



The Global Chemicals Outlook II (GCO-II)

*From Legacies to Innovative Solutions:
Implementing the 2030 Agenda*

Chemicals conference

Vienna, Austria, 24 October 2018

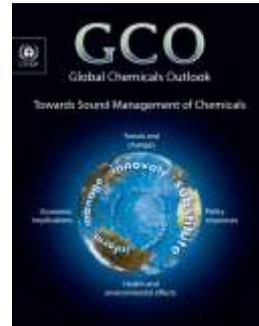
Outline

1. GCO-II: Background, structure and milestones
 2. Emerging insights on the five parts of GCO-II
 - I. Trends, developments and sustainability
 - II. Towards the 2020 goal for the sound management of chemicals an: Where do we stand?
 - III. Chemicals management instruments and approaches
 - IV. Enabling environment, policies and actors
 - V. Scaling up collaborative action
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The Global Chemicals Outlook

The first Global Chemicals Outlook (2013) highlighted a significant increase in manufacture and use of chemicals

- Importance of chemicals to national and global economies
- Costs and negative effects on human health and the environment of unsound chemicals management
- Mandate by UNEA to update GCO by end of 2018 (GCO-II)



Complete report and its synthesis available for download at:

<http://web.unep.org/chemicalsandwaste/what-we-do/policy-and-governance/global-chemicals-outlook>

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Chemicals and waste in the 2030 Sustainable Development Agenda

- The 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) and 169 targets
- Sound management of chemicals and waste relevant across the 2030 Agenda



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Chemicals and waste in the 2030 Agenda

Addressing trade-offs, for example SDG 2 on Zero Hunger, Target 2.1 on safe, nutritious and sufficient food



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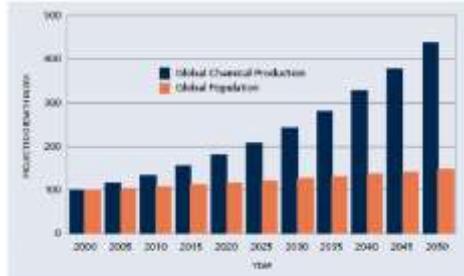
Global Chemicals Outlook II: Emerging insights

I. Trends, developments and sustainability

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The role of megatrends

- Megatrends include population growth, urbanization, digitalization, climate change and others
- Rising income and middle classes drive demand for a range of goods for which chemistry is essential

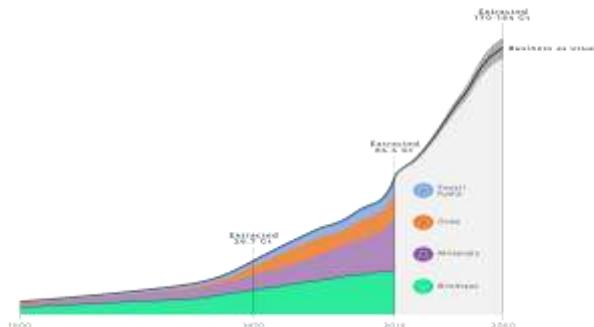


Growth of global chemical production and population, 2000-2050 (Camboni Marco 2017)

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Materials, products and chemicals in the technosphere

- Global resource extraction projected to grow exponentially

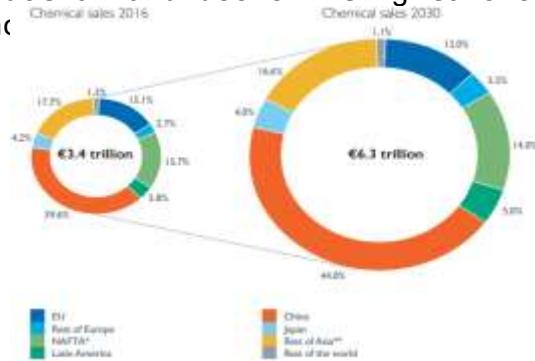


Global resource extraction in billion metric tonnes, 1900-2050 (de Wit et al. 2018)

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Trends in the chemical industry

- One of the largest industries and continues to grow
- Production and use shifting to emerging econ



Projected growth in world chemical sales, 2016-2030 (Cefic 2017)

The universe of chemicals

- A global account of chemicals on the market and chemicals with hazardous properties lacking
- A number of chemicals prioritized for risk manager level



Chemicals in products

- Chemicals can be found in most products, whether intentionally added or contaminated
- The presence of hazardous chemicals in secondary raw materials poses challenges for recycling



