the Basel Convention, the UNEA, as well as other agreements such as the UN Convention on the Law of the Sea (UNCLOS),[19] the 1973 International Convention for the Prevention of Pollution from Ships (MARPOL),[20] and the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention),[21] are on *downstream* regulations. In other words, they concern themselves with what happens to plastic after they become waste. They have little, if anything, to say about *upstream* regulation of plastics, ie reducing plastic waste in the first place. In the UNCLOS, MARPOL, and London Convention regimes, these regimes all focus on the ocean and managing human impacts on it. The question of plastic pollution in general is thus either a small part of these regimes, or even a mere ancillary issue.

The upshot of the current approach is that the international community focuses on cleaning up after ourselves in terms of plastic pollution, but it does not stop the plastic pollution from being generated. At best, it would seem that there would be a reduction in plastic pollution. However, as long as there is no impetus to actively remove plastics from waste streams and affected environments, we cannot reach a state of zero plastic pollution in our environment.

Following the principles of common but differentiated responsibility (CBDR) and the polluter pays principle, this working paper will propose an ambitious new Global Architecture for Plastics Plus (GAP+) consisting of a network of regional plastic agreements under a global

[14] 'Empowering Countries to Stop the Plastic Flood: A Groundbreaking Decision under the Basel Convention' (*Center for International Environmental Law*, 26 June 2019) <https://www.ciel.org/empowering-countries-stop-plastic-flood-basel-amendment/> accessed 20 February 2021.

[15] Paul Hagen, Russ LaMotte and Dacie Meng, 'Basel Convention Recasts the Circular Economy for Plastics' (*Beveridge & Diamond PC*, 15 May 2019) <https://www.bdlaw.com/publications/basel-convention-recasts-the-circular-economy-for-plastics/> accessed 20 February 2021.

[16] INTERPOL, 'INTERPOL Strategic Analysis Report: Emerging Criminal Trends in the Global Plastic Waste Market since January 2018' (August 2020) 15–16 <https://www.interpol.int/en/News-and-Events/News/2020/INTERPOL-report-alerts-to-sharp-rise-in-plastic-waste-crime> accessed 20 February 2021.

[17] Marine litter and microplastics, Decision 3/7, UN Doc EP/EA.3/Res.7 (30 January 2018).

[18] Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches, UN Doc EP/AHEG/2018/1/INF/3 (8 May 2018) , 89.

[19] United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994), 1833 UNTS 3 [*UNCLOS*].

[20] 1973 International Convention for the Prevention of Pollution from Ships, (adopted 2 November 1973), as Modified by the Protocol of 1978 Relating Thereto, (adopted 17 February 1978, entered into force —2 October 1983), 1340 UNTS 62 [*MARPOL*].

[21] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, (adopted 29 December 1972, entered into force 30 August 1975), 1046 UNTS 120 [*London Convention*].

framework agreement. The GAP+ would set out five globally binding measures. These are the elimination of virgin plastic made out of fossil fuels, elimination of plastic waste, minimization of plastic flows, formation and membership of regional plastic agreements, and adoption of an agreed set of standards. The regional agreements will focus on the implementation of the globally binding measures, including phasing out virgin plastic production in favour of recycled plastic production, and further regulations and restrictions on the transport of plastics.

The implementation of the GAP+ will be supported by a global market-based crediting mechanism (MBCM) to deliver and implement appropriate technology development and transfer (TDT) in each region, as well as funding environmental and ecological restoration efforts. Where their regional infrastructure is insufficient, individual countries or entire regions may supplement the infrastructure with market-based mechanisms, subject to access provisions agreed to in the GAP+.

I. Existing international legal regimes

The issue of plastic pollution, thus far, has been mostly addressed by existing international law regimes under the rubric of "marine plastic pollution" or "marine plastic debris". For the purposes of this paper, the former term will be preferred, since the term 'pollution' more accurately describes the nature of the problem.[22] As a preliminary point, however, it is noted that this term implies a downstream approach, as it focuses on the ultimate destination of plastic pollution. Though this paper takes the position that downstream regulation is insufficient, it is noted that these regulations are still important to examine, if only to identify their shortcomings and why upstream regulation is necessary as well.

There are a number of international law regimes which have responded to the issue of plastic pollution. However, they have all been treating the symptoms, rather than the syndrome itself. Principally, the fixation on plastic as "marine" and/or "waste"[23] has meant that the focus has been placed on existing multilateral environmental agreements (MEAs) which govern the production and transport of hazardous substances (the Basel and Stockholm Conventions), and marine pollution (the UNCLOS, MARPOL, and London Convention regimes), but not necessarily upstream sources of plastic waste.

The response of the plastics industry has been to invent new forms of "plastic" which are derived from biomass and degrade in a matter of months, rather than years, with the help of bacteria or fungi.[24] These are known as "bioplastics". They are classified into three "generations" – the first generation of bioplastics use carbohydrate-rich plants. The second generation uses food waste and non-food crops. The third generation uses algae.[25] However, these plastics come with their own set of problems. While both first and second generation bioplastics will produce less GHG

[22] The Oxford Dictionary of English (Angus Stevenson (ed), *Oxford Dictionary of English* (3rd edn, Oxford University Press 2010)) defines "pollution" as "the presence in or introduction into the environment of a substance which has harmful or poisonous effects" and "debris" as scattered pieces of rubbish or remains". The former definition more accurately describes the effect of plastic in the marine environment on aquatic species and humans alike, and it is submitted that it is preferable.

[23] Giulia Carlini and Konstantin Kleine, 'Advancing the international regulation of plastic pollution beyond the United Nations Environment Assembly resolution on marine litter and microplastics' (2018) 27 Review of European Comparative & International Environmental Law 234.

[24] *New Plastics Economy* (n 16), 100.

[25] *New Plastics Economy* (n 16), 92.

emissions that virgin plastics, both involve increased land use, use of pollutants in the form of pesticides and chemicals required to convert the biomass into plastics, as well as ozone depletion.[26] The impact of bioplastics in general on biodiversity and agricultural processes is another issue which may also be of concern.[27] Moreover, some bioplastics require elevated heat levels in order to biodegrade, which may bring with it increased GHG emissions.[28] These heat levels are not available ordinarily in the natural environment, which means that these bioplastics have the same potential to become plastic pollution, in the same way as traditional plastics.[29] As such, it is submitted that the precautionary principle should be applied. In the face of the serious environmental concerns that the industrial production of bioplastics may have, they should not be seen as a solution to plastic pollution.

a. Marine environment protection regimes

The question of pollution generally in the marine environment has been subject to regulation for some time, beginning with the Torrey Canyon incident in 1967.[30] The United Nations Convention on the Law of the Sea (UNCLOS) adopts the basic position in Article 192 that "states have the obligation to protect and preserve the marine environment."[31] It is clear that the states have an duty and obligation to protect the marine environment, including the "living resources and marine life" within.[32] In UNCLOS, Article 192 is then followed by the specific measures that states are required to take to give effect to Article 192. For our purposes, this includes Articles 194, 197, 207, and 210.

Article 194 provides that "states shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source… [and] ensure that activities under their jurisdiction or control… does not spread" to other countries and areas beyond their jurisdiction.[33] Article 197 further binds states to co-operate in "elaborating international rules, standards and recommended practices and procedures … for the protection and preservation of the marine environment".[34]

Article 207 and 210 requires state parties to UNCLOS to, *inter alia*, "adopt laws and regulations" and "other measures as may be necessary" to "prevent, reduce and control pollution of the marine environment by dumping",[35] including in its territorial waters, exclusive economic

[26] Michaelangelo D. Tabone and others, 'Sustainability Metrics: Life Cycle Assessment and Green Design in Polymers' (2010) 44(21) Environmental Science & Technology 8264; Renee Cho, 'The Truth About Bioplastics' (*State of the Planet - Earth Institute, Columbia University*, 2017) <https://blogs.ei.columbia.edu/2017/12/13/the-truth-about-bioplastics/> accessed 20 April 2020.
[27] *New Plastics Economy* (n 16), 95.
[28] *New Plastics Economy* (n 16), 100-101.
[29] Ibid.
[30] The Torrey Canyon incident involved the SS Torrey Canyon, an oil tanker. It ran aground on a reef off the south-west coast of the United Kingdom on 18 March 1967, spilling 120,000 tonnes of crude oil, and polluting coasts in *inter alia,* Britain, France, and Spain were affected by the oil and other substances used in an effort to mitigate damage. (MARPOL 73/78 and Annex I: An Assessment of its Effectiveness Gini Mattson, 'MARPOL 73/78 and Annex I: An Assessment of its Effectiveness' (2006) 9(2) Journal of International Wildlife Law and Policy 175, 179-180).
[31] UNCLOS, Art 192.
[32] *Request for Advisory Opinion submitted by the Sub-Regional Fisheries Commission* [2015] ITLOS Rep 4 , para 216.
[33] UNCLOS, Art 194(1)-(2).
[34] UNCLOS, Art 197.
[35] "Dumping" is defined in Article 1(5) of UNCLOS as 'deliberate disposal of wastes", excluding "the disposal of wastes or other matter incidental to, or derived from the normal operations of vessels".

zone, and on the continental shelf, as well as "pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures".[36] In theory, this should mean that every state party to UNCLOS would have implemented national laws and regulations, as well as other measures, to prevent marine plastic pollution, since it is a form of land-based pollution and dumping. One breakdown of marine plastic pollution has established that land-based plastic pollution forms 80% of the plastics in the ocean, and abandoned fishing gear and plastic waste intentionally dumped at sea each account for another 10%.[37]

Thus, had Articles 194, 197, 207, and 210 been faithfully implemented by all state parties in whole, the problem of marine plastic pollution would not exist. Yet it does. Some have noted that the "international agreed rules" etc. as mentioned in Article 194 does not offer clear guidance in practice, since there is no explanation as what these rules may be, and therefore effectively impossible to enforce.[38] This practice of incorporation by reference assumes the good faith of parties to follow up the adoption of UNCLOS with further internationally agreed rules in the form of legally-binding conventions and other co-operative measures. As it turns out, however, this has only been true for ship-source pollution. Regulation 3 of MARPOL Annex V, adopted in 1988,[39] strictly prohibits "the disposal into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags".[40] Regulation 7 further requires all parties to MARPOL Annex V to "ensure the provision of facilities at ports and terminals for the reception of garbage".[41] Further, Article IV of the 1972 London Convention, read together with a Annexes I and II of the Convention, specifically prohibit the dumping of "persistent plastics" which "may float or may remain in suspension in the sea in such a manner as to interfere materially with fishing, navigation or other legitimate uses of the sea".[42]

Additionally, a significant gap remains in UNCLOS. The regulation of plastic pollution occurring in international waters, beyond the reach of national laws, is entirely absent. Indeed, it has been observed that even after UNCLOS came into force, "the high seas, or the areas outside national jurisdiction, [are still] free for all to use and abuse".[43] Some have proposed that ongoing negotiations on the protection of biodiversity beyond national jurisdiction (BBNJ) should include the prevention of dumping of plastic waste.[44] Others, however, have cast doubt on this approach, since the mandate of the BBNJ negotiations does not mention plastics at all.[45]

[36] UNCLOS, Art 207, 210(1)-(2).
[37] Ritchie and Roser (n 12).
[38] Elizabeth A. Kirk and Naporn Popattanachai, 'Marine plastics: Fragmentation, effectiveness and legitimacy in international lawmaking' (2018) 27 Review of European Community & International Environmental Law 222; Carlini and Kleine (n 24).
[39] Paul E Hagen, 'International Community Confronts Plastics Polluting from Ships: Marpol Annex V and the Problem That Won't Go Away' (1990) 5 American University Journal of International Law and Policy 425.
[40] MARPOL, Annex V, Regulation 3.
[41] MARPOL, Annex V, Regulation 7.
[42] London Convention, Art IV(1)(a).
[43] Rachel Tiller and Elizabeth Nyman, 'Ocean plastics and the BBNJ treaty—is plastic frightening enough to insert itself into the BBNJ treaty, or do we need to wait for a treaty of its own?' (2018) 8 Journal of Environmental Studies and Sciences 411.
[44] Tiller and Nyman (ibid); Kirsten Schmalenbach and Julia Pleiel, 'An Ocean of Plastic: What can a Future "Treaty on Biodiversity in Areas Beyond National Jurisdiction" Contribute to Solving a Global Problem' (2019) 57 Archiv des Völkerrechts 1; E.M. De Santo and others, 'Protecting biodiversity in areas beyond national jurisdiction: An earth system governance perspective' (2019) 2 Earth System Governance 100029.
[45] Carlini and Kleine (n 24).

b. The Basel Convention regime

The 1989 Basel Convention regime, which entered into force in 1992, is concerned with the trade in hazardous wastes. It establishes a system of prior informed consent for the import, export, and transshipment of hazardous waste. Anyone who intends to move export waste must first obtain the prior informed consent of the state where the waste is to be imported into, as well as any states which the hazardous waste may transit through.[46] State parties to the Basel Convention may also limit or ban the import or export of hazardous wastes as well.[47] State parties are also required to ensure that no hazardous waste is imported from, or exported to, non-parties.[48]

Two years after Basel entered into force, the conference of parties to the Basel Convention adopted a decision to ban on hazardous waste flows from developed countries to developing countries for the purposes of disposal, recovery, and recycling.[49] However, as the decision was not considered to be binding on parties, it was converted into an amendment to the main convention, known as the Basel Ban Amendment, in 1997.[50] This amendment entered into force on 5 December 2019.[51]

Further, at the 14th meeting of the parties to the Basel Convention, plastic waste was added to the list of hazardous waste under the Basel Convention, and therefore subject to its prior informed consent control mechanisms.[52] This will come into force on 1 January 2021.[53] Exceptions are made for plastic waste which "almost exclusively" consists of one type of plastic (or a mixture of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET)), as listed in Annex II of the Basel Convention, and "is destined for recycling in an environmentally sound manner and almost free from contamination and other types of wastes".[54] It is expected that the addition of plastic waste to the Basel Convention will slow down, if not halt export of plastic waste. This is especially important where East and Southeast Asia is concerned. China, until its halt on plastic waste imports, was the largest importer of plastic waste, and also had the most amount of mismanaged plastic waste.[55] Five countries in the Southeast Asia region also feature in the list of countries with the most mismanaged plastic waste - Indonesia, the Philippines, Vietnam, Thailand, and Malaysia. These six countries alone account for 55% of the mismanaged plastic waste ending up in the sea globally in 2010.[56]

However, "almost free from contamination and other types of wastes" and "almost exclusively" are not defined in the decision text. Rather, it points to unspecified "international and national specifications" which may "offer a point of reference".[57] It is submitted that the insertion of the "almost exclusive" and "almost free" text is particularly unhelpful as it opens up room for

