

# INTERNATIONAL JOURNAL OF LAW MANAGEMENT & HUMANITIES

[ISSN 2581-5369]

---

Volume 6 | Issue 2

---

2023

© 2023 *International Journal of Law Management & Humanities*

Follow this and additional works at: <https://www.ijlmh.com/>

Under the aegis of VidhiAagaz – Inking Your Brain (<https://www.vidhiaagaz.com/>)

---

This article is brought to you for “free” and “open access” by the International Journal of Law Management & Humanities at VidhiAagaz. It has been accepted for inclusion in the International Journal of Law Management & Humanities after due review.

In case of **any suggestions or complaints**, kindly contact [Gyan@vidhiaagaz.com](mailto:Gyan@vidhiaagaz.com).

---

**To submit your Manuscript** for Publication in the **International Journal of Law Management & Humanities**, kindly email your Manuscript to [submission@ijlmh.com](mailto:submission@ijlmh.com).

---

# Strengthening Global Hydro-Spheric Plastic Regulation: Toward an Overarching Plastic Treaty

---

ABID HUSSAIN<sup>1</sup>, DANIEL F. AKROFI<sup>2</sup>, BUSHRA BIBI<sup>3</sup> AND AAMIR SOHAIL<sup>4</sup>

## ABSTRACT

*In the context of the ongoing negotiations for a global plastic treaty, it is critical to identify lessons and opportunities in the existing legal framework relating to global marine and freshwater (riverine) [referred to in this paper as hydro-spheric] plastic regulation. To ensure the effectiveness of such a treaty, it is imperative to focus on the key countries and river systems that are the primary sources of plastic waste in the marine environment. This paper addresses some central aspects of global plastic regulation, including "key countries for action" and "key river systems for action." It also discusses the importance of regional cooperation in the potential plastic treaty, the need for a dynamic shift from solely marine-based to incorporate freshwater-based regulation, and lessons that can be learned from the UNECE Water Convention. It concludes that the proposed plastic treaty must account for the transboundary flow of plastic and recognize the geographic connectivity, especially in Asia, which facilitates plastic transport from land to the seas via rivers. Moreover, the treaty must move towards a dynamic shift from marine-based regulation to a more inclusive hydro-spheric-based plastic regulation which focuses on the marine and freshwater nexus to ensure an effective global plastic regulation.*

**Keywords:** *Plastic treaty, hydro-spheric plastic regulation, key countries for action, key river systems for action, regional cooperation.*

## I. INTRODUCTION

Plastic pollution poses a significant and widespread threat to the marine environment, making it one of the most significant challenges faced by our oceans in the 21<sup>st</sup> century. The accumulation of plastics in the oceans has escalated into a global crisis.<sup>5</sup> Unfortunately, the

---

1 Author is a Ph.D. Candidate, Research Institute of Environmental Law (RIEL), School of Law, Wuhan University, China.

2 Author is a Ph.D. Candidate, Lincoln Centre for Ecological Justice (LinCEJ), Lincoln Law School, University of Lincoln, United Kingdom.

3 Author is a Ph.D. Candidate, Research Institute of Environmental Law (RIEL), School of Law, Wuhan University, China.

4 Author is a Ph.D. Candidate, Research Institute of Environmental Law (RIEL), School of Law, Wuhan University, China.

5 Thevenon, Florian, Chris Carroll, and Joao Sousa. "Plastic debris in the ocean: the characterization of marine

widespread use and resistance of plastics to decomposition coupled with poor waste management infrastructure in many countries have resulted in an unmanageable plastic waste challenge. Since 1950, it is estimated that 7,800 million metric tonnes of plastic resin and fibres have been produced, with more than half of that production occurring between 2004 and 2017.<sup>6</sup> In 2015, the amount of plastic produced annually surpassed the human population.<sup>7</sup> Unfortunately, this trend is predicted to continue, with plastics projected to outweigh ocean fish by 2050.<sup>8</sup> The devastating effects of plastic waste are already evident, as it constitutes a staggering 80 per cent of all marine debris, from surface waters to sediments in the deep sea. A six-year-long study conducted in 2014 found that an estimated 5.25 trillion plastic particles, weighing 269,000 tons, are currently floating in the ocean, primarily entered via rivers and land-based sources.<sup>9</sup> Shockingly, recent estimates show that between 4.4 and 12.7 million metric tonnes of land-based plastic are added to the oceans each year.<sup>10</sup> These figures highlight the urgent need for action to address the global plastic crisis.

