

Workshop “From science to action, for the implementation of the BRS conventions and guidance on the environmentally sound management of industrial chemicals



# Key Considerations for Strengthening the Science–Policy Interface on Chemicals, Waste, and Pollution Prevention

12 April 2023

Zhanyun Wang

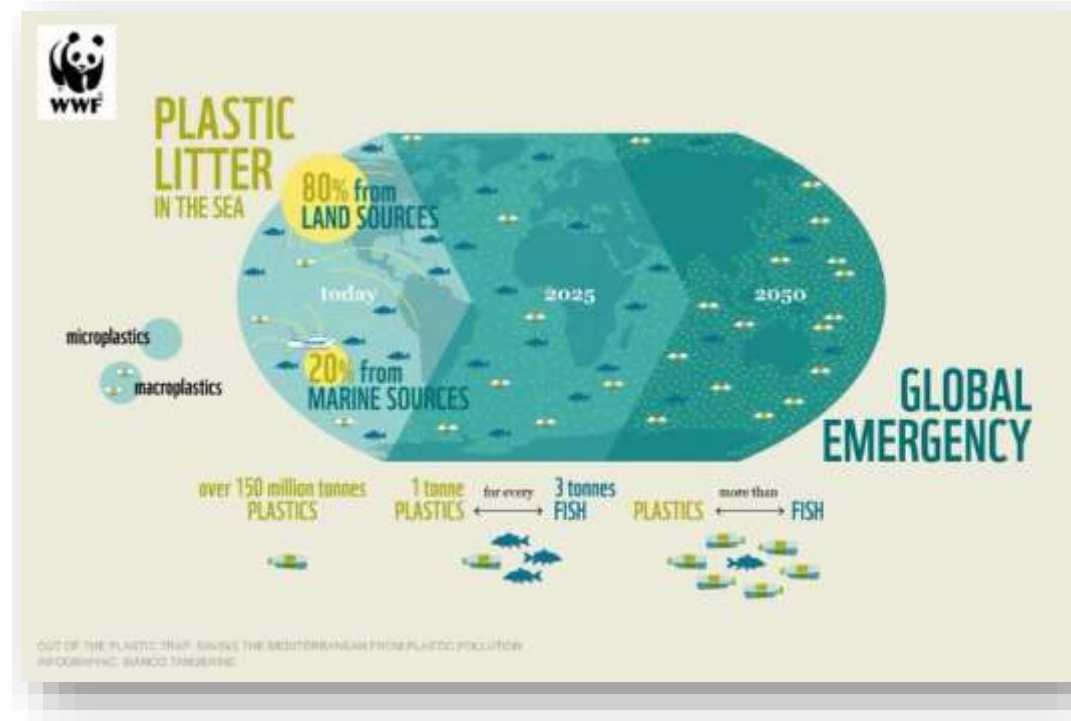




# The Global Threat of Chemical Pollution

## Per year

- ❑ Nearly **1 million** premature death by lead exposure
- ❑ **385 million** cases of unintentional, acute pesticide poisoning and **11,000 fatalities**
- ❑ **>150 billion Euro** societal costs associated with exposure to EDCs and few PFASs in the EU
- ❑ **>100 billion USD** societal costs associated with plastic pollution



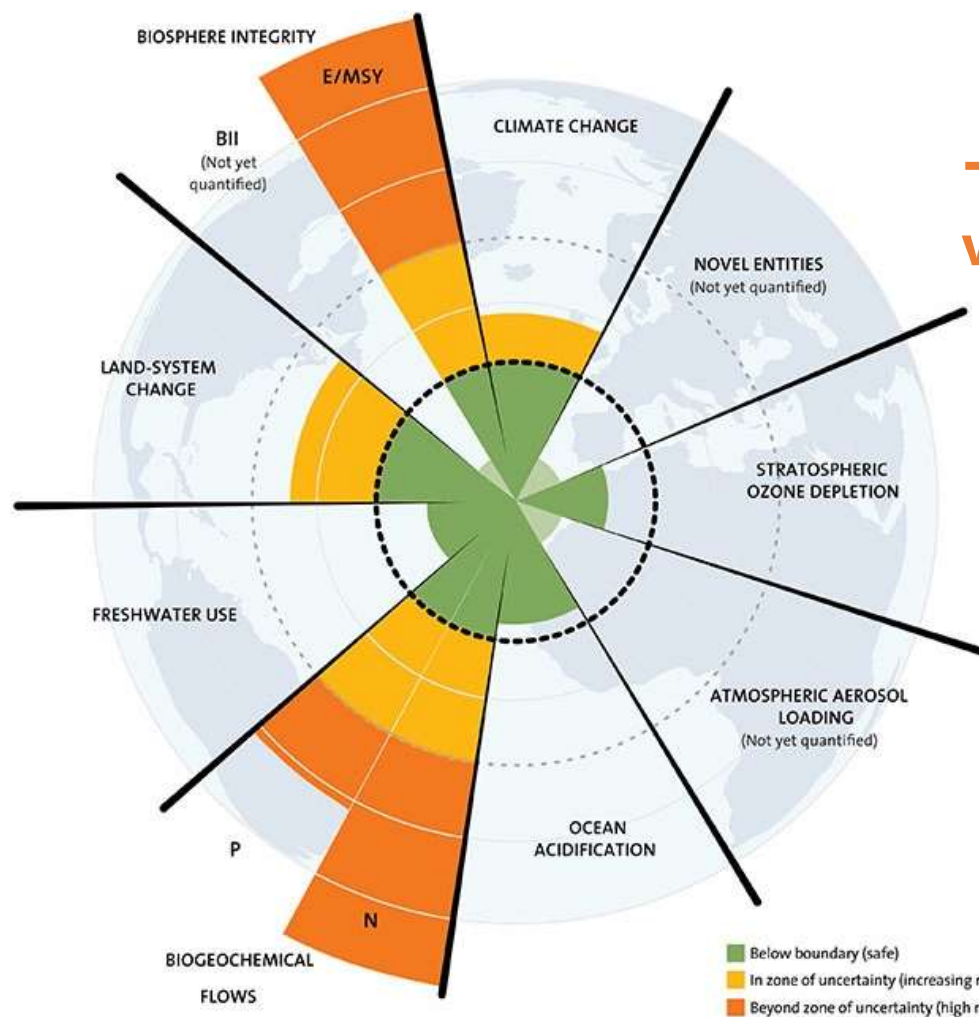
Sources: <https://www.thelancet.com/gbd/summaries>; Boedeker et al. (2020) *BMC Public Health*; Trasande et al. (2015) *JCEM*; Cordner et al. (2021) *ES&T*; <https://www.minderoo.org/no-plastic-waste/reports/the-price-of-plastic-pollution/>





