DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS

Global governance and policy for resource circularity in Plastics

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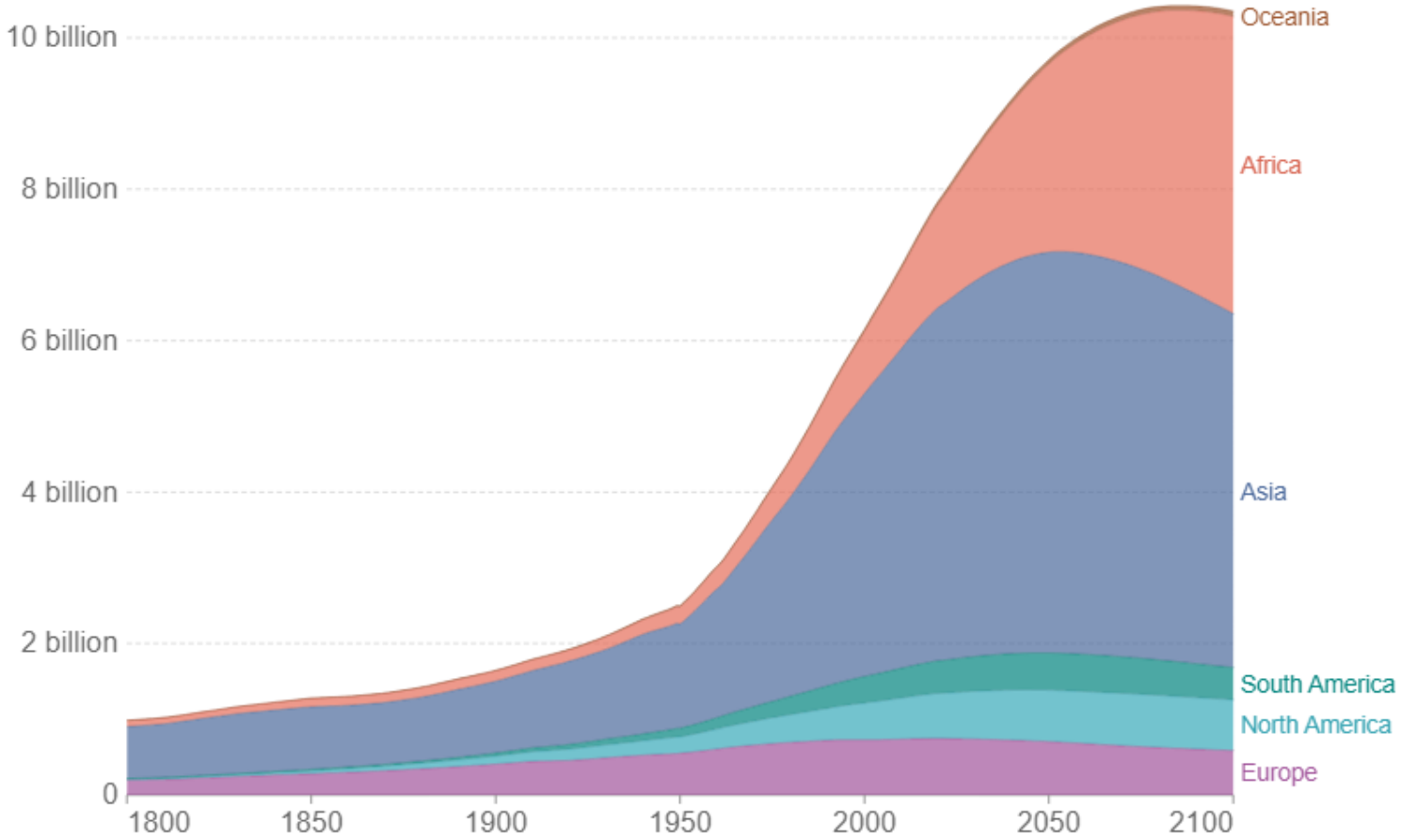
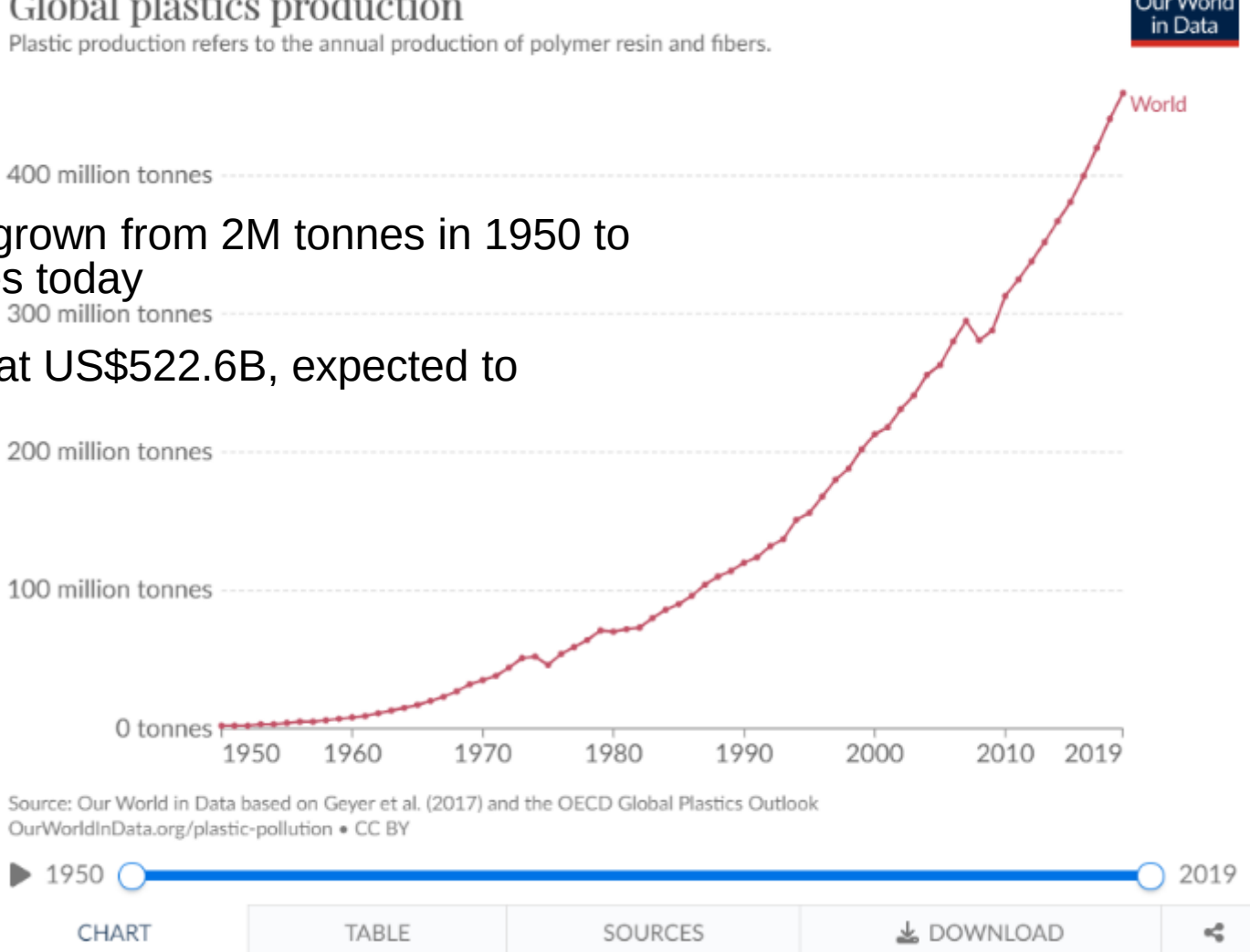
United Nations | Office for Sustainable Development