Chemicals in an office chair (Swedish Chemicals Agency 2016)

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Global value and supply chains

- Global value and supply chains are highly integrated and complex, spanning many countries and regions
- Growth in chemical intensive downstream industry sectors may create risks and opportunities



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Trends in chemical pollution

- Large amounts of chemicals continue being released
- Progress in reducing releases of some pollutants remain



Global Releases of plastic and microplastic waste to oceans (metric tons per year) (Boucher and Friot 2017)

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Chemical concentrations

- A significant number of chemicals is nearly ubiquitous in outdoor and indoor environments

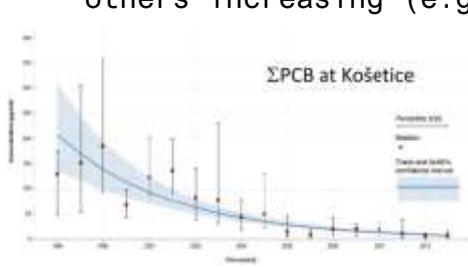


Number of pharmaceuticals detected in surface water, groundwater, tap water and/or drinking water (Owens 2015)

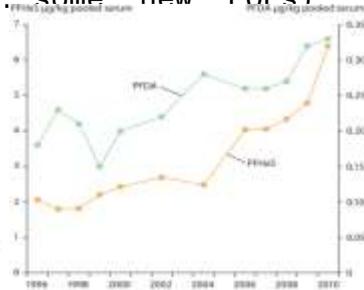
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Trends in chemical concentrations

- Concentrations of some chemicals of concern (e.g. 'legacy' POPs, lead) decreasing, but trends uncertain and others increasing (e.g. some 'new' POPs)



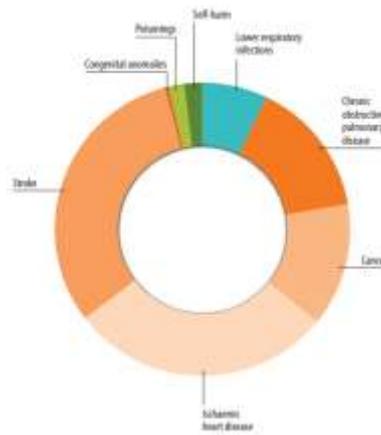
Trends in concentrations of PCBs, Košetice, Czech Republic, 1996-2013 (UN Environment and Secretariat of the Stockholm Convention 2017)



Concentrations of PFHxS and PFDA in blood of Swedish first-time mothers, 1996-2010 (AMAP 2015a)

Selected health effects of chemicals

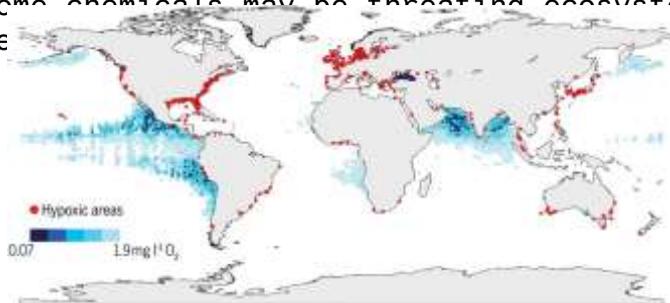
- Workers, children, pregnant women, and the poor among the most vulnerable
- Chemical pollution a major cause of human disease and premature deaths
- Some studies estimate costs of inaction in ranges of several % points of global GDP



1.3 million lives lost in 2012 attributable to chemicals by disease (WHO 2016)

Selected environmental effects of chemicals

- Ocean 'dead zones' have been identified across the world
- Some chemicals may be threatening ecosystems



Coastal sites where anthropogenic nutrients have exacerbated or caused O₂ declines to $< 2 \text{ mg liter}^{-1}$ (red dots), as well as ocean oxygen-minimum zones at 300 m of depth (blue shaded regions) (Breitburg et al. 2018)

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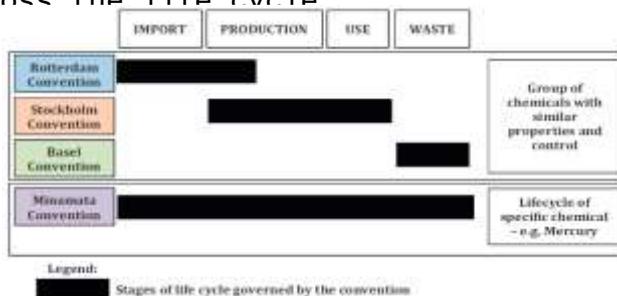
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II. Towards the 2020 sound management of chemicals and waste goal : Where do we stand?