# The Planetary-Boundary Framework

**Planetary boundaries**  
= within which  
humanity can  
continue to develop  
and thrive for  
generations to come.



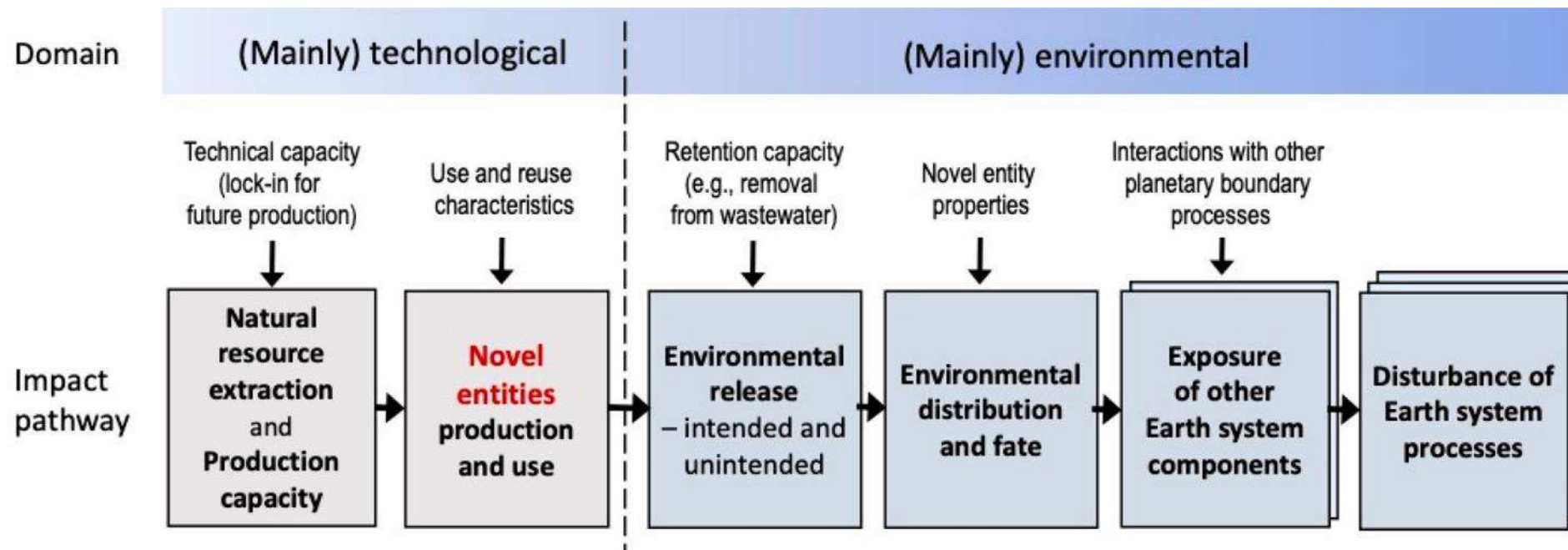
→ Where are we standing with the chemical pollution?

Steffen et al. (2015)





