

# Annual Trends in Plastics Policy: A Brief

Rachel Karasik, Janet Bering, Madison Griffin, Zoie Diana, Christian Laspada, Jonathan Schachter, Yifan Wang, Amy Pickle, and John Virdin



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Rachel Karasik<sup>1</sup>, Janet Bering<sup>2</sup>, Madison Griffin<sup>3</sup>, Zoie Diana<sup>4</sup>, Christian Laspada<sup>4</sup>, Jonathan Schachter<sup>3</sup>, Yifan Wang<sup>4</sup>, Amy Pickle<sup>1</sup>, and John Virdin<sup>1</sup>

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## Summary

In 2020, the Plastics Policy Inventory and accompanying report, 20 Years of Government Responses to the Global Plastic Pollution Problem, were published, providing a baseline for the trends in government responses to the plastic pollution problem, as well as highlighting some gaps. Since that time, momentum has grown toward negotiation of an international agreement as a collective response to the problem, even as governments and resources have been strained by the ongoing coronavirus pandemic. This first brief builds upon the 2020 report and baseline by adding new data on national policy responses to plastic pollution from 2020 and 2021. Assessment of the more up-to-date policy inventory suggests that the twenty-year trend of an increase in the number of national policies introduced to reduce plastic pollution has stalled. While additional data on national policies may subsequently become available to revise these estimates, if confirmed they would suggest a pause in government responses to the problem, coinciding with the pandemic (though we cannot show causality). Our goal is for this brief to be the first in a regular series of annual updates on the trends in government responses to the global plastic pollution problem.

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## Citation

Karasik, R., J Bering, M. Griffin, Z. Diana, C Laspada, J. Schachter, et al. 2022. "Annual Trends in Plastic Policy: A Brief." NI PB 22-01. Durham, NC: Duke University.

## Acknowledgments

This work was funded by UNDP Ocean Innovation Challenge with support from Sida and Norad.

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*Publication Number: NI PB 22-01*



Sida



Norad

## INTRODUCTION

Over the past decade, our collective understanding about the extent of the plastic pollution problem has grown. Across the globe, high rates of disposable plastic production and consumption coupled with both an insufficient capacity to manage waste and a tendency for wealthier nations to export their waste to developing nations has led to mounting plastic pollution in the natural environment. This threatens ecosystems and the communities that depend on them (Jambeck et al. 2015; Lebreton and Andrady 2019; Law et al. 2020; The National Academies of Sciences, Engineering, and Medicine 2021; Brooks et al. 2018; Borrelle et al. 2020). Even still, evidence of plastics in unexpected places such as the deep sea (Taylor et al. 2016), the atmosphere (Shen et al. 2020), and human placenta (Ragusa et al. 2021) underscores that the problem requires comprehensive solutions at all stages of the plastic life cycle (Lau et al. 2020). Among these, public policy solutions are considered a critical and growing component of a “whole of society” response (Karasik et al. 2020), and the United Nations Environment Assembly (UNEA) has called for monitoring these policy responses as part of tracking global collective action to reduce plastic pollution (UNEA Resolution 4/6). This call has been echoed by scholars in a growing body of academic and grey literature, which recommends increased monitoring of both the sources of the plastic pollution problem and government responses (Schnurr et al. 2018; UNEP and WRI 2018; Worm et al., 2017).

The Plastics Policy Inventory was created in 2020 to support the growing momentum to address plastic pollution by tracking policies introduced at the subnational, national, and international levels with the explicit goal of addressing plastic pollution. The Plastics Policy Inventory is an online, searchable database of policy documents agreed by governments, including laws, statutes, ordinances, guidelines, action plans, treaties, and memoranda of understanding indicating an effort on behalf of government bodies to address plastic pollution explicitly. An initial review of the inventory suggested that, among others: (i) current international agreements lack a specific or science-based global target for plastic pollution reduction, (ii) national and subnational policies introduced to address plastic bags through bans or fees increased worldwide over the previous twenty years, and (iii) national policies to address primary or secondary microplastics (including tire abrasions) were still relatively few (Karasik et al. 2020). Because the number of policy responses to plastic pollution was only increasing, the review acknowledged that without updating the inventory and assessment of policy trends and gaps, the information from these efforts would soon become outdated (Karasik et al. 2020). As such, the Plastics Policy Inventory has been maintained and expanded to include more policies, with a focus on those passed in 2020 and 2021.

The policy documents in the Inventory have been collected from international legal databases, secondary and gray literature, and crowdsourced from a growing network of partners. Though the Plastics Policy Inventory currently includes policy documents in more than 30 languages, there is a noted English-language bias, whereby there is an overrepresentation of policy documents from English-speaking countries and Western Europe. Policy documents written in English have subsequently been included in an analysis of trends and gaps in government responses, using qualitatively data analysis software NVivo. Expanding the language capabilities

of the analysis and the continued geographic coverage of the Inventory will remain a priority for continued monitoring. For the moment, the Plastics Policy Inventory and the trends it suggests should still be considered indicative (particularly of national level responses worldwide), and not yet comprehensive.

This brief aims to summarize trends in national government responses to the plastic pollution problem, based on an expansion and update of the Plastics Policy Inventory. Analysis of the updated inventory focused on the extent to which policies are targeting different plastic types and the types of policy instruments countries are using in tandem. Tracking these dimensions of policy design follows evidence that policies tended to be more effective in terms of both reduced plastic pollution and increased policy support when they included information instruments coupled with regulatory or economic instruments, such as bans or fees (Karasik et al. 2020). Additionally, the analysis provides an early indication as to whether or not there was any change in the passing or implementation of plastics policy in response to the ongoing coronavirus pandemic (COVID-19), which both constrained government capacity to address other ongoing and systemic challenges, and also resulted in the consumption and disposal of more plastic items including personal protective equipment, medical waste, and packaging containers (Silva et al., 2020; Peng, 2021). While it is likely too early to make any conclusions about the effect of COVID-19 on global attempts to address plastic pollution, this brief offers some insight as to how policy responses may have changed since the onset of the pandemic in early 2020.

While it remains relevant to the community of practice, this brief is intended to be published annually to document and monitor how governments worldwide respond to plastic pollution. The focus of each brief may change, for example, future versions may include more detail on the effectiveness literature, or outline methods and results of targeted research for policy documents from countries currently underrepresented in the inventory.