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International agreements addressing chemicals and waste

- The international community has taken action on the management and elimination of specific chemicals of concern and wastes across the life cycle



Scope of the Basel, Rotterdam, Stockholm and Minamata Conventions (Ta et al. 2016)

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International agreements addressing chemicals and waste

- SAICM adopted in 2006 as a multi-stakeholder and multi-sectoral global policy framework to promote chemical safety around the world
- The Conventions of the International Labor Organizations C170 and C174 address chemical safety at the workplace and the prevention of industrial accidents



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Progress towards the 2020 goal: National Profiles

Most countries have developed national profiles

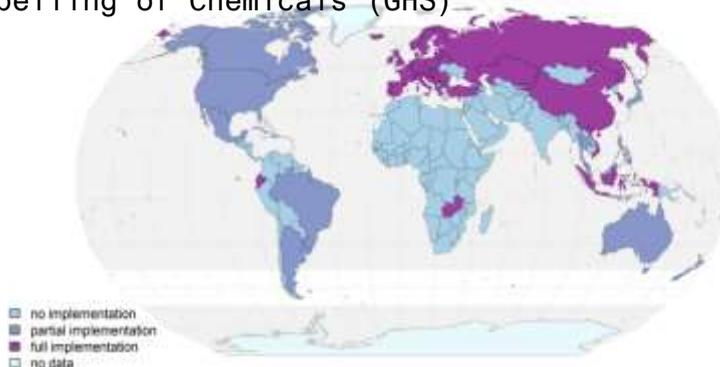


National profiles to assess the chemicals and management infrastructure (UNITAR 2018)

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Progress towards the 2020 goal: GHS

Disparities in implementation of the Globally Harmonized System for Classification and Labelling of Chemicals (GHS)

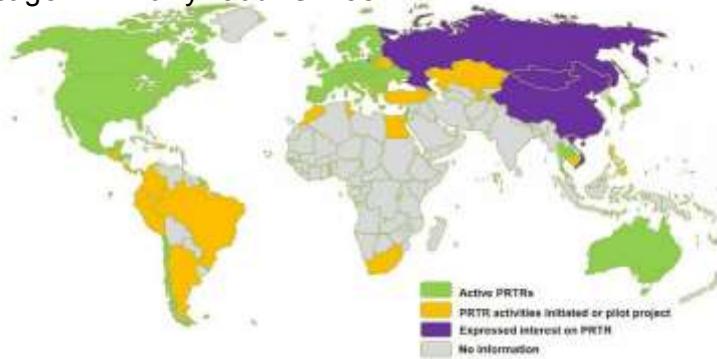


Global GHS implementation status (Persson et al. 2017)

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Progress towards the 2020 goal: Pollutant Release and Transfer Registers

Establishment of Pollutant Release and Transfer Registers (PRTRs) still at an early stage in many countries

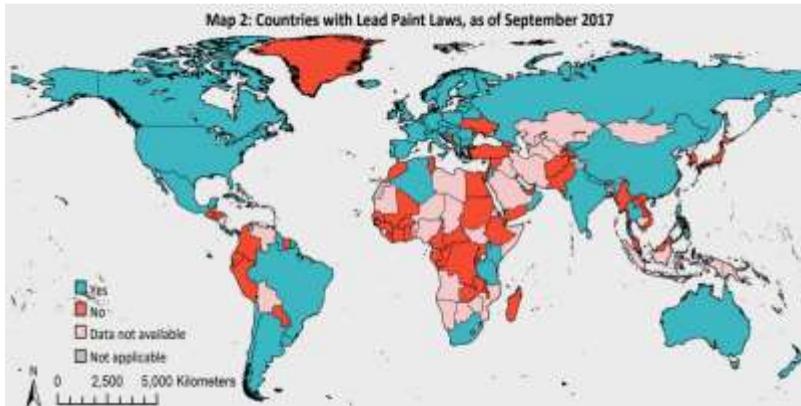


*National Pollutant Release and Transfer Registers
(UNITAR 2018)*

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Progress on the emerging policy issues:

The case of lead in paint
Some countries still lack lead paint laws



*Status of lead paint regulation worldwide, as reported
in 2017 (UNEP 2017)*

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Emerging insights: Towards the 2020 goal: Where do we stand?