# The Impact Pathway of Chemicals

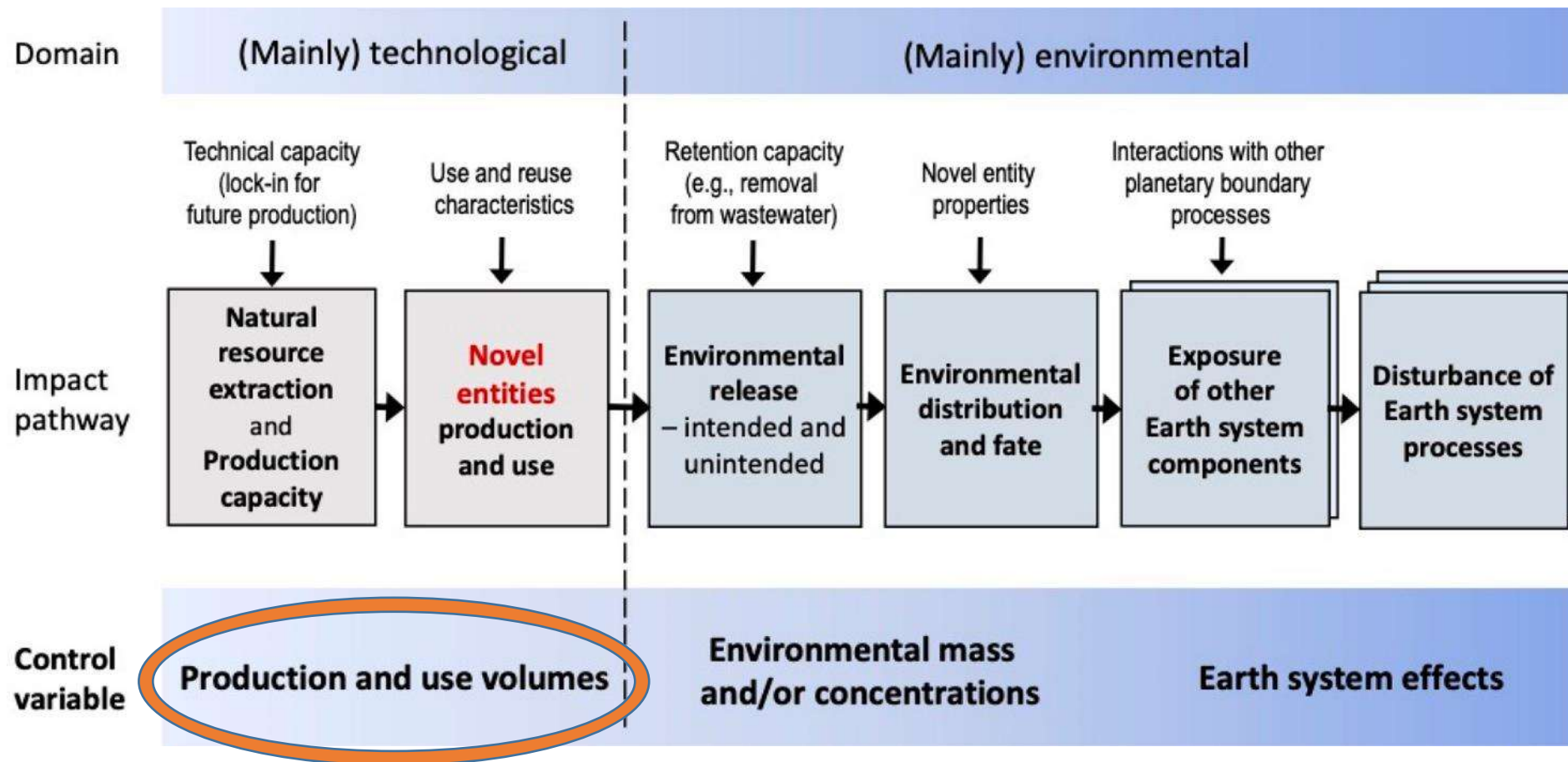


Persson et al.  
ES&T, 56(3),  
1510-1521





# The Impact Pathway of Chemicals

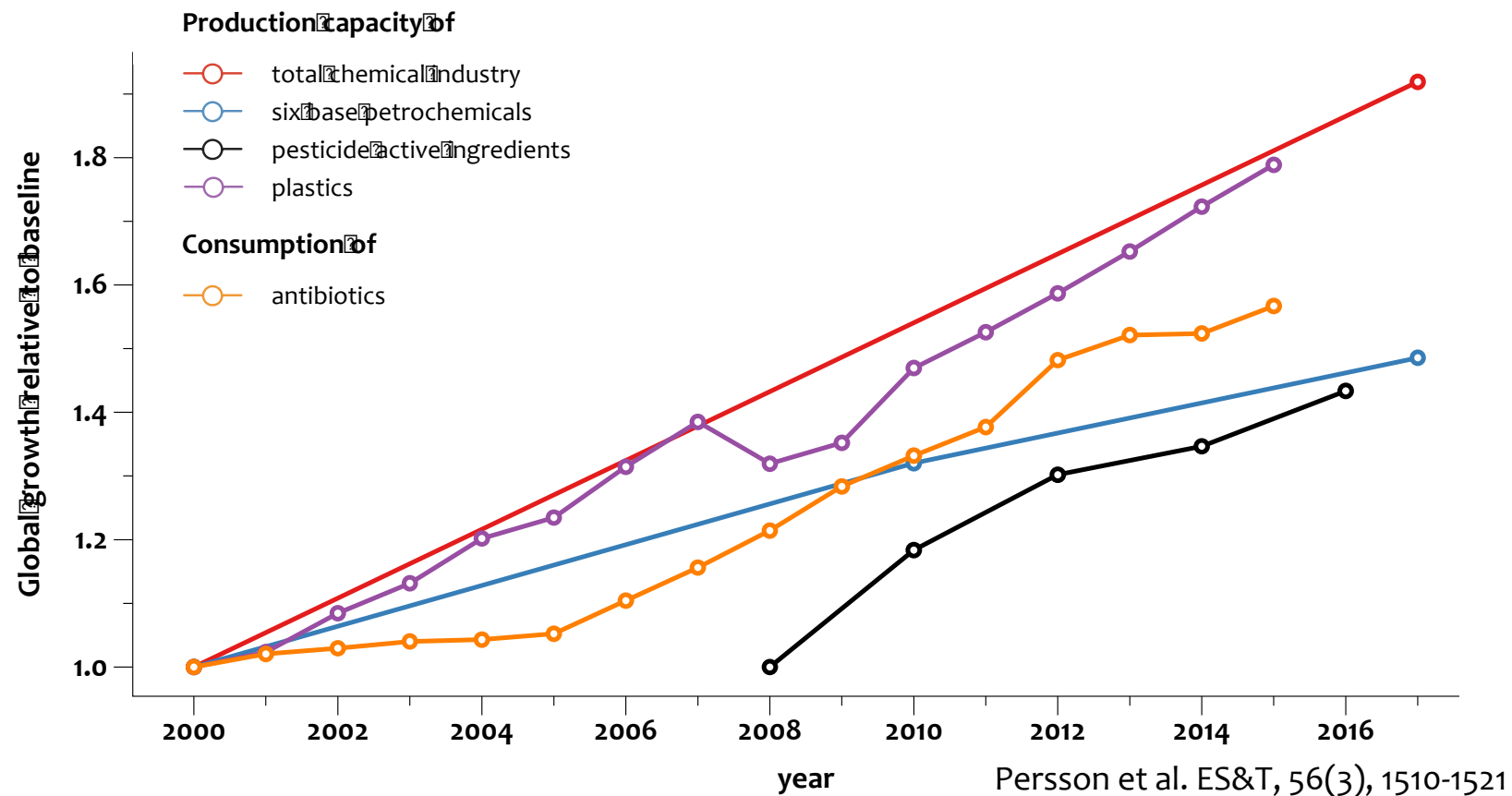


Persson et al.  
ES&T, 56(3),  
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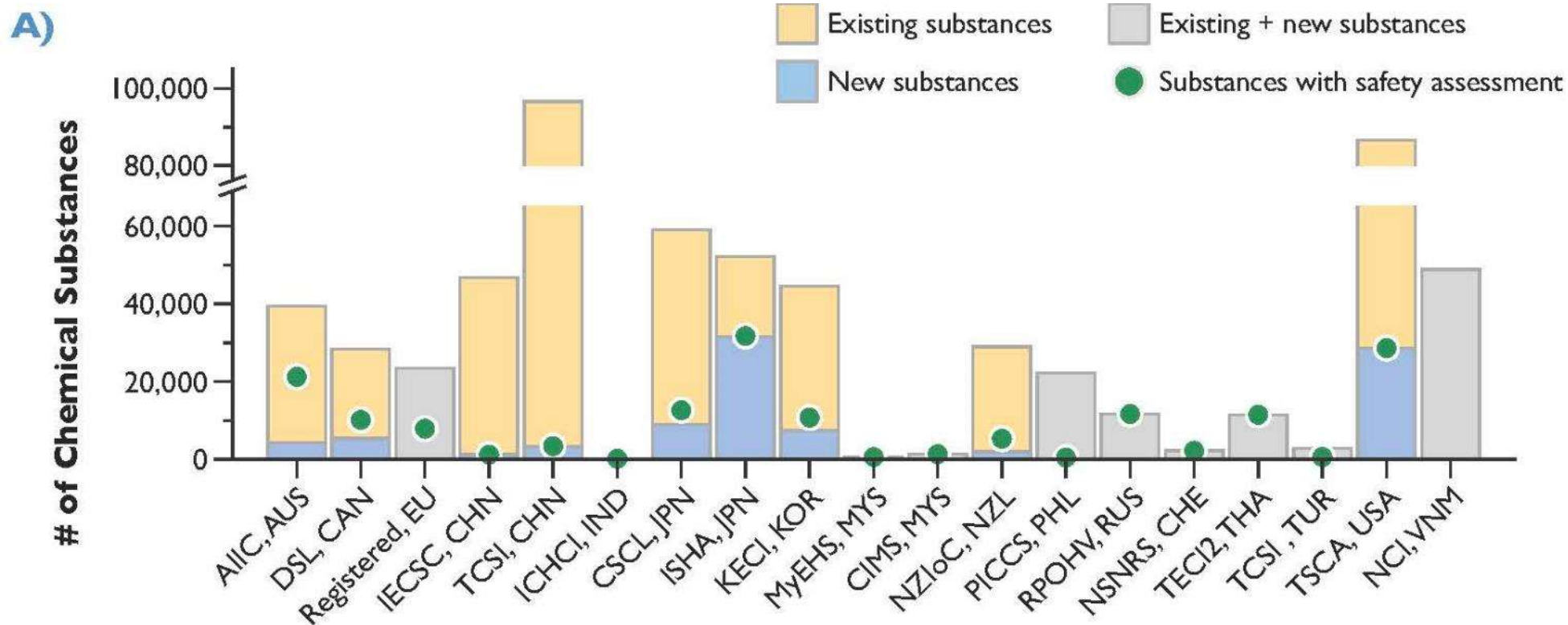


