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Voices

Charting success for the Plastics Treaty

Plastic has become indispensable to human ways of life across the world, yet the environmental cost of our dependence is increasingly recognized as untenable. In 2022, 175 nations resolved to work toward a legally binding agreement on plastic pollution by 2024. Yet addressing plastic pollution requires changes across the entire production chain, from production to consumption to disposal. This Voices asks: what is needed for the Plastics Treaty to meaningfully address the plastics crisis?

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Less is more: Reducing plastics at the source

Numerous studies that have modeled the interventions necessary to significantly reduce plastic pollution and its associated climate emissions have reached the same conclusion: we need to make less plastic. The simplest and strongest way to achieve this is through source reduction mandates—policies to require less plastic over time. Single-use plastics are the ideal target as they represent ~40% of total annual plastic production globally and are the most easily eliminated or replaced. Moreover, Ocean Conservancy data shows that single-use plastics make up a disproportionate amount of marine debris collected from beaches, nearly 70% of which are not recyclable. A focus on source reduction can have an outsized impact to prevent pollution across the plastics life cycle, while also cleaning up our recycling streams to enhance the transition to a circular economy.

Fortunately, there is precedent for the kind of ambitious source-reduction policies necessary to address the plastic pollution crisis. Last year, California, the fifth-largest economy in the world, passed the world's first law requiring precisely that: a 25% reduction in single-use plastics in 10 years. In addition to preventing an estimated 21 million metric tons of plastics, this policy will drive innovation to reduce plastics production at the global scale.

The science is clear—to decrease plastic pollution and reach our climate goals, we need to reduce plastic production. The UN Plastic Treaty represents an unparalleled opportunity to address this crisis at its source. That's why Ocean Conservancy is calling on negotiators at the 2nd session of the Intergovernmental Negotiating Committee to End Plastic Pollution to include a 50% target for source reduction of single-use plastics by 2050, which would eliminate over 2.6 billion metric tons of plastics.

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The voice of the Global South should be heard

The Global Plastic Treaty represents a critical and momentous opportunity for the world to effectively tackle the global plastic crisis, but the Global South bears the brunt of its impact. Given the substantial environmental and socio-economic challenges faced by the region, it carries a significant responsibility to actively voice its concerns. Plastic-associated pollution pervades every stage throughout the life cycle, from extraction and production to disposal. While plastic pollution is pervasive in every stage of its life cycle, the disposal phrase is particularly concerning for countries in the Global South compared to their wealthier counterparts. With their technological and economically inadequate waste management infrastructure, the Global South is incapable of managing the influx of low value, single-use plastics from wealthier countries. Moreover, wealthy nations outsource their plastic to poorer countries via trade, effectively engaging in waste colonization, resulting in a moral and ethical quandary.

Resolving these environmental inequities is crucial to ensuring equitable responsibility among all stakeholders involved in the agreement. While negotiating for technology and knowledge transfer of innovations in sustainable plastic alternatives, it is crucial for Global South to also seek support in building necessary infrastructure to manage their waste. It becomes imperative to establish consolidated, value-chain-oriented systems to meet the evolving sustainability needs of the developing

economies. Advocacy for integration of plastic pollution reduction efforts with broader development agendas, such as poverty alleviation, biodiversity conservation, and climate action can rally support from the international community and mobilize resources for comprehensive and sustainable strategies.

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Independent science needs to get in the room

As the second session of the Plastic Treaty negotiations unfolds in Paris, serious questions have been raised about the process. While the United Nations Environment Assembly called for "the widest and most effective participation possible," logistics were cited as the reason for restricting participation to one person per registered NGO. This affects engagement of the most impacted and vulnerable populations (e.g., waste pickers, children and youth, Indigenous representatives). It also limits scientists' inputs. Under UN accreditation rules many independent academics rely on NGOs to register and risk being "locked out of the room." This is particularly salient as intergovernmental ambitions to deal with the pollution crisis (including plastics) are yet to be supported by robust independent scientific assessments like those of the IPCC for Climate Change or IPBES for biodiversity loss.

This is illustrated by the controversy following the recent launch of the "Turning off the tap" report subcontracted to three institutions and intended to inform negotiations. Its scope excludes consideration of a cap on production referring instead to eliminating "unnecessary production" and implicitly frames this systemic issue as driven by demand and consumers' behavior. Some assumptions, e.g., that circularity minimizes impacts of chemicals in plastics, are not supported by scientific evidence. Given the speed at which such assessments are drafted, they cannot be expected to be as robust and thorough as those of the IPCC or IPBES. Transparency and the meaningful contribution of independent scientists is crucial to the success of the Plastics Treaty. For this, they must be in the room.