## RESULTS

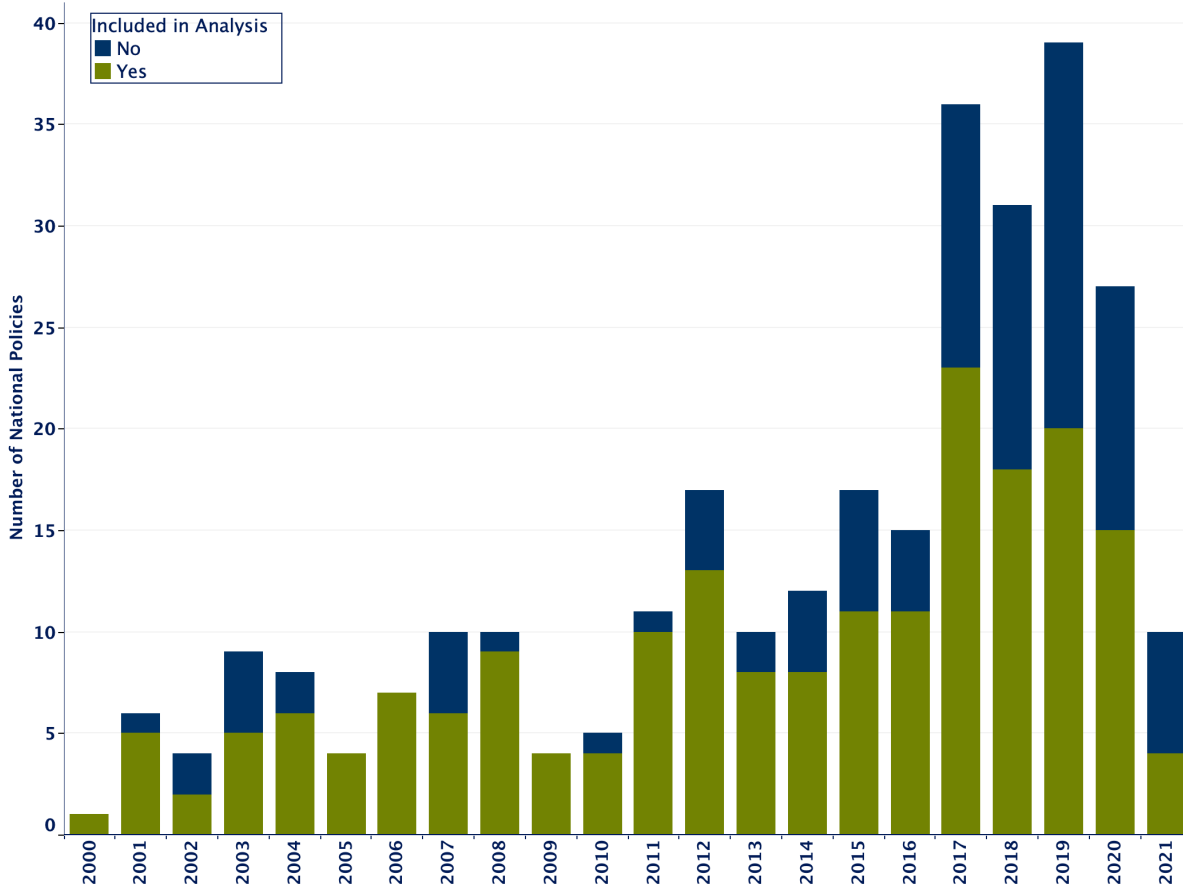
The analysis of the updated and expanded Plastics Policy Inventory focused on trends and gaps in the introduction of national policy responses to the plastic pollution problem. Not every single policy document was assessed for content and design using qualitative analysis software because it was written in a language that the researchers could not read or credibly translate from (see Figure 1). The majority of this section focuses on assessments of only the policy documents indicated as included in the analysis.

### ***Trends in National Policy Responses to Plastic Pollution***

**Total number of national policies enacted.** While the total number of national policies introduced to address plastic pollution steadily increased from the year 2000, there was a noted drop in the number of policies passed or amended in 2020 and 2021 (**Figure 1**). This may be due to the pandemic but may also reflect a lag between the enactment of policies and their inclusion in international environmental law databases or journal articles searched. We expect to find more policies enacted in 2020 and 2021 with subsequent searches, as the total count will be updated periodically, together with the inventory.

**Figure 1. National Policies in the Plastics Policy Inventory**

**National Policies in the Plastics Policy Inventory**

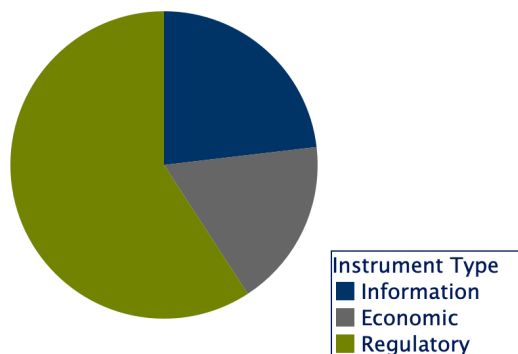


*Note.* Policies color-coded as “included in analysis” were assessed using qualitative analysis software, NVivo. The remainder were not included in the analysis because the researchers do not speak the language they are written in.