[46] Basel Convention, Art 6.
[47] Basel Convention Arts 4(1), 13(2).
[48] Basel Convention Art 4(5).
[49] Decision BC-II/12, Report of COP-2, UN Doc EP/CHW.2/30, 25 March 1994.
[50] Amendment to the Basel Convention, Decision BC-III/12, UN Doc EP/CHW.3/34, 28 November 1995 [*Basel Ban Amendment*].
[51] Secretariat of the Basel Convention (n 6).
[52] Basel Plastic Waste Amendment (n 2).
[53] Ibid.
[54] Ibid.
[55] China imported 106 million metric tons (MMT) of plastic waste between 1988 and 2016, and mismanaged 9 MMT of plastic waste in 2010. (Jenna R. Jambeck and others, 'Plastic waste inputs from land into the ocean' (2015) 347 Science 768).
[56] Defined as inadequately managed waste plus 2% littering and calculated for populations within 50 km of the coast (Ibid)
[57] Basel Plastic Waste Amendment (n 2), at notes 6 and 7.

disputes over what standards may be applicable. Allowing plastic waste to be exported for the ostensible purpose of "recycling" is also a major concern, regardless of the cleanliness and purity of the plastic waste exported, since the importing country, especially in the case of developing countries, may lack the capacity to recycle the plastic properly.

c. The Basel Ban Amendment

The Basel Ban Amendment, when it went into force in 2019, barred the transfer of hazardous waste (as defined by the Basel Convention) from Liechtenstein, as well as the European Union (EU) (formerly the European Community (EC)) and Organisation for Economic Co-operation and Development (OECD) member states, to other countries. This move to ban North-South hazardous waste flows was adopted under the urging of African countries,[58] and environmental non-government organisations.[59] The Basel Ban was justified on the basis of environmental justice. The concern was that global North countries would, without the Basel Ban, continue to export their waste to the global South under the guise of "recycling".[60] Further, African countries specifically argued that political instability, economic difficulties, corruption and the prevalent lack of relevant and adequate knowledge meant that a complete ban on exports of waste was necessary.[61] While this concern has been shown to be justified per the experience of China and Southeast Asia, the adoption of the Basel Ban as a decision in 1997 has been identified as a major reason for the United States' abstention from the Basel Convention.[62] Also notable is the absence of South Asian states such as India, Pakistan, and Bangladesh. It is posited that these countries rely on the hazardous waste trade in recyclables to support their domestic industries.[63] On the other hand, of the six countries accounting for 55% of the mismanaged plastic waste ending up in the sea in 2010 (China, Indonesia, Malaysia, Philippines, Thailand, and Vietnam), only China, Malaysia, and Indonesia have ratified the Basel Ban Amendment.[64]

However, the Basel Ban Amendment is silent about other potentially harmful flows of hazardous materials, especially South-South flows. Even within the group of developing states, which for the purposes of the Basel Ban Amendment, are the states not included in Annex VII, they represent a broad spectrum of interests. For example, the development of the recycling industries in South and Southeast Asia may be hemmed in by the restrictive nature of the Basel Ban. On the other hand, some African countries may require this protection as they do not have the same interests in the recycling sector and may be unfairly harmed by North-South waste flows.[65]

The Basel Convention further allows for regional waste conventions banning imports of hazardous waste to be adopted under Article 11 of the Basel Convention, provided that they are

[58] Avitus A. Agbor, 'The Ineffectiveness and Inadequacies of International Instruments in Combatting and Ending the Transboundary Movement of Hazardous Wastes and Environmental Degradation in Africa' (2016) 9 African Journal of Legal Studies 235, 248.
[59] Zada Lipman, 'Chapter 12 - Trade in Hazardous Waste' in Shawkat Alam and others (eds), *International Environmental Law and the Global South* (Cambridge University Press 2015), 266.
[60] Ibid, 267.
[61] Agbor (n 63), 248.
[62] Ibid, 267.
[63] Ibid, 267.
[64] Secretariat of the Basel Convention (n 6).
[65] Zada Lipman (n 64), 274.

"not less environmentally sound than those provided for by this Convention".[66] Individual states may also impose a full or partial blanket ban on imports of hazardous waste under Article 4(1) of the Basel Convention.[67]

d. Regional waste conventions under Article 11 of the Basel Convention

The Bamako Convention in the African region,[68] as well as the Waigani Convention in the South Pacific region,[69] are the two regional conventions which come under Article 11 of the Basel Convention. Both conventions prohibit their member states from importing hazardous waste from anywhere outside their area of coverage,[70] require that wastes which cannot be successfully treated in an environmentally sound manner at destination are sent back to the point of origin (i.e. reimported),[71] and allow for regional additions to the list of hazardous wastes above and over the list of hazardous wastes included in the annexes of the Basel Convention.[72] These provisions thus provide a shield for "Southern" regions, such as Africa, against the scourge of imported hazardous waste, including the EIT countries in the UNFCCC classification, as well as emerging[73] and high-income[74] "developing" countries. This approach is preferable to the Basel Ban Amendment as it allows Southern countries who rely on the import of hazardous waste to generate raw materials for their economies to continue doing so, while allowing other Southern countries to stop the importation of hazardous wastes into their region. The regionalization of the plastic waste question will allow for flexible approaches which respond to the specific challenges of each region,[75] and could serve to further develop the CBDR principle. It should be noted, however, that a regional waste convention alone is not a silver bullet-solution. Without the necessary technologies to process waste in an environmentally sound manner within the region, the problem of plastic waste mismanagement will still exist. Further, without the necessary capacity-building and financial transfers, as well as political will, enforcement will remain weak on the ground, as the experience

[66] Basel Convention, Arts 11(1), 4(2)(e).
[67] Basel Convention, Arts 4(1)(a), 13(2)(d)-(e).
[68] Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (adopted 30 January 1991, entered into force 22 April 1998), 2101 UNTS 177 [*Bamako Convention*].
[69] Waigani Convention to ban the importation into Forum island countries of hazardous and radioactive wastes and to control the transboundary movement and management of hazardous wastes within the South Pacific Region (adopted 16 September 1995, entered into force 21 October 2001), 2161 UNTS 91 [*Waigani Convention*].
[70] Bamako Convention, Art 4(1); Waigani Convention, Art 4(1)(a).
[71] Bamako Convention, Art 8; Waigani Convention, Art 8(1).
[72] Philippe Sands and Jacqueline Peel, *Principles of International Environmental Law* (Cambridge University Press 2012), 572
[73] A leading definition of "emerging economies" includes the BRICS (Brazil, Russia, India, China, and South Africa), and the Next 11 (Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, South Korea, Turkey and Vietnam), based on macroeconomic stability, macroeconomic conditions, technological capabilities, human capital, and political conditions. (Jim O'Neill and others, 'How Solid are the BRICs? (Global Economics Paper No: 134)' (*Goldman Sachs*, 2005) <https://www.goldmansachs.com/insights/archive/archive-pdfs/how-solid.pdf> accessed 20 April 2020).
[74] Some of the "high-income" countries, as defined by the World Bank as having a gross national income of US$12,376 or more (World Bank, 'World Bank Country and Lending Groups' (*World Bank*, 2020) <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519#High_income> accessed 20 April 2020), , but which are neither EU nor OECD members, include the Bahamas, Bahrain*, Brunei*, Israel, Kuwait*, Oman*, Qatar, Saudi Arabia*, Singapore, Seychelles, and the United Arab Emirates*. Countries with an asterisk (*) are members of OPEC, or the Vienna group of countries which co-operates with OPEC in forming an oil cartel. (Organization of Petroleum Exporting Countries (OPEC), 'Declaration of Cooperation OPEC and non-OPEC, 10 December 2016 and 30 November 2017' (*OPEC*, 30 November 2017) accessed 20 April 2020) Qatar was previously an OPEC member, but left in 2019. (Organization of Petroleum Exporting Countries (OPEC), 'Member Countries' (*OPEC*, 2020) <https://www.opec.org/opec_web/en/about_us/25.htm> accessed 20 April 2020).
[75] Agbor (n 63), 247.

of the Bamako Convention shows.[76] Finally, in practice, African countries with established recycling industries have been more reticent to sign up to the Bamako Convention. Their main concern seems to be the loss of much needed materials and revenue.[77]

Other than the Bamako and Waigani Conventions there have been other attempts at regional waste management. This includes the EU's 2006 regulations on shipments of waste,[78] and, the United States' bilateral agreements with Canada and Mexico on waste shipments since 1986, which, taken together, could be seen as a North American regional waste agreement of sorts.[79] Still, large parts of the world, including Asia, Eastern Europe (outside the EU), and Latin America, have no regional waste conventions.

More needs to be done to build the capacity of Southern countries which rely on these imports to enable them to adopt environmentally sound management of these waste imports. In regions where these countries are present, there will be a reluctance to enter into such "classical" regional waste conventions for fear of starving their economies of much needed raw material. Other countries and regions, though well-meaning, may end up falling short of lofty goals to "show solidarity, a willingness to cooperate, and a desire to end the trade in hazardous waste",[80] as they lack the financial and technological resources to effectively manage waste. Therefore, the regional waste management framework must provide for TDT and capacity-building.

II. The proposed new regime

In relation to the plastic pollution issue, the UNEA AHEG has conducted a study of possible response options.[81] However, it concluded in its report that there were only three options: Option 1: "maintain status quo", relying on enhanced collaboration between intergovernmental organizations and voluntary agreements between governments and with the private sector; to address "marine plastic litter and microplastics", Option 2: "revise and strengthen existing framework", building on the existing international law regimes such as the Basel Convention and UNEP's Regional Seas programmes to include "marine plastic related action"; and Option 3: "new global architecture with multi-layered governance approach", which relies primarily on "self-determined national reduction targets" and "development/improvement of industry-led design standards that promote recovery and recycling", i.e., GAMP.[82] The proposed elements of the GAMP are as follows:

[76] Ibid, 257-258.
[77] Zada Lipman (n 64), 265.
[78] European Union Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste [2006] OJ L190/1.
[79] Sands and Peel (n 77), 574 at note 191.
[80] Andrew Webster-Main, 'Keeping Africa out of the Global Backyard: A Comparative Study of the Basel and Bamako Conventions' (2002) 26 Environs Environmental Law and Policy Journal 67, 94.
[81] Discussion paper on feasibility and effectiveness of different response options, UN Doc EP/AHEG/2018/1/5 (23 April 2018).
[82] Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches, UN Doc EP/AHEG/2018/1/INF/3 (8 May 2018).

1. Objectives
2. Principles
3. Definitions
4. Prevention, control and removal measures (e.g. minimum standards and binding targets, trade), including self-determined national reduction targets, adoption of global standards (including global standards for import controls as well as export controls), labelling and certification, maintenance of national inventories
5. Monitoring and Assessment Programmes
6. Calculation methods for agreed targets and measurements (e.g. production, consumption, trade, reduction processes)
7. Compliance, non-compliance and reporting
8. Other mechanisms to be established (e.g. funding, implementation and compliance, compensation, information exchange, stakeholder engagement), including a global liability and compensation scheme
9. Regional and international cooperation
10. Enhancement of public awareness and education
11. Countries in need of differential treatment (e.g. developing countries, SIDS)
12. Review processes (e.g. science, control measures, effectiveness)
13. Meeting of the parties
14. Secretariat
15. Signature
16. Entry into force

Figure 1. Elements of the GAMP, as proposed by UN Environment[83]

The first two options perpetuate the problem of viewing the plastic pollution problem through the "marine" / "waste" lenses, and focuses on downstream efforts.

On the other hand, the GAMP mentions "incentivizing reductions in domestic rates of production and consumption",[84] but makes it clear that the level of reductions will be determined by each state party. This resembles the Paris Agreement's Nationally Determined Contributions (NDCs). The GAMP's inclusion of a waste hierarchy through the 6Rs (reduce, redesign, refuse, reuse, recycle, recover),[85] is itself groundbreaking, as it establishes that not all attempts to treat plastic waste are equal. Further, it recognizes the dearth of global standards and regulations which currently exist in connection with the GAMP. And to some extent, it recognizes the need for regional and international co-operation.

However, there needs to be more ambition and more co-operation above and over that proposed in the GAMP. It only aims to "*reduce* the quantities and impact of marine plastic litter and microplastics"[86] and "[incentivise] *reductions* in domestic rates of production and consumption" through "*self-determined* national reduction targets"[87] (emphasis added). The former reveals a residual attachment to viewing this problem predominantly as a "waste" issue, without placing upstream measures to reduce overall plastic production and consumption on an equal footing. The latter, on the other hand, leaves too much autonomy to states, as there is no mention of a global target to bring plastic waste to zero. A headline global target is needed to set

[83] Ibid, 90.
[84] Ibid, 90.
[85] Ibid, 89.
[86] Ibid, 89.
[87] Ibid, 90.

the tone for states and regions to align their reduction targets to. Without this headline figure, it would be all too easy for states and regions to offer up marginal reductions, thus adhering to the letter of the agreement, but not necessarily its spirit.

It is submitted that while the concept of nationally determined reduction targets may be a useful bottom-up compromise between global neglect and top-down governance, which may not be palatable to all, the gap between the nationally determined goals, and the global ambition to eliminate the proliferation of plastic pollution, need to be bridged. One of the more troublesome stumbling blocks in MEAs is the desire or need (in the case of the UNFCCC) for global consensus in decision-making, which would allow the least-ambitious countries to withhold progress.[88]

This is where the role of regional cooperation comes in. Regional agreements would initially be pursued and concluded in regions forming "coalitions of the willing", which would include some of the most enlightened and enthusiastic members. It has been noted that "small groups of countries find it easier to reach agreements than large-n settings, mainly because fewer countries' interests and circumstances need to be taken into account, [and] fewer… side-deals need to be struck."[89] These first-mover regions would lead the way in pathfinding for the rest of the global community. They would then be able to shape subsequent global decision making and incremental standards-setting, and acting as a bloc, they would have more clout to influence global negotiations.

Of course, the *size* of each region is important as well, as regions that are too small will lack the resources necessary to implement change. On the other hand, regions that have too many members will lose some of the benefits of having a smaller group in the first place, such as ability to make decisions quickly and specifically tailored to a region. In general, Parkinson's "coefficient of inefficiency"[90] applies: past an optimal number of members, the quality of decision-making and governance drops.

The building blocks of the proposed more ambitious GAMP, hereafter referred to as the GAP+, are as follows:

[88] Jon Hovi and others, 'Climate change mitigation: a role for climate clubs?' (2016) 2 Palgrave Communications 16020.
[89] Robert Falkner, 'A Minilateral Solution for Global Climate Change? On Bargaining Efficiency, Club Benefits, and International Legitimacy' (2016) 14(1) Perspectives on Politics 87.
[90] Cyril Northcote Parkinson, *Parkinson's Law and Other Studies in Administration* (The Riverside Press 1957) 33-44. See also Peter Klimek, Rudolf Hanel and Stefan Thurner, 'To how many politicians should government be left' (2009) 388 Physica A 3939 for a more systematic approach, comparing the size of selected national cabinets with their performance on the United Nations Human Development Index. It validates the general concept behind Parkinson's "coefficient of inefficiency", reaching the conclusion that the optimal number is between 19 and 21.

