

## Review

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### Corresponding author:

Thomas Maes;

Email: [thomas.maes@grida.no](mailto:thomas.maes@grida.no)

# A little less conversation: How existing governance can strengthen the future global plastics treaty

Thomas Maes<sup>1</sup> , Nicole Wienrich<sup>2</sup>, Laura Weiland<sup>2</sup> and Emily Cowan<sup>3</sup> 

<sup>1</sup>GRID-Arendal, Arendal, Norway; <sup>2</sup>Research Institute for Sustainability (RIFS), Potsdam, Germany and <sup>3</sup>SINTEF Ocean, Trondheim, Norway

## Abstract

The growing plastic production, the lack of their waste management, and fragmented regulatory responses have increased their abundance in the environment. Plastic pollution has created significant environmental concerns leading to planetary boundary threats. As a result, an increasing number of governments and non-state actors have begun negotiations on a legally binding treaty to cover the full-life-cycle of plastics by 2024. While the negotiations were mandated at the United Nations Environment Assembly 5.2 in March of 2022, how the new agreement would link to existing governance bodies addressing plastic pollution at the global, regional, national and local levels requires careful consideration. This analysis examines the main multi-level governance structures in place to govern plastics while highlighting their principal roles as well as shortcomings and gaps. It then explores ways a new global agreement could complement existing governance structures without imposing and duplicating the work of previous agreements.

## Impact statement

Plastic pollution is a serious global challenge. In response, the international community has embarked on a transformative journey towards crafting a comprehensive solution to end plastic pollution in the form of a global treaty. By investigating the gaps and synergies within multi-level governance and regulatory frameworks, this article explores the complex network that aims to establish an effective Global Plastics Treaty.

## Introduction

Plastic pollution including marine litter is one of the most pressing issues affecting the planet's health and productivity. Despite the existing commitments by governments to stop plastic from entering the ocean, annual plastic waste inputs may further grow (Borrelle et al., 2020). According to the OECD, if current trends continue, the worldwide accumulation of plastic waste is projected to increase from 353 million metric tons in 2019 to surpass 1 billion metric tons by 2060 (OECD, 2022). Upstream measures and curbing mismanaged plastic waste within the terrestrial environment are therefore a main priority for all governments. Plastic pollution is a true global, transboundary issue; leaked plastic items of different sizes are transported by a range of natural processes such as wind, rivers, currents and biota, as well as global supply chains and international trade mechanisms (UNEP, 2021; Nyberg et al., 2023). As a result, solutions will have to be found across the entire life-cycle including joint efforts from industry, civil society and authorities in collaboration with the countries along a drainage basin, within marine regions and globally.

An assessment report (Progress in the implementation of resolution 2/11 on marine plastic litter and microplastics Report of the Executive Director, n.d.), presented to the third United Nations Environment Assembly (UNEA) in 2017, concluded that the current legal and institutional framework for addressing plastic litter and microplastics was fragmented and insufficient in addressing the pollution problem (Raubenheimer and McIlgorm, 2017). The report presented three policy options for the international community going forward: (1) continue and encourage existing efforts under current instruments, (2) revise and strengthen existing frameworks by adding new instruments specific to marine plastic litter and microplastics and (3) adopt a Global Plastics Treaty (GPT) with a multi-layered governance approach (Kirk, 2016; Vince and Hardesty, 2017; Raubenheimer and McIlgorm, 2018).

The third option which quickly gained momentum, was adopted at UNEA 5.2 in March of 2022 to begin negotiations on a first of its kind agreement. Before the second half of the fifth

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UNEA session, three resolutions for a treaty mandate were proposed. The first brought forward by Peru and Rwanda, ensured a full-life-cycle approach to plastics. The second brought forward by Japan focused on marine litter and did not include upstream measures and the final proposed resolution by India focused on voluntary measures and banning plastics for single use (Del Castillo and Dixon, 2021). In the end, the draft resolution proposed by Peru and Rwanda was most prevalent in the adopted text mandate for negotiating an international legally binding instrument (UNEA, 2022). The draft resolution (Resolution adopted by the United Nations Environment Assembly on 2 March 2022 5/14. End plastic pollution: towards an international legally binding instrument, *n.d.*) recommended establishing an Intergovernmental Negotiating Committee (INC) with a mandate to agree on a legally binding global agreement to address the full-life-cycle of plastic. It highlighted the need for a commitment to create a framework for international cooperation that includes coordinated actions to address the entire life-cycle of plastics and recommends a circular economy approach, involving all actors, including governments, industry, the scientific community and civil society. The next step in the United Nations-led process towards a Global Plastics Treaty has emerged in the form of a “zero draft” version released in September 2023. It will be negotiated at the third Intergovernmental Negotiating Committee (INC-3) in Nairobi. The document offers avenues for reducing plastic production, eliminating polymers and “chemicals of concern,” eliminating short-lived and “avoidable” plastics and creating targets and systems for plastics reduction and reuse. It was prepared by the INC Chair, with the support of the UN Environment Programme (UNEP), based on the views of the countries participating in the first and second INC sessions. The Zero Draft will serve as the basis for text negotiations over the next year, with the aim of finalising the treaty text by the end of 2024.

While much thought has already been invested in identifying the potential elements of a new global agreement (Raubenheimer and Urho, 2020; Cowan and Tiller, 2021; Simon *et al.*, 2021; INC, 2023), the way the new agreement would link to the existing governance bodies addressing plastic pollution at the global, regional, national and local level in a way that creates synergies and takes into account existing processes has been less well understood, yet is necessary for successful implementation.

The following section provides the necessary context by first examining the main multi-level governance structures in place, highlighting their principal roles as well as shortcomings and gaps that will need to be addressed within the plastics negotiations. Tiller *et al.* (2022) reported the fragmentation in plastic governance and how the existing international agreements are not effective to addressing the full problem. Building on this overview, synergies with and potential ways in which a new global agreement could complement the existing governance structures are examined. Such as adopting financial, organisational, reporting and monitoring mechanisms from other treaties to advance the implementation of the GPT. As the adopted mandate takes a full-life-cycle approach, its crucial to avoid duplicating the work of previous MEAs, particularly in matters concerning chemical and marine pollution, where numerous conventions already hold significant importance as examined in Table 1. This process is also called regime or policy convergence and might arise through: emulation, where state officials copy action taken elsewhere; elite networking, where convergence results from transnational policy communities; harmonisation through international regimes and penetration by external actors and interests (Bennett, 1991).

## Overview of existing governance frameworks

In this study, governance framework refers to a structured set of principles, policies, processes and mechanisms that guide the decision-making, management and oversight of an organisation, system or a particular issue. It provides a clear structure for how responsibilities are allocated, how decisions are made, and how various stakeholders interact within the defined context. These instruments can be broadly divided into legally binding instruments (hard law), which mainly address a specific issue related to plastic pollution as well as non-legally binding (soft law), although potentially less effective, they aim to address the issue in a more comprehensive and integrated manner (Mendenhall, 2023). Non-legally binding instruments can play a vital role in international relations by offering flexibility, consensus-building mechanisms and guidance in addressing complex challenges and fostering cooperation. They complement legally binding agreements and can be effective tools in the absence of, or in preparation for, formal legal obligations.