World population by region, including UN projections

Future projections are based on the UN's medium-fertility scenario.



- Plastic production has grown from 2M tonnes in 1950 to more than 400 M tonnes today
- Global industry valued at US$522.6B, expected to double by 2040



Global governance f
a global challenge

The 2030 Agenda SDGs and plastics

Table 1

Summary of UN SDGs directly impacted by (micro)plastics.

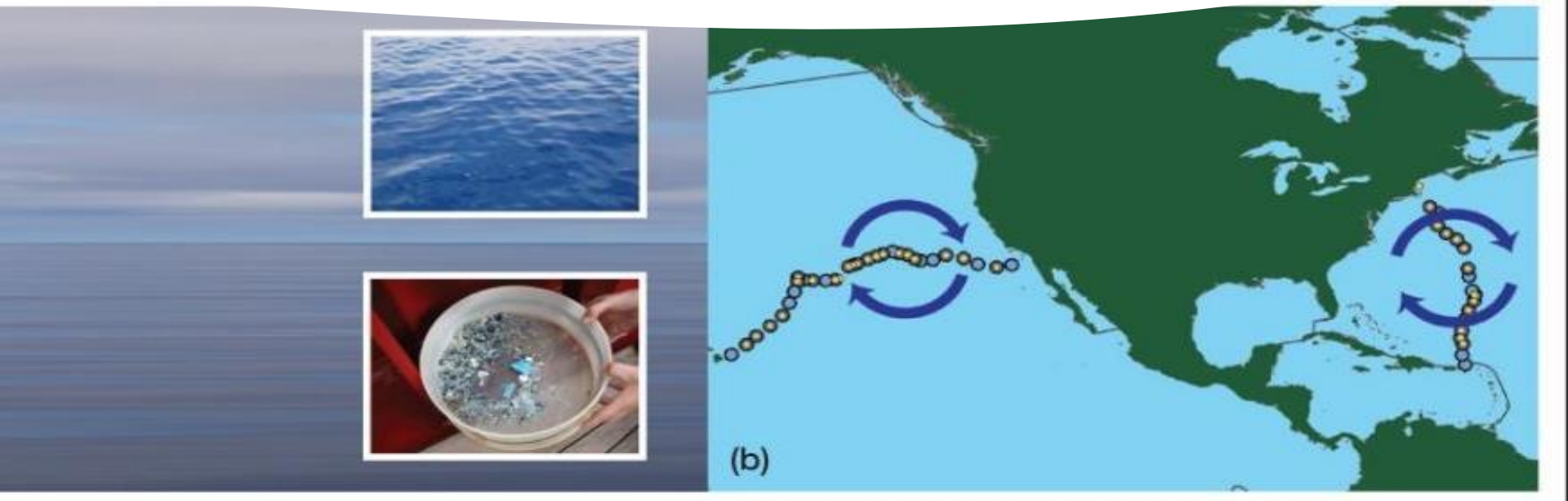
Goal	(Micro)plastic challenges to implementing UN SDGs
1	Negative impacts on ecosystem services and economic impacts on communities [16].
2	Presence of (micro)plastics in food packaging, agricultural soils, fruits and vegetables, fish and shellfish posing potential risks to human health through ingestion [17,18,20–22,24,25].
3	Presence of (micro)plastics in humans and fetus via ingestion, inhalation, and dermal exposure of microplastics in packed food products, foodstuff, and air [25–30].
6	Presence of (micro)plastics in drinking water and treated wastewater effluent [33–35].
7	Incineration of (micro)plastic waste used in waste-to-energy systems contributes to greenhouse gas emissions, release of atmospheric pollution, and is unsustainable [37–39].
9	Innovation is required for sustainable bio-based alternatives to fossil fuel–based plastics to help contributing to a circular econo [37,40].
10	Exports of plastic waste from developed to developing countries have been considered waste pollution transfer [43–45].
11	Indiscriminate disposal of plastics in countries with inadequate waste management systems is choking critical urban infrastructu [1,8,49].
12	Unsustainable global plastic production and plastic waste mismanagement [1,6,37,45,51].
13	Greenhouse gases are emitted at every step of the plastic life cycle, from production to transportation to waste disposal [52,53].
14	Extraordinary efforts are required to reduce emissions of (micro)plastics to marine and freshwater ecosystems [1,45,51].
15	Mismanagement of (micro)plastic waste causing widespread terrestrial pollution of (micro)plastics in landfills, urban and rural are protected areas, and agricultural soils [4,28,37,59,60,61].