The persistence of plastic in marine ecosystems poses a serious threat to aquatic life and habitats, human health, tourism, fishing industries, and economies.<sup>11</sup> Research has demonstrated that both macro and micro-plastics have the potential to cause significant harm to the marine environment. Macro-plastics are large plastic items with a size >25 mm, and they have been polluting the marine environment since the early days of plastic production. On the other hand, microplastics are much smaller, with a size <5mm.<sup>12</sup> Although microplastics have only recently gained attention, they have made their way into the deepest parts of the marine environment and are more easily ingested.<sup>13</sup>

---

plastics and their environmental impacts, situation analysis report.” *Gland, Switzerland: IUCN* 52 (2014).

6 Schmaltz, Emma, Emily C. Melvin, Zoie Diana, Ella F. Gunady, Daniel Rittschof, Jason A. Somarelli, John Virdin, and Meagan M. Dunphy-Daly. “Plastic pollution solutions: emerging technologies to prevent and collect marine plastic pollution.” *Environment international* 144 (2020): 106067.

7 Worm, Boris, Heike K. Lotze, Isabelle Jubinville, Chris Wilcox, and Jenna Jambeck. “Plastic as a persistent marine pollutant.” *Annual Review of Environment and Resources* 42 (2017): 1-26.

8 Agenda, Industry. “The new plastics economy rethinking the future of plastics.” In *World Economic Forum*, vol. 36. 2016. Available at <[https://www3.weforum.org/docs/WEF\\_The\\_New\\_Plastics\\_Economy.pdf](https://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf)> accessed on March 11, 2023.

9 Xanthos, Dirk, and Tony R. Walker. “International policies to reduce plastic marine pollution from single-use plastics (plastic bags and microbeads): A review.” *Marine pollution bulletin* 118, no. 1-2 (2017): 17-26.

10 Jambeck, Jenna R., Roland Geyer, Chris Wilcox, Theodore R. Siegler, Miriam Perryman, Anthony Andrady, Ramani Narayan, and Kara Lavender Law. “Plastic waste inputs from land into the ocean.” *Science* 347, no. 6223 (2015): 768-771.

11 Kandziora, J. H., N. Van Toulon, P. Sobral, H. L. Taylor, A. J. Ribbink, J. R. Jambeck, and S. Werner. “The important role of marine debris networks to prevent and reduce ocean plastic pollution.” *Marine pollution bulletin* 141 (2019): 657-662.

12 For more information on macro and microplastics, see <<https://theoceancleanup.com/faq/what-are-microplastics-and-macroplastics-and-why-may-they-be-harmful/>> accessed on March 31, 2023.

13 LI, Wai Chin, H. F. Tse, and Lincoln Fok. “Plastic waste in the marine environment: A review of sources, occurrence and effects.” *Science of the total environment* 566 (2016): 333-349.

Furthermore, the discovery of both micro and macro plastics in marine life in isolated areas highlights the pervasive nature of these pollutants.<sup>14</sup> It was estimated nine years ago that approximately 5.25 trillion pieces of plastics are already in the ocean.<sup>15</sup> However, in 2018, a report on plastic pollution in soils revealed that the amount of microplastics on land is 4-32 times higher than in the ocean.<sup>16</sup> This might shed some light as to why understanding the plastic flow from land to riverine systems and ultimately to the marine environment is crucial to designing a truly representative global plastic regulation that explores the intricacies of plastic invasion of the Earth system. As such, there is a pressing need for effective strategies to address the issue of plastic pollution not only in the marine environment but also in riverine systems as far as global hydro-spheric plastic pollution is concerned.

Microplastics are prevalent in the marine environment and can travel vast distances, to the extent that they are commonly found in seafood and table salt.<sup>17</sup> As a result of ingesting or becoming entangled in plastic, marine organisms are subject to starvation, suffocation, infection, laceration, reduced reproductive ability, and even death.<sup>18</sup> The impact of marine plastic pollution has been observed in approximately 700 species, ranging from zooplankton to whales and fish that humans consume.<sup>19</sup> The magnitude of floating plastic debris in the oceans is established by the well-documented five plastic gyres, with the Great Pacific Garbage Patch being particularly noteworthy due to its associated consequences.<sup>20</sup>

#### **(A) Rationale - The urgent need for action to address hydro-spheric plastic pollution**

Plastic pollution is a complex and multifaceted issue that demands a collaborative global approach. The excessive accumulation of plastics in natural environments is undeniably one of the most pressing environmental challenges of our time. A recent report by the United Nations Environment Programme (UNEP) states that every year, the world generates over 300 million tonnes of plastic waste, of which only 9 per cent is recycled, while the remaining 91 per cent ends up in landfills, incinerators, or, most importantly, the natural environment, including an

---

14 Haward, Marcus. "Plastic pollution of the world's seas and oceans as a contemporary challenge in ocean governance." *Nature communications* 9, no. 1 (2018): 667.