- A global coherent results, indicator and reporting framework is lacking
 - Opportunities exist to create synergies between different international prioritization processes
 - Policy learning and alignment is taking place across countries and creates opportunities
 - The development of an integrated national programme based on a national profile could help strengthen national chemicals and waste management
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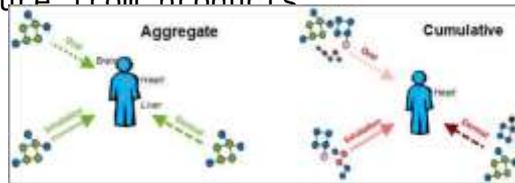
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III. Chemicals management instruments and approaches

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Chemical exposure assessment

- Wider awareness of generic exposure assessment methods and models can provide insights on local chemical exposure
- Further work ongoing regarding aggregate exposures, cumulative exposures, and exposure from products

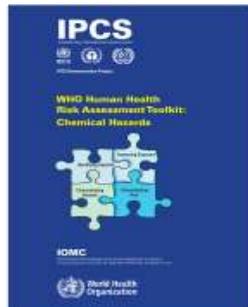


The concepts of aggregate and cumulative exposure (adapted from US EPA 2017)

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Chemical risk assessment

- Further steps can be taken to facilitate the use of risk assessment methods in developing countries, and develop harmonize and s or risk assessment



The WHO Human Health Risk Assessment Toolkit (WHO 2010)



The OECD Environmental Risk Assessment Toolkit (OECD 2016)

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Assessment of chemical and non-chemical alternatives

- Refining and harmonizing alternatives assessment methods based on functional substitution as well as to exchange lessons learned can help to avoid regrettable substitutions.

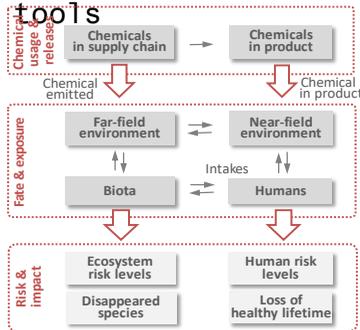
Chemical of Concern (function)	Hazard	Substitute	Hazard
Bisphenol-A (BPA) (plasticizer)	Endocrine disruption	Bisphenol-S (BPS), Bisphenol-F (BPF)	Endocrine activity
Bis(2-ethylhexyl) phthalate (plasticizer) (DEHP)	Endocrine disruption	Diisononyl phthalate (DiNP)	Carcinogenicity, Possible endocrine disruption
Lead (additive in gasoline)	Neurotoxicity	Methyl tert-butyl ether (MTBE)	Aquatic toxicity
Chlorofluorocarbons (CFCs) (refrigerant)	Ozone depletion	Hydrofluorocarbons (HFCs)	Greenhouse gas

Notable examples of regrettable substitutes (compiled based on various sources)

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Approaches to sustainability assessment

- Stakeholders may find value in further development and use of wider sustainability assessment methods, including life-cycle assessment tools



Elements of a comprehensive framework to evaluate global chemical supply chain impacts on humans and the environment (Fantke et al. 2016)

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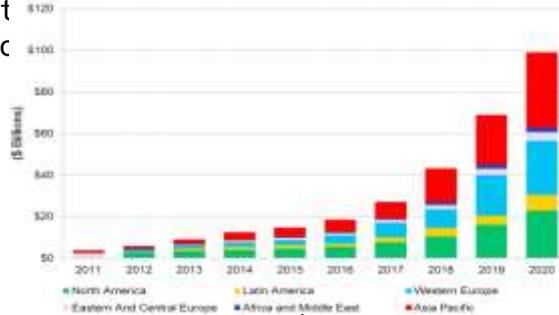
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IV. Enabling environment, policies and actors

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The future of chemistry

- Innovations in chemistry have a significant potential in advancing sustainable development
- Sustainable chemistry is an evolving concept that



Global Green Chemicals Market by Region 2011-2020 (GC3 2015)

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New and evolving business models

- New and evolving business models (e.g. chemical leasing, 3-D printing, e-commerce), chemical parks and social enterprises create opportunities but may also create risks



Ocean Sole: a social enterprise in Kenya (Panum and Hansen 2014)

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Fiscal incentives

- Market based instruments is limited but increasing
- Such instruments can effectively complement command and control regulatory approaches