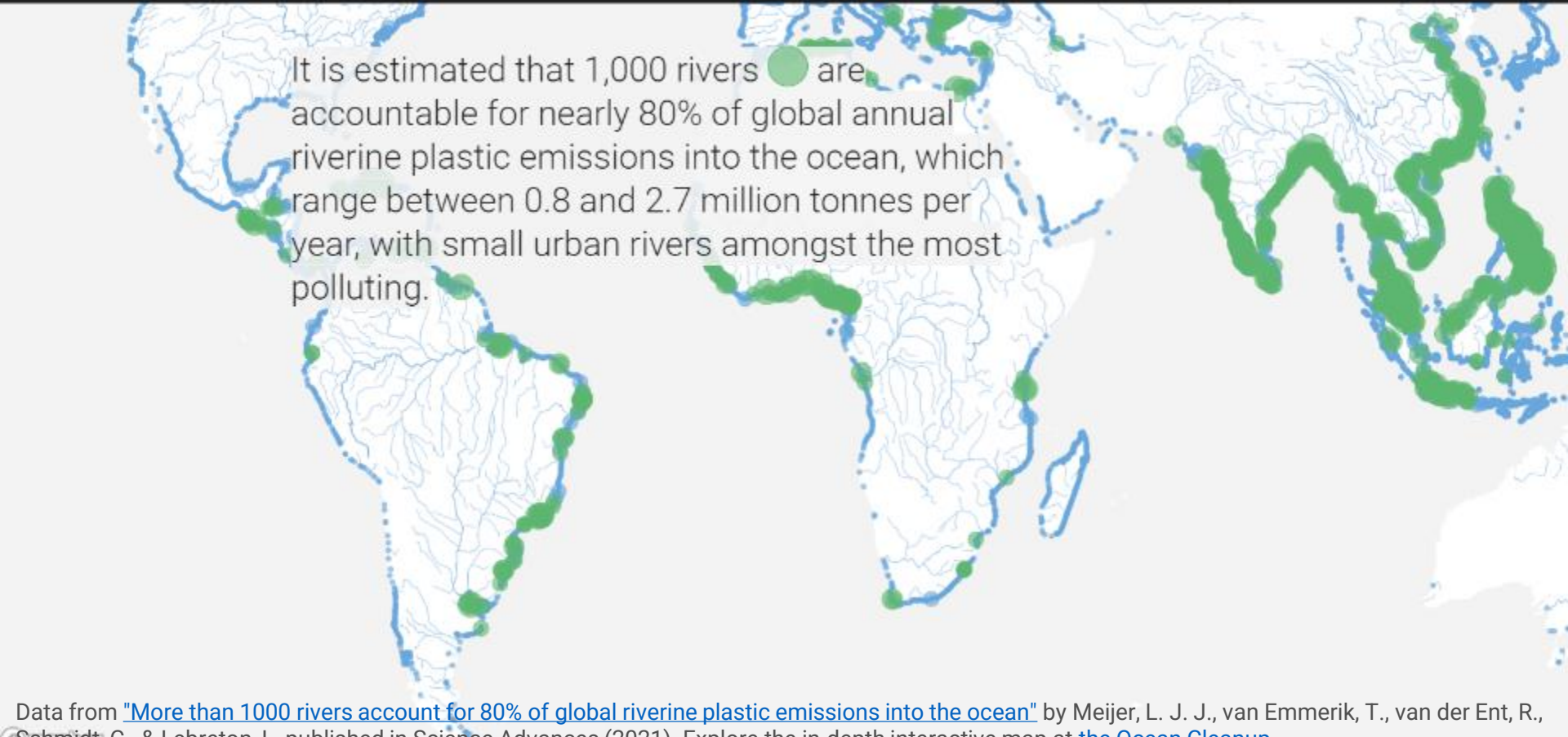
Source: Walker, 2021

The Plastisphere
The Anthropocene

- **Microplastics (particles less than 5 mm) dominant in marine debris**
- Source: coastal waters to mid-ocean gyres
- Marine plastic and the rise in plastic production
- Impacts of plastic on marine ecosystems will likely increase
- **Result: Microplastics (the “Plastisphere”) thrive and can be transported long distances.**
- **Plastic is everywhere…rain, water, air**