<table>
<tr><th colspan="3">Global Architecture for Plastics Plus (GAP+)</th></tr>
<tr><td>Global level</td><td>GAP+ Framework Agreement

Phases of implementation
• Peak by 2030
• Begin reductions between 2030 and 2040
• Get to net zero by 2050

Obligations
• Eliminate virgin plastic
• Eliminate new plastic waste
• Minimise plastic flows
• Form and join regional plastic agreements
• Adoption of global standards and indicators</td><td rowspan="2">Global market-based co-operation mechanism

• Support states and regions without domestic capacity through trading positive outcomes from other states

• State access: participating states and regions (both buying and selling) must:
o adopt global standards and indicators
o maintain national reduction plans and inventories

• Project certification:
o Projects not directly accredited by GAP+ parties
o Parties to agree on basic RPAV and SDG criteria and certify plastic crediting standards which meet or exceed these criteria

• A share of proceeds to go to global market-based co-operation mechanisms</td></tr>
<tr><td>Regional & national level</td><td>Regional plastic agreements

States are free to choose which regional agreement to join

Minimum obligations to be recognized as part of GAP+:
• Regional plastic reduction plans + progress indicators
• Net zero virgin plastic production
• Net zero plastic waste
• Net zero plastic flows
• Maintain plastic inventories
• Each country to adopt:
o National inventories
o National plastic reduction plans + progress indicators
o Civil liability laws</td></tr>
</table>

Figure 2. Elements of the proposed GAP+

Revisiting the GAMP structure, it could be augmented to form the GAP+ by adding a few elements, as seen below:

1. Objectives
2. Principles
2A. Generally binding commitments, adopted at both regional and national levels: eliminating the production of virgin plastic, eliminating existing and new plastic waste, minimising plastic trade flows, and entering into regional plastic agreements (RPAs)
3. Definitions
4. Prevention, control and removal measures (e.g. minimum standards and binding targets, trade), including self-determined national reduction targets, adoption of global standards (including global standards for import controls as well as export controls), labelling and certification, maintenance of national inventories
5. Monitoring and Assessment Programmes
6. Calculation methods for agreed targets and measurements (e.g. production, consumption, trade, reduction processes)
7. Compliance, non-compliance and reporting
8. Other mechanisms to be established (e.g. funding, implementation and compliance, compensation, information exchange, stakeholder engagement), including a global liability and compensation scheme
- **8.1 Supplementary market-based co-operation mechanisms**
- **8.2 Regional insurance and technology funds**
9. Regional and international cooperation
9A. Facilitating the adoption of RPAs
10. Enhancement of public awareness and education
11. Countries in need of differential treatment (e.g. developing countries, SIDS)
12. Review processes (e.g. science, control measures, effectiveness)
13. Meeting of the parties
14. Secretariat
15. Signature
16. Entry into force

Figure 3. Elements of the GAMP, with the GAP+ added

These building blocks will be explained in turn. Before proceeding to introduce the proposed GAP+ regime, the question of whether this will contribute to the phenomenon of "treaty congestion"[91] and the fragmentation of international law, specifically international environmental law. It is noted that there have been at least 139 different major international environmental treaties to date.[92] And it raises the question of whether international environmental law is burdened with "too many meetings to attend, too many secretariats to finance, and too many reports to file… creat[ing] the potential for duplication of effort, lack of coordination, and even conflict between different environmental regimes."[93]

It is submitted that the question of plastic pollution is already "fragmented" by different MEAs picking up on different elements of the issue and proposing to deal with them using the tools available to them. As seen above, the Basel Convention has put regulations on the transport

[91] Edith Brown Weiss, 'International Environmental Law: Contemporary Issues and the Emergence of a New World Order' (1993) 81 Georgetown Law Journal 675, 697–702.
[92] Donald K. Anton, '"Treaty congestion" in contemporary international environmental law' in Shawkat Alam and others (eds), *Routledge Handbook of International Environmental Law* (Routledge 2012).
[93] Daniel Bodansky, *The Art and Craft of International Environmental Law* (Harvard University Press 2010) 35.

and trade of plastic waste, while the marine environment regimes have introduced rules on not introducing plastic waste into the marine environment while at sea. But these regimes do not take an economy-wide or life-cycle approach to the question. In effect, this resembles the Dutch boy who saves his country by putting his finger in a leaking dike. That story ends with adults finding the boy the next morning and making the necessary repairs to the dike. International environmental law has, in effect, stuck the finger in the dike. But where are the adults to repair the dyke?

The GAP+ regime is meant to both repair the dike by reducing plastic waste towards zero, as well as to reinforce the dike by providing financial, TDT, and capacity-building assistance to member states to enable them to cease the production of virgin plastics as well. It also allows the minds of the global community to focus on the specific issue of plastic pollution by creating binding commitments specifically for plastic pollution, rather than being treated as an ancillary or peripheral issue in different forums. As such, the GAP+ regime should be seen as a way to "defragment" the parts of plastic pollution governance scattered amongst the other international conventions and bring them all under one roof.

As for the regional approach to implementation, it is submitted that this is necessary due to the broad spectrum of countries, with their different attendant needs and issues. As mentioned above, some countries want a complete ban on plastic waste, while others rely on them for their economic output. Some regions, like Africa, lack strong plastic industries and lobbies in their economies in the first place, allowing African states to impose heavy penalties on importing them, including jail sentences.[94] Other regions, such as Southeast Asia, have a steeper learning curve. For example, the prevalence of the sachet economy in Southeast Asian countries such as Indonesia, Thailand and the Philippines[95] means that a different approach is needed in this region, beginning with an appreciation of the high baseline plastic production and consumption rates. They will not be able to be as ambitious as African countries in eliminating plastic pollution. However, they may prove to be fertile ground for new recycling technology to clear up legacy plastic pollution by providing the critical mass to test out these technologies and scale up the implementation of these technologies.

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[94] Roli Mahajan, 'Finding alternatives' (*Development and Cooperation*, 2020) <https://www.dandc.eu/en/article/rwanda-taking-its-ban-single-use-plastic-bags-one-big-step-further-include-most-other-types> accessed 18 May 2020.

[95] The sachet economy refers to a market where everyday household essentials, such as soap, toothpaste, and detergent, and condiments, are sold in single-use quantities, most often in disposable sachets, rather than in regular multi-use consumer packaging or in bulk. The sachets are more likely than not to be cheaper than a similar quantity of the same product in multi-use packaging, which makes the product more accessible to impoverished communities. It is arguable that this has brought better quality products to such communities. However, as they tend to have to live with the waste generated by the sachets due to a lack of resource recovery services in their areas, it is questionable whether their quality of life has been improved. Moreover, these sachets are frequently not recyclable as they are made up of composite materials (metal film laminated with plastics), and cannot be washed clean to be prepared for recycling. For an estimate of how pervasive the sachet economy can be in some countries, the Philippines, with a population of around 100 million people, is observed to have used and disposed of 60 billion sachets in a year. On average, this means that one Filipino uses almost two sachets a day. See: Guilberto Borongan, Prakriti Kashyap and Pascal Renaud, 'Managing Packaging Waste in the ASEAN Region: From Linear to Circular Packaging Value Chains' (*Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH,*, 2018) <https://www.giz.de/de/downloads/giz2018_ASEAN-Packaging-Waste_web.pdf> accessed 18 May 2020, Karen Lema, 'Slave to sachets: How poverty worsens the plastics crisis in the Philippines' (*Reuters*, 2019) <https://www.reuters.com/article/us-asia-waste-philippines/slave-to-sachets-how-poverty-worsens-the-plastics-crisis-in-the-philippines-idUSKCN1VO0G3> accessed 18 May 2020; https://www.theguardian.com/sustainable-business/sachet-packaging-low-income-communities-waste-nightmare, and Dennis Posadas, 'Sachets help low-income communities but are a waste nightmare' (*The Guardian (UK)*, 2014) <https://www.theguardian.com/sustainable-business/sachet-packaging-low-income-communities-waste-nightmare> accessed 18 May 2020.

In any case, a framework global agreement buttressed by regional implementation agreements is not new. UNCLOS's marine environment provisions are supported by the Regional Seas Programme, which encompass 13 regional seas to set rules on environmental assessment, environmental management, institutional arrangements, financial arrangements, and regional legal instruments.[96] Further, the regional implementation agreement is still anchored by the global GAP+ framework agreement, and global standards adopted at that level.

a. Part 1: GAP+ Framework Agreement

The proposed GAP+ framework agreement will be global in nature. It will, much like the UNFCCC, create a framework consisting of principles and generally binding commitments, which would then be implemented in subsequent agreements and mechanisms under this framework. The environmental law principles which would be relevant to this framework agreement, and which are found in the found in the 1992 Rio Declaration,[97] include the precautionary principle,[98] polluter pays principle,[99] liability and compensation for adverse effects of environmental damage,[100] and the prevention of environmental dumping.[101]

On the other hand, the CBDR principle,[102] while relevant in this context, has proved to be something of a moving goalpost. The CBDR principle has usually been expressed as dividing state parties into "developed" and "developing" countries. The scope of the "differentiated responsibilities" differs as seen in the definition of "developed" in various MEAs below:

Classification by MEA	**"Developed" Parties**	**"Developing" Parties**
Basel Convention As adopted in 1997	OECD, EC, Liechtenstein	All others
Convention on Biological Diversity (CBD) As adopted in 1994	Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Italy, Ireland, Japan, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, UK (US is not a party to the CBD)	All others

Figure 4. Elements of the proposed GAP+

While there is a significant overlap between the definitions of "developed country" in the four MEAs, the CBDR principle, as seen above, has largely been used as a blunt tool to form a limited number of large groups based on either economic or geographic criteria on a dichotomous (yes-no) basis. This does not take into consideration whether the countries in a group share the same needs or challenges, or whether they form a coherent grouping between themselves. Formulating differentiated responsibilities for each of these groups thus defaults to the lowest common denominator approach, with the possibility of some states taking on more or higher-level responsibilities on a voluntary basis (if at all).

[96] Sands and Peel (n 67), 352-365.
[97] 1992 Rio Declaration on Environment and Development, Report of the United Nations Conference on Environment and Development, UN Doc A/CONF.151/26 (Vol. 1) (12 August 1992) [*Rio Declaration*].
[98] Rio Declaration, Principle 15.
[99] Rio Declaration, Principle 16.
[100] Rio Declaration, Principle 13.
[101] Rio Declaration, Principle 14.
[102] Rio Declaration, Principle 7.

Despite that, the potential flexibility of the CBDR principle is illustrated by the UNFCCC's recognition of an intermediate category, "economies in transition" (EITs), in addition to the existing "developed" and "developing" categories. Other examples include the inclusion of differentiated regimes for landlocked countries (LLDCs),[103] small island developing states (SIDS),[104] and high ambient temperature (HAT) countries.[105] This allows for a potentially granular approach in assigning differentiated responsibilities based on their respective characteristics.

The CBDR principle should therefore be extended to allow for a regional approach – but with states determining by themselves the regions they wish to be grouped in. This will create more coherent groups, with more similar interests between members. This would go some way to defusing any possible tensions between Asian states which rely on plastic recycling as a part of their economy, and African states which want to see a complete ban on plastic trade (as seen in Part 3 above). Devolving parts of the GAP+ regime would also engender greater ownership of the issue, since each region would be free to adopt policies and mechanisms in response to the specific character of plastic pollution in their region, while still being backstopped by the global framework and its principles.

The proposed four generally binding commitments are: eliminating the production of virgin plastic, eliminating existing and new plastic waste, minimising plastic trade flows, and entering into regional plastic agreements. These commitments are explained briefly below. It is important to note, however, that these commitments are designed to be open-ended at the global level. While there will be phased implementation phases (peaking, reducing, getting to zero), these phases are timeframes by which states and regions should begin to enter these phases, not a fixed time period in which the entire phase should be completed. Further, while states and regions are expected to peak production by 2030 latest, and begin to reduce production by 2040 latest, the timeframe to accelerate reductions in production to reach zero is set at a relatively generous 2050. These commitments are meant to shape the regional plastic agreements to be adopted under the GAP+ framework agreement.

However, the value of signing up states to these commitments at a global level should not be overlooked. Placing these commitments as part of a treaty would at least empower the conference of the parties to the GAP+ framework agreement to exercise a measure of oversight by adopting transparency measures, ensuring that every state and region is on track, or at least not backsliding.

b. Eliminating the production of virgin plastic

The first step towards ending the proliferation of plastic pollution is to regulate, restrict, and finally, end the production of virgin plastics. It would not be feasible to institute a ban on fossil-fuel plastics on an immediate, or even short-term basis. The pervasiveness of plastics in our lives and the global economy mean that a phased approach is needed to bring down the production of virgin plastics.

[103] UNFCCC Art 4.2.8.
[104] UNFCCC Art 4.2.8, Paris Agreement, Arts 4.6, 9.4, 9.9, and 13.3.
[105] MP Handbook (n 114), 235.

At the same time, it is important to begin the process of limiting the supply of virgin plastics. The limitation on the supply of virgin plastics will restrain oil producers from using the plastic industry as a support mechanism when the price of oil goes down, or when countries reduce their use of oil to adhere to their climate commitments under the Paris Agreement. Plastics, and the wider petrochemical industry, has already been described as the "last man standing" for the oil industry.[106] It will also nudge the industry towards including more recycled plastics in their supply chains.

This commitment would require states to agree to peak production of virgin plastics by 2030, begin reductions by 2050, and further agree that the end goal would be to reduce production to zero by end-century or earlier. However, to allow for flexibility in goal-setting at the regional level, the absolute reduction / rate of reduction targets will not be prescribed at the global level.

i. Eliminating new plastic waste

The second commitment is the eventual elimination of existing and new plastic waste, wherever possible. As virgin plastics are phased out, there will be an opportunity to capture waste plastic to be recycled into new plastic material. This could extend further into harvesting plastic from existing landfills and marine plastic pollution. Admittedly, the technology for the latter may not currently exist. States and regions may not be willing to enter into binding commitments to reduce legacy plastic waste, especially if they have floated out to the part of the seas outside national jurisdiction.

Thus, this commitment will bind states to bring new plastic waste to zero, but also commits states and regions to work towards finding solutions to reduce legacy plastic waste (though not to actually reduce such waste as of yet). This commitment is designed to be relatively open-ended, as different states and regions will need to find mechanisms and approaches which are appropriate for them, and how fast they can credibly implement them. However, the overarching goal for this commitment would be to reach zero plastic waste (both new and legacy), by end-century. States and regions are of course welcome to commit to doing so earlier than end-century.

ii. Minimising plastic trade flows

The third commitment draws on the experiences of the Bamako and Waigani Conventions. To alleviate the concern of states which currently rely on the recycling industry to provide raw materials for their industries, this commitment does not call for an absolute ban on plastic flows. Rather, it requires states to reduce and minimise plastic waste flows in a gradual manner, based on the respective capabilities and conditions in each state. This commitment will be the most heavily shaped by the CBDR principle.