15 Eriksen, Marcus, Laurent CM Lebreton, Henry S. Carson, Martin Thiel, Charles J. Moore, Jose C. Borerro, Francois Galgani, Peter G. Ryan, and Julia Reisser. "Plastic pollution in the world's oceans: more than 5 trillion plastic pieces weighing over 250,000 tons afloat at sea." *PLoS one* 9, no. 12 (2014): e111913.

16 Susanna, G. "Plastic Pollution in Soil. Interactive Soil Quality Assessment." *Institute for European Environmental Policy Waste in Switzerland. Soil Use Manage* (2018): 1-12.

17 Borrelle, Stephanie B., Chelsea M. Rochman, Max Liboiron, Alexander L. Bond, Amy Lusher, Hillary Bradshaw, and Jennifer F. Provencher. "Why we need an international agreement on marine plastic pollution." *Proceedings of the National Academy of Sciences* 114, no. 38 (2017): 9994-9997.

18 Xanthos. "International policies to reduce plastic marine pollution from single-use plastics."

19 Gall, Sarah C., and Richard C. Thompson. "The impact of debris on marine life." *Marine pollution bulletin* 92, no. 1-2 (2015): 170-179.

20 Xanthos. "International policies to reduce plastic marine pollution from single-use plastics."

alarming 11 million tonnes that reaches our oceans.<sup>21</sup>

This research builds upon the existing legal literature and presents lessons learned and opportunities identified to help set the context for the hydro-spheric plastic regulation within the plastic treaty. As negotiations for the treaty are underway, it is crucial to focus on the key river systems (deliberated upon in section 1.4.1) responsible for most plastic pollution. To achieve this, the involvement of key countries (discussed in detail in section 1.4.1) in the negotiations is essential. A global plastics treaty would be pointless if the countries that are the biggest polluters do not participate fully noting their concerns and adequately addressing them. Therefore, to ensure fairness and transparency, it is crucial to obtain the cooperation of Asian states, particularly whose jurisdiction key river systems that contribute the most to plastic waste in the ocean. Besides, as far as hydro-spheric plastic pollution is concerned, it is imperative to coordinate efforts between UNCLOS, International Maritime Organisation (IMO) Conventions, UN Water Conventions, and the proposed global plastics treaty.

While many countries have taken steps to reduce plastic waste and pollution, a coordinated global effort is lacking save the BAN Amendment in the Basel Convention to tackle the problem although some regional efforts have been made.<sup>22</sup> There is a pressing need for an overarching global plastic treaty to address the plastic pollution crisis effectively. An overarching global plastic treaty could provide a framework for countries to work together to end plastic waste and pollution, especially by focusing on the key rivers systems and countries.

### **(B) Status quo - An overview of the existing international laws for hydro-spheric plastic regulation**

The 1972 UN Conference on the Human Environment (UNCHE) Declaration was one of the earliest global attempts to tackle environmental issues. Principle 7 of the Declaration stipulates that all States should take measures to prevent pollution of the seas.<sup>23</sup> Over time, international law has developed, and there has been an increasing concern regarding the degradation of the oceans, leading to the establishment of various legal regimes aimed at addressing marine

---

21 United Nations Environment Programme (2021). "From Pollution to Solution: A global assessment of marine litter and plastic pollution." Synthesis. Nairobi. Full report is available at <<https://wedocs.unep.org/bitstream/handle/20.500.11822/36965/POLSOLSum.pdf>> accessed on March 14, 2023.

22 Linda Yanti Sulistiawati and Rose-Liza Eisma-Osorio (eds.). "Marine Plastic Pollution and the Rule of Law." Konrad-Adenauer-Stiftung, Ltd., Korea Legislation Research Institute, Asia-Pacific Centre for Environmental Law-National University of Singapore, and University of Cebu School of Law, ISBN: 978-621-96185-2-6, (2021); Axel Van Trotsenburglim and Jock Hoi. "Turning the tide on plastic pollution through regional collaboration in Southeast Asia." (2022). See <<https://blogs.worldbank.org/eastasiapacific/turning-tide-plastic-pollution-through-regional-collaboration-southeast-asia>> accessed on March 30, 2023.

23 Report of the United Nations Conference on the Human Environment. Stockholm, 5-16 June 1972. Available at <<https://undocs.org/en/A/CONF.48/14/Rev.1>> accessed on March 30, 2023.

environmental problems.

There are at least three globally binding agreements that address sea-based sources of marine litter. These include the United Nations Convention on Law of the Sea (UNCLOS), the International Convention for the Prevention of Pollution from Ships (MARPOL), and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention) and its Protocol. In addition, two binding agreements deal with the sustainable management of international watercourses, namely, the Convention on the Law of the Non-Navigational Uses of International Watercourses 1997 (UN Watercourses Convention) and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes 1992 (UNECE Water Convention). Furthermore, two multilateral environmental conventions address trade in hazardous waste and persistent organic pollutants (POPs): the Basel Convention and the Stockholm Convention.