Source: Amaral-Zettler, et al. (2015)





Data from "More than 1000 rivers account for 80% of global riverine plastic emissions into the ocean" by Meijer, L. J. J., van Emmerik, T., van der Ent, R., Schmidt, C., & Lebreton, L. published in Science Advances (2021). Explore the in-depth interactive map at the Ocean Cleanup

"Humans inhale about 22,000,000 micro- and nanoplastics annually, and that's because they're in our food, water, and air."

A plastic-free future?

Ultimately, plastic manufacturers and the companies that sell their products are responsible for the high volume of plastic waste in our environments, and significantly reducing that plastic—and the microplastics that come with it—will require bold legislation like global treaties and state laws.

But individual consumers can still make a difference.

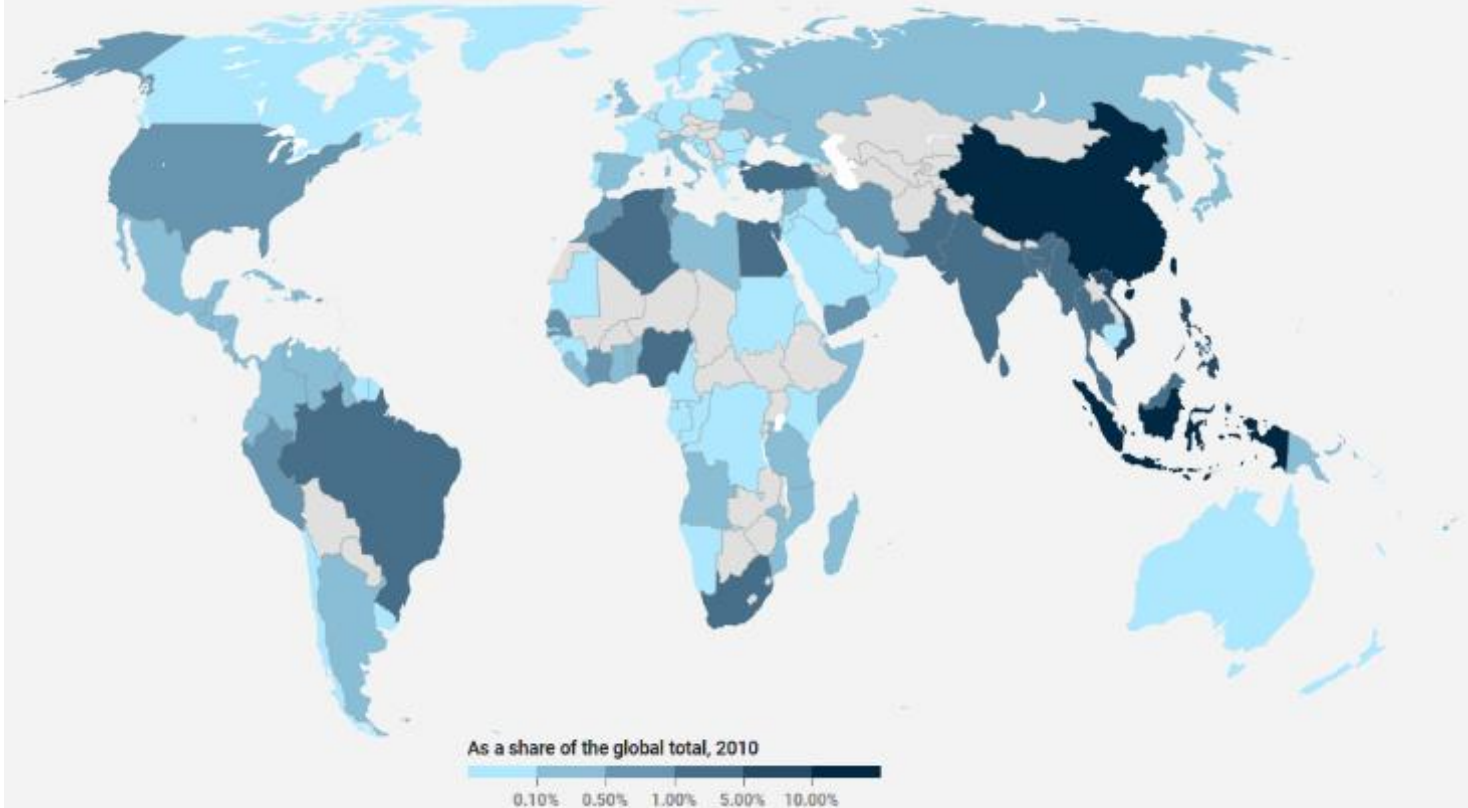
"It's high time we need to be accountable for the plastic that we think we are not responsible for," says Yadav.