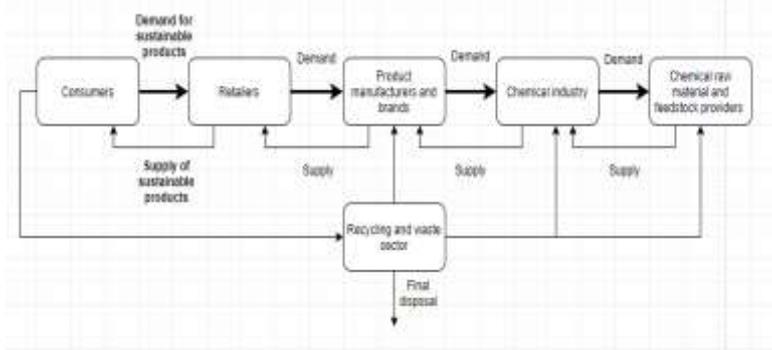
Policy instrument	Example of application
Tax	Pesticides; inorganic fertilizers; chlorinated solvents; batteries
Charge/fee	Hazardous waste; pesticide or chemical containers; tyres; batteries
Subsidy	Subsidies for organic farming; lead paint removal
Subsidy removal	Removal of subsidies for use of chemical fertilizers or pesticides
Deposit-refund	Pesticide or chemical containers; batteries; tyres
Tradeable permits	Lead, non-halogenated ozone depleting substances (based on Stavins, 2001; Sterner and Coria 2012; OECD n.d.)

Types of market-based instruments and examples of application to chemicals management (based on Stavins, 2001; Sterner and Coria 2012; OECD n.d.)

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Sustainable supply chain management

- Ensuring procurement complies with sustainability criteria and creates a



Interface of demand and supply in driving sustainability of chemicals in the supply chain

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Sustainable supply chain management

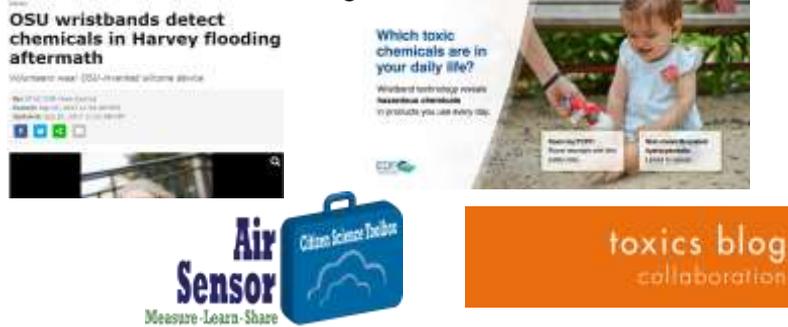
- Retailers, product manufacturers, and companies in the chemical industry have taken relevant measures



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Citizens and consumers

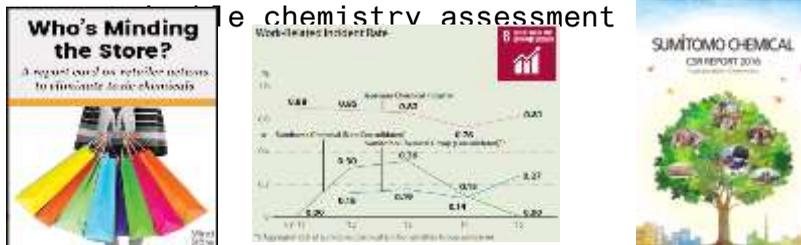
- Enabling policies, including consumer, workers and community rights to know, public participation, and access to justice, allow citizens to engage and protect their rights for a healthy



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Sustainability metrics and reporting

- Private sector metrics and reporting proliferating and hold significant potential to measure progress
- Efforts needed to align approaches, ensure reporting is meaningful, increase transparency, and address the lack of a



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Global Chemicals Outlook II: Emerging insights

V. Scaling up collaborative action

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Towards a collaborative framework for action on chemicals and waste

SDG 17 is a call for new partnerships and an opportunity for collaborative action. Building on existing efforts, a global framework for collaborative action on chemicals and waste, could

- ~~Develop~~ ^{seek to} develop a common vision, goals, targets and indicators
- Strengthen chemicals and waste management programmes
- Mainstream chemicals and waste in economic sector policies and actions
- Mainstream chemicals and waste in enabling policies and actions
- Strengthen results-based metrics, reporting and accountability



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Engaging all sectors and actors

A global collaborative framework would require incentives for active commitment and engagement of relevant stakeholders at all levels:

- Key economic and enabling sectors
 - Companies, industry groups and trade associations
 - Academic and research community
 - Donor, investor and financial community
 - Leaders in the media
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Thank you.



Chemicals Conference

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