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The Plastics Treaty as an instrument of innovation

Implementing an international legally binding policy instrument will be monumental in addressing global plastic pollution and has the power to also encourage sustainable innovation. The Plastics Treaty aims to address the full life cycle of plastic issues but should also consider the wide spectrum of actors and initiatives needed to address plastic pollution. In fact, long before the Plastics Treaty negotiations began, community organizers, entrepreneurs, and technology developers have been deploying solutions for sustainable plastic management. These initiatives are expertly designed to meet local challenges, such as ineffective waste management, but often struggle with financing and scaling-up. Projects such as washing machine filters for microplastics, zero waste refill stores, and personal plastic offsets have been spearheaded by small organizations and can lead to large impacts only if they are sufficiently scaled.

As policymakers negotiate the conditions of the Plastics Treaty, it is important they include incentives to support bottom-up initiatives and innovation. Bans and regulations are powerful tools to foster innovations in responsible production and recycling/reuse, but there must also be sufficient investment in alternative materials, novel delivery systems and advanced recycling and reuse infrastructures. To secure financing, the Treaty can implement extended producer responsibility (EPR) schemes whereby plastic producing and using companies pay into funds which are then earmarked for innovation programs. If the Treaty builds-in incentives for bottom-up initiatives and innovation and solid support to scale them up, there is huge potential to effectively address pollution *and* support the on-the-ground actors already working hard in this fight.

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The Plastics Treaty needs to be fair and ambitious

The Plastics Treaty negotiations are reaching a high point in 2023. However, there have been efforts to undermine the United Nations Environment Assembly's endeavor to embrace a universally binding global agreement by 2024, such as attempts to form a coalition of countries seeking an approach with no enforcement mechanism (e.g., the Paris Agreement). It thus becomes imperative to focus on the agreements and priorities of an international legally binding treaty to effectively eradicate plastic pollution. The Plastics Treaty must consider three crucial aspects: (1) plastic reduction, (2) efficient waste management, and (3) measures to prevent contamination. Plastic reduction can be achieved through implementating recyclable/reusable plastic product designs, promoting the use of recycled plastic materials, and diminishing plastic footprint by incentivizing less plastic production. Enhancing waste management practices requires a comprehensive approach, from efficient collection to proper disposal, while also striving to elevate recycling performance. Finally, to avert plastic contamination, it is imperative to phase out the use of single-use plastics and allocate resources toward the development of waste management strategies (e.g., hierarchical-level approaches) with a specific emphasis on coastal regions. Importantly, the Plastics Treaty must be fair and equitable, particularly in supporting developing countries that possess limited resources to establish advanced sustainable waste management systems. This can be achieved through the provision of financial and technical assistance, which call for a well-designed governance framework to ensure the necessary supports are delivered and implemented.

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"Make less" and "make better"

The global crisis of plastic pollution ranges from macro- to nanoplastics. As research shows, these various scales of pollutants are released into the environment, the air we breathe, food we eat, and water we drink via society-wide use of plastic products. Such emissions, inherently linked to our everyday activities, constitute a wicked problem, and it is increasingly evident that existing systems, regulations, and technological solutions are insufficient to level off the exponential growth in plastic production and pollution.

Without fundamental changes in how society utilizes, produces, and perceives plastics, emissions of plastics in all size ranges will continue to escalate. A meaningful Plastics Treaty should acknowledge that "conventional" solutions like recycling and reuse are one-sided measures. What is needed are bold and disruptive initiatives addressing the fundamental principles of "making less" and "making better."

As such, the concept of "making less" is simple but faces momentous challenges due to the plastic habituation deeply ingrained in modern societies. Defining the concept of "making better" requires in-depth discussions and careful consideration via a holistic lens: it is particularly crucial to recognize that plastics, throughout their life cycle, are intricately linked to climate change, biodiversity loss, and chemical pollution, collectively forming the triple planetary crisis.

In the pursuit of reducing global plastic production, and improving the plastics we do produce, we must consider risks of promblem-shifting and cascading effects on other environmental challenges. Their interconnectedness necessitates a holistic examination to ensure that any initiatives under the Plastics Treaty do not inadvertently exacerbate other environmental problems.