Plastic pollution has been widely acknowledged as a threat to marine ecosystems and a driving force for progress in ocean governance. The international law of the sea serves as a crucial underpinning for ongoing efforts to address this issue of plastic pollution. Nevertheless, the future of conservation of both marine and fresh water ecosystems hinges on the States' willingness to collaborate on shared objectives of reducing marine pollution, as well as their ability to develop and enforce effective laws for protecting marine and freshwater environments. To this end, individual states must build their capacity for conservation and enforcement while cooperating with one another to achieve collective goals.<sup>24</sup>

## **II. AN OVERARCHING PLASTIC TREATY - THE WAY FORWARD**

The way forward for a global plastic treaty is to create a comprehensive agreement that sets out clear and binding commitments for all countries, particularly the key countries.

The following section takes an interesting approach to the question of what lessons must be incorporated into the forthcoming plastic treaty to ensure its comprehensiveness as far as regulating the marine and riverine plastic pollution nexus is concerned. It explains the critical role of the options presented in this paper to end plastic pollution (as set out in the Resolution UNEP/EA.5/L.23/Rev.1) and emphasizes the necessity for the proposed treaty to integrate these options for effective implementation.

---

24 Howard S. Schiffman. "International Law and the Protection of the Marine Environment." Chapter. In Schwabach, Aaron, and Arthur John Cockfield, eds. *International law and Institutions*. EOLSS Publications, 2009. Available at <<https://www.eolss.net/sample-chapters/C14/E1-36-02-03.pdf>> accessed on March 11, 2023.

**(A) The "Key Countries for Action" and "Key River Systems for Action"**

The "key countries for action" in this paper are referred to China, Indonesia, the Philippines, Vietnam, Sri Lanka, Thailand, Malaysia, Bangladesh, India, and Pakistan. These countries have been selected based on an extensive research and analysis.<sup>25</sup> Firstly, these countries are the top-ranked globally for mismanaged plastic waste, which is a significant contributor to ocean pollution. Secondly, over 50 per cent of the world's land-based plastic waste leakage into the sea originates from these countries, emphasizing the need for immediate action. Thirdly, these countries are some of the most populous and significant plastic producers. Fourthly, they are not Party to the United Nations Global Water Conventions, indicating a lack of commitment to addressing this critical issue concerning riverine systems at the global level. Fifthly, some of the world's largest and most polluted river systems originate or pass through these countries. Additionally, they have relatively weak waste management systems in place. Sixthly, they have extensive coastlines and are among the world's most significant plastic trading countries. Seventhly, these countries attract a significant tourism influx, further exacerbating the plastic waste problem. Lastly, they share borders, transboundary rivers, and international watercourses, highlighting the importance of cooperation to address this issue effectively and the role the existing UN Global Water Conventions could play.

Similarly, the "key river systems for action" comprise of Yangtze, Indus, Yellow, Hai He, Ganges, Pearl, Amur, Mekong, Xi, Huangpu, Brantas, Pasig, Irrawaddy, Solo, Dong, Serayu, Tamsui, Han, and Progo. These rivers have also been identified as crucial targets for environmental action for several reasons presented.<sup>26</sup> Firstly, they are among the top-ranked rivers in the world and transport a staggering ninety-five per cent of global plastic waste into the oceans. Secondly, many of these rivers are also the most polluted in the world, exacerbating environmental degradation and negatively impacting the health of surrounding communities. Thirdly, many of these river systems traverse multiple countries and represent critical international watercourses, further complicating efforts to address environmental concerns. Finally, a significant portion of the world's population resides along these river systems, often with limited access to proper waste management infrastructure, making them particularly vulnerable to the negative impacts of environmental degradation.

There is a significant concentration of plastic in the river systems of Asia. The region's

---

25 Hussain, A., Haisong, C., Akrofi, D. F., Bibi, B., & Sohail, A. (2023). "The UN global Water conventions and riverine plastic regulation: the role of Asian States." *Russian Law Journal*, 11(3s), 232-242. Available at <<https://www.russianlawjournal.org/index.php/journal/article/view/762>>.