# Ever-Growing Production of Chemicals



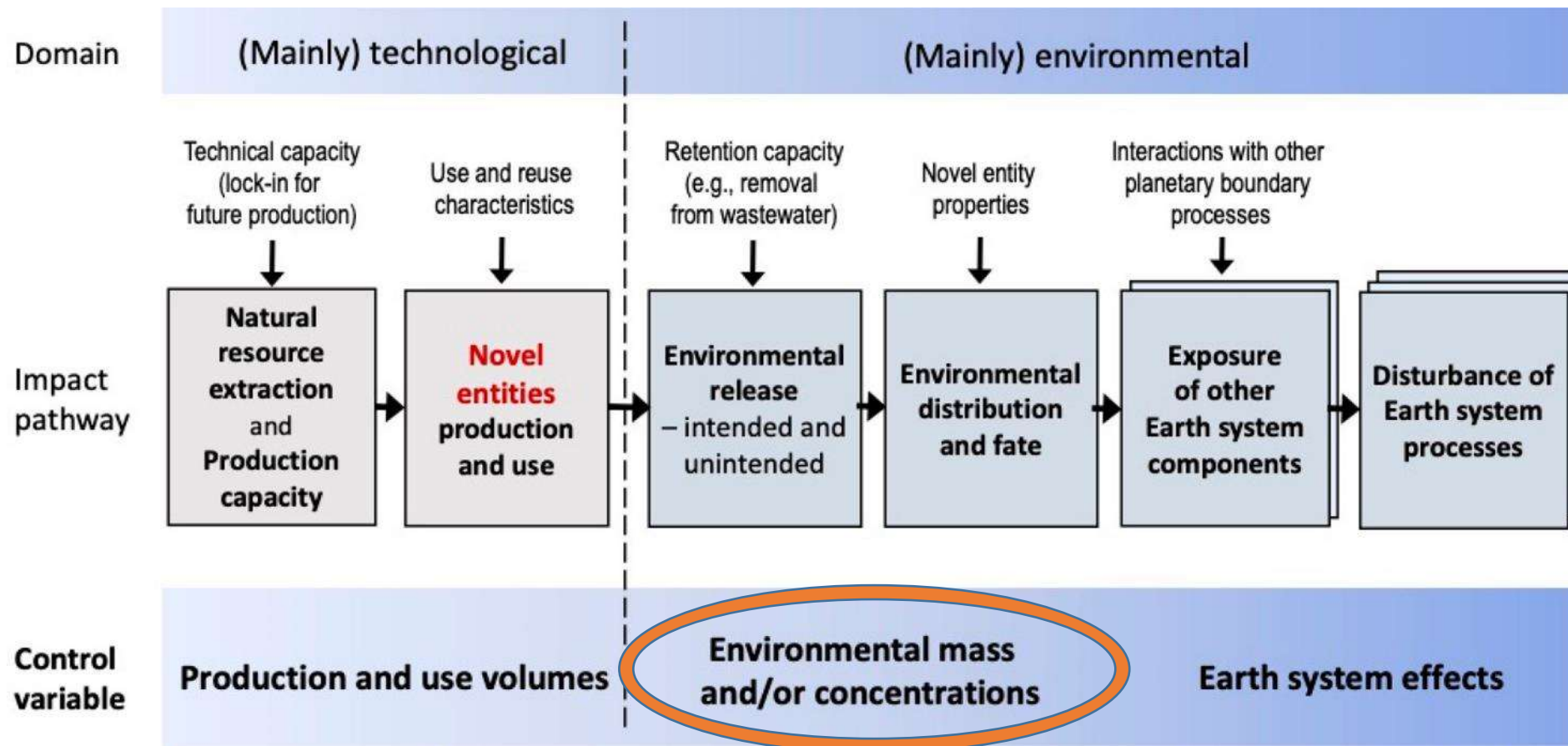


# Limited Assessments of Chemicals





# The Impact Pathway of Chemicals



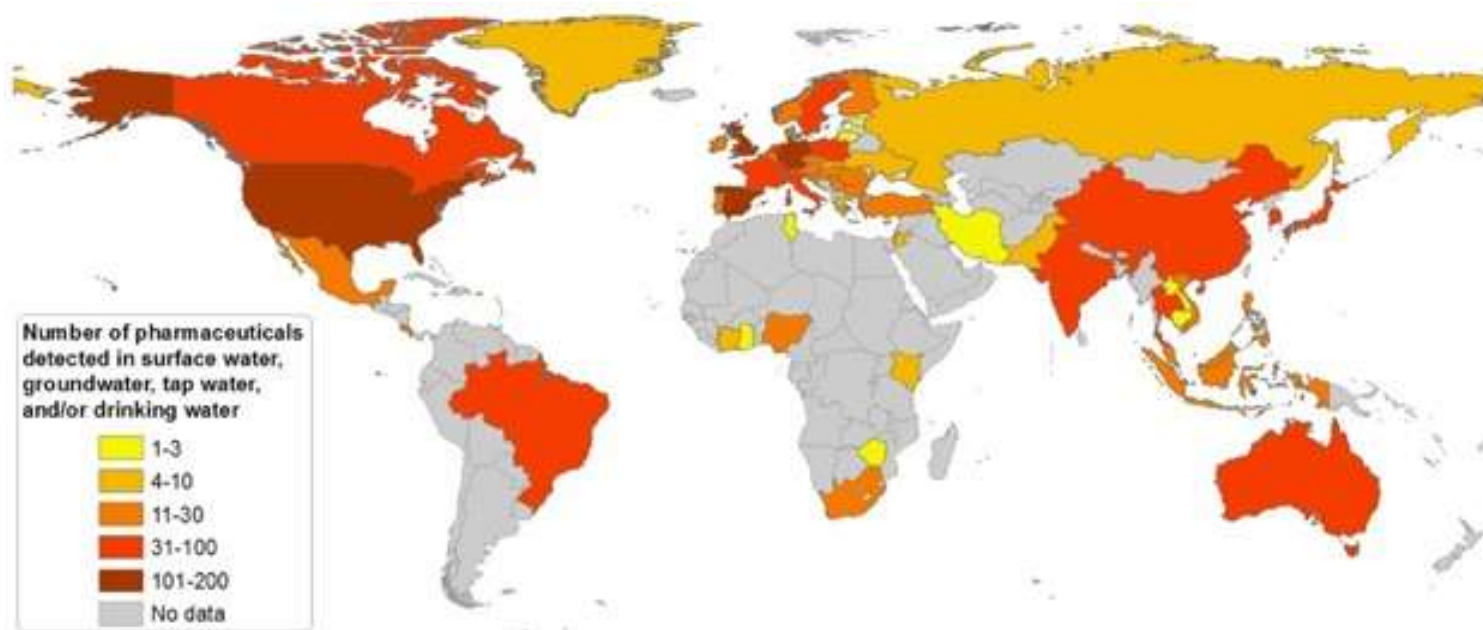
Persson et al.  
ES&T, 56(3),  
1510-1521