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Renewability, still highly important, still not enough

Global plastic production amounted to 390 million tonnes in 2021. Although only 8.3% and 1.5% were bio-based and recyclable plastics, their proportions are expected to increase at higher rates. This is laudable, yet insufficient, as production remains to rely quite heavily on fossil resources that are CO_2 intensive. Plastic waste also inflicts harmful outcomes like soil contamination and water pollution. Switching to renewable-based feedstock emerges as an important way to alleviate the negative impacts. However, the production process can still be energy intensive, and hazardous and toxic chemicals can also be generated as by-products. The principles of green chemistry must be applied to improve overall sustainability. In addition to addressing these issues, the mounting plastic waste cannot be overlooked. Degradable materials may seem to be the solution, but the impacts of degraded plastics on the environment remain unclear. Degradable polymers should, in my opinion, remain a niche product for selected applications before we have a clear understanding of their ecotoxicity. We can, alternatively, help to address the plastic waste problem by leveraging what plastics are—a valuable carbon source: possibilities are manifold, ranging from gasification via targeted depolymerization (e.g., converting plastic waste to syngas or other valuable building blocks) to upcycling to useful monomers and new valuable products (e.g., converting used plastic bottles to new textiles). With CO_2 budgets decreasing and an increasing price tag on CO_2 emissions, the value of plastic waste is likely to increase. This could lead to more responsible use of plastics throughout their life cycle, facilitate recycling/upcycling, and foster new and circular developments in the context of urban mining.

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Building local capacity for plastic control

The open burning of mixed wastes containing plastics is rampant across the world. Such burning leads to toxic emissions, contributes to air, soil, and water pollution and is a serious public and planetary health problem. Nevertheless, communities with absent or inadequate waste services are often left to fend for themselves in the face of a tsunami of plastic packaging and consumer plastics, such that open burning is an almost inevitable result. This is despite laws against such burning. In fact, ostensibly anti-plastic pollution campaigns and policies that focus on plastic litter can often lead to increased plastic burning. Although communities and local government officials engage in clean-up activities to care for their spaces or to meet waste management goals, there are no real alternatives to deal with the collected wastes, and, ultimately, the communities end up burning them.

The case of open burning speaks to the necessity of policies that are attentive to local contexts and constraints and that take a comprehensive view of the plastic pollution problem. To be successful, the UN Plastics Treaty must include mechanisms to build local capacities for (1) alternatives to both plastics *and* single-use dependence, (2) effective waste management, and (3) monitoring of implementation. As of now, we are too dependent upon plastics to eliminate them completely. What is needed is a pragmatic approach that involves the multiple, diversified stakeholders who are reliant on plastics (industry players included), recognizes their varied interests and constraints, and targets the most pernicious plastics and additives to reduce harmful impacts as we work progressively toward plastic control and stewardship.

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Funding priorities in the combat of plastic pollution

Like in all multilateral agreements, states negotiating the Global Plastics Treaty need to decide on funding issues. This is not just about decisions on how to mobilize funds. More important are decisions on funding priorities.

In general, funds need to support changes in all stages of the plastic value chain and enable a transition to a circular plastic economy. Yet, funds should above all be used to reduce burdens on waste management, which, even if expanded, will in no case keep up with the projected growth of plastic waste. Therefore, funds should focus on the first stages of the plastic value chain with the aim to minimize plastics that become waste.

More specifically, funding should prioritize two sets of actions that reduce the demand for, and consequently the production of, virgin plastic. First, funds should be used for research, development, and evaluation of sustainable alternatives for plastic and plastic products, and their market introduction. Second, funds should be used to increase the share of plastic products that are reusable and made from recycled plastic, mainly by supporting innovations in product design (and recycling technologies), as well as new business models.

Of course, expanding and improving environmentally sound waste management, including collection, sorting, recycling, and disposal, also requires funding, in particular in developing countries. Likewise, funds are needed for remediating legacy plastic pollution. Yet, as with any pollution, the most effective way to sustainably reduce plastic pollution starts at the source and should therefore throttle the tap on virgin plastic or even turn it off on problematic and avoidable plastic and plastic products.

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Better catalytic systems for plastic waste upcycling

Plastics have increasingly become a cornerstone of modern society. However, polymers of plastic waste, with their inert bonds, are seldom decomposed in natural environments but will fall apart into micro- and nanoplastic particles that challenge the wellbeing of humans and nature. Given that plastic waste can be a valuable carbon resource, there is an urgent necessity to develop effective methodologies to rationally utilize this resource to help alleviate the plastic waste issue. Aside from the recycling process aimed at monomer recovery, catalytic upcycling represents a potential strategy for transforming plastic waste into valuable chemicals, fostering the creation of a circular economy. Recent efforts have focused on the upcycling of individual types of plastic waste, such as polyolefins and polyesters, into various products, including aromatics, alkanes, alkenes, and assorted oxygenates. However, in practical scenarios, plastic waste often exists as physical mixtures of different plastic types. The resultant chemical diversity and complexity pose significant challenges in developing efficient and sustainable upcycling processes. Thus, it is crucial to design feasible catalytic systems that combine different catalytic approaches and methods of energy input. These systems aim to upcycle mixed plastic waste into valuable chemicals, enhancing sustainability by eliminating the need for plastic-sorting processes. While still in the early stages of development and requiring further optimization, it shows significant promise for the future valorization of plastic waste.