### The global level

Several existing legal instruments and international agreements have relevance to parts of the life-cycle of plastics, addressing various aspects from production to disposal, including environmental protection, greenhouse gas emissions, trade, chemical and waste management. Numerous international instruments have been adopted to regulate aspects of plastic pollution (UNEP, 2021) from a marine and terrestrial perspective, however, critical challenges remain in terms of enforcement and coordination. These governance frameworks have been unspecific and incomprehensive in their scope and coverage to tackle plastic pollution across its entire life-cycle (Cowan and Tiller, 2021). The effectiveness of these policies also depends on the willingness of governments, industries and communities to implement and adhere to them. Relevant legally binding provisions addressing specific issues related to plastic pollution have been introduced under international instruments (see Table 1). These global instruments related to plastic pollution cover different types of stakeholders and range from conventions, agreements and regulations as well as strategies, action plans, programmes and guidelines. As a result, the global community continues to explore the need for a dedicated and overarching global plastics treaty or agreement.

Some examples of international soft law instruments, non-legally binding, attempting to combat plastic pollution are listed in Table 2.

Despite this wide range of international instruments which have been introduced over the years (see Figure 1), the international policy framework has several shortcomings to address plastic pollution. First and foremost, the hard law instruments listed do not specifically target plastic pollution across its entire life cycle and thus have limited reach and require more uniformity (i.e. UNCLOS and MARPOL). Moreover, most legally binding instruments focus on addressing the sea-based sources of plastic pollution (Raubenheimer and McIlgorm, 2017; Vince and Hardesty, 2018; Ferraro and Failler, 2020), even though land-based sources are responsible for the majority of global plastic pollution (Li *et al.*, 2022). Second, most existing international instruments endeavouring to regulate plastic pollution from all sources lack enforcement and compliance mechanisms (Vince and Hardesty, 2018). Inefficiency and execution issues in the implementation of soft laws have been documented across various instruments

**Table 1.** International instruments related to plastic pollution and their main gaps improved from Cowan and Tiller (2021)

International instrument	How it addresses plastic	Main regulatory gaps
United Nations Convention on the Law of the Sea (UNCLOS)	No specific legally binding obligation to address marine plastic pollution as its prime focus is broader in nature (see Pollution Prevention article 194; Environmental Impact Assessment Article 206; Marine Scientific Research Part XIII; Marine Pollution Regulations and Liability and Compensation for Pollution Damage Article 235)	Fails to address accountability and penalties
Annex V of MARPOL 73/78	Only marine-based waste is addressed, not specific for plastics (e.g. Discharge Restrictions; Special Area Designation; Exceptional Circumstances; Placards and Procedures and Record-keeping)	Lack of enforcement and monitoring capabilities
London Convention/London Protocol (LC/LP)	Indirectly addresses marine pollution but does not specially target plastic pollution	Plastic pollution requires more specific and international comprehensive efforts
Basel Convention (including 2019 plastics amendments)	Enhances the control and prevention of disposal and dumping of plastic waste (e.g. Prior and Informed Consent (PIC) Procedure; Legal Framework for Plastic Waste Trade; Enhanced Reporting and Monitoring). Amendments encourage parties to build capacity	Only one aspect of the plastic pollution problem (waste trade), production and consumption are not addressed
Stockholm Convention <sup>a</sup>	Covers certain toxic additives and its related chemicals commonly found in plastic products (e.g. lists several chemicals used in plastics, maps environmental impacts and investigates negative effects of pollution)	Does not specifically target plastics and only addressed elimination and restriction of certain chemicals
United Nations Framework Convention on Climate Change (UNFCCC)	The UNFCCC and its related agreements, such as the Paris Agreement, address the reduction of greenhouse gas emissions, including those related to the production, incineration and distribution of plastic items, which can contribute to climate change	Only has the ability to focus on emissions across parts of the plastics life-cycle
Biodiversity Beyond National Jurisdiction Treaty (BBNJ)	Recognises the problem of plastic pollution based on its impacts on marine ecosystems and includes provisions that indirectly address plastic pollution (e.g. Environmental Impact Assessments, Area-based Management Tools, Cross-cutting Issues, Capacity Building and Technology Transfer)	Focuses on marine diversity and management – more comprehensive approach is required to adequately address plastics
Convention on Biological Diversity (CBD)	Primary focus is on biodiversity, however, indirectly addresses plastics within the unsuccessful Aichi Biodiversity Targets (T14), Cartagena Protocol, Global Biodiversity Outlook Report which includes consideration related to environmental risks of certain technologies that could contribute to plastic pollution	Need for more specific targeted agreements when it comes to plastics

Note: List is not exhaustive, the major global instruments are highlighted.

<sup>a</sup>While the Rotterdam Convention does not specifically target plastic pollution, it plays a role in managing hazardous chemicals and pesticides – some of which might be used in productions, processing and disposal of plastics.

(Chen, 2015; Karasik et al., 2020). Only a few binding commitments such as those under MARPOL Annex V and the London Convention and Protocol explicitly address the problem of marine plastic pollution and create appropriate implementation mechanisms (Vince and Hardesty, 2018; Karasik et al., 2020). Third, the existing international regulatory framework is disjointed due to its lack of coordination, limited enforcement mechanisms, resource strains, as well as its diverse set of interests and priorities by UN member states. This makes the implementation of an ecosystem approach difficult and undermines strong leadership and the formulation of generally agreed targets (like the SDGs), which could guide global action to reduce plastic pollution (Ferraro and Failler, 2020; Karasik et al., 2020). Finally, current global instruments mostly aim to address downstream pollution while less activities were aimed at promoting the needed transformation of upstream and circular approaches (Barrowclough and Birkbeck, 2022).

### The regional level

Regional governance instruments provide the opportunity to address plastic pollution within countries sharing borders and

ecoregions. Regional instruments and cooperation efforts can help support member states in meeting their obligations to MEAs. They facilitate the development and implementation of monitoring, agreements, strategies, action plans, programmes and guidelines tailored to address the challenges, needs and characteristics of different regions and affected countries. As such, they create an opportunity to implement the standards set by international instruments, thus potentially inspiring further action around the world by inspiring higher ambition and knowledge transfer from various communities (Wienrich et al., 2021).

Several relevant regional conventions and frameworks already address plastic pollution (see Table 3); however, these are mostly focused on the marine environment and fall short in addressing other environmental compartments (e.g. freshwater, atmospheric) and social aspects (e.g. human health and rights). Relevant regional instruments include the Regional Seas Conventions and Action Plans, as well as activities carried out under Large Marine Ecosystems (LMEs) and Regional Economic Organisations (REOs) (Wienrich et al., 2021). These regional sea conventions and programmes often have specific strategies, targets and initiatives to address plastic pollution in their respective marine environments. They promote cooperation among countries within their regions to