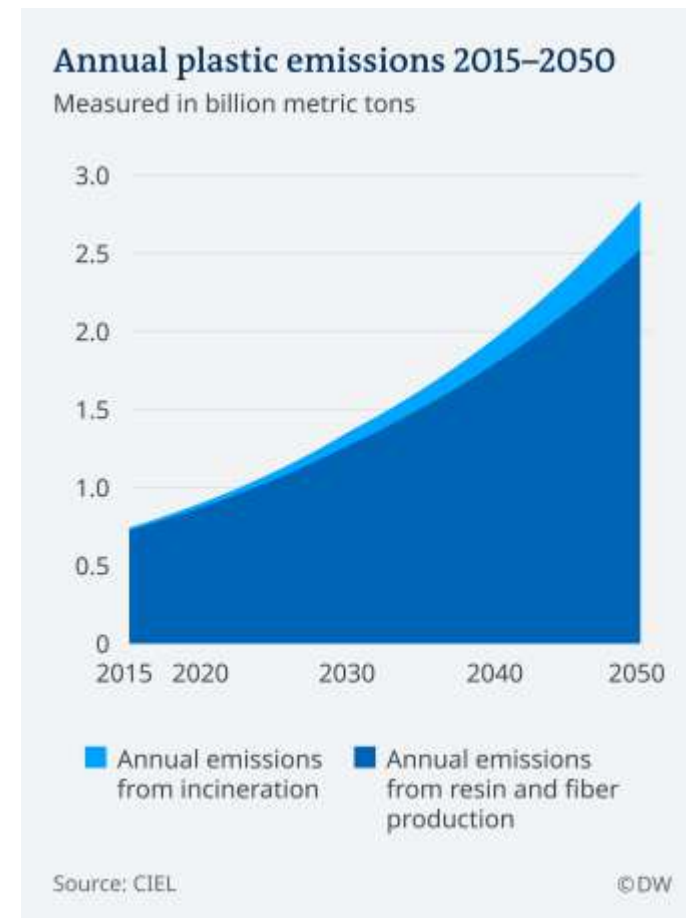




# Ever-Growing Emissions of Chemicals

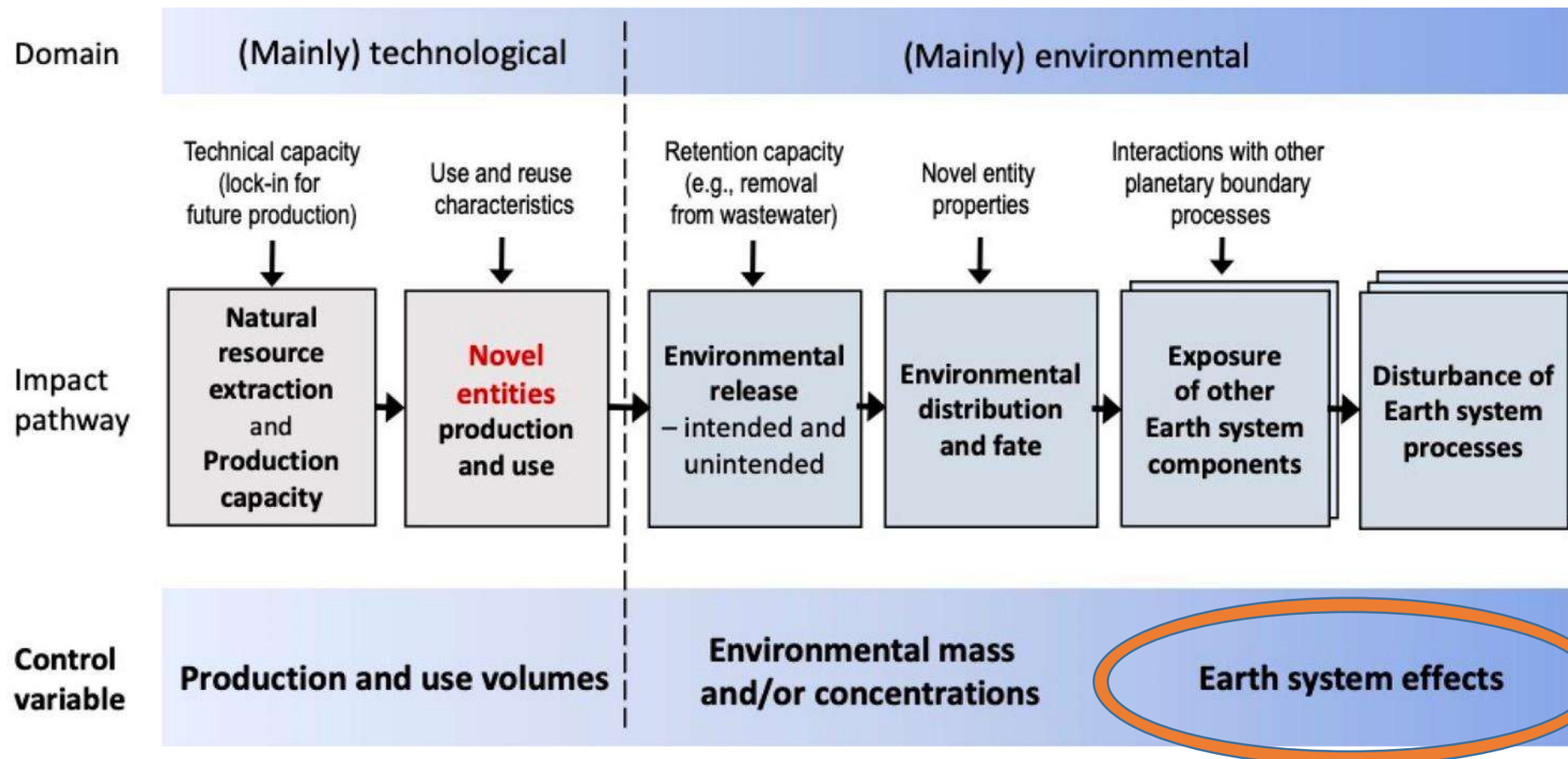


Aus der Beek et al. (2015) ET&C





# The Impact Pathway of Chemicals

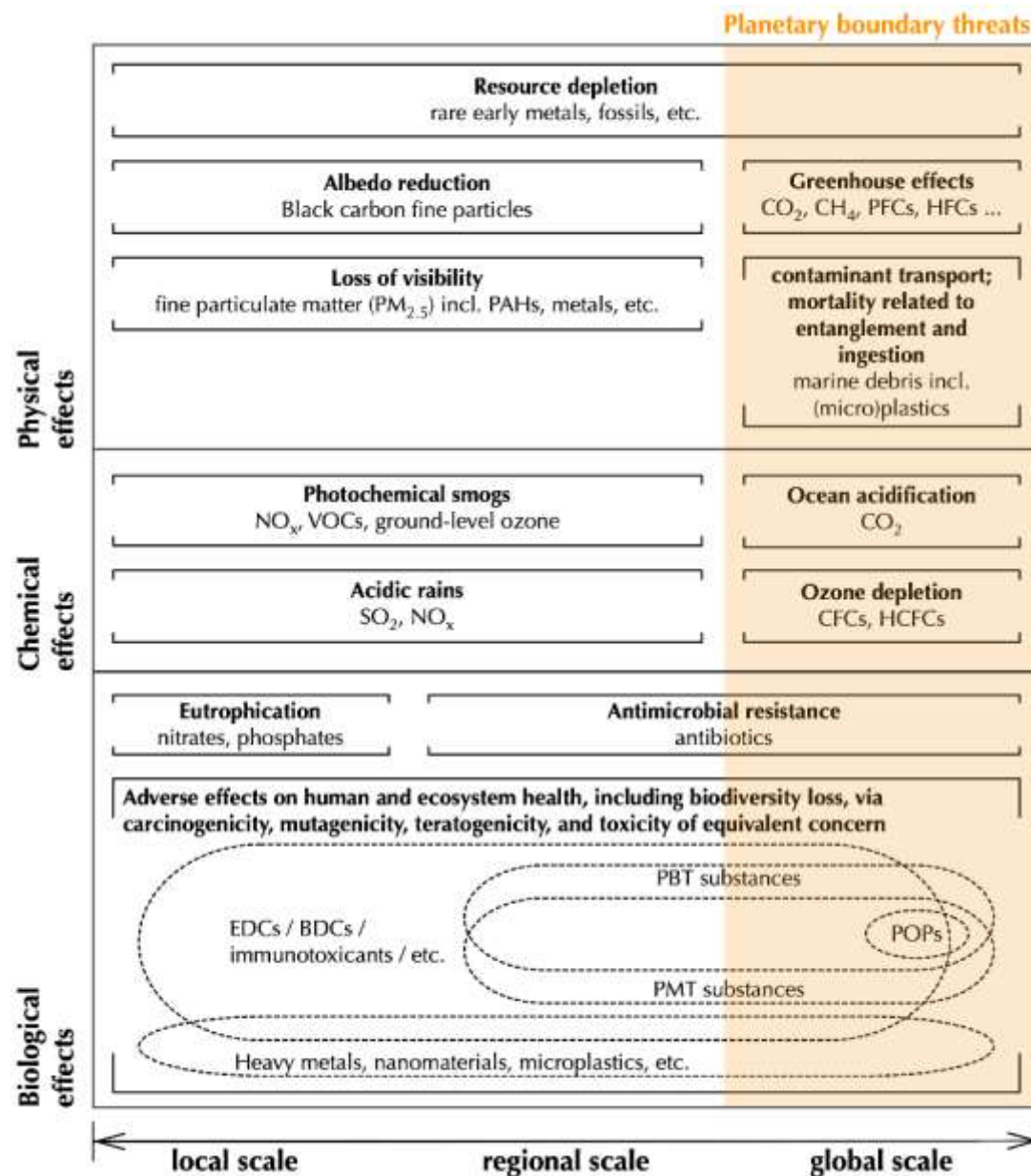


Persson et al.  
ES&T, 56(3),  
1510-1521





# Multifaceted Effects of Chemicals





# Outside the Planetary Boundary for Chemicals

**While many data gaps persist, we are facing**

- ❑ Ever-growing numbers and production of chemicals
- ❑ Limited assessments of chemicals on the market
- ❑ Ever-growing releases of chemicals, both in terms of diversity and quantities
- ❑ Multi-faceted effects of chemicals

**→ The increasing rate of production and releases of larger volumes and higher numbers of anthropogenic chemicals with diverse risk potentials exceed societies' ability to conduct safety-related assessments and monitoring.**





# Time to Act is Now!

**United Nations Environment Assembly of the  
United Nations Environment Programme  
Fifth session**  
Nairobi (hybrid), 22 and 23 February 2021  
and 28 February–2 March 2022