On the other hand, however, this commitment extends to both new plastic material and waste plastic. Other than the documented cases of unrecycleable waste plastic being shipped under the guise of recycling plastic material, reducing overall plastic flows, including "embedded"

[106] Ajit Niranjan, 'Oil companies pivot to plastics to stave off losses from fuel demand' (*Deutsche Welle*, 26 March 2020) <https://www.dw.com/en/plastic-oil-petrochemicals-coronavirus/a-52834661> accessed 20 April 2020.

plastic such as the packaging of finished goods, will catalyze and accelerate the design of supply chains towards a circular economy model. One way this can be done is through a "Physical Internet", where modular, standardised, reusable containers are maintained and refilled with finished products at a regional, national, or local level. These containers would be leased and maintained by logistics providers to finished product manufacturers, or product distributors, to be refilled and shipped out to the end user.[107] Another way may be to simply incentivise localism, and to promote choosing locally-sourced products which need to travel less and need less packaging. This can keep any existing reusable plastic packaging within a local community or national economy (possibly then converting to non-plastic reusable packaging later) and remove the need for trade in plastics.

The more crucial part of this commitment is on the regional level – plastic waste should be kept within the region. This is expected to be an extension of the principle against environmental dumping. At the same time, this gives countries which genuinely lack the necessary resources to manage plastic waste in an environmentally sound manner the flexibility to export it to a neighbouring state which does. Where the entire region lacks the resources, states in the region may want to establish a regional centre of excellence for the environmentally sound management of plastics. Alternatively, states and regions may enter into bilateral agreements with other states or regions to manage plastic waste in an environmentally sound manner.

c. Part 2: Regional Plastic Agreements

The fourth generally binding commitment in the GAP+ is the formation and joining of regional plastic agreements. These regional agreements must, just like the GAP+, bind its members to collectively eliminate the production of virgin plastic and eliminate existing and new plastic waste. Further, this commitment at the GAP+ level will require that each regional agreement sets out a clear timeframe as to when these are to be achieved. The timeframe will consist of firm peaking and reduction timelines, as well as a reduction pathway. The pathway can either be expressed as year-on-year reductions, or a firm deadline to bring the production of virgin plastic, as well as plastic waste, to zero.

As to the minimisation of plastic flows, this commitment is replicated in the regional agreements through the adoption of regional rules on the trade in plastics. In some cases, the region may agree on an absolute halt of all imports and exports of plastic material, or just a ban on trade in plastic waste. In other cases, the trade in plastic may be deemed as necessary to the countries in the regional agreement in the short to middle term. This would make an absolute ban in the trade of plastics unpalatable to them. The region can agree on a more gradual approach to reducing plastic flows applicable to and from the region, while allowing for continued trade in plastics within the region. This regional import substitution, combined with the Physical Internet, would eventually reduce inter-regional plastic flows towards zero, thus partially addressing the lack of restriction of South-South waste flows in the Basel Ban Amendment. Further reductions in South- South waste flows may be achieved through targeted sectoral regulations in each region.

Each regional agreement must also bind its members to compile national inventories of their plastic stocks, and to submit national implementation plans towards achieving the regionally-

[107] *New Plastics Economy* (n 16), 62-65.

determined goals. The former will go towards the regional plastic inventories, while the latter will assist the regional agreement's meeting of the parties, as well as the GAP+'s conference of the parties to identify the possible issues faced at regional and national levels. This would help the regional funds to address emerging issues in implementation of the agreements. The regional plastic inventories will also assist the parties in identifying any shortfalls in implementation, or backsliding by an entire region. Where these are identified, the regional funds may engage the region by stepping-up capacity-building efforts to get the region back on track.

Finally, each regional agreement will require its members to adopt a civil liability law to require plastic manufacturers to put up financial guarantees for any environmental damage caused by their plastics. This is backstopped by the state where the plastic is produced (producing state) or exporting state, for damages above the financial guarantee cap. The levels at which the guarantees are to be set will be agreed regionally, with the understanding that the lower the cap on guarantees, the more likely states will need to stump up any excess damages above the guaranteed amounts. Producing and exporting states may in turn, approach the global fund for compensation and technology transfer if necessary. This may come in the form of loans, or in the exceptional case (such as LDCs), outright grants. This will mean that states need to balance the views of plastic manufacturers and exporters (who are likely to try to minimize their exposure by seeking lower guarantee amounts), and the risk of incurring liabilities by having to seek loans from the global fund (and therefore setting higher guarantee amounts to prevent this scenario from happening).

d. Part 3: Global market-based co-operation mechanisms

The final part of the proposed regime is the possible inclusion of private-sector involvement and international co-operation through market-based co-operation mechanisms (MBCMs).

It has been noted that "the primary difference in capacity between [developed and developing countries] is one of resources, not know-how. Converting industry to non-toxic methods requires an initial outlay of capital which many developing countries cannot afford."[108] Specifically, this is a matter of money. The South simply lacks the financial resources necessary to implement environmentally sound waste management practices, or the infrastructure necessary for a circular economy.[109]

Further. even if developing countries have the political will to properly process the waste plastic, the economic case for recycled plastics remain weak.[110] In turn, this means that recouping investments in putting in place the appropriate technologies necessary to process waste plastic will be a significant cost and burden on developing countries. Without any economic impetus to recycle

[108] Zada Lipman (n 64), 275.
[109] Ibid, 275.
[110] The price of virgin polyethylene terephthalate (PET), used in plastic drinks bottles, has fallen rapidly in 2019 from EUR 1100/tonne in January 2019 to under EUR 900/tonne in January 2020. Meanwhile, the price of recycled PET (R-PET) has held relatively steady at the EUR 1000/tonne mark. This has seen producers reduce their demand for R-PET and increase demand for virgin PET. Prevailing economic forces also mean that, according to a S&P Global report in January 2020, "only a small portion of R-PET is [used] to produce bottles again. It is largely uneconomic because of competitive virgin PET prices". (Gustav Holmvik and others, 'Global petrochemical trends: H1 2020' (*S&P Global Platts*, 2020) <https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/petrochemicals/global-petrochemical-trends-h1-2020.pdf> accessed 20 April 2020).

plastic, it is more likely than not that producers and consumers will prefer to continue using virgin plastic rather than recycled plastic. This means that plastic collected for recycling may not even make it all the way to being recycled as a new product, and may still end up in landfills. Worse still, it could end up in the sea.

A market mechanism would be able to unlock more funds that are currently provided by the developed world to the developing world, by allowing the private sector to provide new materials and solutions to reduce and eliminate plastic waste. This would also benefit the developing countries participating in the market mechanism by indirectly providing financial and technological transfers.

Rather than reinventing the wheel and build a new market from scratch, it is proposed to build on existing established voluntary markets for environmental goods and services such as carbon offsetting. MBCMs are defined here as projects and activities which:

- achieve one of the 6Rs (reduce, redesign, refuse, reuse, recycle, recover) for plastic waste;
- on a real, permanent, additional (i.e. the activity would not have happened without the MBCM project), and verified (RPAV) basis;
- does not cause a negative impact on the Sustainable Development Goals (SDGs), and/or provides SDG co-benefits;
- and results in monetary compensation for the participants executing the project from a foreign source.

There are many types of possible projects which could possibly fall within the scope of the MBCM, including downstream activities such as organized provision of plastic recovery and recycling services to communities which lack them, or upstream activities such as reducing and replacing the sachet economy in certain developing countries with a sustainable packaging regime.

e. Access control

Projects which intend to offer its outcomes as transferrable benefits to states and regions for compliance with the GAP+ regime will need to be verified by standards organisations with methodologies which the GAP+ conference of parties deem in line with the MBCM's RPAV and SDG criteria. This is similar to the International Civil Aviation Organisation (ICAO)'s approach to carbon crediting in its Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) mechanism. Through the CORSIA Emissions Unit Eligibility Criteria, carbon credit standards can be approved, allowing credits which have been certified by these standards to be used for the purposes of compliance with the CORSIA regulations.[111]

As for states and regions, they may only apply MBCMs towards their plastic inventories if

[111] See: International Civil Aviation Organisation, 'CORSIA Emissions Unit Eligibility Criteria' (*International Civil Aviation Organisation*, 2019) <https://www.icao.int/environmental-protection/CORSIA/Documents/ICAO_Document_09.pdf> accessed 18 May 2020, international Civil Aviation Organisation, 'CORSIA Eligible Emissions Units' (*International Civil Aviation Organisation*,, 2020) <https://www.icao.int/environmental-protection/CORSIA/Documents/TAB/TAB%202020/ICAO_Doc_CORSIA_Eligible_Emissions_Units_March_2020.pdf> accessed 18 May 2020.

they have committed to national and regional implementation plans to achieve the four generally binding commitments. They should also be able to show that they have implemented the global standards which may be decided on by the GAP+ conference of parties from time to time.

i. Global compensation and technology transfer fund

A related issue is liability and compensation for environmental damage caused by mismanaged waste. The Basel Convention has a Protocol on Liability and Compensation, concluded in 1999.[112] However, it has not entered into force, since it lacks the 20 ratifications[113] needed to do so.[114] Moreover, the Protocol only provides for "liability and… compensation for damage resulting from the transboundary movement of hazardous wastes and other wastes and their disposal".[115] This means that damage from post-disposal activities, such as damage from recycling operations as a result from inadequate management of residues and emissions, are not covered. Pure environmental damage, without any loss of life, personal injury, damage to property, or loss of income, is not directly claimable either – only the cost of the measures taken to reinstate the environment (if any) are.[116] And if the total cost of damage from an accident exceeds the financial guarantee limits, then the country where the damage is caused has to foot the remainder of the bill. No safety net is provided in this circumstance.

Here, the global compensation and technology transfer fund, adopted directly under the GAP+, steps into the breach. The fund would be maintained jointly by the World Bank, and existing regional multilateral development bank (MDB). The regional MDBs, with their focus on a specific region each, would be better placed to advise on the appropriate technologies for their region to be transferred, as well as the implementation of compensation and rehabilitation measures relating to plastic pollution. They would therefore act as the "front office" for the fund in each region, with the World Bank playing a co-ordinating role between the regional MDBs. The fund would initially receive seed funding from the World Bank and the MDBs, but will be replenished by a share of MBCM proceeds, possibly set at 25%.[117] This is justified by the polluter-pays principle – states which cannot reduce and eliminate the production and use of plastics by their own efforts should contribute to cleaning up plastic pollution.

The fund would then be used for various activities, including the rehabilitation of the

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[112] Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, UN Doc EP/CHW.1/WG/1/9/2, Annex 1 (28 April 1999) [*Basel Protocol*].

[113] Basel Protocol, Art 29.

[114] Secretariat of the Basel Convention, 'Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal Basel: Status of Ratifications' (2019) <http://www.basel.int/Countries/StatusofRatifications/TheProtocol/tabid/1345/Default.aspx> accessed 20 April 2020.

[115] Basel Protocol, Art 1.

[116] Basel Protocol, Art 2(2)(c), 2(2)(j), Annex B; Zada Lipman (n 59), 268.

[117] This quantum is taken from the Association of Small Island State's proposal in relation to Article 6.4, in which they proposed that 20% of all credits generated be cancelled to generate "overall mitigation in global emissions", plus another 5% of share of proceeds of sale of credits to go towards climate adaptation. (Alliance of Small Island States, 'Submission of views on the content of Article 6.2 guidance and Article 6.4 rules, modalities and procedures, presented by the Republic of the Maldives on behalf of the Alliance of Small Island States' (2017)<https://www4.unfccc.int/sites/SubmissionsStaging/Documents/167_344_131542508049675849-AOSIS%20Submission%20on%20Art%206.2%20and%20%206.4.Nov.2017.cleandocx.pdf> accessed 1 July 2020).

environment and ecosystems damaged by marine plastic debris in oceans and on land,[118] as well as to directly finance TDT in developing countries through grants or loans to achieve environmentally sound management and recycling of plastic waste, in cases which are compelling, but where the MBCM may not find economically efficient to deliver.

Finally, the fund should also set aside a small but substantial amount to engage in capacity-building to enhance national authorities' enforcement and compliance with the Basel and Stockholm Conventions as they relate to plastic waste, as well as to establish regional waste conventions.

In general, the financing mechanism adopted by the fund should be through concessionary loans, to prevent the premature depletion of the fund. However, in exceptional cases, such as where the beneficiary is an LDC, then an outright grant may be warranted. Another funding structure worth considering, especially for TDT, is a green bond, backed by the fund, allowing private investors to participate in the financing of TDT.

Summary

The above discussion serves as a starting point for an ongoing discussion. The global community is coming to terms with the fact that plastic pollution is an important environmental issue. What is lacking, it is submitted, is urgency. However, as with any new international law instrument, there will be negotiations prior to the adoption of this instrument, and then more time passes before the instrument is adopted by a sufficient number of countries with critical mass, before the instrument goes into force. How long any agreement to adopt the GAP+ would take is an open question. However, the proposal above attempts to reduce this factor of uncertainty by borrowing from existing instruments and including the possibility of contributions from the private sector.

A larger concern may be the risk of the regionally and nationally determined goals not being ambitious enough to meet the globally binding goals. This is a phenomenon which has shown up in the Paris Agreement. Though the Paris Agreement has set out a goal of "Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels",[119] the intended NDCs submitted by state parties to the Paris Agreement so far fall well short of the necessary level of GHG emission cuts needed to keep global warming within those levels.[120] To an extent, this was originally driven by uncertainty about what level of cuts, and at what rate, was needed to achieve the Paris Agreement's temperature goals, though the publication of the Intergovernmental Panel on Climate Change's Special Report on the Impacts of Global Warming

[118] The inclusion of ecosystem services as part of the calculation of environmental damages has found support in *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua), Compensation, Judgment* [2018] ICJ Rep 15 para 78: "it is appropriate to approach the valuation of environmental damage from the perspective of the ecosystem as a whole, by adopting an overall assessment of the impairment or loss of environmental goods and services prior to recovery, rather than attributing values to specific categories of environmental goods and services and estimating recovery periods for each of them.".

[119] Paris Agreement, art 2(1)(a).

[120] United Nations Environment Programme, 'Emissions Gap Report 2019' (2019) <https://www.unenvironment.org/resources/emissions-gap-report-2019> accessed 1 March 2020.

of 1.5°C[121] has since served to better inform state parties, and the state parties are expected to ramp up their ambition in their NDCs over time.[122] Whether state parties take heed, however, is another question. States are, after all, sovereign.