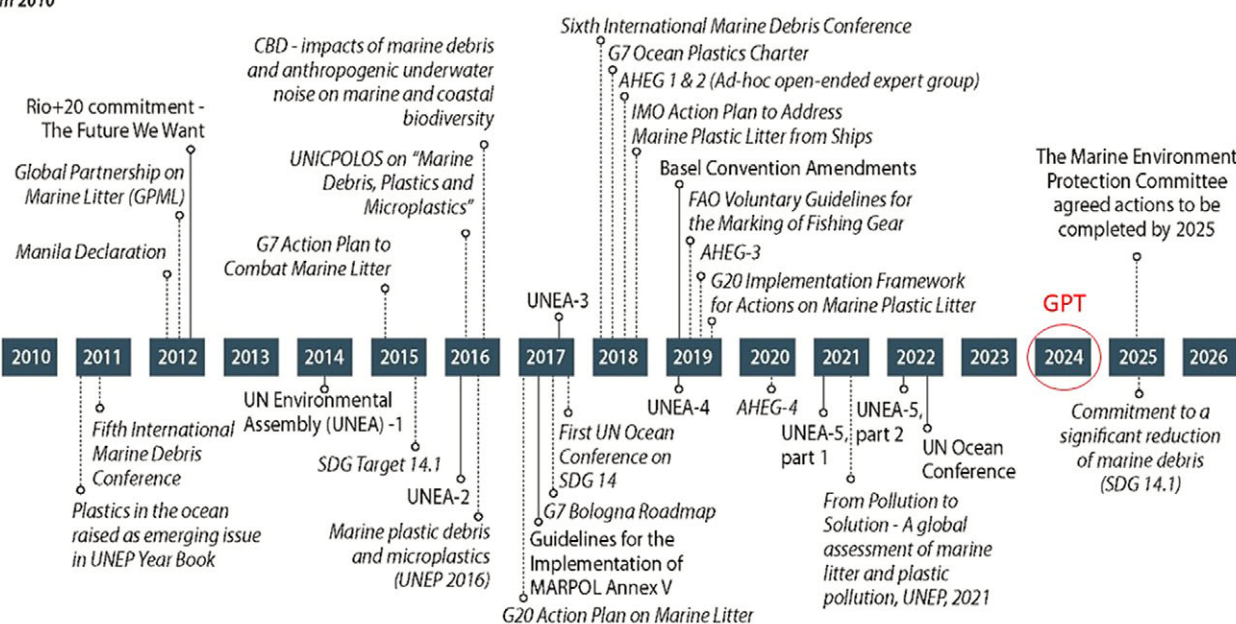
**Table 2.** Soft instruments related to plastic pollution and their main gaps

Soft instruments and partnerships	How it addresses plastic	Main regulatory gaps
Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA)	Plastic pollution is addressed as a priority issue by emphasising the importance of waste management and source reduction. It encourages awareness and capacity building as well as highlights need for monitoring and assessment	Plastic pollution is multi-faceted and requires more concerted efforts across various sectors of society
Global Partnership on Plastic Pollution and Marine Litter (GPML)	Brings together multiple stakeholders to raise awareness on this issue, share information, build capacity, collect data, develop policy and coordinate international efforts. It has the potential to act as a tool to follow implementation and progress of the GPT	Voluntary and only complementary to other international agreements
G7 and G20	Action plans include commitments to address plastic pollution (e.g. 2030 targets, innovation and redesign, improved waste management practices, transparency and accountability in reporting progress)	Changing political landscape, and limited scope of countries involved
2017 UNEP Clean Seas Campaign	Raises awareness of social and environmental impacts of marine plastic pollution including civil society and industry involvement	Only complimentary to other international agreements and initiatives
UN Sustainable Development Goals (SDG)	There is no stand-alone SDG for plastics, however, plastic pollution is addressed as part of broader efforts to promote environmentally sustainable protection and marine ecosystems and communities. (e.g. 12.5, 14.1, 14.6, 15.1, 17.14)	Implementation and achievement depend on coordinated efforts
UNEA 1-5.2 Resolutions	Plastic pollution has been addressed in several UNEA resolutions reflecting the global ambition to take action as reflected in the mandate to negotiate a GPT	Contribute towards global efforts and the global understanding of the pollution but not effective in and o

Note: List is not exhaustive, only some of the soft instruments are highlighted.

## Timeline for selected international marine litter and plastic pollution initiatives, laws and policies

From 2010



United Nations Environment Programme (2021). From Pollution to Solution: A global assessment of marine litter and plastic pollution. Nairobi.

Illustrated by GRID-Arendal

**Figure 1.** Timeline depicting main global regulations and policies relevant to marine plastics and the build-up towards the future Global Plastic Treaty in 2024. Source: GRID-Arendal (UNEP, 2021).

collectively tackle the issue of marine litter and plastic pollution, reflecting the understanding that plastic pollution is a global challenge requiring localised solutions and actions. Other relevant regional instruments are *inter alia* regional agreements which are set up to support international conventions by facilitating national implementation (see Table 3).

Most of the actions and measures created by those regional instruments are soft law instruments that often lack the authority and resources to promote the implementation of agreements. Some of the critical challenges regional instruments face are a lack of human and financial capacities, geographic gaps, the significant variation in the level of implementation of measures to address

**Table 3.** Current regional instruments related to plastic pollution and their main gaps

Regional Instruments	How it addresses plastic	Main regulatory gaps
Barcelona Convention for the Mediterranean Sea	Includes measures to prevent marine litter, including plastics and promotion of sustainable waste management	Regional based and not suitable to address the global scale of plastic pollution. Varying National Priorities
Oslo-Paris Convention for the North-East Atlantic (OSPAR)	OSPAR action plan and Joint Assessment and Monitoring programme includes targets and measures to reduce plastic litter	
Nairobi Convention for the Western Indian Ocean	Addressing marine litter including plastic and promote pollution prevention and encourages countries to adopt measures	
Caribbean Environment Programme (CEP) and the Regional Activity Centre for the Protocol Concerning Pollution from Land-Based Sources and Activities (Specially Protected Areas and Wildlife – SPAW Protocol)	This initiative focuses on addressing pollution from land-based sources, including plastic pollution, in the Caribbean region. It aims to promote sustainable practices and policies to reduce plastic waste entering the marine environment	
European Union (EU)	Numerous directives and policies that directly affect plastic pollution. (i.e. single-use plastics directive, plastics strategy, waste framework directive, packaging waste directive, extended producer responsibility schemes, marine strategy framework directive, circular economy action plan) in combination with funding and research and international efforts of collaboration	
South Asian Cooperative Environment Programme (SACEP)	SACEP involves awareness campaign, capacity building and development to reduce plastic waste from entering the environment	

Note: List is not exhaustive, only some of the regional instruments across geographical areas are highlighted.

plastic pollution among countries, differences in capacities and systems in place to monitor and assess relevant data, deficits in the implementation of multi-stakeholder approaches and a widespread lack of engagement with the private sector (Wienrich et al., 2021; Manyara et al., 2023). It will be vital that the global agreement draws from the best practices of these regional instruments as well as aids in strengthening them (Maes and Preston-Whyte, 2023).

### The (sub)national level

The obligations made under the auspices of international and regional instruments only become effective once they are incorporated into national legislation and are implemented and enforced. Two types of national plans exist, national implementation plans (NIPs) and national action plans (NAPs), the main difference between them lies in their scope and level of detail. NIPs are typically more comprehensive and are developed to meet specific obligations under a complex MEA, while NAPs are more action-oriented and can be used for a broader range of environmental initiatives. Both types of plans play a crucial role in helping countries meet their commitments under MEAs and address environmental challenges effectively. The effectiveness of national implementation depends on the presence of national and local policies as well as the available waste management infrastructures (Dauvergne, 2018) and subsequent uptake by stakeholders. An extensive range of NAPs have been developed and implemented by countries worldwide to address plastic pollution (Vince and Hardesty, 2018; GRID-Arendal, 2021). Among these national actions are policies regulating the sources of plastic pollution, such as restricting or banning the use of certain plastics and actions targeting improved waste management or the monitoring of plastic litter (Dauvergne, 2018; see Table 4).