### Types of Policy Instruments Used by National Governments to Address Plastic Pollution

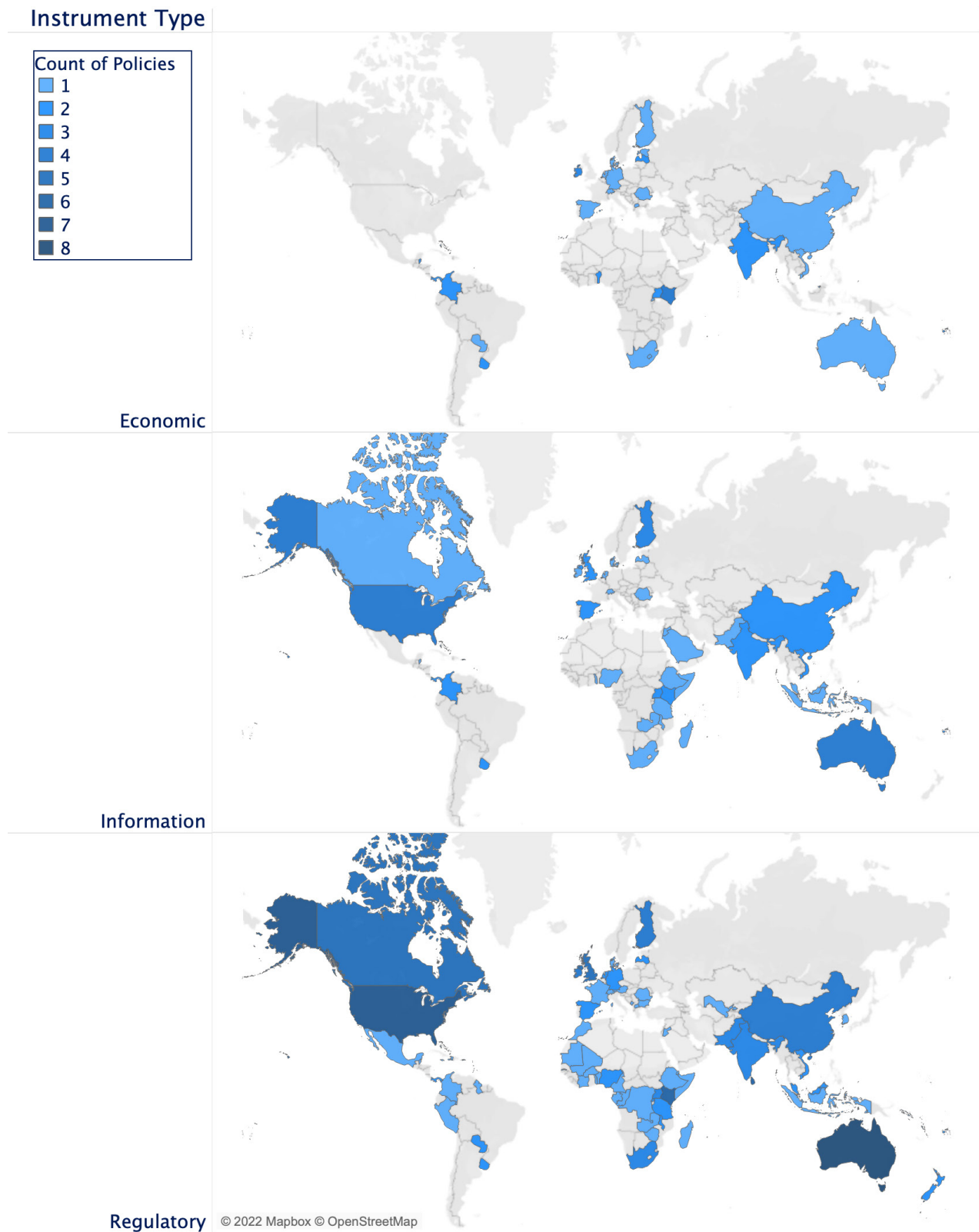
Policy instruments refer to the tools that governments are using in their policies to address plastic pollution. Of the types of policy instruments used by national governments, countries have most frequently used regulatory instruments (176 national policy documents, or 90% of national policy documents included in the analysis) such as bans, followed by information-based instruments (69 national policy documents, or 36% of national policy documents included in the analysis) such as education and outreach, rather than economic instruments (53 national policy documents, or 27% of national policy documents included in the analysis) such as fees or subsidies (**Figure 2**). Policy documents can incorporate the use of more than one instrument type, which is why the percentages above add up to more than 100%.

**Figure 2. Types of Instruments used in National Policies (2000–2021)**



In some cases, national government policy responses combine different types of instruments (**Figure 3**). For example, governments may ban a certain type of plastic and launch an outreach campaign. Sometimes a policy document will include multiple policy instruments, but sometimes a national response to the plastic pollution problem is comprised of multiple policy documents with relevant instruments. Across all regions, regulatory instruments are used more often than economic and information-based instruments.

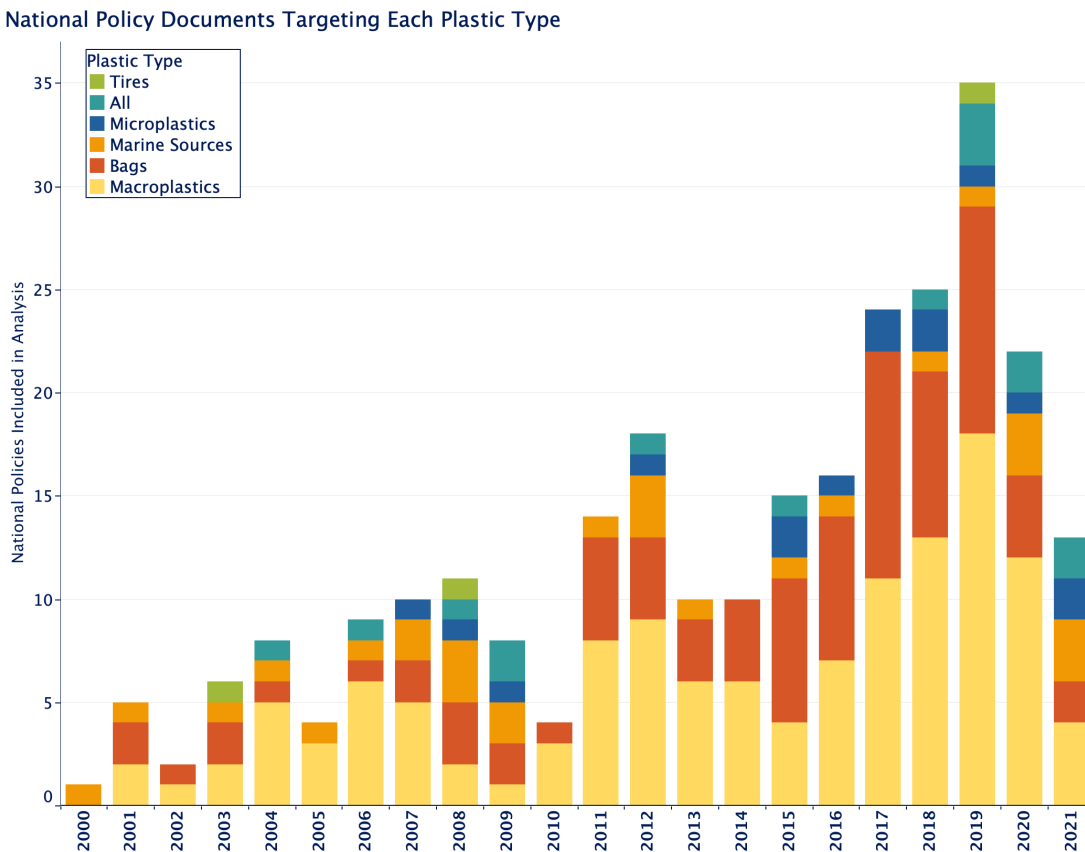
**Figure 3. Use of Policy Instruments by Countries Analyzed (2000–2021)**