The inclusion of the MBCM is likely to cause concern in some states which take a critical or skeptical view on market mechanisms. As the MBCM's contributions to the global fundserves as the financial mechanism for the GAP+, they are likely to pose a challenge to the universal adoption of the GAP+. However, the MBCM is needed to provide incentives for the developed countries and the private sector to participate in financing the GAP+, by providing credits, profits, and dividends. A straight-up financing mechanism is unlikely to provide sufficient funding since there is nothing that contributors can show in terms of immediate or future financial returns. Other forms of co-operation, including direct provision of overseas development aid in kind, does not require the GAP+ to exist, and should be left to individual countries to provide. States which oppose market mechanisms are free to opt out of the MBCM by not participating.

At the end of the day, the GAP+ is not meant to impose a solution on its state parties. Respect for each state's sovereignty and each country's special circumstances is baked into the GAP+, which will reduce the compliance burden created by mandatory obligations. Instead of a top-down solution, such as absolute and immediate bans (such as the Basel Ban Amendment's ban on waste plastic exports to developing countries), which may be prohibitively damaging to developing economies, the GAP+ allow regions and states to determine the level of ambition which they wish to pursue. Further, the GAP+ also provides for a more comprehensive scheme of financial and technological transfers than the previous international agreements concerned with plastic waste and pollution. This will benefit developing countries in providing the necessary funds, technology, and know-how in responsible management of plastic waste in an ecologically-appropriate manner, rather than having to deal with waste flows from the developed world on their own without assistance.

III. Conclusion

The question of plastic waste has floated up to the top of the environmental law agenda in recent years. While the focus on downstream concerns such as marine plastic debris, especially after David Attenborough's Planet Earth series which featured various scenes of plastic polluting our oceans. This led to the "Attenborough effect", driving a 55% increase in online searches for "plastic recycling".[123]

However, the issue of plastic waste is complex and multifaceted. Plastics still have their uses, and attempting to rid the world of plastics could end up with the global community finding the potential cure worse than the syndrome. It is submitted that treating "plastic" as "waste" isthe wrong way to look at the issue. This has resulted in the development of bioplastics, which compete with other uses of arable land, including feeding humans and animals, and may also accelerate

[121] Joyashree Roy and others, *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global*.
[122] Paris Agreement, art 4.2.
[123] Alexandra Gill, 'How startling images are helping to win hearts in the fight against plastics pollution' (*Maclean's Canada*, 2018) <https://www.macleans.ca/society/environment/how-startling-images-are-helping-to-win-hearts-in-the-fight-against-plastics-pollution/> accessed 20 April 2020.

land use changes, including deforestation. The damage caused to the environment is not lessened in this case. It merely becomes another type of harm. Rather, the key is to make plastic a resource, by continually recycling plastics, treating the current stock of plastic we have on our Earth as substantially finite, but infinitely renewable.

It is hoped that this paper answers the call by former Secretary Kerry for a Non-Proliferation Treaty for plastic pollution. Now, countries need to recognize the importance and urgency of this issue and act.

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GLOSSARY

AHEG	Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics
BBNJ	Biodiversity beyond national jurisdiction
CBDR	Common but differentiated responsibilities
CDM	Clean Development Mechanism
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
EC	European Communities
EIT	Economies in transition
EU	European Union
GAMP	Global Architecture for Marine Plastic
GAP+	Global Architecture for Plastics Plus (proposed)
GHG	Greenhouse gases
HAT Countries	High ambient temperature countries
ICAO	International Civil Aviation Organization
ITMO	Internationally Transferred Mitigation Outcomes
LDC	Least developed countries
LLDC	Landlocked developing countries
MARPOL	International Convention for the Prevention of Pollution from Ships
MBCM	Market-based crediting mechanism
MDB	Multilateral development bank
MEA	Multilateral environment agreement
MT	Megatonnes
NDC	Nationally Determined Contributions
OECD	Organisation for Economic Co-operation and Development
PE	Polyethylene
PET	Polyethylene terephthalate
PP	Polypropylene
RPAV	Real, permanent, additional, and verified
SDG	Sustainable Development Goals
SDM	Sustainable Development Mechanism
SIDS	Small Island Developing States
TDT	Technology development and transfer
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
6Rs	Reduce, redesign, refuse, reuse, recycle, recover

Legal Practice and Future Prospects of Marine Plastic Debris Management in China

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Abstract

The growing problem of marine plastic pollution is causing irreversible damage to marine ecosystems and has prompted many countries to adopt marine ecosystem protection legislation to address this problem. China's statutes on the management of marine plastic debris pollution mainly include the Marine Environmental Protection Law (MEPL), the Law on the Prevention and Control of Environment Pollution Caused by Solid Wastes (SWL), and other promotional laws and administrative regulations that indirectly regulate plastic waste pollution. The principles of "sea-land coordination" and "determining the land by the sea" in China's legal practice controlled the generation of land-based plastic debris to a certain extent; however, due to the imperfections in the interface between the MEPL and the SWL, there had been repeated failures in the treatment of marine plastic pollution in practice. The future revision of the MEPL should incorporate the practical experience, strengthen the legislative supply, properly deal with the interface with the SWL, and improve the design of the allocation of marine environmental tort liability and exemptions. At the same time, technological innovation is the most fundamental and effective way to combat marine plastic debris at source. China's intellectual property protection legislations, cleaner production promotion laws, and government policies to promote green technology development aim to promote scientific and technological innovation to strengthen the fight against marine plastic pollution. Finally, effective international cooperation frameworks and the application of soft law documents are also crucial for the protection of marine ecosystems in the Asia-Pacific region, as national sovereignty and its spatial limitations prevent domestic laws and policies from addressing plastic pollution in the high seas.

Keywords: Marine Plastic Debris; Sea-land Coordination; Substituted Fulfillment; Marine Sanitation; Extended Producer Responsibility; Technical Innovation; International Cooperation

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I. Introduction

Plastic products are widely used in industrial production, transportation, and daily life activities due to their ease of use and low cost. According to relevant statistics, from the 1950s to 2014, global production of plastic products increased from 0.17×10^8 t to 2.99×10^8 t.[2] But around 9% of which had been recycled, 12% was incinerated, and 79% was accumulated in land-fill or the natural environment.[3] According to the UN Environment Programme (UNEP), marine debris is defined as persistent, man-made or processed solid waste in the marine and coastal environment.[4] Plastic debris again accounts for a significant proportion of marine pollutants. As plastic debris is difficult to degrade and contains toxic chemicals, the presence of marine plastic debris poses a serious threat to the life and health of marine organisms. In addition, plastic debris is easily absorbed by marine organisms and may further threaten human health.

According to relevant statistics, more than 80% of marine debris originates from land, and plastic debris accounts for 80-95% of marine debris. For the management of the marine ecological environment of all countries, the key to combating marine plastic debris pollution lies in controlling the discharge of land-based plastic debris. The management of China's marine ecological environment is based on the principle of sea-land coordination and determining the land by the sea: coordinating the Marine Environmental Protection Law (hereinafter referred to as "MEPL") and the Solid Waste Pollution Prevention and Control of Environmental Pollution Law (hereinafter referred to as "SWL") to control the production, consumption, and discharge of land-based plastic garbage. In addition, China has gradually developed the substitutive implementation of environmental administrative (hereinafter referred to "substitutive implementation") and maritime sanitation system to effectively clean up marine plastic debris. SWL is a general legal regulation on the prevention and control of solid waste pollution based on the "three principles" management, whole process management and classified management. In view of the peculiarities of marine pollution, the provisions on the scope of application of the SWL stipulate that the prevention of pollution of the marine environment by solid waste and the prevention of pollution of the environment by radioactive solid waste are not applicable to this Law. The SWL and MEPL define their respective fields of application, but this crude division has, to some extent, fragmented the integrated arrangement of the two laws in the joint control of marine plastic debris pollution and weakened the role of sea-land coordination. The effectiveness of China's marine plastic debris management relies on the organic coordination and seamless integration of the two laws. Meanwhile, technological innovation and international cooperation are important ways to achieve plastic debris treatment. This paper examines the effectiveness and shortcomings of China's domestic laws in enabling technological innovation and the development path of international cooperation in plastic debris treatment.

[2] Bin CHEN, Synthesis of Research on the Distribution of Marine Plastic Particle Sources and Ecological Impacts, Vol. 44, No. 02, Environmental Protection Science. 90 (2018).
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II. The effectiveness of the new SWL on plastic debris and its interface with the MEPL

China's legal system on the treatment of marine plastic waste is mainly based on the SWL and the MEPL, which follow the internal logic of determining the land by the sea and sea-land coordination. China's legislators have considered the different nature and characteristics of marine environmental pollution and land-based environmental pollution and made different functional positions in relation to the SWL and the MEPL on the control of land and sea-based plastic waste. According to Article 2 of the SWL, the pollution of the marine environment by solid waste is not subject to this law, the SWL regulates the prevention of solid waste pollution of the environment.[5]

The adoption of a "divide and rule" legal approach to counter marine plastic debris and land-based debris can realize the specialization and refinement of pollution control. China's newly revised SWL also introduces several targeted measures to control the source of marine plastic waste, including limiting the excessive use of plastic packaging by the takeaway industry and e-commerce platforms, and banning or restricting the production, sale and use of non-degradable plastics. However, at the same time, the sectoral orientation of plastic waste management legislation has led to a gap between China's MEPL and SWL in the treatment of marine plastic debris. For instance, it lacks supervision of the current MEPL on the treatment of marine plastic debris, and the legislative process lags the practice.

A. The newly revised SWL strengthens prevention of plastic waste at source

On April 29, 2020, the Standing Committee of the National People's Congress (NPC) of China passed the latest revision of the SWL, which mainly made the following amendments: first, it is clear that the prevention and control of solid waste pollution of the environment continues to adhere to the "three principles", namely, reduction, recycle and harmlessness; second, continue to strengthen government regulatory responsibilities, clarify target responsibility, strengthen credit records, implement joint prevention and control, whole process monitoring and information traceability mechanism; third, strengthen the solid waste pollution prevention and control system, including strengthening producer responsibility and increasing the comprehensive utilization of resources evaluation system; and fourth, strengthen the remediation efforts on excessive packaging and plastic pollution.

In recent years, with the rapid rise of express delivery and takeaway industries in China, the problem of environmental pollution caused by plastic products is most serious in the aforementioned industries. Excessive use of plastic products is a common problem in excessive packaging of goods, so the newly revised SWL specifically addresses this problem. Article 68 (1) of the SWL regulates the design and manufacture of products and package in order to prevent environmental pollution by over-packaging of goods; paragraph 3 establishes a mandatory recycling system; and paragraph 4 regulates the reduction and recycling of packaging for e-commerce, express delivery, take-away and other industries.[6] With regard to the control of plastic waste pollution, Article 69 of the SWL makes it clear that the state prohibits and restricts the

[5] Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes (2020 Revision), § 02 (2020).
[6] Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes (2020 Revision), § 68 (2020).

production, sale and use of disposable plastic products such as non-degradable plastic bags in accordance with the law. At the same time, the legislation establishes a reporting system for the use of plastic products, and SWL requires shopping malls, takeaways, couriers, and e-commerce companies that provide plastic products services to actively report the use and recycling of single-use plastic products.

The newly revised SWL formally establishes the three principles of plastic waste management: reduction, resourceization and harmlessness, stipulating that any entity or individual should promote the comprehensive utilization of plastic waste products and reduce the harmful effects of plastic waste. Secondly, the SWL implements the most stringent regime on solid waste import, specifying that the country will gradually achieve zero import of solid waste, and for the first time stipulates that the carrier of solid waste and the importer bear joint and several responsibilities. Thirdly, the cost of violations has been significantly increased: the new SWL has increased the number of provisions on legal liability from 21 to 23. It also added the types of penalties and fines, and it will increase the financial penalties for violations of the law, especially for importing solid waste.

B. Existing mechanisms for the interface between MEPL and SWL are not working well

The SWL is a general prescriptive legal norm for the prevention and control of solid waste pollution based on the principles of whole process management and classified management. In view of the special nature of marine pollution, Article 2 of the SWL on the scope of application of the law stipulates that the prevention of solid waste pollution of the marine environment is not applicable to this law, that is, the legislator distinguished the field of application of the SWL and MEPL respectively. But at the same time, both MEPL and SWL lack further clear regulations on the definition and connection of land-based plastic debris to the ecological environment. As for MEPL, it should be systematically connected with SWL according to the principle of sea-land coordination and determining land by sea, to realize the long-term control of marine plastic waste pollution.

The management of pollutants from land-based sources and the prevention and control of environmental pollution by near-shore solid wastes cannot be separated into two non-intersecting systems, and the close connection between them can enable the SWL and MEPL to achieve their intended legislative purposes. Under the existing legal framework, there are still many conflicts between the two laws at the institutional level: the MEPL is not sufficiently adapted to the changes arising from the reform of the administrative system; the regulatory bodies and their responsibilities for the management of plastic waste from land-based sources, offshore and marine plastic waste are not clear; the valuable practice of marine plastic waste management has not been implemented nationwide through legislation in a timely manner; the legal liability for violation of plastic waste prevention obligations is not clearly defined by the MEPL and SWL; the application of the exemption clause needs to be further clarified, etc.

1. The current MEPL lacks regulatory system for marine plastic debris control

The SWL has clear provisions on the regulation of plastic waste, for example, according to Article 48 of the SWL, there are clear provisions on the removal of domestic waste, according to which the environment and health authorities of local people's governments at or above the county level may, on their own or by means of public bidding, entrust qualified units to sweep, collect, transport and dispose of urban and rural domestic waste.[7] Taking into account the actual situation of domestic waste disposal in different regions, the SWL provides sufficient legislative authorization for the implementation of the waste classification system and the treatment of domestic waste in rural areas. For example, according to Article 59 of SWL, provinces, autonomous regions, municipalities directly under the Central Government, cities divided into districts and autonomous prefectures can formulate their own specific measures for local domestic waste treatment in accordance with local actual conditions. However, from the practice of solid waste disposal, especially plastic waste management in China, most of the local legislations fail to provide institutional safeguards for the management of domestic waste in rural areas, which results in a large legislative gap in rural waste disposal, and the current legislation should further supplement the supervision of rural domestic waste. In addition, the cleaning, collection, transportation, and disposal of domestic waste in coastal areas should comply with national standards for environmental protection and environmental health management. The MEPL and the SWL are based on the principle of determining land by sea, they should maintain the organic unity of subjects and standards for the management of domestic waste, especially plastic debris.