26 Hussain. "The UN global Water conventions and riverine plastic regulation: the role of Asian States."

population, tourism boom, poorly managed plastic waste, plastic production, and dynamics of the plastic trade are just a few of the causes of this enormous concentration of plastic in its river systems.<sup>27</sup> One of the first analyses of plastic inputs from land to oceans found that only twenty nations account for 83% of the 4.4–12.7 million tons of land-based plastic trash that end up in marine habitats, with five Asian countries accounting for more than half of this plastic debris.<sup>28</sup> Similarly, based on the volume of improperly handled plastic garbage, the same research discovered that eight of the top ten countries are in Asia.<sup>29</sup>

Research findings offer crucial insight into the relevance of Asian river systems in global plastic transportation and the connection between freshwater and marine habitats, despite some commentators' assertions that the present scientific models are still too new to verify these claims.<sup>30</sup> An immediate international response involving all pertinent actors at various levels, particularly states in this region, is required in light of the origin, fate, transport, and distribution of riverine plastic litter in Asia, the transboundary nature of Asian river systems,<sup>31</sup> and the sizeable influx of poorly managed plastic from this region. This indicates that a remedy to the marine plastics problem must go beyond the ocean by looking into solutions inside the riverine systems, especially in Asian nations.

The analysis presented above highlights the crucial role that Asian States play in riverine plastic pollution. As no other region is as well-positioned geographically to address riverine plastic

---

27 For more details about the population statistics in Asia and the Pacific region, visit <<https://asiapacific.unfpa.org/en/populationtrends>> accessed on March 14, 2023; Asia and the Pacific welcomed 23 per cent of the world total in 2013. UNWTO/GTERC Annual Report on Tourism Trends, UNWTO, Madrid, (2014). Available at <<https://www.e-unwto.org/doi/book/10.18111/9789284416301>> accessed on March 28, 2023; In Asia, an estimated 1.2 billion tons of municipal solid waste was generated in 2016. W Hoornweg, Daniel, and Perinaz Bhada-Tata. "What a waste: a global review of solid waste management." (2012). Available at <<https://openknowledge.worldbank.org/entities/publication/1a464650-9d7a-58bb-b0ea-33ac4cd1f73c>> accessed on March 30, 2023; East Asia is contributing 60 per cent of global plastic waste. Gong, Lina, and Julius Cesar Trajano. "Tackling East Asia's New Environmental Challenge Marine Plastic Pollution." (2019). Available at <[https://www.rsis.edu.sg/wp-content/uploads/2019/06/PR190620\\_Tackling-East-Asias-New-Environmental-Challenge.pdf](https://www.rsis.edu.sg/wp-content/uploads/2019/06/PR190620_Tackling-East-Asias-New-Environmental-Challenge.pdf)> accessed on March 14, 2023; Morita, Y., & Hayashi, S. (2018). "Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap." Institute for Global Environmental Strategies. Available at <<https://www.iges.or.jp/en/pub/proposals-strengthen-japan%E2%80%99s-domestic-measures/en>> accessed on March 14, 2023; Johnson, Hope, Zoe Nay, Rowena Maguire, Leonie Barner, Alice Payne, and Manuela Taboada. "Conceptualizing the transnational regulation of plastics: Moving towards a preventative and just agenda for plastics." *Transnational Environmental Law* 11, no. 2 (2022): 325-355; Managing municipal solid waste remains a low priority for most Asian cities. Hoornweg. "What a waste: a global review of solid waste management." (2012).

28 Lebreton, Laurent CM, 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, no. 1 (2017): 15611.

29 Lebreton. "River plastic emissions to the world's oceans."

30 van Emmerik, Tim, and Anna Schwarz. "Plastic debris in rivers." *Wiley Interdisciplinary Reviews: Water* 7, no. 1 (2020): e1398.

31 Some of these rivers are the Indus (China, India Pakistan), Ganges (India, Bangladesh), Amur (China, Russia) and Mekong (China, Myanmar, Laos, Thailand, Cambodia, Vietnam) are transboundary river systems/international watercourses.



pollution as the Asian States, their actions are crucial to effective mitigation efforts. However, it also underscores the need for proactive engagement of these countries, especially those that are key to action, in the new plastic treaty. Despite the critical role that Asian States can play in mitigating this global problem, they are currently falling short of expectations, because of the economic interests discussed above, such as the tourism influx, plastic trade, and rapid economic growth. Given the plastic freshwater nexus, Asian States must recognize the importance of their contributions and step up their efforts towards regulating the hydro-spheric plastics. They must build consensus and demonstrate the much-needed commitment, political will, and support for the new plastic treaty negotiation process to achieve the "end plastic" goal of the proposed treaty as adopted in the resolution.