Challenges in addressing plastic pollution at the national level are related to the fact that plastic production, manufacturing, consumption, disposal and its unintentional releases are commonly dispersed (March et al., 2023). Moreover, there is little coordination and conversation between governments, waste management organisations, industry and consumers, on the sheer number of plastic materials produced, used and available for recycling (Tessnow-von Wysocki and Le Billon, 2019). Obviously, this does not even include documentation of chemicals, alternatives or substitutes. An analysis of national policies furthermore indicated that some governments have not developed comprehensive national policies concerning plastic waste (Karasik et al., 2020; March et al., 2023). Some issues are still not addressed, especially those with diffuse sources, pathways and fates, for example, relatively few policy responses exist regarding microplastic pollution (Karasik et al., 2020; March et al., 2023) and certainly none exist for nanoplastics. The notion of a circular economy is perceived as a more environmentally sound substitute for the conventional linear model characterised by “take-make-dispose.” Its objective is to confront ecological dilemmas like the depletion of resources, pollution and the accumulation of waste, all while yielding economic advantages, such as diminished material expenses, the generation of jobs in repair and recycling sectors, and heightened resilience within supply chains. Multiple entities, corporations and governments have been adopting the principles of the circular economy to foster sustainable growth and tackle urgent environmental concerns. Some key principles of a circular economy are regenerative and restorative and encompass designing durable products to extended their lifespan; fostering reuse, repair, remanufacturing and environmentally sound recycling practices; prioritising efficient resource utilisation; encouraging shared consumption models (e.g. rentals); harnessing digitalisation, innovation and resource management optimisation (Pires and

**Table 4.** Current national instruments related to plastic pollution and their main gaps

National instruments	How it addresses plastic	Main regulatory gaps
Plastic Bag Bans or Restrictions	Many countries have implemented bans or restrictions on the use of single-use plastic bags. These policies encourage the use of reusable bags and aim to reduce the consumption of plastic bags that often end up as litter	Policies tackle only one part of the plastic problem and requires global cooperation. Enforcement issues and compliance challenges
Single-Use Plastics Bans	Some countries have gone beyond plastic bags and implemented bans or restrictions on other single-use plastic items, such as straws, cutlery and beverage stirrers	
Plastic Waste Management and Recycling Regulations	Countries have established regulations to improve plastic waste management systems, promote recycling, and set recycling targets for different types of plastics	
Deposit-Return Systems (DRS)	Some countries have introduced DRS for beverage containers, encouraging consumers to return used containers for recycling and reducing litter	
Extended Producer Responsibility (EPR)	EPR policies make producers responsible for the collection, recycling and proper disposal of the products they put on the market, including plastics	
Plastic Pollution Reporting and Monitoring	Policies requiring the monitoring and reporting of plastic waste generation and its sources help countries track progress and adjust strategies accordingly	

Note: List is not exhaustive, only some of the national instruments across geographical areas are highlighted.

Martinho, 2019). While the concept of a circular economy is widely regarded as a more sustainable and environmentally friendly alternative it is not without its challenges and issues (e.g. research and development, product demand, material purity and contamination, behavioural change). Addressing these challenges requires a concerted effort from governments, businesses and individuals to create a supportive environment for the transition to a circular economy in MEAs and regional and national policy frameworks. Policy initiatives, investment in infrastructure, consumer education

and innovation in product design and manufacturing are all critical components of this transition.

### Potential synergies with existing MEAs

The GPT is likely to have linkages and synergies with various MEAs and agreements related to hazardous waste, chemicals, biodiversity and climate change (see Table 5). Collaborative efforts and

**Table 5.** Potential synergies between current MEAs and their linkages to the GPT

International instrument	Synergies	Linkage to GPT
Rotterdam Convention	Within the Prior and Informed Consent (PIC) procedure for certain hazardous chemicals and pesticides in regard to international trade	Coordination between the two agreements can enhance the management of such chemicals and substances found in plastics
Convention on Biological Diversity (CBD)	Plastic pollution's adverse effects on biodiversity and ecosystems' health	The GPT may align with the CBD goals and objectives to protect and restore ecosystems and support conservation and sustainable management and use of resources
Basel Convention (including 2019 plastics amendments)	Movement and disposal of hazardous wastes, which can include certain types of plastics	Linkages may be found in addressing non-hazardous plastic waste and promoting better management practices
Stockholm Convention	Addressing additives and chemicals in plastics (e.g. plasticizers)	May work in conjunction with the Convention to regulate and phase out use of POPs in plastic production
United Nations Framework Convention on Climate Change (UNFCCC)	Plastic production and waste management having environmental implications including the emissions of GHGs	Cooperation may be seen in agreeing to reduce emissions associated with plastic production, disposal and incineration in line with the Paris Agreement
Biodiversity Beyond National Jurisdiction Treaty (BBNJ)	Addressing coherently and cooperatively, biological diversity loss and degradation of ecosystems of the ocean specifically pollution and unsustainable use of resources	The GPT may include downstream provisions that link to areas beyond national jurisdiction
Vienna Convention for the Protection of the Ozone Layer	Under the Montreal Protocol substance control and phase-outs occur for ozone-depleting substances	The GPT can learn from the Montreal Protocol by adopting annexes and phase-out measures which control consumption and production of certain substances (in this case additives and polymers)

Note: The list is not exhaustive, only some of the MEAs are highlighted.

coordination among these agreements can lead to more effective strategies for addressing the complex issue of plastic pollution and its environmental impacts.

To start, the future GPT can adopt relevant provisions and elements from existing MEAs that deal with waste management, hazardous materials and pollution control. For example, it can incorporate principles from the Basel Convention for regulating the transboundary movement of plastic waste. It can establish control measures for plastic production, use, disposal and recycling, taking inspiration from control measures in MEAs like the Stockholm Convention for Persistent Organic Pollutants (POPs) and the Montreal Protocol for ozone-depleting substances. Therefore, cooperation and coordination with other MEAs, international organisations and initiatives working on related issues should be promoted. Collaboration can avoid duplication of efforts and create synergies to address complex challenges. Capacity-building measures and experiences from other MEAs should be utilised to enhance member countries' abilities to address plastic pollution effectively. This may involve technical assistance, knowledge sharing and technology transfer. Collaboration between governments, industry and other stakeholders is essential to effectively achieve the goals of these MEAs and address pressing global environmental issues.

Learning from the implementation measures of other MEAs, the new GPT can create a framework for member countries to enact and enforce policies and regulations related to plastic management. This includes setting up monitoring, reporting and enforcement mechanisms. Successful reporting and accountability mechanisms applied in other MEAs can be used to design a framework for the GPT. Establishing science-based targets for plastic pollution reduction will provide a solid foundation for action. Scientific assessment processes similar to those used in climate change agreements like the Paris Agreement should be incorporated. As well as regular reporting and review processes to track progress and hold member countries accountable for meeting their commitments. We should learn from the adaptive management approaches of other MEAs that allow for adjustments and improvements in response to changing circumstances and emerging scientific findings.

Financial mechanisms used in other MEAs should also be considered in the future GPT, such as the Global Environment Facility (GEF) or specific funds dedicated to addressing particular environmental issues. These mechanisms can provide financial support for member countries to implement plastic pollution reduction initiatives. To promote sustainable practices and investments, the treaty can encourage performance indicators that prioritise projects and initiatives aimed at reducing plastic pollution. Drawing from the principles of the Green Climate Fund (GCF), which supports climate-resilient and low-emission projects, the treaty can guide member countries towards environmentally sound investments.

Incorporating these elements from other MEAs will help the GPT build on the successes and lessons learned from previous international environmental agreements. It can create a more robust framework to address the urgent and complex issue of plastic pollution effectively and comprehensively.

### Implications for a new global agreement to address plastic pollution

The previous sections introduced the main instruments forming the current governance frameworks tackling plastic pollution,

mainly in the marine environment and the related shortcomings, gaps and potential synergies. This section reflects on how the new GPT may address these shortcomings and thus provide an effective instrument able to improve the current fragmented governance of plastics' life-cycle. We argue that if a new global agreement is to be developed, it must (1) set clear and ambitious targets and goals; (2) address regulatory gaps and (3) strengthen existing efforts at the global, regional, national and subnational levels.