## Types of Plastic Targeted by National Policies

Over time, national plastics policies have increasingly targeted plastic bags and other single-use plastics in the category labeled here as “Macroplastics” (Figure 4). Despite their contribution to plastic pollution, there have been relatively few countries targeting tire abrasion particles, microplastics, and marine sources of plastic pollution in recent national policies. Tire abrasion in particular remains an unregulated source of microplastic pollution that is projected to grow in the future (Lau et al. 2020; PEW Charitable Trusts, SystemIQ 2020). However, policies that regulate solid waste management and port reception facilities may have an impact on the release of these pollutants into aquatic systems (Schmaltz et al. 2020; Lauer 2019), but these policies are not included in the analysis or in the inventory if they do not explicitly target plastic pollution.

Figure 4. National Policy Documents Targeting Each Plastic Type



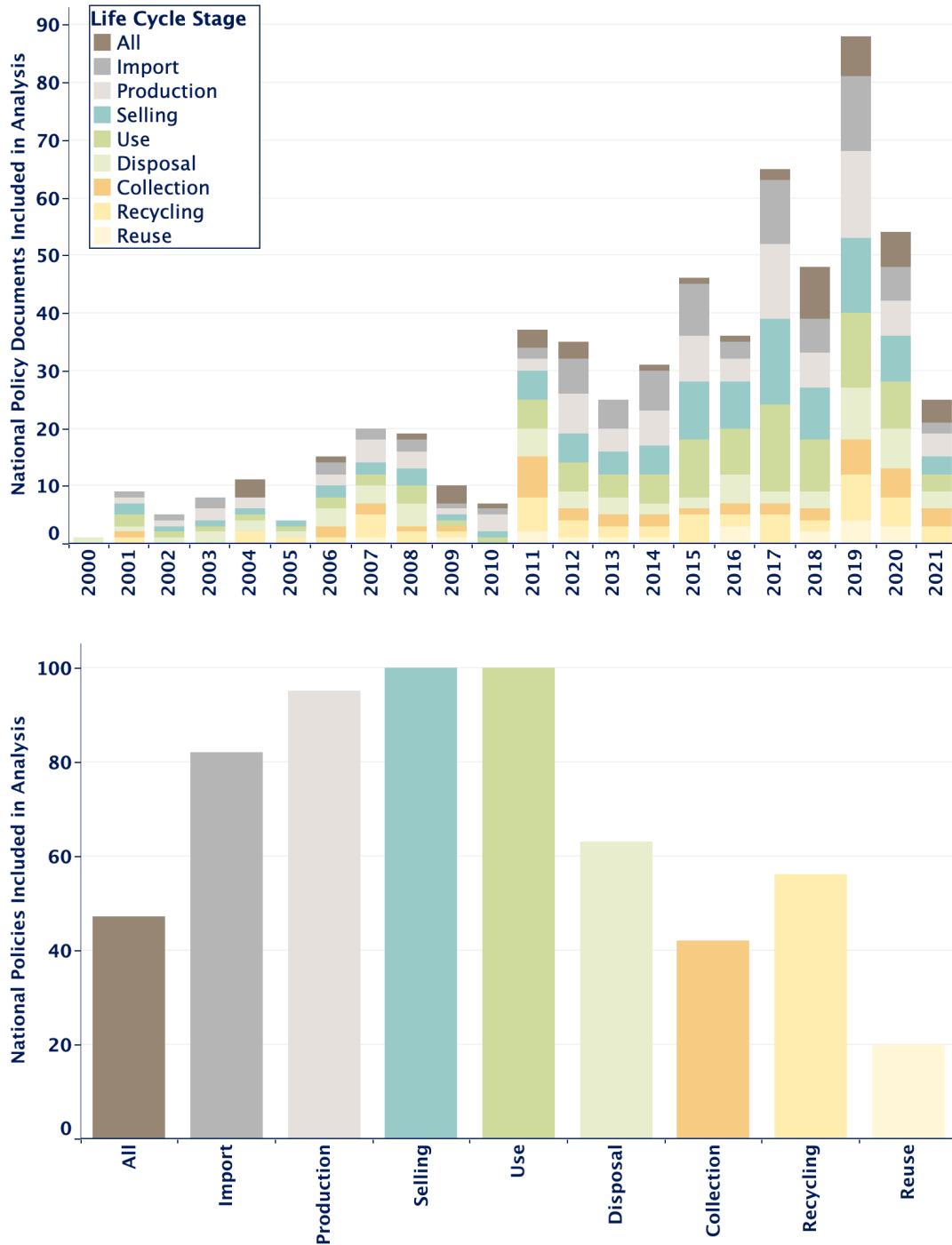
## Stages of the Life Cycle of Plastic Pollutants Targeted by National Policies

There are no notable trends in the stages of the life cycle of plastic pollutants targeted by national policies, though policies targeting the production and consumption stages of the life cycle outnumber policies targeting the management of plastic waste after it is used (Figure 5). This is likely because 105 national policy documents (54% of national policy documents analyzed) have



either fees or bans on the manufacture, import, selling, and use stages of plastic bags and/or other single-use macroplastics.

**Figure 5. National Policy Documents Targeting Each Life Cycle Stage**



## DISCUSSION

### *Indication of a COVID-19 Effect on Plastics Policy?*

Policy Responses to Pandemic-Related Plastic Pollution. Research on the effect of COVID-19 on plastic pollution is only now being completed and published. As early as February 2020, single-use plastic face mask production reached a high of 116 million masks produced per day in China alone, and as mask usage increased, little to no information about proper disposal was made available to the public (Adyel 2020). Evidence now demonstrates that medical waste as well as single-use and disposable plastics in personal protective equipment and packaging increased significantly (Peng et al. 2021). Estimates as of 2021 suggested that “more than eight million tons of pandemic-associated plastic waste have been generated globally, with more than 25,000 tons entering the global ocean” (Peng et al. 2021), a figure that will likely only continue to grow.