In addition, the generation of marine plastic debris is mainly due to the transport of land-based plastic wastes into the ocean through water currents and other means, and the source control of marine plastic debris mainly relies on the control of land-based plastic wastes under the SWL, which regulates the production, collection, transportation, and disposal of land-based solid wastes in detail. The design does not fully consider the realistic needs of marine ecological environment protection for land-based solid waste control, which leads to the situation that some of the MEPL quasi-applicable norms have no effective interface with other rules. For instance, article 38 of the MEPL is applicable to the disposal, dumping and disposal of solid waste, including garbage, on the shoreline, with reference to the provisions of the SWL. However, if we look at the legal provisions of the SWL, the only applicable rule of Article 38 of the MEPL that can be referred to is Article 20(2), which prohibits any entity or individual from dumping, depositing, or storing solid waste in rivers, lakes, canals, channels, reservoirs and their beaches and slopes below the maximum water level. From a comparison of the two laws, the SWL mainly focuses on the disposal and dumping of solid wastes including plastic wastes in inland waters, but it is not specific enough on the control of beach solid wastes related to marine plastic waste pollution. Therefore, the SWL fails to provide sufficient legislation for the treatment of marine plastic waste. According to Article 38 of the MEPL, the discharging, piling up and disposal of mining tailings, waste ores, cinders, garbage and other solid wastes on shores or beaches shall be conducted in accordance with the relevant provisions of the SWL. Article 38 is also not satisfactory in its application, so the legal vacuum between the two laws regarding the prevention and control of marine plastic waste needs to be filled.

[7] Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes (2020 Revision), § 48 (2020).

Secondly, MEPL provides insufficient legislation on the prevention and control of marine plastic waste pollution. In addition to land-based sources of marine plastic pollution, the plastic garbage generated by marine production and operation should not be neglected. Since SWL and MEPL adopt a dichotomy between the management of land-based and sea-based plastic waste, the SWL also explicitly states that the management of marine waste is not subject to the relevant provisions of the SWL. However, the MEPL also lacks legal guidance on the control of the pollution sources, as the MEPL only stipulates in Article 61(1) the obligations of ports, docks, loading and unloading stations and ship repair yards regarding the disposal of pollutants and wastes from ships. However, the absence of a superordinate law has not affected the development of distinctive local regulations and judicial practice, and many local regulations in China specifically address the disposal of garbage from fisheries production and domestic garbage at sea. For instance, the second paragraph of Article 37 of the Dalian Marine Environmental Protection Regulation[8] provides for the establishment of the management of domestic garbage in rural areas near the sea, the implementation of garbage classification and resource utilization, and the prevention of domestic garbage from entering the sea by strengthening the management of rural garbage. Meanwhile, Article 39 of the Regulation provides that the government shall organize a professional task force to establish a marine sanitation system and makes it clear that relevant sea area users shall be responsible for the sanitation work of marine garbage salvage, beach garbage cleanup, and landing garbage disposal in their sea-use areas. Article 18, paragraph 3, of the Regulation of Fujian Province on Marine Environmental Protection[9] provides that production and domestic wastes from maritime aquaculture shall be transported to land for harmless treatment and shall not be disposed of in the sea. And Article 21 of the Regulation of Shandong Province on Marine Environmental Protection provides that units and individuals engaged in maritime production shall not dispose of production and domestic wastes that have not been harmlessly treated in the sea.

2. The experience with marine plastic debris control has not been replicated through legislation in a timely manner

At present, for the clean-up of plastic debris that has entered the sea, the practice has gradually developed a polluter-responsible and environmental substitute fulfillment system, such as the provisions of Article 21 of the Regulation on Marine Environmental Protection in Fujian Province, Article 33 of the Regulation on Marine Environmental Protection in Shandong Province, Article 33 of the Measures for the Implementation of the MEPL in Guangdong Province, etc. The provisions of Article 50 to Article 52 of China's Administrative Compulsion Law basically establishes the environmental administrative substitute fulfillment system, and in practice, the legal authority for the substitute fulfillment of marine plastic garbage cleanup is mainly derived from the Administrative Compulsion Law as well.

[8] § 37-2 of Dalian Marine Environmental Protection Regulation, "Housing and urban-rural construction authorities shall establish a coastal rural household garbage cleaning, transportation, and disposal system. Implementing local classification and resource utilization of garbage, promoting rural household garbage management, and preventing which from entering the river and sea."
[9] § 18-3 of the Regulation of Fujian Province on Marine Environmental Protection, "Mariculture production, life waste should be transported to land-based places for environmentally sound treatment and shall not be disposed of in the sea. Coastal fishery administrative departments of the local people's government at or above the county level shall regularly monitor the quality of the marine environment of key aquaculture waters."

According to Article 16 of the SWL, the ecological and environmental authorities under the State Council shall, together with relevant departments under the State Council, establish a national information platform for the prevention and control of environmental pollution from solid wastes such as hazardous wastes, and promote the whole process of monitoring and information traceability of solid waste collection, transfer, and disposal. Following the previous institutional design of the SWL, the MEPL provides, in article 14, that the competent national marine administrative authorities shall manage the investigation, monitoring and surveillance of the marine environment in accordance with national norms and standards for environmental monitoring and surveillance; and, in article 15, that the relevant departments of the State Council shall provide the administrative department in charge of environmental protection under the State Council with the marine environmental monitoring information necessary for the preparation of a national environmental quality bulletin. But in practice, regions such as Hainan Province, Fujian Province and Dalian City have also explored the marine sanitation system.[10] However, since the SWL does not provide for a system of cleaning and salvage of solid waste, especially plastic waste that enters the sea, and the MEPL lacks provisions to cover such situations, there is an obvious institutional gap at the national legislative level.

Marine garbage cleaning and substitute fulfillment systems, as well as marine sanitation systems, contain institutional designs with distinctive characteristics of marine protection. Since SWL has already provided a general compliance system for the management of hazardous waste, MEPL should consider the special characteristics of the prevention and control of marine solid waste pollution and introduce the marine garbage cleaning and substitute fulfillment system, along with the marine sanitation system, as a supplement to the general provisions of SWL. In the future, the MEPL can refer to the SWL, which stipulates that users of the sea or coastline have the clean-up responsibility and the system of administrative substitute fulfillment, making it clear that polluters have the responsibility to remove domestic garbage and solid floating objects within the sea area they use, in case of refusal to remove the waste, the competent ecological and environmental authorities should designate relevant units to remove the waste on their behalf, and the polluter should bear the cost of garbage removal. Besides, the MEPL should be based on a marine environmental monitoring system that builds on successful local experiences and establishes a maritime sanitation regime to provide institutional remedies for the solid waste pollution already caused.

3. The exemptions for environmental torts in MEPL exist controversy

According to Article 89(1) of the MEPL, the perpetrator of pollution of the marine environment shall remove the nuisance and pay compensation for the damage, while the third party shall remove the nuisance and be liable to pay compensation if the damage to the marine environment is caused solely by the intention or negligence of the third party. As a matter of fact, China's legal system for environmental protection has already made detailed provisions on the distribution of liability for environmental pollution and tort damage: Article 64 of the Environmental Protection Law has in fact guided the liability for environmental pollution and ecological damage entirely to the Civil Code of the People's Republic of China (hereinafter referred to as the Civil Code), and Articles 1729 to 1735 of the Civil Code have very specific

[10] For instance, in March 2020, Hainan Province issued a notice on the "work plan for the establishment of a maritime sanitation system (for trial implementation), https://www.hainan.gov.cn/data/zfgb/2020/05/8709/ (Visited on Feb 8, 2021).

provisions on the exemptions and reductions of liability for environmental torts.[11] Article 89 (1) and 91 of the MEPL stipulate liability for environmental infringement arising from the fault of a third party and the grounds for exemption from liability, respectively. According to the MEPL, if the environmental pollution is entirely due to the fault of a third party, the third party at fault shall exclude the nuisance and be liable for the environmental pollution and ecological damage, although the environmental tort liability of the third party at fault is clearly stipulated here, the liability of the operator and the individuals is not mentioned. In contrast, Article 1233 of the Civil Code stipulates that if the environment is polluted or ecological damage is caused by the fault of a third party, the victim of the tort may claim compensation from the infringer, or from the third party; the infringer has the right to recover compensation from the third party after compensating the victim. With respect to the type of tort liability stipulated in Article 1233 of the Civil Code, there are two distinct views in China, positive and negative, and some scholars believe that it is not joint and several liability[12], and some scholars believe that it is untrue joint and several liability[13]. In general, however, the majority of Chinese academics are still positive about this.[14] Although it is still controversial whether Article 1233 of the Civil Code is not joint and several liability, most scholars in China recognize that MEPL and the Civil Code both affirm that the environmental pollution caused by the fault of a third party should be borne by the third party at fault for environmental torts. However, MEPL and the Civil Code have not yet "reached a consensus" on the allocation of the infringer's liability.

The functions of tort law, such as atonement, punishment, intimidation, education, filling of damage and prevention of damage, vary from time to time and from country to country, reflecting the socio-economic conditions and ethical and moral values of the time, and filling of damage is the basic function of tort law.[15] The function of environmental tort law refers to the goal which should be achieved through the application of environmental tort law, which has similarities with the function of the Tort Law.[16] The setting up of marine environmental tort liability is essentially to fill the diminished rights of victims through legal means. The distribution of liability among the subjects of marine environmental tort legal relations reflects the different values of legislative protection for different interest subjects. As far as article 1233 of the Civil Code is concerned, the purpose of the legislation on joint and several liability for environmental torts is to balance the damage to the ecological environment caused by the activities of private entities, with the aim of restoring the natural environment as soon as possible by imposing joint and several liability on the infringer and the third party at fault. In contrast, Article 89 of the MEPL is much less stringent regarding the allocation of tort liability between the infringer and the third party at fault with respect to the marine ecosystem. Article 89 only stipulates that "in case the pollution

[11] China has formally promulgated the Civil Code on May 28, 2020, the Tort Law has been absorbed by the Civil Code and become the "Tort Chapter", the relevant provisions of the Tort Law relating to environmental pollution infringement have also been incorporated into the Civil Code "Tort Chapter".

[12] See Xinbao ZHANG, On the Supplementary Liability in the Tort Liability Law of China, Vol. 31, No. 06, Law Science Magazine, 3 (2010); Huixing LIANG, Several Issues on China's Tort Law, Vol. 32, No. 03, Jinan Journal (Philosophy & Social Sciences), 11 (2010); Zhengzhang ZHANG, On the Untrue Joint and Several Liability in Current China's Tort Law, Vol. 155, No. 04, Academics, 110 (2011).

[13] Li ZHANG, Zhi-feng ZHENG, The Third Party's Tortious Act in Tort Liability of China: Discussion with Professor YANG Li-xin, Vol. 37, No. 01, Modern Law Science, 32 (2015).

[14] Jinghua ZHUANG, On the Nature of Partial Joint and Several Liability under Article 68 of the Tort Law, No. 01, Journal of China University of Political Science and Law, 99 (2017).

[15] TZE-CHIAN WANG, Tort Law, Vol. 01, 153 (Fang DENG, ed., China University of Political Science and Law Press 2001).

[16] Xiao ZHU, On the Special Elements of Environmental Pollution Liability—Comments on Article 68 of the Second Draft of the Tort Law, No. 12, Political Science and Law, 11 (2009).

damage to the marine environment is entirely caused by an intentional act or a fault of a third party, that third party shall relieve the damage and be liable for the compensation". However, there is no mention of whether the victim can claim compensation from the infringer or the actual manager of the pollution source in addition to requesting compensation from the third party at fault. Of course, the environmental tort liability should be determined by both legitimate rights and social interest rules, and the polluter's liability and the victim's rights and interests should not be absolutized, ignoring the social value of the "environmental tort".[17] However, for regulators, they should not only consider the balance of interests between the subjects of marine environmental torts, but also the ecological and environmental benefits of the marine industry.

At present, the problem of marine plastic debris pollution continues to worsen, and the goals of marine plastic debris control and marine ecological environmental protection need the MEPL to aggravate the tort liability of marine ecological environment to achieve. In addition, in terms of legal status and legal relations, the MEPL, the Tort Law and the Environmental Protection Law are all enacted by the Standing Committee of the NPC and are general laws, three laws have the same legal status and legal effect. The Civil Code, on the other hand, was enacted by the NPC and is the basic law of China. In terms of effectiveness, the Civil Code has a higher legal force than the three laws mentioned above. Since the Civil Code incorporates tort law, in the event of a conflict of laws, the rules governing the allocation of liability for environmental torts should take precedence over the higher law. The problem that arises is that the change in the legal hierarchy of tort law leads to an ambiguity of legal liability between the higher and lower law. As far as the allocation of marine environmental tort liability is concerned, the MEPL is not closely connected with the Environmental Protection Law and the Civil Code. Therefore, it is suggested that the MEPL should be revised in the future to strengthen the effective connection between the marine environmental tort liability and China's legal provisions on tort liability, and to promote the unity of China's environmental tort liability system while avoiding legal conflicts.

In addition, some of China's legislation, such as the Environmental Protection Law, the Water Pollution Prevention Law and the Air Pollution Prevention and Control Law, only exempts force majeure for natural disasters; for example, in environmental torts, force majeure for natural disasters is usually the only exemptive cause.[18] However, the MEPL provides an exemption from liability for acts of war, in addition to a third-party cause exemption and a force majeure exemption. The provision on exemption from liability for third-party causes, which has already been affirmed earlier, reflects the original intention of the legislation to respect the exercise of legitimate rights and to protect the balance of the rights and interests of the victims. However, the introduction of war into the exclusion clause on force majeure is questionable. War is by nature a social anomaly, and force majeure such as a social anomaly can usually be a cause of exclusion from liability for breach of contract. For tort liability, war is difficult to be claimed as a cause of exemption,[19] and China's civil code did not take war as a cause of exemption from tort liability, either.

[17] Chao LIU, Proving and Determining the Illegality of Environmental Torts, Vol. 33, No. 05, Law Review, 179 (2015).
[18] Wenquan YUAN, Understanding and Application of Force Majeure as a Pretext for Exemption from Tort Liability -- Interpretation of Article 29 of the Tort Law, Vol. 32, No. 01, Studies in Law and Business, 129 (2015).
[19] Ibid.

III. Practical exploration of China's treatment of marine plastic debris

Marine plastic pollution control requires laws that regulate the production, transportation, sale, use, and disposal of plastic products. In addition, green technology products such as degradable plastics are the ideal substitute for disposable plastic products, and the promotion of the production and consumption of degradable plastic products is also an important way to indirectly control marine plastic pollution. The role of law is to allocate the uncertainties and market risks associated with scientific and technological development by establishing an order for the distribution of rights and obligations, and to direct the pooling of market capital and technology toward green technologies through the guidance and drive of legal policy. Currently, the legislature and government of China have enacted several laws and regulatory policies aimed at promoting the development of green technology, which, do not, at first glance, appear to be relevant to addressing the marine plastic pollution, but do play a critical role in addressing root causes and providing plastic substitutes, such as intellectual property protection laws, "promotional" legislative practices, and governmental regulatory policies.