### Set clear ambitious goals and achievable targets

To address the sources of plastic pollution across the full-life-cycle of plastics, a high-level political commitment is needed, which drives all relevant policy sectors towards harmonised actions for the prevention, mitigation and removal of plastic pollution. A High Ambition Coalition to end plastic pollution has been formed, which includes 60 nations (as of October 2023) with a clear goal to ensure a strong GPT (HAC Homepage – High Ambition Coalition to End Plastic Pollution n.d.). The coalition has developed clear goals and targets, such as reducing production and incorporating circular principals. Setting production limits will be critical in this regard to deal with the sheer volume of plastics produced worldwide. Some experts and also industry representatives propose a production cap on virgin plastics to drive down aggregated global plastics production (Simon et al., 2021; Wang et al., 2021; Bergmann et al., 2022) and to reduce dependency on fossil fuels (Guardian, 2021). However, for this to function, a production cap will need to ensure fair principles where low-income nations dependent on plastic products are not disadvantaged by the cap (e.g. higher production costs may equal higher consumer costs). Global targets could then be translated into regional and national implementation plans (RIP & NIP), requiring obligations towards monitoring and reporting to evaluate the future treaties effectiveness (GRID-Arendal, 2021; Wienrich et al., 2021).

### Address regulatory gaps

Implementing key international conventions and other agreements aimed at addressing plastic pollution presents successes and challenges (Kuyper et al., 2018; Petersson and Stoett, 2022; Stokke et al., 2022). A brief overview can be found in Table 6.

The GPT needs to address existing legal and institutional gaps as well as potential synergies as outlined in the previous sections. These include geographical gaps, especially regarding the High Seas and some regional gaps where few or no regional instruments are in place such as areas beyond national jurisdiction which is expected

**Table 6.** Successes and challenge to implementing MEAs list is not exhaustive, only some of the national instruments across geographical areas are highlighted based upon Petersson and Stoett (2022)

Successes	Challenges
1. Global awareness	1. Compliance and enforcement
2. Cooperative efforts	2. Transboundary pollution
3. Reduction of specific pollutants	3. Varying national priorities
4. Technology and innovation	4. Lack of data and monitoring
5. Policy frameworks	5. Technological and financial constraints
6. Public engagement	6. Political and legal barriers
7. Regional initiatives	
8. Financial support mechanism	

to briefly be addressed in the soon to be implemented BBN agreement. In addition to establishing limits to production (Simon *et al.*, 2021), a new GPT provides an opportunity to address current regulatory gaps regarding issues on the design and trade of plastics, and processes for the removal and remediation of legacy plastics. For example, redesigning plastic products to make them safer in terms of chemical and polymer content would also facilitate subsequent recycling by simplifying and restricting the number of options on the market (U.S. Plastics Pact, 2020; Fenner and Scheringer, 2021; Wiesinger *et al.*, 2021). High return rates can be achieved by creating economic incentives for plastic recycling and/or reuse (e.g. taxes, deposit return schemes) (Oosterhuis *et al.*, 2014; Tudor and Williams, 2021).

### Strengthen existing efforts

Whereas a new global agreement needs to fill critical regulatory gaps, it should build on and strengthen existing efforts of existing MEAs by coordinating the action of relevant stakeholders, harmonising efforts at all levels, providing and promoting finance and capacity building, raising public awareness and supporting research and innovation (Maes and Preston-Whyte, 2023). To improve cooperation and coordination, the future treaty can address gaps in current plastic governance by, for example, creating a reporting framework to encourage open dialogue and information sharing when it comes to the sheer number of plastic pellets, materials and products produced, sold and traded on a global scale. Moreover, the GPT can facilitate technology transfer and capacity-building programs for lower-income nations (i.e. waste management and recycling technologies that work in practice for each country). As well as foster international collaboration to identify solutions for managing all plastic waste streams. This will require binding commitments for reduction, preventions and consider countries individual capabilities with interim targets leading to ambitious long-term goals such as reducing the amount of plastic produced. Stronger standards for a wide range of materials, products, systems and services linked to plastics would allow for improved regulation and permit better collaborations with the industry (e.g. manufacturers, distributors, recyclers), improving transparency and risk determination (Fenner and Scheringer, 2021; Wang *et al.*, 2021). Furthermore, by recognising their role as stewards of the environment, industry can actively contribute to reducing pollution and support broader efforts to preserve ecosystems and biodiversity. Sustainable practices not only benefit the planet, but can also enhance a company's reputation, attract eco-conscious customers and create a positive impact on the community and the world.

### Coordinating action

For effective global governance of plastics, coordination among all relevant stakeholders is crucial. A new GPT should improve this coordination by forming a committee to function as the leading, coordinating body and providing a forum where all relevant stakeholders, including international and regional organisations, governments, NGOs, academia, private sector and civil society, can gather and exchange ideas on what is working, and more importantly what is not. This is written into the negotiation mandate itself and demonstrated in the INCs multi-stakeholder dialogue sessions which took place during and directly before the first session of negotiations in November 2022. In the future, it is probable that, following the adoption of the treaty, a Conference of the Parties (COP) will be established. This COP will consist of representatives

from member states of the convention and accredited observers and will be tasked with reviewing the implementation of the GPT.

Achieving adequate management and protection of natural assets requires that the socio-economic and human security needs of the populations are met. One way to reach the goal is through proper governance of the coastal and ocean assets (Kullenberg, 2010). The new GPT could build on the Global Partnership on Plastic Pollution and Marine Litter (GPML) efforts ("Global Partnership On Plastic Pollution and Marine Litter," *n.d.*), which was established in 2012 between UN Environment and other UN bodies such as IMO, IOC-UNESCO and FAO. Especially the engagement of the private sector will be a crucial task since private companies will be essential stakeholders when discussing and agreeing on measures such as the use of alternative materials in manufacturing or improvements of waste management systems.

### Harmonising efforts at all levels, including monitoring and reporting

Policy coherence and interoperability are other prerequisites for reducing conflicts and promoting synergies between stakeholders and policy areas. By providing common frameworks, guidelines, protocols, and so forth and setting common targets and measures, a new global agreement would harmonise various instruments' efforts from the global to the (sub)national level. For example, through a systematic spatial and temporal scaling across multiple jurisdictions (e.g. community, municipal, regional, national and international), a generic suite of indicators is applied to monitor the annual changes in plastic production, usage and waste management, as well as pollution and ecosystem health, socioeconomics and governance (Sherman, 2014). Attempts to harmonise efforts must be accompanied by technology and knowledge transfer (on mutually agreed terms), best practice exchange, innovation, cooperation, financial and technical support and capacity building. The lack of common standards, baselines, monitoring methods and reporting systems for social and environmental data in relation to plastic make it difficult to compare data sets. Existing frameworks which could provide potentially relevant plastic indicators and data are for example those developed under the Sustainable Development Goals (SDG), the Green Growth Indicators and other OECD initiatives, the Strategic Approach to International Chemicals Management (SAICM), the Basel Convention, the Framework for the Development of Environment Statistics (FDES) and the System of Environmental Economic Accounting (SEEA). One of the major advantages of these frameworks is their reliance on universally accepted concepts, definitions, classifications and accounting principles. To successfully incorporate plastic-related data into this structure, it will be essential to engage in further mapping and collaborate with pertinent accounts.

Establishing a common framework for data collection and assessment will be crucial to encourage uptake and compliance, while ensuring that the obligations of the agreement can be validated. Environmental policy integration is a key defining feature of sustainable development (Lafferty and Hovden, 2003). Policy integration and adaptive capacity are complementary concepts in the context of addressing complex, dynamic challenges. Integrated policies can help build adaptive capacity by considering diverse factors and promoting holistic decision-making, learning and innovation to enhance resilience in the face of environmental change and uncertainty. Links between existing and proposed collaborative groups, whether they are communities, organisations, governments or stakeholders, enhance adaptive capacity by creating a network of support, knowledge sharing and resource pooling.