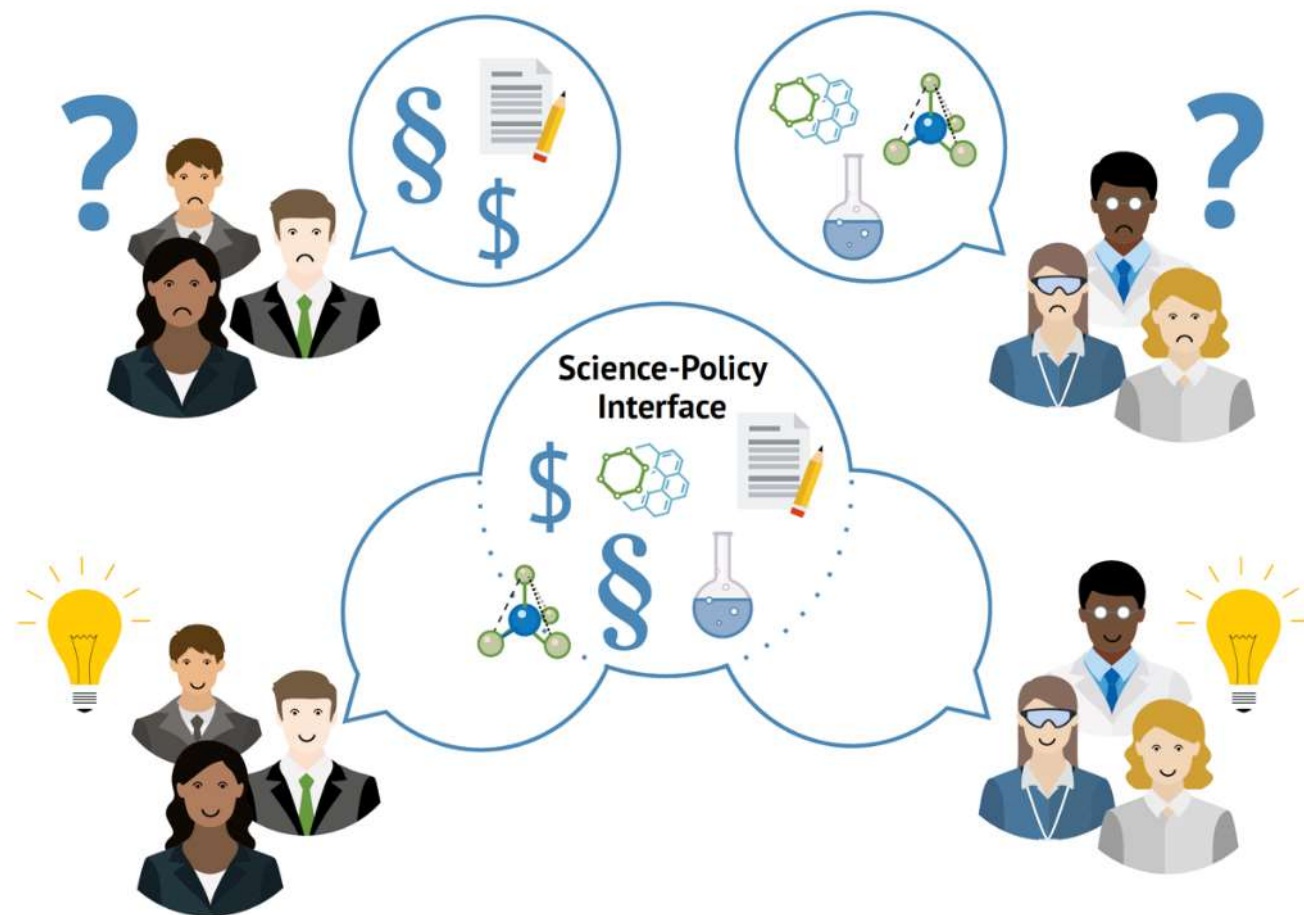
## **Resolution adopted by the United Nations Environment Assembly on 2 March 2022**

**5/14. End plastic pollution: towards an international legally binding instrument**

**5/8. Science-policy panel to contribute further to the sound management of  
chemicals and waste and to prevent pollution**



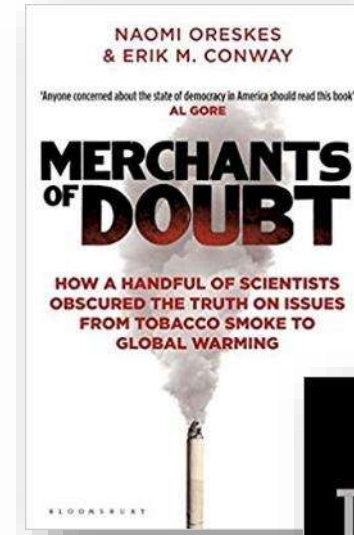
# The Importance of Science–Policy Interface





# Merchants of Doubt

- However, it is increasingly observed that a loose-knit group of high-level scientists, with extensive political connections, ran effective campaigns to mislead the public and deny well-established scientific knowledge over four decades.



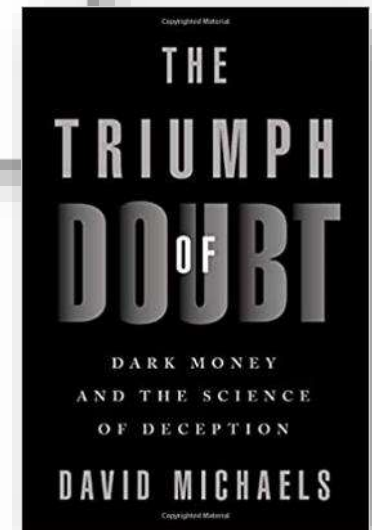
Movie available



Originally claimed “a coalition of fire professionals, educators, burn centers, doctors, fire departments and industry leaders, united to ensure that our country is protected by the highest standards of fire safety.”

**Founded by Albemarle Corporation, Chemtura Corporation, ICL Industrial Products (major producers of PBDEs)**

<http://media.apps.chicagotribune.com/flames/index.html>





# Merchants of Doubt

1. Welcomes<sup>10</sup> the report by the United Nations Environment Programme and the World Health Organization entitled “State of the Science of Endocrine Disrupting Chemicals – 2012”, which


<sup>10</sup> The International Council of Chemical Associations, CropLife International and the United States Council for International Business wish to note that the methodology and conclusions of the report remain contentious among certain scientific groups.



SAICM/ICCM.4/15\*

Distr.: General  
28 October 2015

Original: English

 Strategic Approach  
to International  
Chemicals Management

International Conference on Chemicals Management  
Fourth session  
Geneva, 28 September–2 October 2015

**Report of the International Conference on Chemicals  
Management on the work of its fourth session**







# Key Questions to be Answered

1. What are the **desired objectives and functions** of a strong, two-way science–policy interface on chemicals, waste and pollution prevention?
2. How and to what extent are these objectives and functions fulfilled by existing interface bodies/processes? Based on this, what are the **major gaps**?
3. Which **key elements** of the new global science–policy panel are needed?





# Recent Initiatives to Answer These Questions

**MULTI-STAKEHOLDER WORKSHOP ON STRENGTHENING THE SCIENCE-POLICY INTERFACE IN INTERNATIONAL CHEMICALS GOVERNANCE: SUMMARY**

December 2018

**STRENGTHENING THE SCIENCE-POLICY INTERFACE IN INTERNATIONAL CHEMICALS GOVERNANCE: A Mapping and Gap Analysis**

February 2019

**INSIGHTS**

**POLICY FORUM**

**ENVIRONMENTAL SCIENCE**

**We need a global science-policy body on chemicals and waste**

Major gaps in current efforts limit policy responses

By Zhanyun Wang<sup>1</sup>, Rolf Altenburger<sup>2,3</sup>, Thomas Bachhaus<sup>4</sup>, Adrian Covaci<sup>5</sup>, Miriam L. Diamond<sup>6</sup>, Juan O. Grimalt<sup>7</sup>, Rainer Lohmann<sup>8</sup>, Andreas Schäffer<sup>9</sup>, Martin Scheringer<sup>10,11</sup>, Henrik Selten<sup>12</sup>, Anna Sobel<sup>13</sup>, Noriyuki Suzuki<sup>14</sup>

**M**any countries and regional political unions have regulatory and policy frameworks for managing chemicals and waste associated with human activities to minimize harms to human health and the environment. These frameworks are complemented and expanded by joint international action, particularly related to pollutants that undergo long-range transport via air, water, and

**M**ore, move across national borders through international trade of resources, products, and waste; or are present in many countries (1). Some progress has been made, but the Global Chemicals Outlook (GCO-1) from the United Nations Environment Programme (UNEP) (2) has called for "strengthen[ing] the science-policy interface and the use of science in monitoring progress, priority-setting, and policy-making throughout the life cycle of chemicals and waste." With the UN Environment Assembly (UNEA) soon meeting to discuss how to strengthen the science-policy interface on chemicals and waste (3), we analyse the landscape and outline recommendations for establishing an overarching body on chemicals and waste.

The world has seen a tremendous increase in the amount and variety of chemicals in use, with continuous growth expected; global chemical sales reached over US\$5.6 trillion in 2017 and are projected to almost double by 2030 (2). Similar trends are also true for waste generation; for example, global plastic waste entering the ocean is estimated to increase from 4.8 to 12.7 million tonnes in 2010 to some 100 to 250 million tonnes by 2025 (3).