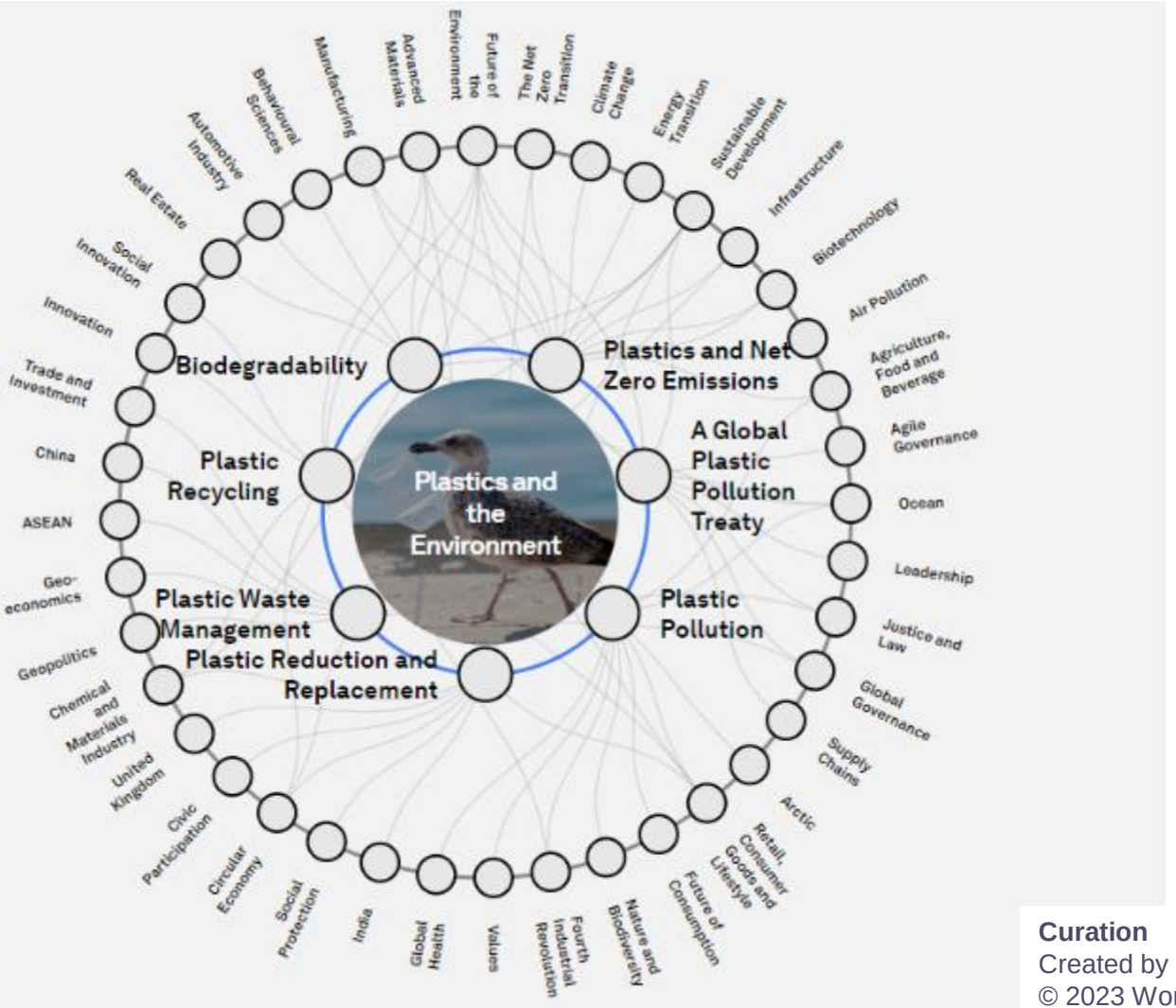
Microplastics are hidden in your home. Here's how to avoid them.
nationalgeographic.com • 4 min read

https://www.nationalgeographic.com/environment/article/how-to-avoid-microplastic-health-home

A high share of the world's marine litter and plastic pollution has its origin in Asia

How much plastic waste is mismanaged | **Where are the hotspots**





Curation
Created by University of Oxford

Complex challenge – we are all responsible

Multilateral government action: UN resolution ‘End plastic pollution”

- Heads of State, Ministers of Environment, and UN representatives endorsed resolution at UNEA-5 2022
- Objective: To End Plastic Pollution and establish an **international legally binding agreement by 2024**
- Resolution focuses on full plastic **lifecycle: production, design, and disposal**
- **Establishes Intergovernmental Negotiating Committee (INC)** with meetings globally 2023/2024 ***(final in Korea)***
- Diverse alternatives to address plastic lifecycle, reusable products, and international collaboration.