Select governments and policies found in the Inventory provide some examples of how governments are responding to the plastic pollution resulting from the COVID-19 pandemic:

**Tallinn, Estonia.** In 2021, Estonia’s capital city, Tallinn, administrative officials tasked with implementing coronavirus prevention measures installed 100 mask collection bins in public spaces in order to recycle them. These masks were strategically placed in vaccination centers, polling stations during elections, stadiums, and health care facilities. Five months after installation, over a quarter of a million facemasks were recycled (Tallinn 2021).

**Indonesia.** In 2020, Indonesia’s Ministry of Environment and Forestry (MoEF) issued circular letter No. SE.2/MENLHK/PSLB3/PLB.3/3/2020 on infectious (hazardous) and domestic waste management from COVID-19 response. The guidance allowed healthcare facilities to dispose of medical waste using treatment facilities such as incinerators or autoclaves, in burial pits, or using third-party waste handlers, even if these waste management facilities had not been licensed to receive medical-grade waste by the MoEF (UNEP ITC 2020).

**Mauritius.** In 2020, the national government of Mauritius passed the Environment Protection (Banning of Plastic Bags) Regulations 2020 which, in addition to providing registration requirements for the manufacture or import of certain types of plastic bags, bans the import, export, manufacture use or selling of non-exempt plastic bags. This law however has a clause in which “(2) The Minister may, if it is in the public interest to do so, **or in the case of a disaster or pandemic, allow the import, manufacture, sale or supply of a plastic bag.**”<sup>1</sup> To date, this is the only policy in the database which includes adaptive provisions for pausing a ban due to the COVID-19 pandemic.

**Potential Pandemic Effects on Policy Responses to Plastic Pollution.** Just as scholarship and evidence of the pandemic’s effect on plastic pollution is growing, there is also interest in the extent to which the COVID-19 pandemic has slowed the development and implementation of policies intended to reduce plastic pollution. One recent paper noted the withdrawal or delay in the implementation of single use plastic policies with bans or fees in the United States (US), Canada, Portugal, Spain, Italy, France, the United Kingdom, India, Myanmar, and China, as well

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1. Environment Protection (Banning of Plastic Bags) Regulations 2020.

as shifts in waste management policies that encourage incineration of discarded medical waste or temporarily cease recycling activities out of concern for contamination from medical waste in waste treatment or recycling facilities (Silva et al. 2020). The Product Stewardship Institute developed a tool to track the delay in adoption and rescinding of subnational policies (primarily bag and select other single-use plastics such as food takeout containers) in the US until April 2021 as a result of the pandemic (Product Stewardship Institute 2021). Using this tool, researchers found that dozens of bans and fees were temporarily delayed or rescinded, while at least ten policies were either passed or took effect during the pandemic (Product Stewardship Institute 2021). It is possible that at this point documented policies that have been paused or delayed have been implemented. Ultimately, the evidence base on the effect of COVID-19 on the introduction of plastics policy is still emerging and it remains too soon to draw conclusions.

Assessment of the number of national policies adopted from **Figure 1** suggests that the twenty-year trend in an increasing number of national policies introduced to combat plastic pollution has slowed, potentially in response to the pandemic though we do not have a way to determine causality. There are a number of possible reasons for this, including that the sources used to update the inventory have not yet reflected policies introduced in 2020 and 2021. At the same time, however, this suggests that the pandemic may be pausing some government responses to plastic pollution, while showing that other governments have been able to continue addressing plastic pollution. Continued analysis of the global databases used as sources and targeted searches from countries will confirm if this is the case. For the moment, the most recent data suggests a change in the longer trend that coincides with the onset of the pandemic.

### ***Policy Instruments Are Targeting More Plastic Types and Life Cycle Stages over Time***

The policies analyzed from the inventory suggest a more specific focus on different types of plastic pollution over time, particularly on single-use plastics such as cutlery, straws, balloon sticks, and Styrofoam. The analysis conducted did not disaggregate single-use plastics from other macroplastics targeted by policies, so measurements are difficult. Examples of policies more explicitly targeting single-use plastics include:

- Single-Use Plastic Phase-Out Plan (Maldives)
- Control of Disposable Plastics Act, 2019–11 (Barbados)
- Litter Control and Prevention Act, 2019 No. 3 of 2019 (Antigua and Barbuda)
- S.I. 31 of 2019 Environmental Protection Act (Seychelles)
- Restrictions on Placing on the Market of Single-Use Plastic Products Regulations (Malta)
- Styrofoam and Plastic Food Service Containers 2019 (Prohibition) Act (St. Lucia)
- Environmental Protection (Control Of Plastic Pollution) Act, 2019 (The Bahamas)
- Environmental Protection (Pollution From Plastics) Regulations, 2020 (Belize)
- The National Environmental Act, No. 47 Of 1980 (Sri Lanka)

- Law No. 17/2019 Relating To The Prohibition Of Importation, Use And Sale Of Polyethylene Bags And Single-Use Plastic Items (Rwanda)
- Waste Management (Prohibition on the Importation of Single-Use Plastic) Regulation 2019 (Tuvalu)

Likewise, a number of policies are beginning to regulate the use of plastics labeled as biodegradable, oxo-degradable, or otherwise compostable. In some cases, policies encourage the use of these plastics as substitutes to products made from fossil fuels. In other cases, they are regulated alongside products made from fossil fuels, e.g., are included within the definition of a banned plastic product.

For example, in Mauritius' Environment Protection (Banning of Plastic Bags) Regulations 2020, a plastic bag is defined as “a bag of any size or type made of plastic, with or without handles or gussets, designed for carrying goods, materials or products and **which is not biodegradable or compostable.**” In this policy, the possession, use, distribution, selling, trade, and manufacture of plastic bags is prohibited, while the import and manufacture of a biodegradable or compostable bag is allowed as long as it is registered.

In another example, In Latvia's 2021 Law on the Reduction of Consumption of Products Containing Plastic, a suite of single-use plastic products are prohibited from entering the market including cotton buds, tableware, plates, straws, beverage stirrers, balloon sticks, Styrofoam packaging, and oxo-degradable plastic.

