German Environment Agency

Umwelt Bundesamt

How to measure sustainability in international chemicals management?

Criteria for meaningful indicators

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PART 1: Setting the scene in the international Process

Towards ICCM5

1992
UN Conference on Environment and Development (UNECD)
Agenda 21 (Chapter 19)
Rio de Janeiro

2002
World Summit on Sustainable Development (WSSD)
Johannesburg

2006
1. International Conference on Chemicals Management (ICCM1)
Dubai Declaration
Dubai

2012
UN Conference on Sustainable Development (UNCSD)
The Future We Want
§213
Rio de Janeiro

2015
UN Summit on Sustainable Development (UNSSD)
Agenda 2030
New York

IP4

2023
World Chemicals Conference (ICCM5)
Bonn

Beyond 2023

The 2020 goal

SDG Target 12.4 (2020 goal):

By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

2020 goal missed – GCO-II Findings

- Increase in production and consumption creates risks and opportunities
- Potential benefits of chemicals innovation for sustainable development
- Hazardous chemicals -> sustainable materials management and circular business models
- Sustainable supply chain management
- Benefits of action to minimize adverse effects -> $
- Drivers: consumer demand, green and sustainable chemistry education and innovation

“Business as usual is not an option” (GCO-II)

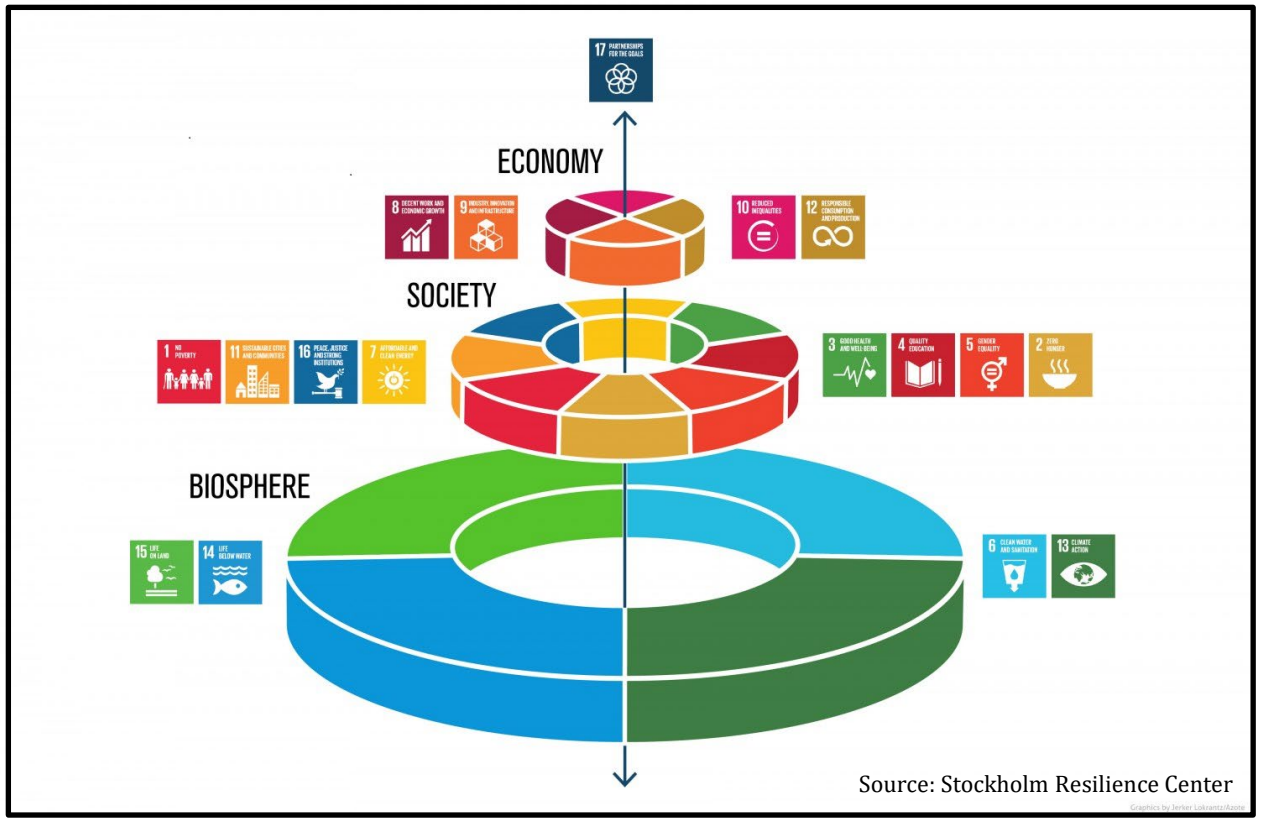
- Tools available, capacities lacking

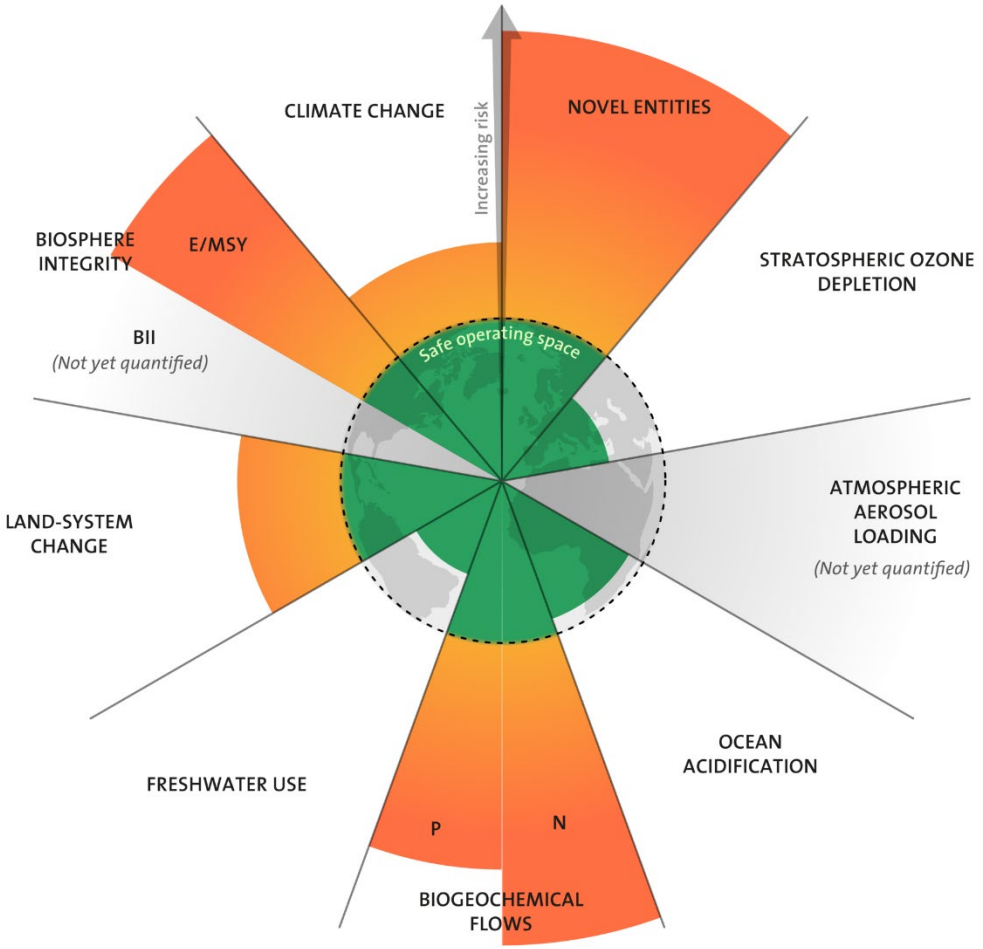
MINAMATA CONVENTION ON MERCURY

- Chemical safety essential, but not enough

Sustainability Context and Planetary Boundaries

By J. Lokrantz/Azote based on Steffen et al. 2015., CC BY 4.0, https://commons.wikimedia.org/w/index.php?curid=115282370





Chemistry is involved in at least 14 SDG and 29 Targets and is affecting all planetary bounderies (at least indirectly)

PART 2: Building the SAICM successor framework

- *Our **vision** is create a healthy planet with healthy people that allows society to realise the benefits of chemicals whilst preventing and minimizing any harm.*
- **Strategic objectives** (freely shortened, parts still "[bracketed]" anyway)

A) Prevent or minimise damage from chemicals

B) Generate data/information/knowledge + make it available

C) Issues of concern are identified, prioritized and addressed

D) Safer alternatives and innovative and sustainable solutions; benefits maximized; risks prevented/minimized

E) SMCW is integrated in relevant decision-processes for sustainable development, financing and business.

Operational objective:

Overcome fragmentation, promote coherence, coordination, cooperation at all levels

The SAICM successor framework: Targets for Objective D*

* as prepared by the Co-Chairs after IP4.1.