### **(B) The "regional cooperation" as a tool to regulate plastic pollution**

Transboundary cooperation is crucial for effectively managing transboundary watercourses and associated ecosystems. Approximately forty per cent of the global population live in areas with rivers and lakes that cross sovereign borders, ninety per cent live in countries that share these water systems, and about 30 countries are entirely within transboundary rivers, lakes, and aquifers.<sup>32</sup> Interestingly, out of the 263 international river systems and lakes, only 105 have some form of cooperative management mechanism(s) in place.<sup>33</sup> Thus, the absence of specific regulatory and management arrangements at local levels presents a significant regulatory challenge.<sup>34</sup>

Cooperation among States is an essential aspect of addressing pollution, which is a transboundary problem. And the duty to cooperate regarding the utilization and management of water resources is a central feature of customary international water law.<sup>35</sup> According to a pioneering assessment of plastic inputs from land to oceans, the river systems of Asia have a significant concentration of plastics. Only five Asian countries contribute almost half of the land-based plastic waste, and eight of the top ten countries with the largest mass of mismanaged

---

32 Water, U. N. "Transboundary waters: sharing benefits, sharing responsibilities." *Thematic paper 20* (2008). Available at <[https://www.unwater.org/app/uploads/2017/05/UNW\\_TRANSBOUNDARY.pdf](https://www.unwater.org/app/uploads/2017/05/UNW_TRANSBOUNDARY.pdf)> accessed on March 11, 2023. Page 1.

33 Water, U. N. "Transboundary waters: sharing benefits, sharing responsibilities."

34 Alistair Rieu-Clarke. "A cure or a curse? Entry into force of the UN Watercourses Convention and the Global Opening of the UNECE Water Convention." Centre for Water Law Policy & Science, University of Dundee. Page 4. Available at <<http://www.qil-qdi.org/a-cure-or-a-curse-entry-into-force-of-the-un-watercourses-convention-and-the-global-opening-of-the-unece-water-convention/>> accessed on March 11, 2023.

35 The rule that non-navigational uses of international water resources must adhere to the equitable and reasonable utilization standard, the no-harm rule, and the obligation to cooperate are the three rules of customary international water law that cannot be contested. Mager, U. "International water law: global developments and regional examples, Miscellane." *Jedermann-Verlag Heidelberg, Heidelberg* (2015). Page 11 and 12.

plastic waste are also in Asia.<sup>36</sup> These research findings underscore the significance of regional cooperation in tackling plastic pollution.

The UNECE Water Convention has influenced the formation of various bilateral and multilateral arrangements between European countries (further discussed in section 1.4.3). Other regions can benefit from the example of the UNECE region and develop more robust bilateral and regional agreements that are devoid of any potential vagueness. In the context of the transboundary nature of plastic pollution, the duty to cooperate must be a central feature of any bilateral or multilateral arrangement(s) related to riverine or marine plastic pollution. Regional and bilateral agreements that promote sustainable management of transboundary river systems are vital to tackling the riverine and marine plastic pollution.<sup>37</sup>

Regional cooperation could play a crucial role in limiting, if not entirely mitigating, riverine plastic pollution. It could create a common ground for negotiations and innovatively identify regional needs. By doing so, potential gaps and inconsistencies in riverine plastic governance could be identified and tackled by the appropriate parties, strengthening global plastic governance. Although, relying solely on regional cooperation may not be enough to solve the problem of riverine plastic pollution. Nonetheless, given the transboundary nature of riverine plastic pollution, the concept of transboundary cooperation, as enshrined in the Rio Declaration and the UNECE Water Convention, could be a vital element of the larger governance and cooperation arrangements needed to manage plastic pollution effectively.

### **III. THE UNECE CONVENTION AS A CASE FOR REGIONAL PLASTIC REGULATION**

The UNECE Water Convention offers a comprehensive legal framework for regional cooperation on shared water resources, surpassing similar agreements. Its implementation has shown that formulating both bilateral and multilateral arrangements,<sup>38</sup> as well as establishing joint bodies,<sup>39</sup> are crucial in implementing agreements and arrangements.<sup>40</sup> Moreover, the Convention has played a significant role in shaping various cooperative arrangements among

---

36 Jambeck. "Plastic waste inputs from land into the ocean."

37 Rieu-Clarke. "A cure or a curse? Entry into force of the UN Watercourses Convention and the Global Opening of the UNECE Water Convention."

38 For more details on some of the arrangements developed under the UNECE Water Convention, read <[https://unece.org/sites/default/files/2022-06/UNECE-TheWaterConvention-30Years-A4-150dpi\\_WEB2.pdf](https://unece.org/sites/default/files/2022-06/UNECE-TheWaterConvention-30Years-A4-150dpi_WEB2.pdf)> accessed on March 28, 2023.

39 For more information on of the joint bodies under the UNECE Convention, visit <[https://unece.org/sites/default/files/2022-06/UNECE-TheWaterConvention-30Years-A4-150dpi\\_WEB2.pdf](https://unece.org/sites/default/files/2022-06/UNECE-TheWaterConvention-30Years-A4-150dpi_WEB2.pdf)> accessed on March 25, 2023.