A. Strengthened intellectual property rights protection is an intrinsic motivation for achieving marine plastic debris control

The intellectual property system is an incentive and protection system for technological innovation, as well as a legal mechanism to promote enterprise technological innovation, which is not only a legal guarantee for the national innovation system, but also an important content of the enterprise technological innovation policy system, and a core policy and effective mechanism to promote technological innovation.[20] In recent years, China has continued to strengthen the protection of intellectual property rights, strengthening the legal protection of marine ecological environment management technology and degradable plastics products technology. On July 3, 2020, the Standing Committee of the National People's Congress (NPC) announced the second review draft of the amendments to the Patent Law. The amendments to the Patent Law listed 29 changes, among which legislative measures such as improving the design system, establishing the patent open license system, and increasing infringement compensation are crucial to the development and protection of marine plastic debris management technology.

Articles 50 to 52 of the second draft of the amended Patent Law stipulate the requirements for the establishment and withdrawal of open licenses by the patentee, the way potential licensees may obtain open licenses, and the handling of open license disputes. Article 50 of the deliberation draft stipulates that if the patentee declares in writing to the patent administrative authority under the State Council that he/she is willing to license any unit or individual to enforce his/her patent, and specifies the method and standard of payment of royalties, the patent administrative authority shall make a public announcement and implement the open license.[21] Any entity or individual that is willing to exploit an open-licensed patent shall notify the patentee in writing and may obtain the patent exploitation license after paying the royalty according to the announced royalty payment method and standard.[22] And where the parties have any dispute over the exploitation of an open

[20] Xiaoqing Feng, On the Function of Intellectual Property Rights System in the Technological Innovation, Vol. 33, No. 02, Hebei Academic Journal, 149 (2013).
[21] The Patent Law of the People's Republic of China (Draft), § 50 (2020).
[22] The Patent Law of the People's Republic of China (Draft), § 51 (2020).

license, the party may request the patent administrative department of the State Council to conduct mediation.[23]

Although the number of annual patent applications in China is at the forefront in the world, the conversion and implementation rate of patents in China has been low, which means that a considerable proportion of innovative technologies cannot be applied to social production in a timely and effective manner. Take China's degradable technology for example, enterprises generally face the problems of outdated production equipment and technology, complicated production processes and inconsistent industry standards. These problems reflect, on the one hand, that China's production technology is not advanced enough and, on the other hand, that the relevant patented technology has not been well transformed into advanced productivity. The open licensing system established by the Revised Patent Law establishes an open, professional, and transparent market for patent transactions and enforcement. It not only facilitates the widespread implementation of patented technologies, including marine plastic debris treatment technologies, but also ensures the safety and efficiency of patent licensing transactions related to marine plastic debris control through the open offer system, providing transaction protection for licensees or potential licensees.[24]

Secondly, China's patent law amendments have increased the compensation for patent infringement. Amendments to the Patent Law Article 71 details the legal liability for infringement, increased punitive damages, abolished the lower limit of statutory damages for infringement. Cancellation of the lower limit of the amount can reduce the expected profits of patent litigation, effectively prevent malicious litigation. For intentional infringement of others' patent rights, and the circumstances are serious, Article 71 provides that the infringer shall bear one times but not more than five times the amount of compensation. The introduction of punitive damages in China's Patent Law is undoubtedly a breakthrough in China's patent infringement damage compensation system, the five-fold penalty meets the practical needs of strengthening patent protection and will deter infringement on the one hand and promote social innovation on the other.[25]

B. "Promotional" laws provide effective incentives for innovation in marine environmental protection technology

In addition to amending the Patent Law to increase penalties for infringement of marine plastic debris treatment technologies, China has also promulgated a number of promotional laws to facilitate technological innovation in marine ecological protection, such as the Cleaner Production Promotion Law, Circular Economy, and the Cleaner Production Promotion Law. Promotion Law, Scientific and Technological Progress Law, etc. This type of promotional law is mainly concerned with weak areas of social development and aims to promote the development of public goods, such as scientific and technological innovation, ecological and environmental protection, etc. Promotional law has a unique advantage in regulating and balancing economic and

[23] The Patent Law of the People's Republic of China (Draft), § 52 (2020).
[24] Li Luo, On the Improvement of Designing the System on Licenses of Right in the Draft Amendment to the Patent Law, No. 05, Political Science and Law. 29 (2019).
[25] Yuting DENG, Liming LI, Research on Deterrence Mechanism and Rule Application of Punitive Damages for Patent Infringement: From the Perspective of Law and Economics, No. 08, Intellectual Property, 46 (2020).

social development and facilitating the social ecological welfare.[26] Regulatory law emphasizes strong administrative intervention by the state in economic and industrial development, which is often used in cases of excessive competition and market monopoly. Compared with the regulatory legislations such as Environmental Law, MEPL, etc., promotional law, on the other hand, is usually aimed at those areas where the production technology has not been well developed and the market size has not yet been formed but it is urgent to encourage the formation of market size. The law mainly addresses the issue of supply.[27] In addition, most of such legislation contains provisions that encourage the development of innovative technologies, the establishment of government support policies and the provision of financial and technical support; at the same time, most of the legal provisions lack mandatory punitive measures and strict government accountability systems, which leans towards soft law in nature.

Take the Cleaner Production Law as an example, it is the first special law in China that aims to prevent pollution, and its introduction provides a legal basis for clean production in China's related industries, especially in plastic-polluting enterprises. In addition, the environmental protection department of the State Council and the NDRC have also formulated relevant standards and evaluation systems for cleaner production, evaluating domestic enterprises' cleaner production and providing technical guidance to enterprises. Furthermore, in accordance with the provisions of the Cleaner Production Law concerning incentives, the relevant agencies of the State Council have set up a central financial fund for cleaner production to support common and key technology demonstration projects and medium- and high-cost technological transformation projects that have a significant impact on the overall level of cleaner production in the industry and have prospects for popularization and application, as well as projects that can significantly improve the level of cleaner production in enterprises.[28] The promotional law represented by the Cleaner Production Law and the Science and Technology Progress Law can mainly help weak industries with market failure and lack of social capital investment to achieve rapid development. They are of vital importance to China's marine plastic debris control technology, especially to the biodegradable plastics industry, which is at the critical stage of commercialization.

IV. Useful practices of other sectoral laws in promoting the development of technologies to combat marine plastic debris

A. Government makes regulatory policies to restrain the production and consumption of plastic products

At the beginning of 2020, China's National Development and Reform Commission(NDRC) issued “Opinions on Further Strengthening the Management of Plastic Pollution”, Opinions put forward: by the end of 2020, the country will ban the production and sale of disposable foamed plastic tableware, disposable plastic cotton swabs; ban the production of daily chemical products containing plastic microbeads; by the end of 2022, ban the sale of daily chemical products containing plastic microbeads.[29] It also stipulates the promotion of the use of alternative products

[26] Lijuan ZHANG, Yu WANG, An Analysis of the Significance and Methods of Promotional Legislation—Taking “Beijing Intangible Cultural Heritage Regulations” as An Example, No. 05, The People’s Congress of Beijing, 44 (2019).
[27] Zixuan YANG, Economic Law, 284 (Li WANG ed., Peking University Press & Higher Education Press, 1999); Law of the People's Republic of China on Promotion of Agricultural Mechanization (2018 Amendment), § 07 (2020).
[28] Hongyan GUO, Review on China’s Clean Production Policy, No. 04, China Sustainability Tribune, 72 (2013).
[29] *See also* https://www.ndrc.gov.cn/xxgk/zcfb/tz/202001/t20200119_1219275.html (Visited on Sep 8, 2020).

such as degradable plastics in shopping malls, supermarkets, pharmacies, bookstores and other places and food delivery areas.[30] In fact, China from June 1, 2008 onwards began to implement the "Plastic Restriction Order", which provides for a nationwide ban on the production, sale and use of plastic shopping bags with a thickness of less than 0.025 mm. All supermarkets, shopping malls, bazaars and other retail outlets must implement a paid use of plastic shopping bags system, all free plastic shopping bags are not allowed to provide. However, apart from the ban, the government has found it difficult to use the market to effectively supply society with alternatives to disposable plastic products, and the cost of the plastic bag fee system has been fully passed on to consumers. Since the basic demand for plastic products cannot be met by other alternatives, China's efforts to control plastic waste have been ineffective, even though plastic restrictions have been in place in China for more than a decade. In addition to being a market regulator, the government also plays an important role as a market service provider. Apart from banning and restricting the production and sale of disposable plastic products, governments should also actively promote the adequate supply of alternatives in the fight against plastic waste. Completely banning the production and sale of disposable plastic products and transferring the cost to consumers cannot curb the aggravation of plastic pollution from the root cause, the "ban + alternative" mechanism is the most effective way to combat marine plastic debris. Under current technical conditions, degradable plastics are the perfect alternative to disposable plastics: compared to disposable plastics, degradable plastics have a similar function to ordinary plastics and can degrade quickly in natural conditions, becoming environmentally usable fractions or fragments that can eventually be returned to nature. Degradable plastics are also not harmful or potentially harmful to the environment in terms of the substances produced during and remaining after degradation. However, compared with disposable plastic products, its research cost and raw material cost are higher, therefore their selling price is much higher than that of disposable plastic products, which makes it difficult to promote them on a large scale in the market.[31] The control of marine plastic debris pollution essentially needs to rely on technological development, and the role of law is to adjust the relationship between rights and obligations to allocate the market costs and the uncertainty of marine environmental management. At the same time, through the guidance and drive of laws and policies, the means of production are directed to concentrate on degradable plastics, creating a depression effect. To support the development of degradable plastics, the Chinese government and legislative bodies have promulgated a series of laws and policies to encourage and promote the innovation of degradable plastics technology.

B. Application of the environmental substantive fulfillment in the management of marine plastic debris

In China, the "substantive fulfillment" refers to a system of enforcement in which the court may entrust a third party to perform on behalf of the person subject to enforcement ("the person") when the person fails to comply with the obligations established in the referral document, with the costs of such fulfillment to be borne by the person.[32] The Administrative Compulsion Law adopted by the Standing Committee of the Eleventh National People's Congress in June 2011 provides for

[30] Zhen HE, Investing in the Economic Viability of Degradable Plastics, No. 003, China Environment News, (2020).
[31] Siriluk Chiarakorn, Chompoonuh K. Permpoonwiwat, Papondhanai Nanthachatchavankul, Cost Benefit Analysis of Bioplastic Production in Thailand, Vol. 06, No. 03, Economics and Public Policy, 81 (2011).
[32] Jianhua CHEN, An Empirical Study on the Substitute Fulfillment of Environmental Pollution Liability Disputes, Vol. 10, Journal of Law Application, 67 (2020).

the introduction of a system of substantive fulfillment for environmental pollution control. According to Article 50, where an administrative organ makes an administrative decision to require the party concerned to perform an obligation such as removal of obstruction or restitution, if the party concerned fails to perform it within the prescribed time limit, still fails to do so after being prompted and the consequences of it have endangered or will endanger the traffic safety, have caused or will cause environmental pollution or have damaged or will damage natural resources, the administrative organ may perform the obligation on behalf of the party concerned or authorize a third party which is not a party of interest to perform the obligation on behalf of the party concerned. At the same time, Article 51 and Article52 of the Administrative Compulsion Law specify the procedures for implementing the system of substituted compliance. For the first time, these three legal provisions have clarified China's environmental substantive fulfillment system in the form of a basic law.[33]

In addition to the provisions of the Administrative Compulsion Act, local governments have likewise established a system of surrogate compliance through local regulations to combat marine plastic waste pollution. For example, Article 21 of the Regulation of Fujian Province on Marine Environmental Protection[34] stipulates that ports, wharves, ship repair (dismantling) yards, seaside tourist spots and other units using the sea areas or coastline shall prevent pollutants and wastes from entering the sea areas, and they shall be responsible for the removal of domestic garbage and solid floating objects within the sea areas used by the unit. In case of refusal to remove, the competent maritime administrative authority shall designate personnel to remove them on behalf of the unit, and the cost incurred shall be borne by the sea area or coastline users. Article 33 of the Regulations on Marine Environmental Protection of Shandong Province[35] stipulates that if a user refuses to remove garbage or waste from the sea, or abandoning production or domestic waste in the sea, the competent ecological and environmental authorities shall designate the relevant unit to remove it, and the cost shall be borne by the user. Article 33 of the Measures for the Implementation of China's MEPL in Guangdong Province[36] stipulates that units and individuals using the sea should promptly remove domestic garbage and debris within the sea area they use; in case of refusal, the competent marine administrative authorities shall compel them to do so. The required costs are borne by the entity or individual using the sea area.

[33] Shaojun TANG, Yunfei JIANG, Environmental Administrative Substitute Fulfillment: Advantages, Difficulties and Improvement, No. 01, Academic Journal of Zhongzhou, 85 (2016).

[34] § 21 of the Regulation of Fujian Province on Marine Environmental Protection, "Ports, docks, ship repair (dismantling) plant, seaside tourist spots and other units using the sea or coastline should prevent pollutants, waste into the sea, and is responsible for the removal of domestic garbage and solid floating matter within the waters used by the unit. For those who refuse to clean up, personnel designated by the maritime administrative department will clean up on their behalf, and the necessary expenses shall be borne by the unit using the sea area or coastline."

[35] § 33 of the Regulations on Marine Environmental Protection of Shandong Province, "In violation of the provisions of these regulations, refuse to remove domestic garbage and waste within the sea area used by the unit, or discard production or domestic waste in the sea area, the competent department of ecological environment shall designate the relevant unit to remove it on its behalf. The necessary expenses shall be borne by the sea user, and a fine of less than 30,000 yuan shall be imposed."

[36] § 33 of the Measures for the Implementation of China's MEPL in Guangdong Province, "Units and individuals that use sea areas shall promptly remove domestic garbage and wastes; if they refuse to do so, the marine administrative department shall force the removal, and the necessary expenses shall be borne by the units and individuals using the sea areas."