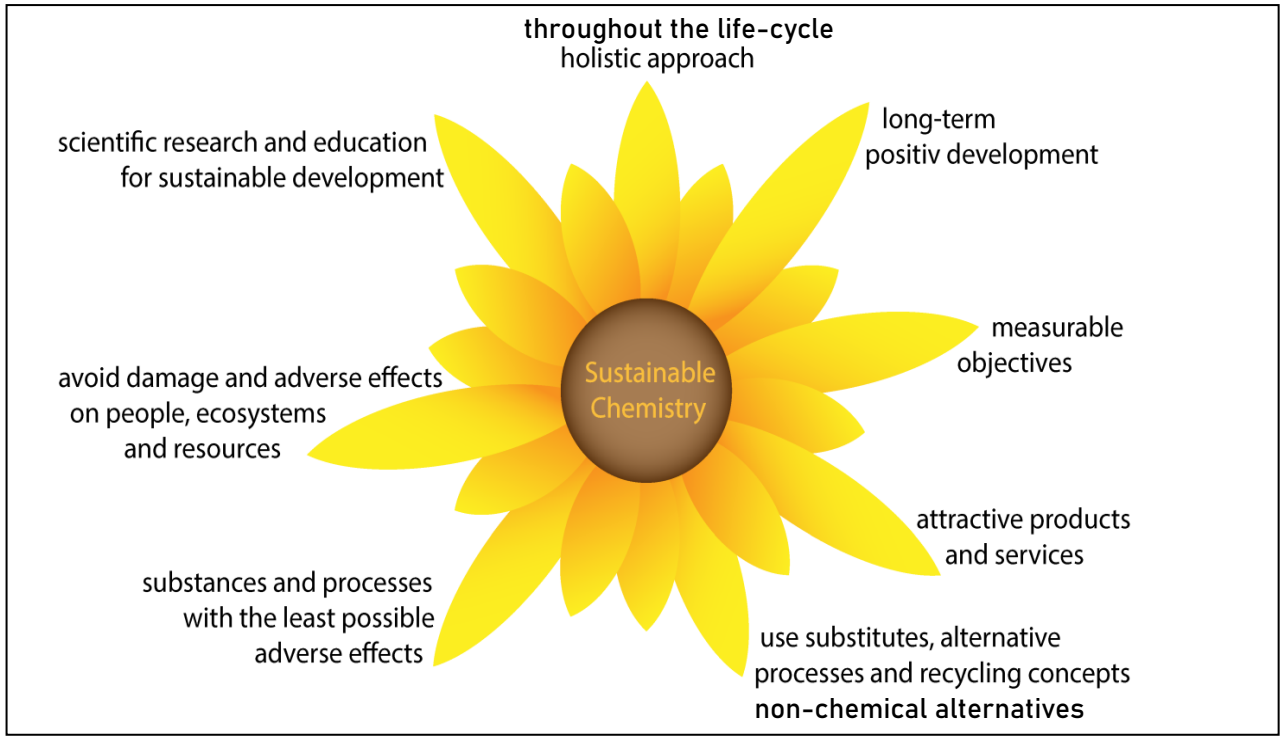
Objective D: Safer alternatives and innovative and sustainable solutions; benefits maximized; risks prevented/minimized

- Target D1 - **Companies** consistently invest in and achieve **innovations toward advancing green and sustainable chemistry**, cleaner production, and the deployment of life cycle management approaches for chemicals.
- Target D2 – […] implement **policies** that encourage **production using sustainable and safe(r) alternatives** including cleaner production technologies and facilitate re-use and recycling of products (**circular economy**).
- Target D4 - In **research** **and** **innovation** programs priority is given to **sustainable solutions and safer alternatives** to harmful substances in products and mixtures, including in consumer products.
- Target D5 – By 2030, **Governments** implement policies and programmes to **increase support to non-chemical alternatives** including agroecology to replace the chemicals or groups of chemicals of global and regional concern including highly hazardous pesticides.

Sustainability Amendment of SMCW

Sound Management of Chemicals and Waste (SMCW) + …

- Development and production of "**design for benign**" substances
- Change of the raw **material** base to **renewable** or secondary raw materials including CO2
- Highly efficient solutions based on **renewable energy sources** with minimal consumption of non-renewable raw materials
- Avoidance or recycling of **waste**
- Changing **business models** based on the lowest possible consumption of materials, recycling cascades, regional, renewable raw materials, etc,
- **Investments** in appropriate industrial plants and processes.