Circular Economy Benefits:

- Reduce ocean-bound plastics by over 80% by 2040.
- Decrease virgin plastic production by 55%.
- Save governments $70B by 2040.
- Cut greenhouse gas emissions by 25%.
- Job creation; as many as 700,000 in the EU alone (European Parliament, 2023)

Next steps for Multilateral government action: UN resolution ‘End plastic pollution”

- Negotiation Phase: Drafting the legally binding instrument with member state concerns.
- UNEA-6 from 26 February to 1 March 2024; further progress expected on the resolution.
- Member states support needed for ratification and Implementation
- **Member state enforcement + mechanisms for monitoring and reporting…**

For more info see: https://shorturl.at/qxyN1

Business opportunity for resource circularity

- Of 7 billion tonnes of plastic waste generated globally so far, <10 % recycled
- Each year, 360,000 kT of plastic produced globally
- In 2019, 130 million metric tons of single-use plastic products thrown away
  - 35% were burned,
  - 31% buried in sanitary landfills, and
  - 19% dumped directly on land or into the ocean

Business opportunity for CE Innovation

- By 2050, the entire plastics industry expected to consume 20% of total oil production
- Total is turning its attention to plentiful raw mat erials, such as vegetable oils, starch and sugar cane.
- Mars and Nestlé to develop chemical recycling in France = first chemical recycling plant w/Pla stic Energy. The plant is set to start operations in 2023/2024, with a processing capacity of 15 kT of plastic waste per year.
- Target: plastics deemed non-recyclable that sent for incineration or disposed in landfill

Lanzatech, Total and L'Oréal: the First Cosmetic Plastic Bottle Made from Industrial Carbon Emissions

Priority: CE Innovation in FMCG Packaging clusters

1. LanzaTech captures industrial carbon emissions and converts them into ethanol using a unique biological process.
2. Total, thanks to an innovative dehydration process jointly developed with IFP Axens, converts the ethanol into ethylene before polymerizing it into polyethylene that has the same technical characteristics as its fossil counterpart.
3. L'Oréal uses this polyethylene to produce packaging with the same quality and properties as conventional polyethylene.

What actions are companies along the plastics value chain expected to take by 2025?

	Petrochemical companies	Containers and packaging companies		Fast moving consumer goods companies	Waste management companies	
Raw material	Monomer production	Polymer production	Plastic conversion	Production of plastic products	Use	Collection, sorting and recycling	After-use phase

Make a commitment to collaborate with other stakeholders to increase plastic reuse/recycling/composting rates

Report annually and publicly on progress

Set target to increase use of recycled plastics

Eliminate problematic or unnecessary plastic packaging

Move from single use packaging towards reuse models where relevant

Ensure 100% of plastic packaging is reusable, recyclable, or compostable

Set a post-consumer recycled content target across all plastic packaging used

Set target to grow volume and quality of recycled/ composted plastics; accordingly increase ratio of recycled and composted over landfilled and incinerated plastic waste volumes

PRI Principles for Responsible Investment

Policy tool: Extended Producer Responsibility (EPR)

APPLYING THE POLLUTER PAYS PRINCIPLE TO ENSURE MARKET TRANSFORMATIONS FOR A CIRCULAR ECONOMY

Legal frameworks provide strong command and control signals to transform markets when well designed and implemented. The Extended Producer Responsibility (EPR) is a regulatory tool targeting the private sector and requiring manufacturers to finance recycling costs or the safe disposal of products in the end-of-life stage. The tool has been applied through legal frameworks to reduce negative externalities from e-waste, plastic products and others. EPR may be viewed as an application of the polluter pays principle extending the manufacturers' responsibility, which can incentivise more circular practices under the 4R framework to capture resources for reuse[10]. EPR laws should be designed in consultation with manufacturers to ensure incentives for producers to design products that are easy to recycle.

An increasing number of countries are adopting EPR laws at national and local level levels. Between 1991 and 2011, US states enacted more than 70 EPR laws[11]. In Sweden, EPR is both a policy and law supported by a 1994 European Union Directive for a more circular waste system. However, the driving force for the policy in Sweden has been mostly economic because recycling resources are more profitable than making new products from virgin

Source: UN DESA, 2023
https://www.un.org/sites/un2.un.org/files/circular_economy_14_march.pdf