This collaborative approach strengthens resilience and facilitates effective responses to various challenges, including plastic pollution, climate change and biodiversity loss. This enhances the development of adaptation responses through the coordination of monitoring and review processes to promote learning across scales (Di Gregorio et al., 2017; Greenhill et al., 2021). Improved monitoring, reporting and transparency (e.g. enhanced HS codes for polymer, products and packaging including alternatives and substitutes) will allow for better control of exports, including reducing plastic waste trade to countries ill-equipped to manage waste in an environmentally sound manner. Where necessary, the implementation of such a common framework needs to be supported through regional capacity-building programmes. The GPML platform could act as a depository or clearing house, in allowing to assess progress on the GPT in future years.

### Finance and funding

Preventing plastic waste inputs at the source will require significant long-term investments to support technical support, the implementation of policies, strategies, as well as capacity building. The necessary funding for the implementation of a new global agreement could come in four forms: public financing, private financing, public-private partnerships and donors and grants (Galaz et al., 2012; Oliveira and Hersperger, 2018). Especially lower-income nations and emerging markets will need capital input to address infrastructure and capacity needs. At this stage, it is unclear whether the GPT will either provide financial assistance (finances) or facilitate access to global, regional or national financial assistance for developing countries' and economies in transition to meet the agreement's objectives. Furthermore, a GPT could create an environment to support innovative financing instruments (e.g. GEF or GCF). Some MEAs obtain financial assistance through bilateral agreements between countries or multilateral agreements or have their own dedicated trust funds, which are financed by contributions from the parties to the treaty. For instance, the Adaptation Fund under the United Nations Framework Convention on Climate Change (UNFCCC) is a dedicated trust fund for climate adaptation projects. In the context of climate change agreements, adaptation funds are created to support vulnerable countries in adapting to the impacts of climate change. The funds can be financed through various mechanisms, including carbon market revenue or contributions from developed countries. Investment and financing from financial institutions, including green bonds and impact investments, may also support projects and activities aligned with the GPT goals. Private sector companies, philanthropic foundations and non-governmental organisations may further contribute to dedicated funding mechanisms for the GPT. These novel funding platforms will be crucial to developing and implementing practical finance mechanisms to increase the impact across stakeholders. Such solutions should complement government spending for what governments allocate funding for (e.g. infrastructure development and social welfare programs) and amplify domestic financing (raising funds from within the country) to ensure countries can meet their spending commitments within the GPT's requirements. In addition, there is an interest from the private sector to engage private sector investors. Various financing and funding possibilities are currently being deliberated upon during the INC meetings. These encompass the potential implementation of globally coordinated fees, for instance, on particular polymers, additives and product types. The objective is to apply the "polluter pays" principle effectively and ascertain the responsible parties for levying such charges. This approach is intended to aid

nations in fulfilling their financial commitments under the treaty (Proposal for a Global Plastic Pollution Fee in the legally binding instrument to end plastic pollution, 2023). Preventing industries from externalising their production and operating costs is a multifaceted challenge that requires the cooperation of governments, businesses, consumers and civil society. A combination of regulatory and economic measures, alongside a shift in corporate culture and public awareness, can help address this issue and promote sustainability and responsible business practices.

### Improving science-policy interface

Inter-agency scientific coordination among the UN agencies about issues relating to the marine environment is formally carried out by GESAMP. Under a new global agreement, the science-policy interface concerning plastic pollution must be expanded by coordinating the efforts of a broader range of stakeholders from a wide range of experts in civil society, science community and the informal sector so that scientific studies and assessments can provide the best possible basis for decision-making across the entire life-cycle of plastics. This is visualised in the creation of an intergovernmental panel of experts to harmonise and steer assessments, develop global standards and regulations (e.g. assessment criteria, baselines, methodologies and protocols), and support and improve the global agreement over time. In the lead-up to INC-1, The Scientists' Coalition for an Effective Plastics Treaty ("Scientists' Coalition – Ikhapp," n.d.) formed. It comprises autonomous scientists and experts aiming to enrich the treaty proceedings. They provide concise and comprehensible presentations and analyses of scientific insights to member states and observers engaged in the global plastics treaty.

### Discussion

Plastic pollution is a global, transboundary problem that requires multilateral solutions and multi-stakeholder engagement. A key conclusion from the pre-UNEA6 sessions and first and second session of GPT negotiations have been that a continuation of "business-as-usual" is not an option. The existing legal and regulatory frameworks have proven insufficient in addressing the growing problem of plastic pollution. The mandate for an ambitious, legally binding global agreement covering the full life-cycle of plastics and allowing for coordination, cooperation and compliance can only be successful when using the foundations of existing governance structures. Promoting regional and sub-national approaches alongside the global plastics treaty negotiations is a prudent choice, particularly given the escalating issue of plastic pollution. After the second round of negotiations on the GPT in June 2023 (INC-2 in Paris), it was clear that two schools of thought are still prevalent for how the treaty should be governed. The first stemmed from a group of like-minded nations who advocated for the treaty to only include NAPs and voluntary measures. The second emerged from nations, including many of which who bear the brunt of the downstream effects of pollution, urged for mandatory and legally binding measures and funding mechanisms for transition (Cowan, 2023).

Although what the treaty may include is still undetermined, what is clear is that the framework created will require full societal systems change. In contrast to previous global agreements that addressed one or a limited number of chemicals, plastics encompass our entire way of life. The harmful effects of plastic pollution on ecosystems and human health are well

documented. Furthermore, climate change, ocean acidification and biodiversity loss are already affecting the marine environment and coastal populations (Mendler de Suarez *et al.*, 2014; Talukder *et al.*, 2022). However, to solve the problems society faces from the triple planetary crisis it will require each aspect (biodiversity, climate and pollution) to be addressed *via* a legally binding instrument with provisions for flexibility to accommodate national and regional contexts and needs along the full life-cycle. An effective GPT will need to build upon regional initiatives gathering “likeminded” nations. Nations could report on monitoring and compliance to a regional body which then can report back to the global level once the treaty is negotiated, and a COP is formed. The regional centres might also assist with developing RIPs and subsequent NIPs depending on national needs.

To succeed in the short-term and reduce plastic pollution, the utilisation of existing global and regional frameworks is required. This should be followed by the formation of new partnerships and stronger regulations under the future GPT. Adopting a full life-cycle approach requires accounting for plastics released into all ecosystems, and a new global agreement should thus address land-based and sea-based sources, focusing on upstream and downstream actions and measures.

## Conclusion

In light of the problems caused by plastic pollution, the urgent need for comprehensive and cohesive governance mechanisms cannot be overstated. This study has illuminated the complex landscape of plastic pollution governance and has shed light on the myriad challenges posed by the growing production (including the unregulated material and current lack of design and labelling standards), and inadequate waste management. This complex regulatory landscape requires strong coordinated action which may find synergies within other MEAs. The GPT negotiations mark a pivotal point in the fight against plastic pollution. Mandated at the UNEA 5.2 in March of 2022, this future agreement represents global effort to address the issue from its roots and provide the ability to govern the full life-cycle of plastics globally which has been absent in previous instruments.