Blum et al. 2017; adopted

Project: A future-oriented contribution to SMCW

Develop proposals for indicators for the strategic objectives and targets for SMCW beyond 2020.

1. **Focus on progress through sustainable chemistry**
2. Framework conditions for the development of sustainable chemistry are created
3. Basic requirements for SMCW

Project Team:

N3 NACHHALTIGKEITSBERATUNG DR. FRIEGE & PARTNER

BZL Kommunikation und Projektsteuerung GmbH

cscp COLLABORATING CENTRE ON SUSTAINABLE CONSUMPTION AND PRODUCTION

Akademie Dr. Obladen

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PART 3: Criteria for the Selection of Indicators

Indicators for the SAICM 2020 goal (target 12.4)

12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement

12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment

Source: UN 2016

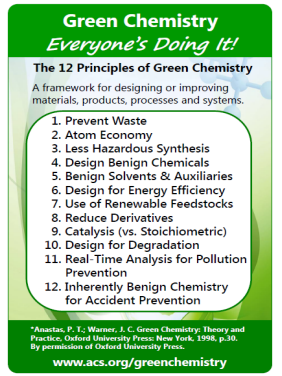
Selection of General Criteria A - G

- Suitability of indicators for the SAICM process
- **SMART-like** features (Specific, Measurable, Achievable, Realistic, Time-bound)

A) Specific	The indicator must be precise and unambiguous.
B) Established	The indicator is already in use by other systems, e.g. SAICM, Conventions.
C) Determinable	The collection of the data needed for reporting in the respective sector is easy and cost-efficient.
D) Measurable	Measurable: Either quantities, thresholds or qualitative properties are applicable.
E) Reliable and transparent	The data associated with the indicator are trustable and traceable.
F) Dynamic	Progress over time, a difference in the data associated with the indicator can be measured.
G) Pertinent	The indicator covers relevant aspects for the respective sector and / or area of application.

Selection of Sustainability Criteria

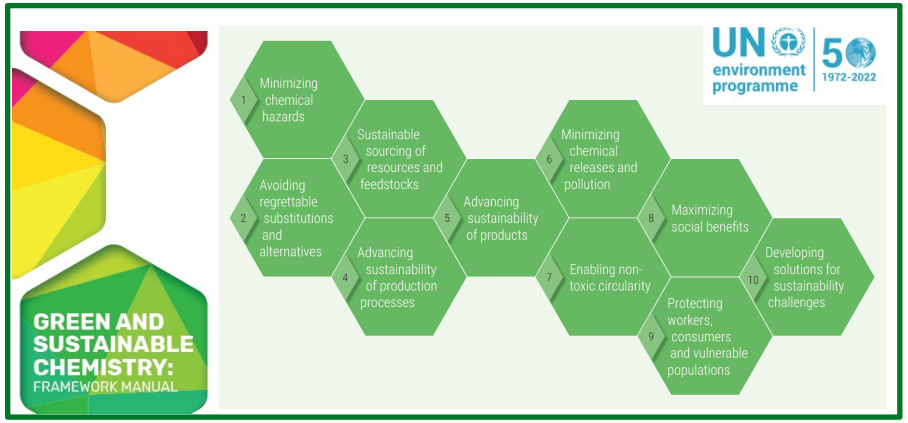
- Sustainability Criteria were revised several times
  - discussions with experts from all UN regions in interviews and five workshops
  - application tests to assess the usability
- Linkage to Sustainable Chemistry as well as sustainable development
- Interfaces with global issues like health, climate, biodiversity, energy, and potential conflicts, like extraction of chemicals from renewable raw materials.



ISC3 International Sustainable Chemistry Collaborative Centre

10 Key Characteristics of Sustainable Chemistry

https://www.isc3.org/en/about-isc3/sustainable-chemistry.html



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https://stg-wedocs.unep.org/bitstream/handle/20.500.11822/34338/GSCF.pdf?sequence=2

Special criterion focusing on Sustainable Chemistry

H) Sustainability	Systems thinking is the prerequisite to reach the goals of the Agenda 2030: Potential **trade-offs** can be identified and managed with **systems thinking**. Sectors dealing with chemical entities[1] contribute to Sustainable Development in compliance with the respective SDG principles and the following subcriteria.

[1] With the term "chemical entities" we comprise chemicals, substances, intermediates, materials, products, waste and recyclates as well as, if appropriate, those entities in (raw material) extractions, processes and applications.