When chemicals and waste are poorly managed, not only are valuable resources lost, but chemical pollution can cause a wide range of adverse effects on human and ecosystem health at local, regional, and global levels. The latest Global Burden of Disease study estimated that exposure to lead and occupational exposure to 12 chemicals or groups of chemicals (a tiny fraction of the more than 100,000 chemicals in use) contributed to over 1.3 million premature human deaths in 2017 (3). Chemical pollution has also caused stratospheric ozone depletion, and it plays an important role in climate change (e.g., synthetic halogenated gases contributed over 10% of the global radiative forcing in 2011) (4) and ecosystem

PHOTO: SHUTTERSTOCK/OLIVIERO TOSCANI



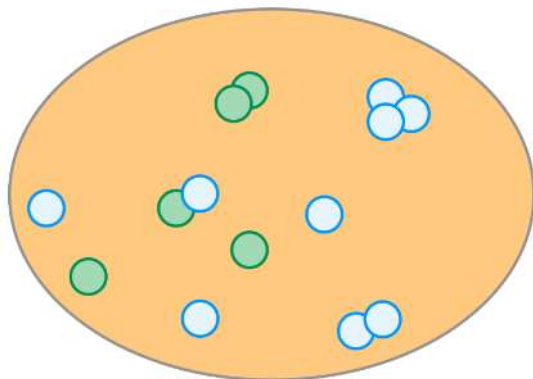


# Current Gaps in the Science–Policy Interface

## (A) CURRENT GAPS

### 1. A lack of coverage

comprehensively + partially covered vs. NOT covered



the chemicals and waste universe

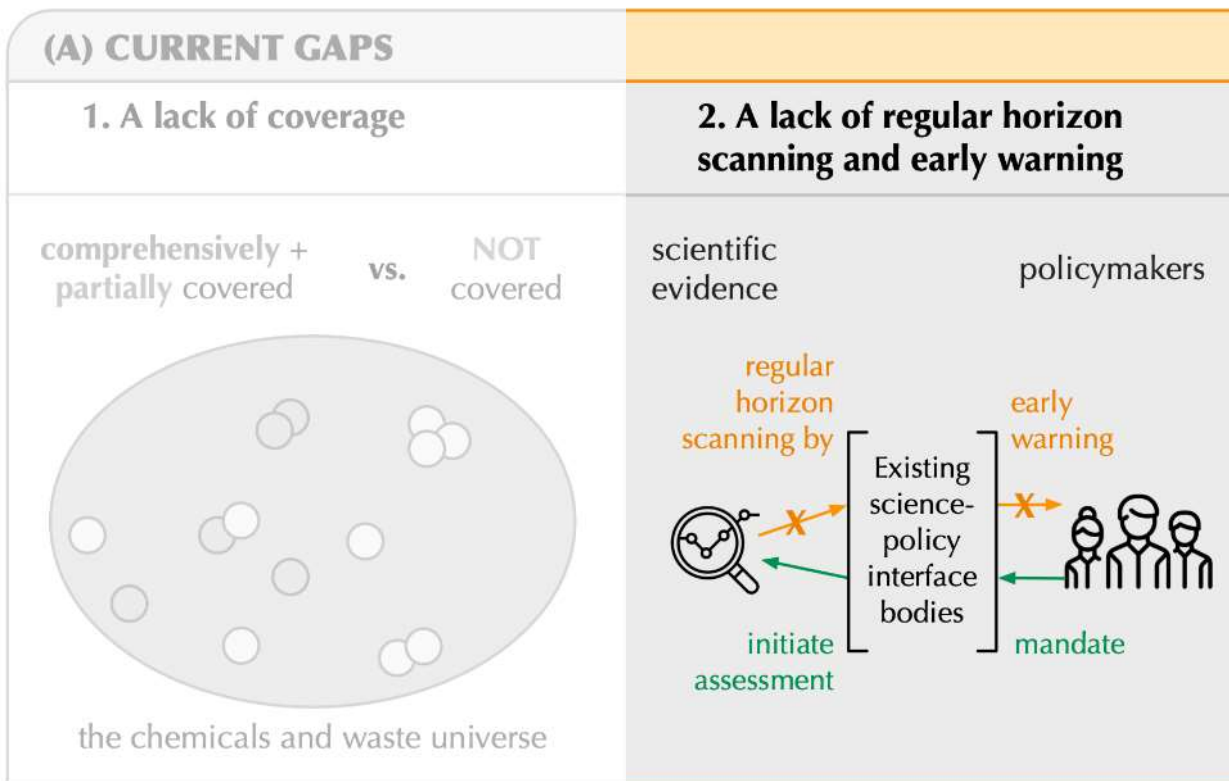


<https://www.science.org/doi/10.1126/science.abeg090>





# Current Gaps in the Science–Policy Interface

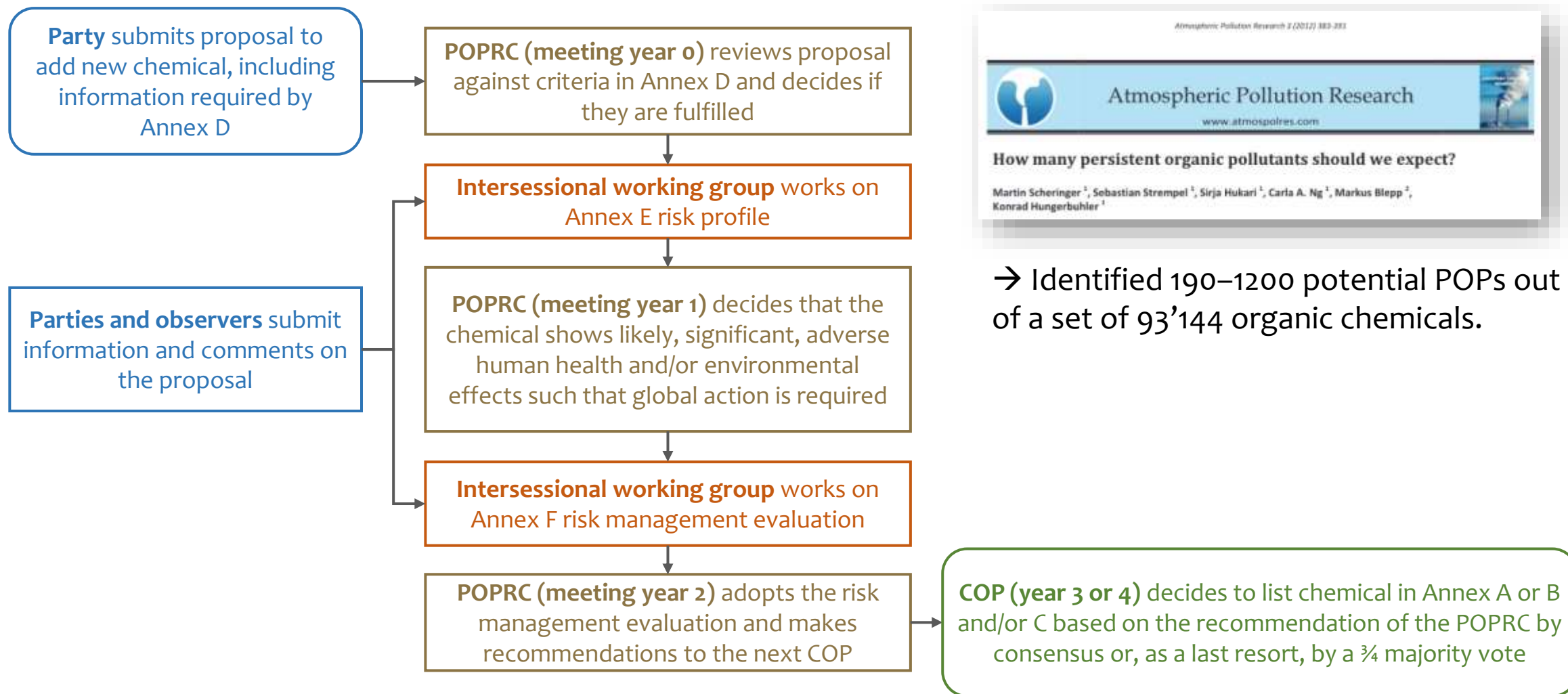


<https://www.science.org/doi/10.1126/science.abeg090>





# Current Gaps in the Science–Policy Interface



→ Identified 190–1200 potential POPs out of a set of 93'144 organic chemicals.