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Ensure diverse, synergistic, and collaborative action

As plastics are indispensable in our lives, the likelihood of getting rid of them is minimal. The United Nation's Plastics Treaty appears as a silver lining that bears a promise to address the plastic challenge that no other commitment has done so far: via the adoption of a systems-based approach, the treaty attempts to identify ways to combat plastic production, waste generation and pollution by placing focus on the entire life cycle of plastic materials, components, and products. Having such a systems-based approach, we stand a better chance of identifying ways with which we can e.g., limit the number of plastics produced, improve their design to make them more valuable and potentially reusable and recyclable, and invent new ways to dispose, collect, and manage them.

This is a crucial step toward understanding and tackling the plastic problem at the source. The source can, however, vary depending on different geographical, social, economic, and cultural contexts. Therefore, an inclusive transformational change must encompass interventions at any stage of the plastics value chain. It is the combination and synergistic effect of multiple interventions—promptly facilitated by collaborations throughout the value chain between governments, industry, businesses, academia, and communities worldwide—that are likely to deliver meaningful and inclusive multidimensional environmental, economic, social, technical, political, and institutional outcomes at societal wide. This is of paramount importance for ensuring a sustainable plastic governance with minimized trade-offs and unintended effects while curbing plastic pollution.

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Global rules to end plastic pollution

Plastic production and pollution have increased dramatically worldwide and are growing. Voluntary initiatives and commitments on plastic pollution have proven inadequate. To end plastic pollution, we need an ambitious, legally binding treaty that establishes global rules. Only a common, binding international legal framework that addresses how we produce and consume across the life cycle of plastics can catalyse system change across borders and global supply chains.

Such a treaty should first include global rules to reduce overall supply and trade of primary plastic polymers. It should eliminate and restrict production, consumption, and trade of unnecessary, avoidable, and problematic plastic materials, chemicals, and products harmful to human health and the environment. It would guarantee only plastic products meeting agreed global criteria are placed on the market and improve transparency of production, trade, and composition of plastics materials and products. It would have binding provisions to prevent, manage, and remediate plastic waste in a safe and environmentally sound manner. Finally, it would ensure effective financial and technological support for developing countries for treaty implementation and spur investment flows that support its goals and just transitions.

Primary plastics—and the fossil fuel and petrochemical industries that underpin and drive their growth—represent a significant and increasing share of the world's greenhouse gas emissions. The plastics treaty is an opportunity to tackle the scale and emissions of the plastics sector at the same time as its wider environmental and health impacts.

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Concerted strategies for a sustainable plastic future

Tackling the plastic challenge is something we can and should do. Much plastic waste stems from unnecessary items like sachets, bags, straws, and bottled water. To succeed, we must consider material substitutes and adopt controls on plastics while preserving them where they are most needed.

Progress toward a sustainable plastic future can be made via material substitutes. Promoting material substitutes can start with replacing plastics with reusable metal bottles, ceramics, seaweed-based packaging, or cups/bags made of e.g., agricultural residual fibers. Encouraging consumer adoption of reusable products is also a promising path, but must ensure safe cleaning of used products, including the reliability of water systems, and the responsible scaling of reuse services.

Also, countries need to embrace collective action with the adoption of orchestrated plastic control measures such as taxation, trade measures, extended producer responsibility fees, regulations, and bans on problematic plastics. An international treaty, e.g., on ending plastic pollution, will need synchronized domestic and multilateral actions including via international trade.

A prime example is to leverage multilateral trade to promote material substitutes and trade-in services for better plastic waste management. This can be done by transforming today's tariff schemes where plastics are often treated more favorably. For example, increasing the currently low import tariffs for problematic, single-use plastics to comprehensively internalize the societal cost of managing plastic litter. In parallel, tariffs for material substitutes to plastics, such as products made of agroforestry residues, should be lower to facilitate their uptake.

Together, these strategies can lead us toward a sustainable plastic future.

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DECLARATION OF INTERESTS

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O.V.M. is one of the European Parliament's representatives on the Management Board of the European Chemical Agency. She is a member of the scientific advisory board of the Food Packaging Forum (FPF) and has also advised and contributed to FPF-funded projects as a consultant. O.V.M. supports some activities of the European Environment Agency related to the European Union's Zero Pollution ambition as a consultant part of a consortium contracted via Framework Service Contract EEA/HSR/20/003. O.V.M. is a member of the OECD Expert Group on Chemicals in Recycled Plastics.