UNEP Green and Sustainable Chemistry Objectives:

- 10: Developing solutions for sustainability challenges.

ISC3 10 Key Characteristics of Sustainable Chemistry:

- 1: Holistic
- 3: Systems Thinking
- 10: Life Cycle

Sub-criteria focusing on Sustainable Chemistry (i)

H1) Responsible innovation	Development of sustainable solutions and **safe and non-regrettable** alternatives for chemicals of concern through cooperation on **innovations**, non-chemical alternatives, services like chemical leasing or Extended Producer Responsibility (EPR) mechanisms. Foster **collaboration** along the **value chains** to promote **circularity**.

UNEP Green and Sustainable Chemistry Objectives:

- 1: Minimizing chemical hazards.
- 2: Avoiding regrettable substitutions and alternatives.
- 4: Advancing sustainability of production processes.
- 6: Minimizing chemical releases and pollution.

ISC3 10 Key Characteristics of Sustainable Chemistry:

- 2: Precautionary
- 6: Sustainable and responsible Innovation
- 7: Sound Chemicals Management
- 9: Green Chemistry

Sub-criteria focusing on Sustainable Chemistry (ii)

H2) Inter- and multidisciplinary, holistic approach	Considering **interfaces** with other urgent issues (health, environment, climate, resources/waste/circularity, biodiversity, nutrition, etc.) throughout the entire **life cycle** of chemical entities, while avoiding transport of problems to other sectors and future legacies.

UNEP Green and Sustainable Chemistry Objectives:

- 5: Advancing sustainability of products

ISC3 10 Key Characteristics of Sustainable Chemistry:

- 1: Holistic
- 3: Systems Thinking

Sub-criteria focusing on Sustainable Chemistry (iii)

H3) Social responsibility	Promoting and ensuring **health and safety** as well as **fair, inclusive, and emancipatory** labour conditions, complying with **human rights and justice** in all its fields including **education and science**. Reduction of inequalities and fair distribution of benefits.

UNEP Green and Sustainable Chemistry Objectives:

- 8: Maximizing social benefit.
- 9: Protecting workers, consumers and vulnerable populations.

ISC3 10 Key Characteristics of Sustainable Chemistry:

- 4: Ethical and Social Responsibility

Sub-criteria focusing on Sustainable Chemistry (iv)

H4) Transparency and information exchange	Enabling right-to-know throughout the entire life cycle. Promoting **knowledge exchange** on all levels including all stakeholders (e.g. science, education, business, governments, administration, NGOs).

UNEP Green and Sustainable Chemistry Objectives:

- n/a

ISC3 10 Key Characteristics of Sustainable Chemistry:

- 5: Collaboration and Transparency

Sub-criteria focusing on Sustainable Chemistry (v)

H5) Resource management and circularity	Sustainable management of **resources, materials, and products** (raw materials extraction, production, application, logistics, recycling and end of life scenario) and **energy**, to enable **circularity** without contamination throughout the **entire life cycle**.

UNEP Green and Sustainable Chemistry Objectives:

- 3. Sustainable sourcing of resources and feedstocks
- 7. Enabling nontoxic circularity

ISC3 10 Key Characteristics of Sustainable Chemistry:

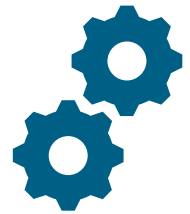
- 8: Circularity

PART 3: Analysis of Indicators

Examination from two perspectives:

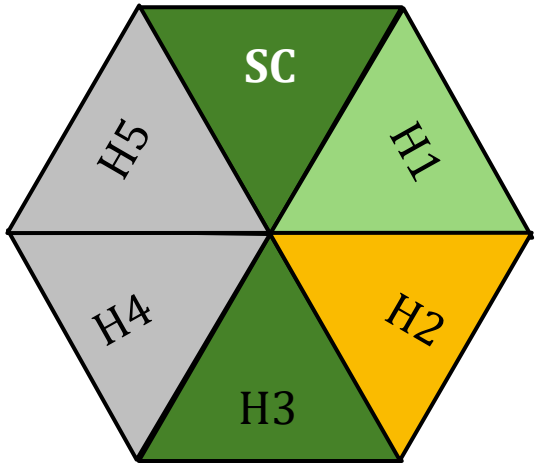
1) **To what extent do the indicators**
   - ➢ meet the goals of "**Sound Management of Chemicals and Waste**" (SMCW) and/or
   - ➢ contribute to the development of "**Sustainable Chemistry**" (SC)?