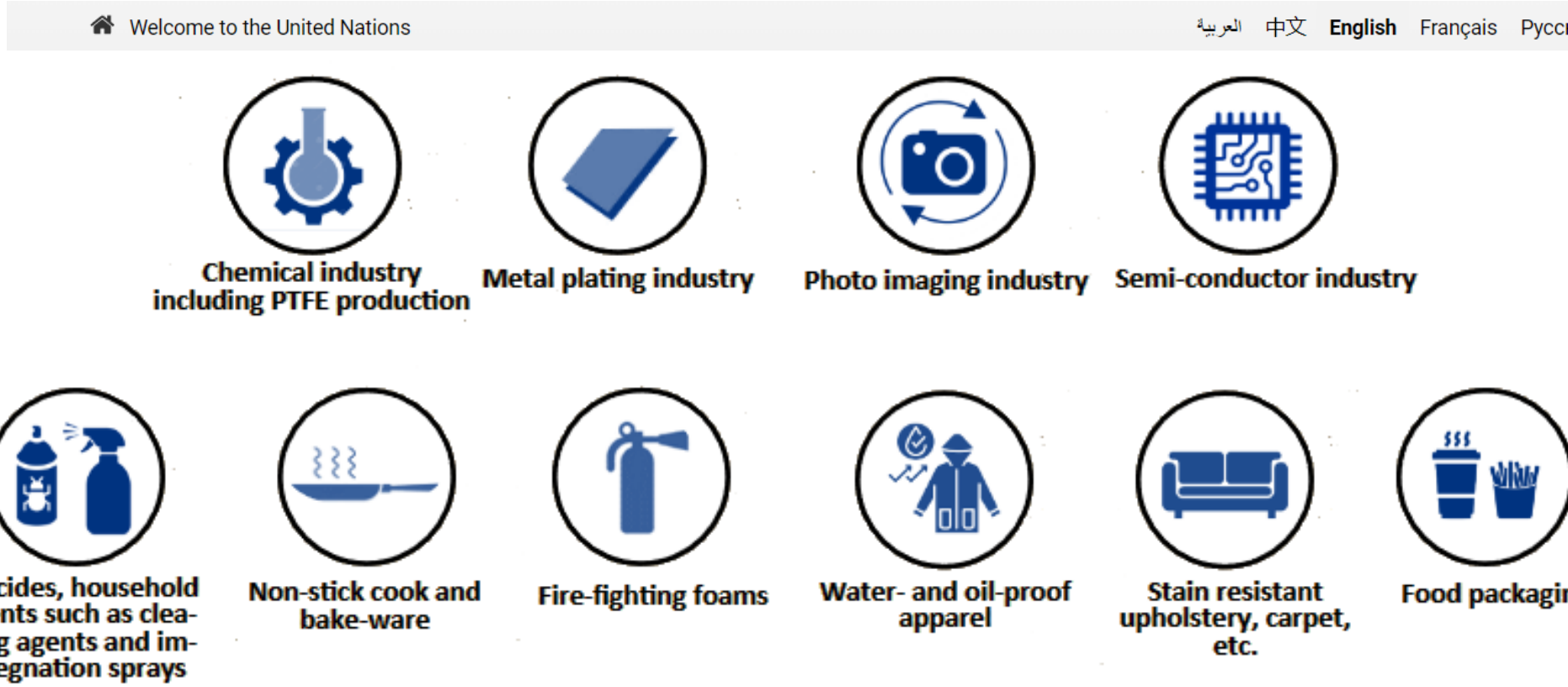
Policy innovations
Behavioral science Solutions

- **Change the default or Choice edit**
- Target the choice architecture
- Humans are complex – difficult to change
- Bangladesh: early adopter of the plastic bag ban policy in 2002 after experiencing severe flooding due to plastic bag-clogged drainage systems. Ban led to a noticeable reduction in plastic waste and improved water drainage.
- European Union: Implemented a ban on certain single-use plastic products, including plastic cutlery, straws, and cotton buds, in July 2021. Regulation aims to reduce marine litter and promote the use of more sustainable alternatives

Policy innovations
Behavioral science Solutions

Steps for planning green growth behavioural interventions

Policy Gap – Forever chemicals from plastic



According to the World Health Organization (WHO), in 2019, a small number of chemicals for which data are available were **estimated**

Policy Gap – US Case
Regulating plastic impact on human health and environment: Forever Chemicals, PFAS, PFOA, Phthalates, etc.

EPA investigation – finding that fluorination of plastic is commonly used to treat hundreds of millions of polyethylene and polypropylene containers (e.g. packaged food and consumer products – HDPE)

The process of polyethylene fluorination was approved by the Food and Drug Administration (FDA) in 1983 for food packaging to reduce oxygen and moisture migration through the plastic that would cause foods to spoil

The fluorination process forms barrier on plastic surface for strong packaging

PFAS - family of thousands of highly persistent synthetic chemicals used wi dely in industrial processing and consumer products (stain-resistant, water proof)

Fluorination of plastic leads to the inadvertent creation of PFAS - reason these ‘forever chemicals’ pollute unexpected places like **freshwater sources**

PFAS

North Carolina residents urge UN to investigate toxic PFAS pollution

Chemical manufacturer Chemours accused of violating human rights by releasing 'forever chemicals' into Cape Fear River basin