Other examples of policies focusing on single-use plastics and addressing biodegradable or oxo-degradable plastics as well include:

- The Trade (Plastic Packaging Materials Prohibition) Order, 2018 (Jamaica)
- Technical Regulation for Degradable Plastic Products (Saudi Arabia)
- Public Notice Plastic Prohibition (Ban) 2019 (Samoa)
- Law No 87/2018 amending and supplementing Law No 249/2015 regarding the management of packaging and packaging waste (Romania)

In addition, a number of plastics policies in the inventory are now beginning to regulate the export of plastic products and waste, something that was not observed in the assessment in the 2020 report and was therefore not included in the codebook. Examples of policies that aim to address plastic product and waste exports include:

- National Marine Litter Policy and Action Plan 2021 – 2030 (Malaysia)
- National Plastics Plan 2021 (Australia)
- Environment Protection (Banning of Plastic Bags) Regulations 2020 (Mauritius)
- The National Environment (Waste Management) Regulations, 2020 (Uganda)

Future analyses are likely to reflect these changes, and it is likely that the codebook will have to be reformatted to adapt to the evolving policy landscape.

### ***The Missing Response to Pollution from Microplastics and Tires***

Despite evidence outlining the significant impact of microplastics and tire abrasions on plastic pollution (Lau et al. 2020), there are still relatively few national policies approaching microplastics and appears to be little to no momentum in acting on microplastics (Dauvergne 2018) from national governments. Of the few (15) national-level microplastics policies included in the analysis, some include plans to address microplastics in future legislation, some prohibit the disposal or release of incinerated plastic ash into the marine environment, many prohibit the manufacture, import, or sale of microbeads in rinse-off cosmetics, some are research or education initiatives, and others encourage the use of voluntary microbead phase-outs by companies. To date, only three policies target waste management of tires, and none explicitly target microplastic abrasions from tire use and wear. The European Union (EU) has made commitments to more explicitly target microplastics and in early 2022 initiated a consultation process to engage stakeholders in better defining problems and solutions to microplastics from production (e.g., pre-production pellets), tire abrasion, and synthetic textiles (EC Europa 2022). At the same time, emerging research suggests that another major contributor to the marine microplastics pollution problem is from paint (Hailstone 2022). New findings such as these may have an impact on the future of policy making that intends to address microplastics.

### ***Main Takeaways for Future Policy Making in a Global Context***

The plastic policy landscape is rapidly evolving. While there is some evidence to demonstrate that policy makers have constrained capacity to focus on plastic pollution and other environmental stressors while they are responding to the COVID-19 pandemic, there is also evidence to show that prior to the pandemic's onset, policies were more comprehensively and explicitly targeting diverse plastics. Particularly since 2017 policies have begun to target more types of plastic, to regulate the trade of plastic and plastic waste, and to consider the benefits and harms of substituting fossil-fuel-based single-use plastics with bio-based ones. Interestingly, some recent examples suggest that the intersection between plastic pollution and other environmental problems has more clearly been recognized in policy responses. For example, the European Maritime, Fisheries and Aquaculture Fund was established to protect aquatic biodiversity and ecosystems and to reduce pressure on wild fisheries, and it includes provisions for compensating fishers for collection lost fishing gear and marine litter from the sea, a concept known colloquially as "Trawling for Trash" (Boss 2011).

At the same time, certain types of plastic pollutants still appear to be largely ignored in policy making, despite their known contributions to the global problem. For example, while microbeads from rinse-off products have been largely phased out, they have not been addressed in other products such as toothpaste and clothing (e.g., microfibers). Innovations to reduce microplastic pollution from tire abrasions are not being supported through national policy. Post-leakage capture technologies, while often used in municipalities as a part of stormwater management, are not directly supported in policy making to address plastics that have already entered the environment. Instead, beach-cleanups are used to collect litter as part of education and outreach campaigns. In this same vein, the personal consumption of plastics is still more heavily regulated

than transferring the burden of responsibility onto producers who continue to generate plastics from virgin materials. Some policies, such as the “Food Service and Packaging Waste Reduction Ordinance” in San Francisco, passed in 2019, and the EU Directive 2019/904 on the reduction of the impact of certain plastic products on the environment require that packaging products sold or manufactured comprised of a minimum post-consumer recycled content. Compliance with such policies may ultimately enable producers to incorporate more recycled plastics into production ahead of similar requirements being enacted in other parts of the world, not unlike how California’s stricter vehicle emission regulations has enabled car manufacturers to create lower emission vehicles that are available in other US states (Beitsh and Frazin 2020).

As UN member states, corporate actors, and civil society groups consider a potential international agreement to address plastic pollution, this brief and the Plastics Policy Inventory aim to help clarify the extent and types of government responses to plastic pollution and highlight potential gaps that remain.

## METHODS

### *Policy Document Collection*

#### Global Environmental Policy Database Search

Following the methods outlined Karasik et al. (2020), the following international environmental policy databases were used to search for policy documents: InforMEA, ECOLEX, and FAOLEX. In each database, researchers input each of the search terms as outlined in **Box 1**.

#### **Box 1. Search terms used in International Environmental Law Databases.**

Search terms are separated by a dash (-). Each term was input into each database one by one.

Cigarette waste - Marine debris - Marine litter - Microplastic - Microfiber - Nurdle\* - Nylon - Plastic - Polyethylene - Polymethyl methacrylate - Polypropylene - Polystyrene - Polyvinyl chloride - Shopping bag - Styrofoam - Synthetic disposable - Tire/Tyre - Beach clean-up - Coast\* clean-up - River clean-up - Recyclate - Polymer - Bioplastic - Oxodegradable

To avoid duplicating past research in Karasik et al. (2020), the researcher limited the search to the time period from 2018 through the end of 2021. This allowed the researcher to focus on finding new policies from 2020 and 2021, but also for finding policy documents that may have been added to these databases since the publication of the report.

The results (i.e., public policy documents) of these searches were quickly screened (e.g., title, summary) for inclusion and combined into one list (stored in an Excel database). If the title or short description provided by the online database clearly indicated that the document was not relevant (e.g., a policy for sterilizing plastic gloves for surgery), it was not added to the database.

Duplicates were removed. Each of the remaining documents was given a unique identification number and retained in the internal database.

### Case Study Search

In addition to updating the policy inventory, researchers conducted literature reviews for 10 countries to assess their plastic pollution problem and policy response. These countries were meant to be geographically and socioeconomically diverse and to have some representation in the existing inventory. They were Costa Rica, Mexico, Turkey, Estonia, Malawi, Kenya, the Philippines, Maldives, Indonesia, and Australia. For each of these, an initial scan of the policy inventory was done to identify national and subnational policy documents from those countries. Subsequently a brief literature review in both Google Scholar and Google was conducted using adapted search strings from the 2020 report, in **Box 2**.