40 See "Progress on transboundary water cooperation under the Water Convention. Second report on implementation of the convention on the protection and use of transboundary watercourses and international lakes 2017–2020." United Nations, 2021. Available at <<https://unece.org/environment-policy/publications/progress-transboundary-water-cooperation-under-water-convention-0>> accessed on March 30, 2023.

the UNECE countries.<sup>41</sup> These arrangements have helped to ensure sustainable water management practices and have promoted shared water resources protection and management in the UNECE region.

The UNECE Water Convention presents a compelling case for regional plastic regulation, given the growing concerns about freshwater plastic pollution worldwide. With its emphasis on protecting water resources and preventing transboundary water and international lake pollution, the Convention offers a robust framework for inter-country cooperation to address these pressing issues. By leveraging the Convention's provisions and building on its existing mechanisms, regional authorities can work together to tackle plastic pollution. As such, the UNECE Water Convention serves as a critical tool in promoting sustainable development and regional environmental stewardship.

The UNECE Convention sets a remarkable example for tackling the escalating issue of plastic pollution by adopting a regional strategy towards plastic regulation. This model can serve as a blueprint for other regions to emulate to combat the harmful impact of plastic pollution. The Convention underscores the significance of cooperation and collaboration among nations in creating and implementing regional regulations to safeguard water resources and the environment. By emphasizing the importance of working together, the Convention demonstrates how collective efforts can be made to address this global challenge.

Given the transboundary nature of plastic pollution, cooperation among countries is essential for effectively regulating riverine and marine plastic. Regional cooperation can provide a platform for negotiations and help identify regional needs for plastic pollution regulation. In this way, regional stakeholders can pinpoint and address gaps and inconsistencies in riverine plastic governance, thereby strengthening global plastic governance. Therefore, considering the transboundary nature of riverine plastic pollution, the concept of transboundary cooperation enshrined in the Rio Declaration and the Water Conventions is a critical element of the broader governance and cooperation arrangements required to manage marine plastic pollution effectively.

#### **IV. THE NEED FOR A DYNAMIC SHIFT FROM SOLELY "MARINE-ORIENTED" TO "MARINE-RIVERS-NEXUS" IN GLOBAL PLASTIC REGULATION AND RESEARCH**

Both freshwater and marine ecosystems are seriously threatened by plastic pollution. Although

---

<sup>41</sup> The implementation of various agreements and conventions has been instrumental in protecting transboundary waters around the world. For more successful examples, read <[https://unece.org/sites/default/files/2022-06/UNECE-TheWaterConvention-30Years-A4-150dpi\\_WEB2.pdf](https://unece.org/sites/default/files/2022-06/UNECE-TheWaterConvention-30Years-A4-150dpi_WEB2.pdf)> accessed on March 30, 2023.

the harmful effects of plastic pollution on the marine environment are widely recognized, freshwater environments, especially rivers, is often overlooked.<sup>42</sup> The main means of transportation for plastic pollution in marine ecosystems are rivers.<sup>43</sup> Studies have shown that land-based plastics, which comprise about 80% of all the plastics in the marine ecosystem, are one of the main sources of plastic pollution.<sup>44</sup> This emphasizes how important river networks are for moving plastics from the land into the sea.

According to a study of plastic pollution from land-based sources, ten rivers account for between 88 and 95 percent of the world's marine plastic load, and interestingly, eight of these rivers originate in Asia, the region that contributes the most plastics to the marine environment.<sup>45</sup> Another analysis of plastic emissions into the ocean discovered that 15 of the top 20 most polluting rivers are in Asia.<sup>46</sup> This study estimated that roughly 1.15-2.41 million tons of plastic flow from global river networks into marine environments each year. Even though these rivers cover only 2.2 per cent of the continental surface area and 21 per cent of the global population, they account for nearly 67 per cent of the global input of plastic waste into the marine environment.<sup>47</sup> These figures highlight the urgent need to address plastic pollution in Asia's rivers to curb plastic pollution in the marine and freshwater environment.

In recent decades, funding and research have increased significantly to understand the dynamics of plastics in the marine environment<sup>48</sup> much less than in freshwater systems. However, labelling plastic pollution as a marine issue has limited the full understanding of the problem.<sup>49</sup> It has also restricted the scope of potential measures to plastic regulation, including prospective global framework arrangements.<sup>50</sup> To address plastic pollution comprehensively, we must acknowledge the interlinkages between plastic pollution in rivers and the marine environment

---

42 Blettler, Martín CM, Elie Abrial, Farhan R. Khan, Nuket Sivri, and Luis A. Espinola. "Freshwater plastic pollution: Recognizing research biases and identifying knowledge gaps." *Water research* 143 (2018): 416-424.