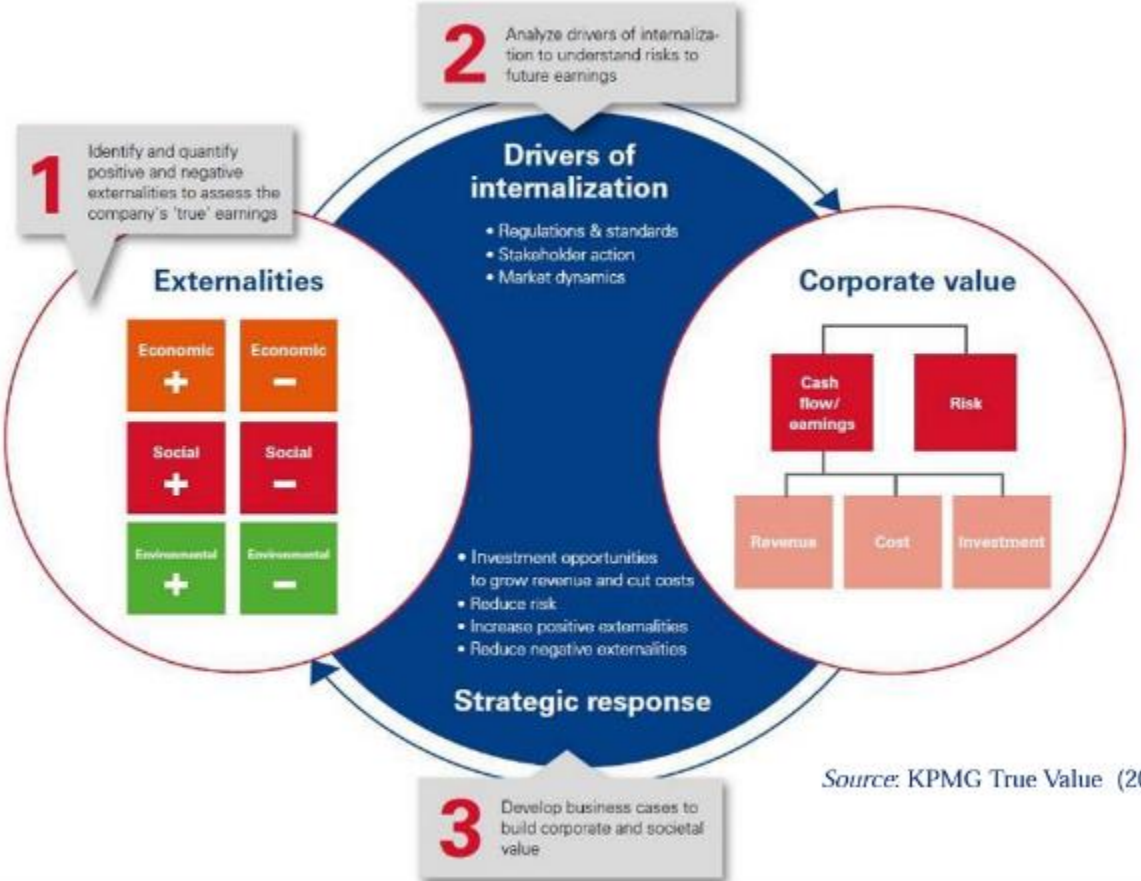
Tom Perkins

Fri 28 Apr 2023 10.00 BST

"The pervasive toxification of human bodies and the ecosystem of the lower Cape Fear River watershed with PFAS that persist essentially forever lends particular urgency to controlling these toxics at their source," the complaint states.

Policy Gap - Full cost accounting + Polluter Pays Principle

+/- Externalities for Full cost accounting = full cost pricing

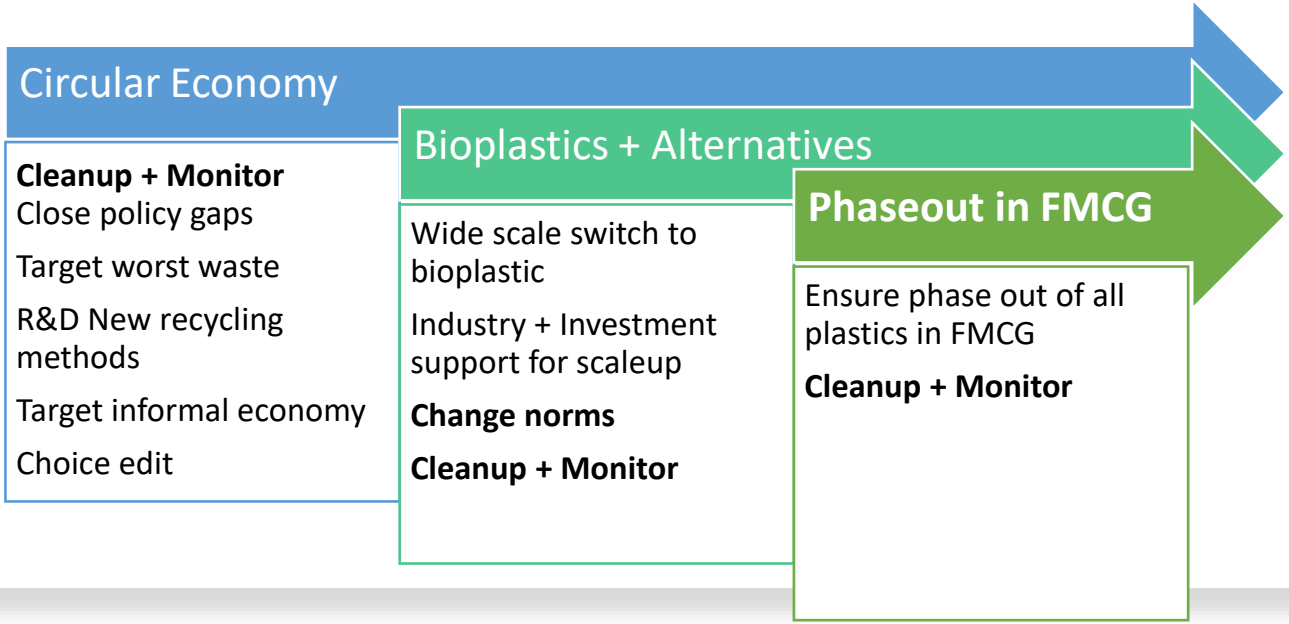


Source: KPMG True Value (2014)

So can we really close the loop with plastics?

- Not likely with full externalities and **INTER GENERATIONAL IMPACT**
- Unknown unknowns – **R&D** + global to local awareness of **full externalities** needed
- **Informal sector**
- **Lax rules and regulation in developing countries**
- Same old challenge of **enforcement**
- Need switch to other materials – **race to innovate**

Short to Long term Solutions



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