#### Box 2. Sample search strings used for country specific plastics policy literature review

“Country” AND “Plastic” AND (Policy OR Govern\* OR Institution OR Law OR Regulat\* OR Legal OR Intervention OR Infrastructure OR Coastal city OR Mega-city OR Municip\* OR Subsidy OR subsidize OR Subsidies OR Ban OR bans OR Tax\* OR taxes OR Fee\*)

Any mention of a national or a subnational policy in the academic literature, gray literature and news media that was not already in the inventory was subsequently searched for using Google and the Library of Congress’ country page, which includes links to legislative databases and gazettes for each country. A researcher did not spend more than 10 minutes looking for any given policy document. Each additional policy document that was found was given a unique identification number and retained in the internal database.

### Secondary Literature Search

In addition to country specific literature, the aforementioned abbreviated literature review yielded secondary sources that had references to policy documents from other countries. Examples of these papers are highlighted in **Table 1**.

**Table 1. Select resources with references to plastic policy documents across many countries**

Title	In-text citation (First author & Publication year)	Countries Covered
A Regional Response to a Global Problem: Single Use Plastics Regulation in the Countries of the Pacific Alliance	Ortiz et al. 2020	Mexico, Colombia, Ecuador, Peru, Chile

Title	In-text citation (First author & Publication year)	Countries Covered
Policies, Regulations And Strategies in Latin America and the Caribbean to Prevent Marine Litter and Plastic Waste	Fernandez Garcia et al. 2021	Antigua and Barbuda, Bahamas, Barbados, Belize, Grenada, Guyana, Haiti, Dominica, Jamaica, Saint Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, Argentina, Chile, Paraguay, Uruguay, Brazil, Colombia, Ecuador, Peru, Bolivia, Costa Rica, Guatemala, Mexico, Panama
Tackling Plastic Pollution: Legislative Guide for the Regulation of Single-Use Plastic Products	Excell et al. 2021.	Global
Inventory of Global and Regional Plastic Waste Initiatives	GRID-Arendal 2021	Global
Evaluation of Legal Strategies for the Reduction of Plastic Bag Consumption	Chasse 2018	Global

Any mention of a national or a subnational policy in these papers that was not already in the database was subsequently searched for using Google and the Library of Congress’ country page, which includes links to legislative databases and gazettes for each country. A researcher did not spend more than 10 minutes looking for any given policy document. All of these papers were also included in a page on the Inventory site as additional resources. Each policy document that was found was given a unique identification number and retained in the internal database. Policy documents not in English could not be extensively screened but were included if the policy titled or its description in the literature clearly indicated an approach to plastics specifically. Each policy document written in English was screened during the policy design assessment, described below.

### ***Assessment of Trends in the Introduction of Plastic Policies***

Every new policy document added that was written in English was analyzed by four researchers using qualitative data analysis software, NVivo, in order to identify and characterize each of the policy instruments within the policy document. Using a codebook, below, each instrument was coded by which plastic type(s) it targeted, which stage(s) of the life cycle it targeted, and which policy instrument(s) it utilized. In all of the above cases, more than one plastic type, stage of the life cycle, and instrument type could be coded for each individual policy instrument within a policy. For example, a ban and information campaign on the manufacture and import of plastic bags and Styrofoam containers would be identified for encompassing multiple dimensions. This



step served as an additional screening step because policy documents could be considered outside of the scope of this analysis upon further review (e.g., they are too broad).

**Table 2. Policy design elements included in analysis**

Dimension	Code	Sub-Code (if any)
Type of instrument	Regulatory - affirmative	<ul style="list-style-type: none"> <li>Develop new, or improve existing process or product</li> </ul>
		<ul style="list-style-type: none"> <li>Plan/commitment</li> <li>Post-leakage plastic capture</li> <li>Responsible handling of plastic</li> </ul>
	Regulatory - prohibitive	<ul style="list-style-type: none"> <li>Ban plastic</li> <li>Irresponsible handling of plastic</li> <li>Limit plastic</li> </ul>
		<ul style="list-style-type: none"> <li>Disincentive (fee, tax, levy, duty)</li> </ul>
Economic	<ul style="list-style-type: none"> <li>Incentive: Cash for return</li> <li>Incentive: Subsidy</li> <li>Incentive: Tax break</li> </ul>	
Information		<ul style="list-style-type: none"> <li>Education or outreach</li> </ul>
		<ul style="list-style-type: none"> <li>Label or placards</li> </ul>
		<ul style="list-style-type: none"> <li>Research, data collection, data reporting or record keeping</li> </ul>
Type of plastic pollutants targeted	Macroplastics from land-based activities, excluding plastic bags	
	Plastic bags	
	Microplastics from land-based activities, excluding tire abrasion	
	Microplastics from tire abrasion	
	Plastic pollutants from maritime activities	
	All plastic pollution	
(All refers to broad and unspecified references to plastic, rather than comprehensive and targeted approaches for plastic, e.g., "Conduct an outreach program about plastic")		

Dimension	Code	Sub-Code (if any)
Stage of the life cycle of the plastic targeted	Production	
	Import	
	Selling	
	Use	
	Disposal	
	Collection	
	Recycling	
	Reuse	
	All	All (All refers to broad and unspecified references to life cycle stages, rather than comprehensive and targeted approaches to each life cycle stage, e.g., "Conduct an outreach program about plastic")

### **Total Policies in Inventory**

A total of 571 public policies introduced since January 2000 have been identified and included in the inventory (as compared to 291 reported in Karasik et al. 2020, meaning almost 300 new policies have been added since the original Inventory was published), of which 294 are national government laws or regulations (**Table 2**). Of these 571 policy documents, 422 have been analyzed using NVivo, and of these 195 national policy documents are included here in the summary of trends. The remaining 149 policy documents have not yet been translated into English for qualitative analysis.