As demonstrated, the current landscape of plastic pollution governance is characterised by a patchwork of global, regional, national and local initiatives to curb the problem. The current frameworks play a critical role in mitigating plastic pollution, but numerous shortcomings and gaps remain that undermine their efficacy to govern the full scale of the problem. The fragmented nature of plastic pollution governance has resulted in failure to achieve meaningful progress to end plastic pollution. In picturing the future of plastic governance, it is vital to strike a balance between the new global agreement and existing governance structures, as was demonstrated in Table 5. The future GPT must be crafted with a keen awareness of the strengths and limitations of the present instruments that complement rather than disrupt ongoing efforts. As negotiations continue with the GPT, careful consideration must be given towards mechanisms for information sharing, data harmonisation and cooperation among all governing bodies – such as building upon regional centres to report on efforts and shortcomings in implementing the treaty. Moreover, the success of the treaty will rely on commitments of nations, robust enforcement mechanisms, and the active engagement of civil society and the private sector.

In conclusion, the problem with plastic pollution requires a societal paradigm and global governance shift. The GPT offers hope for a collaborate framework that transcends jurisdictional boundaries. The journey towards a plastics-responsible world is rife with challenges, yet with political will, binding compliance and enforcement measures, a sustainable future can be an achievable aspiration. We need a little less conversation and build upon what exists to end plastic pollution as soon as possible.

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## References

- Barrowclough D and Birkbeck CD** (2022) Transforming the global plastics economy: The role of economic policies in the global governance of plastic pollution. *Social Sciences* 11(1), 1–69. <http://doi.org/10.3390/socsci11010026>.
- Bennett CJ** (1991) Review article: What is policy convergence and what causes it? *British Journal of Political Science* 21, 215–233. <http://doi.org/10.1017/S0007123400006116>.
- Bergmann M, Almroth BC, Brander SM and Walker TR** (2022) A global plastic treaty must cap production. *Science* 376(6592), 469–470. <http://doi.org/10.1126/SCIENCE.ABQ0082/ASSET/95BC436C-7B33-49B7-A656-805DAAEDF6A0/ASSETS/SCIENCE.ABQ0082.FP.PNG>.
- Borrelle SB, Ringma J, Lavender Law K and Rochman CM** (2020) Predicted growth in plastic waste exceeds efforts to mitigate plastic pollution. *Science* 369(6509), 1515–1518. <http://doi.org/10.1126/SCIENCE.ABA3656>.
- Chen CL** (2015) Regulation and management of marine litter. In *Marine Anthropogenic Litter*. Cham: Springer International Publishing, pp. 395–428. [http://doi.org/10.1007/978-3-319-16510-3\\_15](http://doi.org/10.1007/978-3-319-16510-3_15).
- Cowan E** (2023) Running up that Hill: Event Ethnography to Study Global Negotiations on the Treaty to End Plastic Pollution. *Cambridge Prisms: Plastics*.
- Cowan E and Tiller R** (2021) What shall we do with a sea of plastics? A systematic literature review on how to pave the road toward a global comprehensive plastic governance agreement. *Frontiers in Marine Science* 8, 1–14. <http://doi.org/10.3389/fmars.2021.798534>.
- Dauvergne P** (2018) The power of environmental norms: Marine plastic pollution and the politics of microbeads. *Environmental Politics* 27(4), 579–597. <https://doi.org/10.1080/09644016.2018.1449090>.
- Del Castillo A and Dixon C** (2021) Comparison table on the potential resolutions on plastic pollution to be adopted at UNEA 5.2.
- Di Gregorio M, Nurrochmat DR, Paavola J and Kusumadewi SD** (2017) Climate policy integration in the land use sector: Mitigation, adaptation and