43 Schmidt, Christian, Tobias Krauth, and Stephan Wagner. "Export of plastic debris by rivers into the sea." *Environmental science & technology* 51, no. 21 (2017): 12246-12253.

44 Jambeck. "Plastic waste inputs from land into the ocean."

45 Schmidt. "Export of plastic debris by rivers into the sea." Eight of these river systems, i.e., Yangtze, Indus, Yellow, Hai He, Ganges, Pearl, Amur and Mekong rivers, have their source from Asia.

46 Lebreton. "River plastic emissions to the world's oceans." 15 of these river systems, i.e., Yangtze, Ganges, Xi, Huangpu, Brantas, Pasig, Irrawaddy, Solo, Mekong, Dong, Serayu, Tamsui, Pearl, Han and Progo either originate or traverse through Asia.

47 Lebreton. "River plastic emissions to the world's oceans."

48 Dauvergne, Peter. "Why is the global governance of plastic failing the oceans?." *Global Environmental Change* 51 (2018): 22-31.

49 Hartley, Bonny L., Sabine Pahl, Joana Veiga, Thomais Vlachogianni, Lia Vasconcelos, Thomas Maes, Tom Doyle et al. "Exploring public views on marine litter in Europe: Perceived causes, consequences and pathways to change." *Marine Pollution Bulletin* 133 (2018): 945-955.

50 Carlini, Giulia, and Konstantin Kleine. "Advancing the international regulation of plastic pollution beyond the United Nations Environment Assembly resolution on marine litter and microplastics." *Review of European, Comparative & International Environmental Law* 27, no. 3 (2018): 234-244.

(thus a shift from marine plastic pollution [MPP] to hydro-spheric plastic pollution [HPP]), and broaden our focus to include all aspects of plastic pollution.

Although some scientists believe that the current scientific models are still in their early stages of authenticating these statements,<sup>51</sup> the research findings provide essential insights into the significance of river systems in global plastic transportation and the interconnectivity between freshwater and marine environments. For instance, a study on marine plastic pollution in European waters suggests that mitigating marine plastic pollution requires considering the role of rivers and land-based activities in plastic accumulation in the marine environment.<sup>52</sup> This implies that exploring the river systems' role is a crucial part of the solution to the marine plastics problem. Additionally, the study highlights the incomplete understanding of plastic materials' sources and transport pathways in Europe's current fragmented freshwater legislation, which poses a significant challenge in developing and implementing effective regulations to combat plastic pollution in the marine environment.<sup>53</sup> Therefore, relying solely on marine-based regulations may not solve the issue of plastic pollution, considering the significant role of rivers and land-based sources.

Recent research has highlighted that rivers are the primary conduits for plastics entering the ocean. While this finding is significant, our comprehension of effective strategies to tackle plastic pollution in riverine systems lags our understanding of marine plastic pollution.<sup>54</sup> Consequently, it is crucial to develop a better understanding of the roles and impacts of key river systems, as well as the challenges and opportunities associated with them, to enhance the effectiveness of legal frameworks governing global plastic waste management.

## V. CONCLUSION

The issue of hydro-spheric plastic pollution is a complex and multifaceted problem that requires a robust global legal framework to combat it effectively. The existing legal framework, including international conventions and regional agreements, has shown limited success in addressing the issue due to various challenges, including weak enforcement mechanisms and insufficient participation of key stakeholders. In conclusion, this paper highlights the crucial need to identify gaps and opportunities in the legal framework of global plastic regulation. It draws attention to key countries and river systems that contribute the most to plastic waste in

---

51 van Emmerik. "Plastic debris in rivers."

52 Black, Jeffrey E., Kathrin Kopke, and Cathal O'Mahony. "A trip upstream to mitigate marine plastic pollution—a perspective focused on the MSFD and WFD." *Frontiers in Marine Science* 6 (2019): 689. Page 1.

53 Black. "A trip upstream to mitigate marine plastic pollution—a perspective focused on the MSFD and WFD."

54 Wagner, Martin, and Scott Lambert. "Freshwater microplastics: emerging environmental contaminants?." Springer Nature, 2018.

the marine environment. The proposed global plastic treaty must have a comprehensive scope and implementation framework, including necessary measures for effective marine and riverine pollution compliance. The paper emphasizes the importance of recognizing geographic connectivity, especially in Asia, and the regional influence and contribution of key river systems that facilitate plastic transport from land to sea. The proposed global plastic treaty must prioritize the transboundary flow of plastic and address the root causes of plastic pollution. Furthermore, it emphasizes the need for a dynamic shift from solely marine-based to include freshwater-based regulation and draws lessons from the UNECE Water Convention. With a robust global legal framework and effective implementation, we can reduce the impact of plastic pollution on hydro-spheric ecosystems and ensure the sustainability of our oceans for future generations.

\*\*\*\*\*