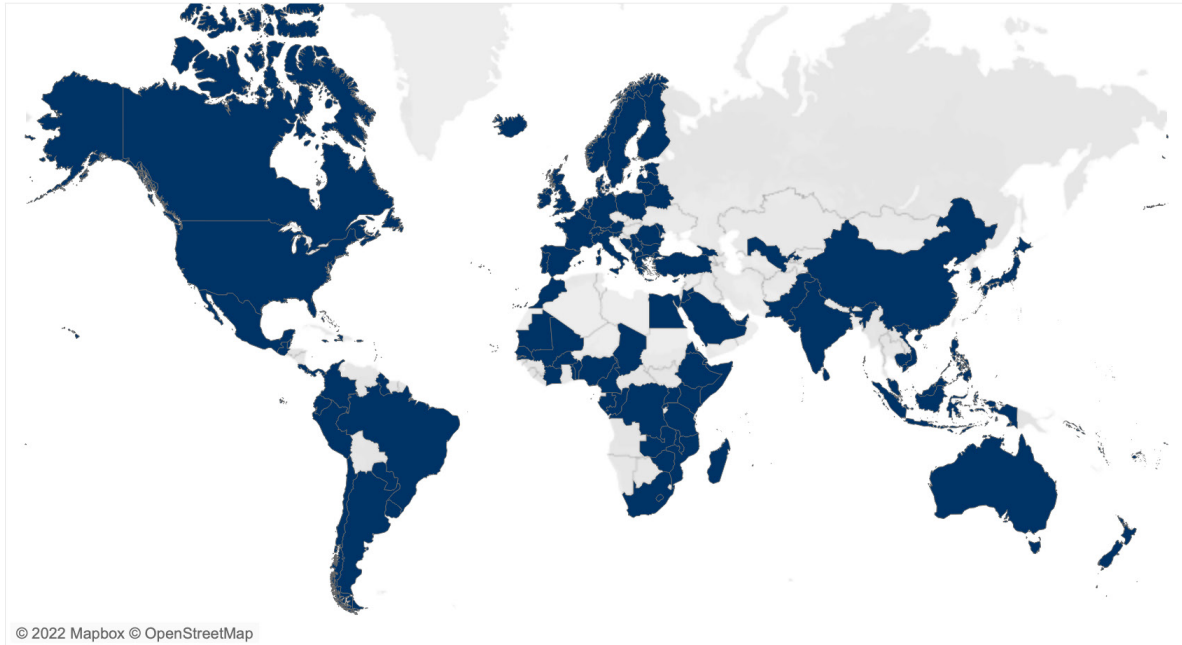
**Table 3. Policy Document Totals**

	Included in Analysis of Trends	Not Included in Analysis	Total
<b>International</b>	34	1	35
<b>Regional</b>	49	0	49
<b>National</b>	195	99	294
<b>Subnational</b>	144	49	193
<b>Totals</b>	422	149	571

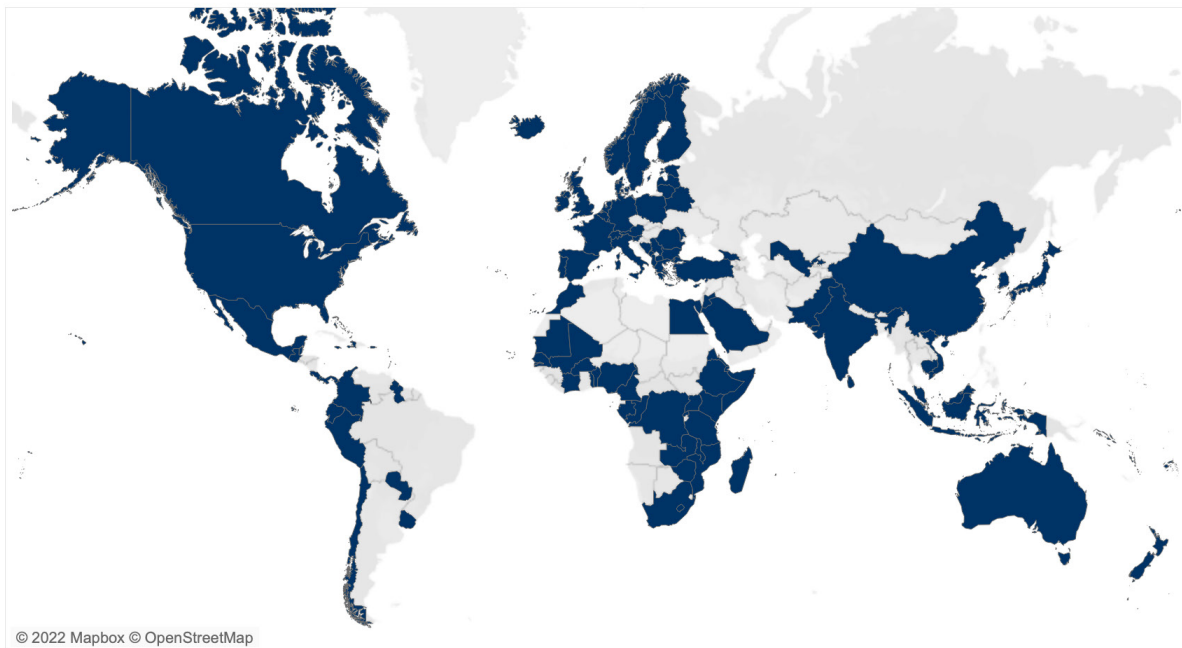
In total, 129 countries currently have at least one national or subnational policy in the inventory (**Figure 6**), suggesting representation across the globe is improving. The ten countries with most policies on either the national or subnational level in the database are the United States, Australia, the United Kingdom, Canada, China, Colombia, Ecuador, India, the Philippines, and Peru. It is important to note that territories, special administrative regions, and other entities with formal

and political links to countries are categorized as subnational. This means, for example, that policies in Wales are labelled as subnational policies and included in the total policy count for the United Kingdom. The ten countries with the most national policies in the database are Australia, China, Costa Rica, Ireland, Malta, Seychelles, United States, France, Kenya, and the Maldives.

**Figure 6. Countries with National and/or Subnational Policy Documents in the Inventory**



**Countries with National Plastics Policies**



In total, there are policies in 34 different languages in the Inventory. There are 394 policy documents in English, 72 in Spanish, 30 in French, and 14 in Portuguese. There are five policies in Russian or Belarussian (for policies from Belarus and Latvia), Dutch, and Chinese. The remaining languages<sup>2</sup> have four or fewer policy documents. Overall, close to two thirds of the national policy documents were included in analysis because they were written in English or translated from Spanish and French during the 2020 report. However, from 2018 on that ratio has trended downwards, with an increasing number of policies in the database being in a language other than English, which excludes them from analysis. For 2021 national policies, fewer than half of the policy documents were included for analysis because they were not written in English.

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2. Albanian, Arabic, Bosnian, Catalan, Danish, Dhivehi, Georgian, German, Greek, Hindi, Icelandic, Indonesian, Italian, Korean, Lao, Lithuanian, Malay, Montenegrin, Norwegian, Polish, Romanian, Slovenian, Swedish, Tigrinya, Turkish, Uzbek, Vietnamese.

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