C. Extended Producer Responsibility (EPR)

The Extended Producer Responsibility (EPR) as an institutional policy was first introduced by Thomas. Lindhqvist, 1990, in a report to the Swedish Environment Agency.[37] According to his theory, EPR is an environmental protection strategy to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product responsible for the entire life-cycle of the product and especially for the take-back, recycling and final disposal of the product.[38] EPR system is a practice and an extension of the theory of externality: producers sell the products they produce to consumers for producer surplus, but after consumption the products become waste products and are discharged into the environment, creating an environmental load and causing society to bear the costs of environmental pollution.[39] For their part, regulators need to redress environmental injustices arising from the external costs passed on by polluting emitters and to internalize external costs by the EPR system. Compared with ordinary consumers, producers have a technological and financial advantage in the treatment of plastic waste, the implementation of plastic waste pollution control by producers instead of consumers helps to specialize and scale the pollution control. The implementation of EPR directly contributes to the reduction of regulatory costs by shifting the regulatory target from consumers to a limited number of plastic manufacturers. Therefore, a well-developed EPR system is more socially efficient for plastic debris management.[40]

In 2011, China formally introduced the concept of EPR into its national regulatory documents on environmental protection, and in December of the same year, the State Council issued the National Environmental Protection Plan for the Twelfth Five-Year Plan, proposing to "implement an extended producer responsibility system, regulate the recycling of waste electrical and electronic equipment, build recycling systems and centralized processing and treatment parks for waste and old items, and promote the comprehensive utilization of resources". Thus, the initial phase of EPR in China was mainly to increase the liability of electronics manufacturers, and the production of plastic products was not subject to EPR. Then in 2016, the State Council of China promulgated the Implementation Plan for Extended Producer Responsibility (hereinafter referred to as the "Implementation Plan"), which incorporates eco-design and the use of renewable raw materials into the EPR system and promotes it in a market-based manner. In the implementation program, the Chinese Government has established four types of environmental responsibilities that producers should bear, namely, eco-design, use of renewable raw materials, regulation of recycling and enhanced information disclosure. The implementation plan is a summary of China's experience in exploring and implementing EPR system in some electrical and electronic products; it also takes into account factors such as the market size, environmental hazards and the value of resources, and takes the lead in implementing EPR system for four types of products, including packaging.[41] According to the implementation plan, by 2025, relevant laws and regulations relating to the EPR system will be basically perfected, the EPR system in key areas will operate in an

[37] Lindhqvist, T. (2000). Extended Producer Responsibility in Cleaner Production: Policy Principle to Promote Environmental Improvements of Product Systems. IIIEE, Lund University.
[38] Ibid.
[39] Jianguo QI, Xinli CHEN, Fang ZHANG, On the Extension of Producer Responsibility under the Construction of Ecological Civilization, Vol. 12, Economic Review Journal, 12 (2016).
[40] *Id*. at 28.
[41] *See also* http://www.gov.cn/zhengce/content/2017-01/03/content_5156043.htm (visited on Sep 4, 2020).

orderly manner, the eco-design of products will be generally implemented, the proportion of recycled raw materials used in key products will reach 20%, and the recovery and recycling rate of waste products will reach 50% on average.[42]

D. Marine Sanitation System

The marine sanitation system generally means that the relevant government agency assumes the underwriting responsibility for marine environmental protection, and in special cases, such as when the liable person cannot be identified, the government agency organizes the salvage and removal of orphaned marine debris. According to Article 16 of the SWL, the ecological and environmental authorities under the State Council shall, together with relevant departments under the State Council, establish a national information platform for the prevention and control of environmental pollution from solid wastes such as hazardous wastes, and promote the whole process of monitoring and information traceability of solid waste collection, transfer, and disposal. Article 14 of the MEPL, which follows on from the design of the previous SWL, stipulates that the competent department of the State Oceanic Administration shall manage the investigation, monitoring and surveillance of the marine environment nationwide in accordance with national norms and standards for environmental monitoring and surveillance; Article 15 stipulates that the relevant departments under the State Council shall provide the State Council's administrative department for environmental protection with the marine environmental monitoring information necessary for the preparation of national environmental quality bulletins. Since the SWL does not provide for a system for cleaning and salvaging solid waste, especially plastic waste that enters the sea, and the MEPL also lacks provisions for bottom-up protection, there are still obvious institutional shortcomings at the national legislative level in general. In practice, the marine sanitation system has been successfully implemented in Hainan, Fujian and other places, and relevant local regulations have also regulated the marine sanitation system. For example, Article 56 of the Dalian Marine Environmental Protection Regulation (draft) stipulates that when the ownership of marine litter or the source of an oil spill at sea cannot be identified, it shall be disposed of by the government. Article 58 stipulates that construction authorities shall establish a mechanism for marine sanitation to regularly clean up and salvage orphaned marine litter. Incentives may also be provided for the harvesting of orphan solid waste.

V. Combating marine plastic debris needs to be underpinned by international cooperation

More than 80% of marine plastic wastes originate from land-based sources, for which China mainly strengthens the source control of land-based plastic solid waste discharge through the SWL; secondly, for plastic wastes that have already entered the sea, many coastal provinces in China have explored the marine sanitation system, and the government is strengthening the control of plastic debris in China's maritime domain by means of administrative substitute fulfillment. However, limited by the spatial effects of national sovereignty, there is a sovereign regulatory vacuum in the management of marine plastic debris in the high seas, domestic regulatory and institutional tools alone are not sufficient to address plastic pollution. The solution to plastic pollution in the high seas also relies on long-term and reliable inter-regional international cooperation mechanisms to achieve an organic combination of pre-emptive and post-emptive management.

[42] Ibid.

A. Tragedy of the commons causes failure to control plastic pollution on the high seas

The "tragedy of the commons" was first proposed by the British scholar Harding in 1968, and the classical model of this theory is that: a group of herders share a piece of grassland, the nature of which is communal, while the herd is private; when the villagers have selfish motives and seek to maximize their own interests, each villager will use the grassland to expand their livestock without restraint, and the grassland will be degraded as a result of long-term overgrazing, and eventually cannot be grazed.[43] According to this theory, the "economically rational man" in society will do whatever he can to maximize his own interests in the marketplace. When confronted with a public good whose ownership is unclear, private actors will try to extract as much profit as possible from it to satisfy their own needs. In terms of marine ecological and environmental protection, international legal mechanisms have clear provisions on the coastal sea, the territorial sea, the contiguous zone and the exclusive economic zone, but the current legal framework cannot yet provide a clear legal basis for the nature of the high seas and its attribution of rights and interests.[44] Therefore, the ecological protection and resource exploitation of the high seas have become the "public grassland" in Harding's theoretical model. To maximize their own interests, countries will exploit the resources of the high seas to the greatest extent possible, while turning a blind eye to the protection of the ecological environment of the high seas. Once countries exploit the resources to an extent that exceeds the capacity of the sea, the ecological environment of the high seas is at risk of being destroyed.

Individual rationality can easily lead to collective irrationality. The "tragedy of the commons" stems, on the one hand, from the lack of ownership of public grasslands and, on the other hand, from the lack of restraint of existing rules on individual behavior. The tragedy of the commons is reflected in the protection of the marine ecological environment: existing international conventions stipulate that the high seas belong to all mankind, that no state can claim sovereignty over the high seas, and that sovereign states have equal access to the economic benefits of the high seas, including fishery resources. At the same time, however, international treaties lack specific provisions on the responsibility of sovereign states for environmental protection in the high seas, and ecological degradation on the high seas are commonplace. Existing international treaties on marine ecological protection include the United Nations Convention on the Law of the Sea (UNCLOS), the 1972 London Convention, and the International Convention for the Prevention of Pollution from Ships (MARPOL). The UNCLOS, signed in 1982, is the basic document on ocean rights and order, establishing the basic legal framework for human use and management of the oceans and marking the establishment of a new ocean order, known as the "constitution for oceans".[45] The provisions of the UNCLOS relating to the implementation of the obligations of Contracting Parties with respect to the protection of the marine environment are mainly found in Part XII of the Convention, "Protection and Preservation of the Marine Environment". According to article 207, states shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources. Although Article 207 stipulates that contracting parties should enact laws and regulations to prevent land-based debris from polluting the marine

[43] Hardin, The Tragedy of the Commons, Vol. 162, Issue 3859, Science, 1243 (1968).
[44] UNCLOS (1982), § 89: No State may validly purport to subject any part of the high seas to its sovereignty.
[45] Jiangeng ZHU, International Law of Marine Environmental Protection, 16 (China University of Political Science and Law Press,2013).

ecosystem, it lacks further clarity on the specific duties and obligations of member states. In addition, the obligation to protect the oceans is too broad and abstract, and some of its provisions are flawed and vague.[46] The shortcomings of the London Convention and MARPOL are the former lacks a sanctions mechanism for non-compliance; the latter's prevention and control of marine plastic pollution is mainly limited to ships, whose binding effect on subjects of international law is more limited, and ship pollution is not the main source of marine plastic pollution. The International Seabed Authority (ISA) is an international organization established under the UNCLOS and is the primary agency for resource development and environmental protection in the international seabed area. Under the UNCLOS, the protection of the marine environment by the ISA is limited to the prevention and control of marine environmental problems associated with the exploitation of the resources of the seabed area; however, the Convention does not regulate plastic debris such as plastic sediment in the seabed area, suspended plastic in the ocean, or plastic floating on the surface of the ocean.

B. Ineffective implementation of existing international treaties and agreements on marine environmental governance

The existing international treaties on marine plastic debris are not sufficiently enforceable and the legal norms are not comprehensive enough. The state is supreme in the international legal framework, because of the regime of State sovereignty and immunity from State obligations, the greatest long-standing challenge to the international legal system has been the difficulty of achieving full compliance with international treaties and fulfilling State obligations. The principle of sovereign equality, which is one of the fundamental principles of international law, proclaims the formal equality of States and determines that supranationalism and the concept of international "government" are nebulous. In addition, the relevant treaties on transboundary marine plastics governance in the Asia-Pacific region mainly include the UNCLOS and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention). The UNCLOS establishes a mechanism for international cooperation in marine environmental protection, while the Water Convention provides for international cooperation to prevent or control possible pollution of transboundary watercourses and international lakes, as well as certain implementation measures.[47] In general, however, the two conventions are relatively broad in their provisions on the allocation of responsibility of member states for marine plastic debris, and the principled provisions are difficult to guide the practice of marine plastic governance. Besides, some treaties do not provide for penalties for non-compliance, and the low cost of non-compliance further weakens the actual function of the treaties.

Compared to the inadequacy of "hard law", such as national treaties, in combating marine plastic litter, countries in the Asia-Pacific region should pay attention to the practical value of "soft law" in achieving marine ecological and environmental protection. International soft law is a document established in response to something new, which is not yet mature for treaty-making, but it is necessary to establish some basic norms to express the justice that should exist and to hope for general and universal compliance.[48] Compared with traditional international treaties, soft law

[46] Hongda PENG, Research on International Law regarding Marine Plastic Debris Governance, Shandong University, 2019.
[47] Yongbo QUAN, The Logical Basis and Institutional Supply of the Cross-Regional Governance on Marine Environment, No. 01, Chinese Public Administration, 19 (2017).
[48] Guiling ZHANG, Zhaocheng ZHANG, Yuxiang MA, Research on Environmental Law, 106 (Ziyang WANG ed. People's Publishing House, 2015).

has a shorter period to reach agreement, faster effects, and greater compatibility. In addition, soft law mostly provides for tendentious action plans (e.g., Honolulu Strategy), so it is easier for countries to combine it with their own actual situation.[49] In the absence of a treaty governing marine plastic debris, the timely replenishment of soft law is a very important complement to the protection of marine ecological environment. Some scholars argue that the existing international legal framework should take appropriate restrictions and supervision on the exercise of sovereignty rights.[50] However, in view of the urgency of ocean plastic litter control and the deep-rooted impression of the traditional concept of "the state is supreme" among the subjects of international law, the expected path to promote ocean plastic debris control by limiting the rights of the state lacks operability and practical significance. Imposing legal obligations on subjects of international law to protect the marine ecological environment through "hard law" will not only fail to address the environmental problem of plastic waste in the short term, but also will be counterproductive and undermine the credibility of national treaties and international organizations.

Table 1. Soft law documents and other practices related to marine plastic pollution control[51]

Documents	Organizations	Contents Related to Marine Debris Control
Code of Conduct for Responsible Fisheries	Food and Agriculture Organization of the United Nations (FAO, 1995)	Regulate the abandonment, loss or otherwise discarding of fishing gear.
The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA)	The United Nations Environment Programme (UNEP, 1995)	Currently the only global intergovernmental mechanism for addressing land-based sources of pollution that requires countries to adopt national action plans to address land-based sources of pollution.
The Honolulu Strategy	The 5th International Marine Debris	It proposed methods to reduce waste from land-based and sea-based

[49] *Id*. at 37.

[50] The scholarly consensus on the international governance model is that, unlike the autonomy model of modern international law, contemporary international law is more characterized by heteronomy and the United Nations (especially the Security Council), WTO, WHO and EU established after World War II are important products of the heteronomy model of contemporary international law. The failure of the traditional "autonomy" model of sovereign states in dealing with international environmental problems (especially climate change, marine pollution, air pollution, etc.) also calls for the introduction of the "heteronomy" model. However, with the rise of anti-globalization, populism and conservatism, the "heteronomy" model of international environmental governance is facing more uncertainties; and considering the urgency of the international plastic pollution problem, the positive effects of soft law should be valued more.

[51] Xiao-dong TOU, Wen-ping ZHAO, Research on International Governance Mechanism of Deep-Sea Plastic Pollution Implementation of the Community of Shared Future for Mankind, Vol. 19, No. 01, Journal of China University of Geosciences (Social Sciences Edition). 59-70 (2019).

	Conference (5IMDC, 2011)	sources, but it did not give measurable goals or timetables.
Global Partnership on Marine Litter (GPML)	UNEP (2012)	Protecting the ocean from land-based pollutants.
Clean Seas Campaign	UNEP (2017)	Urges governments to enact policies to reduce the use of plastics; requires industry to minimize plastic packaging; appeals to consumers to change their habits in using disposable products.
The Future We Want	United Nations Conference on Sustainable Development (UNCSD), RIO+20 (2012)	Requires member countries to implement relevant conventions and plans to achieve significant reduction of marine debris by 2025.
2030 SDGs	United Nations General Assembly	Requires the conservation and sustainable use of oceans and marine resources, with a clear emphasis on reducing marine litter pollution.[52]

A comprehensive framework of international cooperation agreements is one step that countries in the Asia-Pacific region can take to address marine plastic debris pollution beyond the territorial waters of sovereign states and avoid the "tragedy of the commons." For marine plastic pollution control in the Asia-Pacific region, countries can rely on existing regional international organizations (e.g., ASEAN, APEC) to establish a framework agreement to address plastic pollution in this region, with a focus on adopting soft law documents to properly allocate the region's obligations to countermeasures marine plastic pollution.

VI. Conclusion

China is the world's largest producer and consumer of plastic products, and the problem of plastic pollution is also serious. In recent years, China has gradually developed the environmental administrative substitute fulfillment system, the marine sanitation mechanism, and an extended producer responsibility system in practice, which are crucial to the management of marine plastic litter. However, there is a lack of close linkage between China's MEPL and SWL on the issue of plastic debris control, and China should further revise its MEPL to better control marine plastic debris. In addition, a good regional cooperation mechanism is indispensable to combat marine litter. On the one hand, there is a need to clearly define the rights and interests of exploitation of the high seas and the distribution of responsibilities for environmental protection; on the other hand, the practical value of soft law documents on marine ecological and environmental protection

[52] Juying WANG, Xinzhen LIN, Global Ocean Governance in Addressing Plastic and Microplastic Pollution, Vol. 26, No. 04, Pacific Journal. 79-87 (2018).

should also be emphasized, so that they can become an important supplement to international treaties.

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