- sustainable development linkages. *Environmental Science & Policy* **67**, 35–43. <http://doi.org/10.1016/J.ENVSCI.2016.11.004>.
- Fenner K and Scheringer M** (2021) The need for chemical simplification as a logical consequence of ever-increasing chemical pollution. *Environmental Science and Technology* **55**(21), 14470–14472. <http://doi.org/10.1021/ACS.EST.1C04903>.
- Ferraro G and Failler P** (2020) Governing plastic pollution in the oceans: Institutional challenges and areas for action. *Environmental Science & Policy* **112**, 453–460. <http://doi.org/10.1016/J.ENVSCI.2020.06.015>.
- Galaz V, Crona B, Österblom H, Olsson P and Folke C** (2012) Polycentric systems and interacting planetary boundaries – Emerging governance of climate change-ocean acidification-marine biodiversity. *Ecological Economics* **81**, 21. <http://doi.org/10.1016/j.ecolecon.2011.11.012>.
- Global Partnership on Plastic Pollution and Marine Litter** (n.d.) Available at <https://www.gpmarinelitter.org/> (accessed 17 August 2023).
- Greenhill L, Sundnes F and Karlsson M** (2021) Towards sustainable management of kelp forests: An analysis of adaptive governance in developing regimes for wild kelp harvesting in Scotland and Norway. *Ocean and Coastal Management* **212**, 105816. <http://doi.org/10.1016/j.ocecoaman.2021.105816>.
- GRID-Arendal** (2021) Exploring the option of a new global agreement on marine plastic pollution – A guide to the issues | GRID-Arendal. Available at <https://www.grida.no/publications/539> (accessed 9 February 2022).
- Guardian** (2021) It's unavoidable: we must ban fossil fuels to save our planet. Here's how we do it | Roland Geyer | *The Guardian*. Available at <https://www.theguardian.com/commentisfree/2021/mar/09/its-unavoidable-we-must-ban-fossil-fuels-to-save-our-planet-heres-how-we-do-it> (accessed 9 February 2022).
- HAC Homepage – High ambition coalition to end plastic pollution: High ambition coalition to end plastic pollution** (n.d.) Available at <https://hactoplasticspollution.org/> (accessed 17 August 2023).
- INC** (2023) Potential options for elements towards an international legally binding instrument, based on a comprehensive approach that addresses the full life cycle of plastics as called for by United Nations Environment Assembly resolution 5/14. Available at <https://www.unep.org/events/conference/second-session-intergovernmental-negotiating-committee-develop->
- Karasik R, Vegh T, Diana Z, ... Williams K** (2020) 20 years of government responses to the global plastic pollution problem the plastics policy inventory 20 years of government responses to the global plastic pollution problem the plastics policy inventory author affiliations citation.
- Kirk E** (2016) Science and the international regulation of marine pollution. In *The Oxford Handbook of the Law of the Sea*. Oxford: Oxford Academic. <http://doi.org/10.1093/law/9780198715481.003.0023>.
- Kullenberg G** (2010) Human empowerment: Opportunities from ocean governance. *Ocean & Coastal Management* **53**(8), 405–420. <http://doi.org/10.1016/J.OCECOAMAN.2010.06.006>.
- Kuyper J, Schroeder H and Linnér BO** (2018) The evolution of the UNFCCC. *Annual Review of Environment and Resources* **43**, 343–368. <http://doi.org/10.1146/annurev-environ-102017-030119>.
- Lafferty WM and Hovden E** (2003) Environmental policy integration: Towards an analytical framework. *Environmental Politics* **12**(3), 1–22. <http://doi.org/10.1080/09644010412331308254>.
- Li WC, Tse HF, Leung HM and Yue YK** (2022) Degradation of plastic waste in the marine environment. In M. Shahnawaz, M. K. Sangale, Z. Daochen, & A. B. Ade (Eds.), *Impact of Plastic Waste on the Marine Biota*, Singapore: Springer. pp. 143–174. [http://doi.org/10.1007/978-981-16-5403-9\\_8](http://doi.org/10.1007/978-981-16-5403-9_8).
- Maes T and Preston-Whyte F** (2023) The way forward, building up from on-the-ground innovation. In *The African Marine Litter Outlook*. Cham: Springer. pp. 199–224. [http://doi.org/10.1007/978-3-031-08626-7\\_5](http://doi.org/10.1007/978-3-031-08626-7_5).
- Manyara P, Raubenheimer K, Sadan Z, Manyara P, Raubenheimer K and Saryana Z** (2023) Legal and policy frameworks to address marine litter through improved livelihoods. In *The African Marine Litter Outlook*. Cham: Springer. pp. 137–197. [http://doi.org/10.1007/978-3-031-08626-7\\_4](http://doi.org/10.1007/978-3-031-08626-7_4).
- March A, Karasik R, Roberts K and Evans T** (2023) Limited knowledge of national plastics policy effectiveness may hinder global progress. *Cambridge Prisms: Plastics* **1**, e14. <http://doi.org/10.1017/PLC.2023.13>.
- Mendenhall E** (2023) Building a regime complex for marine plastic pollution. *Cambridge Prisms: Plastics* **1**, e12. <http://doi.org/10.1017/PLC.2023.12>.
- Mendler de Suarez J, Cicin-Sain B, Wolk K, Payet R and Hoegh-Guldberg O** (2014) Ensuring survival: Oceans, climate and security. *Ocean and Coastal Management* **90**, 27–37. <http://doi.org/10.1016/J.OCECOAMAN.2013.08.007>.
- Nyberg B, Harris PT, Kane I and Maes T** (2023) Leaving a plastic legacy: Current and future scenarios for mismanaged plastic waste in rivers. *Science of the Total Environment* **869**, 161821. <http://doi.org/10.1016/J.SCITOTENV.2023.161821>.
- OECD** (2022) *Global Plastics Outlook*. <http://doi.org/10.1787/AA1EDF33-EN>.
- Oliveira E and Hersperger AM** (2018) Governance arrangements, funding mechanisms and power configurations in current practices of strategic spatial plan implementation. *Land Use Policy* **76**, 623. <http://doi.org/10.1016/j.landusepol.2018.02.042>.
- Oosterhuis F, Papyrakis E and Boteler B** (2014) Economic instruments and marine litter control. *Ocean & Coastal Management*, **102** (PA), 47–54. <http://doi.org/10.1016/J.OCECOAMAN.2014.08.005>.
- Petersson M and Stoett P** (2022) Lessons learnt in global biodiversity governance. *International Environmental Agreements: Politics, Law and Economics* **22**(2), 333. <http://doi.org/10.1007/s10784-022-09565-8>.
- Pires A and Martinho G** (2019) Waste hierarchy index for circular economy in waste management. *Waste Management* **95**, 298–305. <http://doi.org/10.1016/J.WASMAN.2019.06.014>.
- Progress in the implementation of resolution 2/11 on marine plastic litter and microplastics Report of the Executive Director** (n.d.) Available at [www.cleanseas.org](http://www.cleanseas.org)
- Proposal for a global plastic pollution fee in the legally binding instrument to end plastic pollution** (2023) Available at <https://wedocs.unep.org/bitstream/handle/20.500.11822/41775/Ghanasubmission.pdf?sequence=1&isAllowed=y> (accessed 17 August 2023).
- Raubenheimer and McIlgorm** (2017) Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches, 2017 by UNEA3 | gpml. Available at <https://www.gpmarinelitter.org/resources/information-documents/combating-marine-plastic-litter-and-microplastics-assessment> (accessed 9 February 2022).
- Raubenheimer K and McIlgorm A** (2018) Can the Basel and Stockholm conventions provide a global framework to reduce the impact of marine plastic litter? *Marine Policy* **96**, 285. <http://doi.org/10.1016/j.marpol.2018.01.013>.
- Raubenheimer K and Urho N** (2020) *Possible elements of a new global agreement to prevent plastic pollution*. Nordic Council of Ministers. <http://doi.org/10.6027/temanord2020-535>.
- Resolution adopted by the United Nations Environment Assembly on 2 March 2022 5/14. End plastic pollution: towards an international legally binding instrument** (n.d.)
- Scientists' Coalition – Ikhapp** (n.d.) Available at <https://ikhapp.org/scientists-coalition/> (accessed 17 August 2023).
- Sherman K** (2014) Toward ecosystem-based management (EBM) of the world's large marine ecosystems during climate change. *Environmental Development* **11**, 43. <http://doi.org/10.1016/j.envdev.2014.04.006>.
- Simon N, Raubenheimer K, Urho N, Unger S, Azoulay D, Farrelly T, Sousa J, van Asselt H, Carlini G, Sekomo C, Schulte ML, Busch PO, Wienrich N and Weiland L** (2021) A binding global agreement to address the life cycle of plastics. *Science* **373**(6550), 43–47. <http://doi.org/10.1126/SCIENCE.ABI9010>.
- Stokke OS, Østhagen A and Raspotnik A** (2022) *Marine Resources, Climate Change and International Management Regimes*. <http://doi.org/10.5040/9780755618392>.
- Talukder B, Ganguli N, Matthew R, vanLoon GW, Hipel KW and Orbinski J** (2022) Climate change-accelerated ocean biodiversity loss & associated planetary health impacts. *The Journal of Climate Change and Health* **6**, 100114. <http://doi.org/10.1016/j.joclim.2022.100114>.
- Tessnow-von Wysocki I and Le Billon P** (2019) Plastics at sea: Treaty design for a global solution to marine plastic pollution. *Environmental Science & Policy* **100**, 94–104. <http://doi.org/10.1016/j.envsci.2019.06.005>.
- Tiller R, Booth AM and Cowan E** (2022) Risk perception and risk realities in forming legally binding agreements: The governance of plastics. *Environmental Science & Policy* **134**, 67–74. <http://doi.org/10.1016/J.ENVSCI.2022.04.002>.
- Tudor DT and Williams AT** (2021) The effectiveness of legislative and voluntary strategies to prevent ocean plastic pollution: Lessons from the UK and South Pacific. *Marine Pollution Bulletin* **172**, 112778. <http://doi.org/10.1016/j.marpolbul.2021.112778>.

- U.S. Plastics Pact** (2020) U.S. Plastics Pact. Available at <https://usplasticspact.org/> (accessed 9 February 2022).
- UNEP** (2021) From pollution to solution: A global assessment of marine litter and plastic pollution. *New Scientist* **237**.
- Vince J and Hardesty BD** (2017) Plastic pollution challenges in marine and coastal environments: From local to global governance. *Restoration Ecology* **25**(1), 123. <http://doi.org/10.1111/rec.12388>.
- Vince J and Hardesty BD** (2018) Governance solutions to the tragedy of the commons that marine plastics have become. *Frontiers in Marine Science*, **5**, 1–10. <http://doi.org/10.3389/FMARS.2018.00214/PDF>.
- Wang Z, Wiesinger H and Groh K** (2021) Time to reveal chemical identities of polymers and UVCBs. *Environmental Science & Technology* **55** (21), 14473–14476. <http://doi.org/10.1021/ACS.EST.1C05620>.
- Wienrich N, Weiland L and Unger S** (2021) Stronger together: The role of regional instruments in strengthening global governance of marine plastic pollution. IASS Study, February 2021. <http://doi.org/10.48440/iass.2021.008>.
- Wiesinger H, Wang Z and Hellweg S** (2021) Deep dive into plastic monomers, additives, and processing aids. *Environmental Science and Technology* **55** (13), 9339–9351. [http://doi.org/10.1021/ACS.EST.1C00976/SUPPL\\_FILE/ES1C00976\\_SI\\_002.PDF](http://doi.org/10.1021/ACS.EST.1C00976/SUPPL_FILE/ES1C00976_SI_002.PDF).