# Current Gaps in the Science–Policy Interface

<b>(A) CURRENT GAPS</b>		
<b>1. A lack of coverage</b>	<b>2. A lack of regular horizon scanning and early warning</b>	<b>3. A lack of bi-directional communication</b>
<p>comprehensively + partially covered <b>vs.</b> NOT covered</p> <p>the chemicals and waste universe</p>	<p>scientific evidence      policymakers</p>	<p>scientists      policymakers</p> <p>→ information flow</p>



# Current Gaps in the Science–Policy Interface

<b>(A) CURRENT GAPS</b>			
<b>1. A lack of coverage</b>	<b>2. A lack of regular horizon scanning and early warning</b>	<b>3. A lack of bi-directional communication</b>	<b>4. A lack of engagement of the wide scientific community</b>
<p>comprehensively + partially covered <b>vs.</b> NOT covered</p> <p>the chemicals and waste universe</p>	<p>scientific evidence <b>vs.</b> policymakers</p>	<p>scientists <b>vs.</b> policymakers</p> <p>→ information flow</p>	<p><b>engaged scientists</b> <b>vs.</b> <b>NOT engaged</b></p>

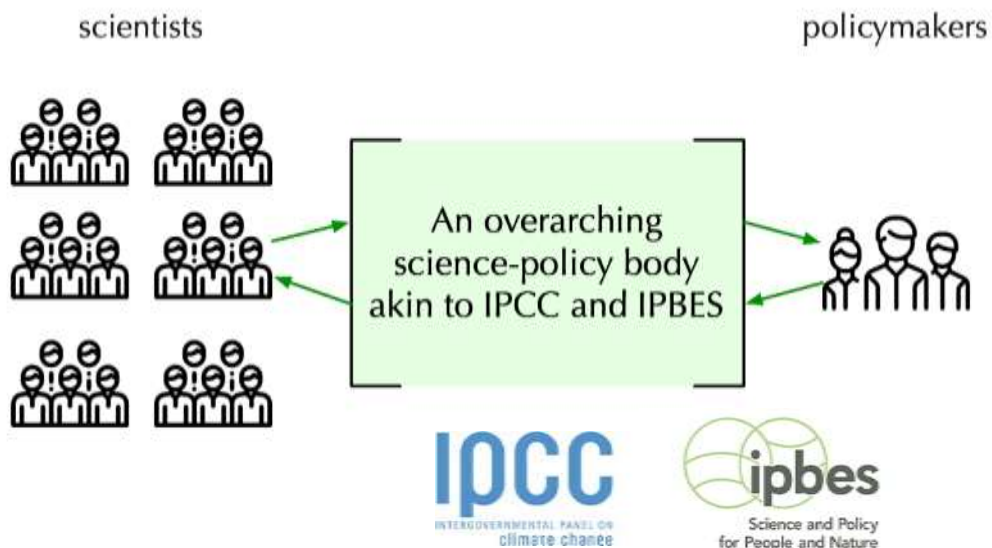
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# Key Elements for the New Science–Policy Panel

## (B) OUR VISION



### Core characteristics

- ✓ **Broad scope**  
with a focus on chemical pollution
- ✓ **Comprehensive functions**
  - Horizon scanning and early warning\*
  - Scientific assessment of any given issues\*
  - Communication and catalyzing research\*
  - Information-sharing with countries\*
  - Capacity building (?)
  - What else?

<https://www.science.org/doi/10.1126/science.abeg090>

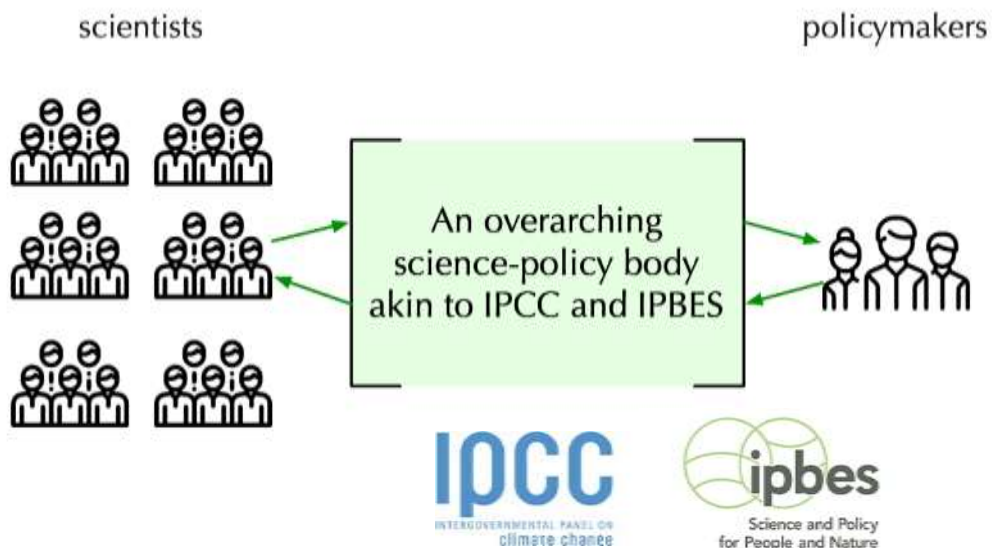






# Key Elements for the New Science–Policy Panel

## (B) OUR VISION



### Core characteristics

- ✓ **Intergovernmental\***  
with stakeholders as observers and providing inputs
- ✓ **Objective, independent & transparent**  
with clearly defined rules and procedures (including a strict conflict-of-interest policy)
- ✓ **Representative and inclusive**  
of disciplines, gender and regions
- ✓ **Active communication\***  
with policymakers, scientists and the public

<https://www.science.org/doi/10.1126/science.abeg090>





# Take-Home Messages

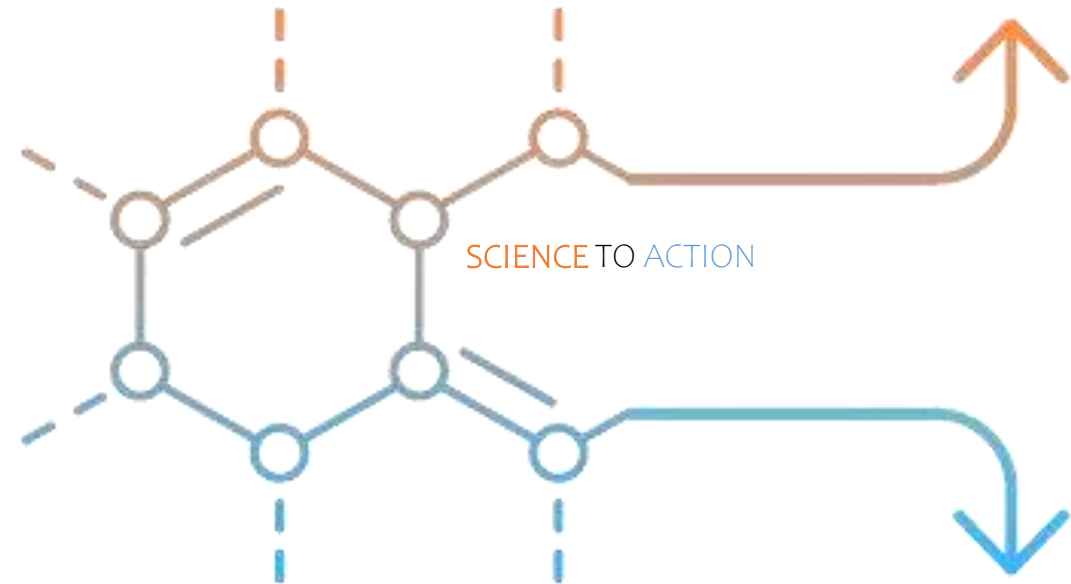
- Chemical pollution exceeds safe operating space of the planetary boundary.
  - Time to act is now, including strengthening the science–policy interface.
- Major gaps in the current science–policy interface include: (1) a lack of coverage; (2) a lack of regular horizon scanning and early warning; (3) a lack of bi-directional communication; and (4) a lack of the engagement of the wide scientific community.
- Key elements for consideration under the new SPP: (1) broad scope; (2) comprehensive functions; (3) intergovernmental; (4) objective, transparent and independent; (5) representative and inclusive; and (6) active communication.



Workshop “From science to action, for the implementation of the BRS conventions and guidance on the environmentally sound management of industrial chemicals



Thank you for your attention!



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