2) **Which SDGs are directly or indirectly supported by the indicators?**
   - ➢ significance of the indicators for the SDG targets and
   - ➢ correspondence in content with SDG indicators.



Example of an indicator on Hazardous Chemicals

Reduction of the **amount of hazardous chemicals** used in design and manufacturing related to the mass of chemical production by x %



SC – Sustainable Chemistry

H1 - Responsible innovation

H2 - Inter- and multidisciplinary, holistic approach

H3 - Social responsibility

H4 - Transparency and information exchange

H5 - Resource management & circularity

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

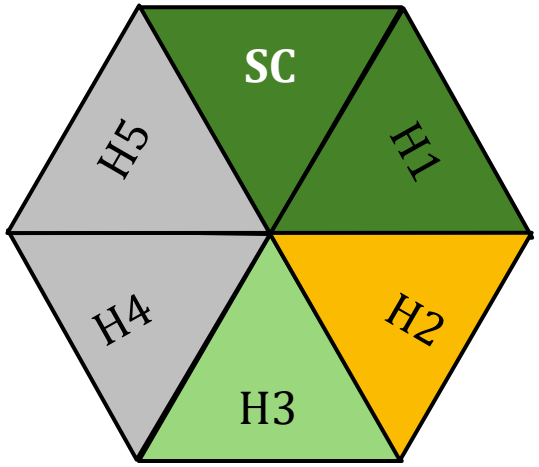
Target 12.4

Progress in the EU Chemicals Sector

SMCW

Example of an indicator on Renewable Materials

Share of **chemical production based on renewable materials** in relation to the global production which is based on renewable materials … [%]



SC – Sustainable Chemistry

H1 - Responsible innovation

H2 - Inter- and multidisciplinary, holistic approach

H3 - Social responsibility

H4 - Transparency and information exchange

H5 - Resource management & circularity

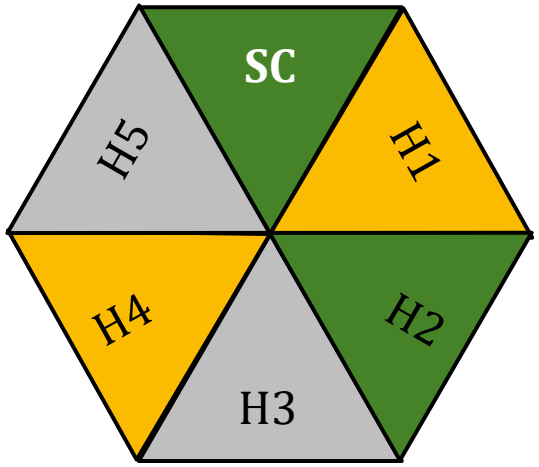
Target 12.2

Progress in the EU Chemicals Sector

SMCW

Example of an indicator on Greenhousegas Potential

CO2eq. Scope 1 & 2 per unit of value added (e.g. gross output [Mg / yr]) of the chemical industry (modification of SDG indicator 9.4.1)



SC – Sustainable Chemistry

H1 - Responsible innovation

H2 - Inter- and multidisciplinary, holistic approach

H3 - Social responsibility

H4 - Transparency and information exchange

H5 - Resource management & circularity

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

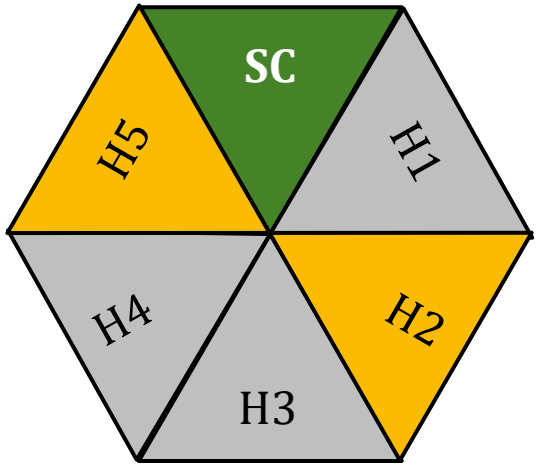
Target 9.4

Progress in the EU Chemicals Sector

SMCW

Example of an indicator on Plastic Waste

Amount of post-consumer **plastic waste** generated / recycled / incinerated / landfilled / not collected per country.



SC – Sustainable Chemistry

H1 - Responsible innovation

H2 - Inter- and multidisciplinary, holistic approach

H3 - Social responsibility

H4 - Transparency and information exchange

H5 - Resource management & circularity

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

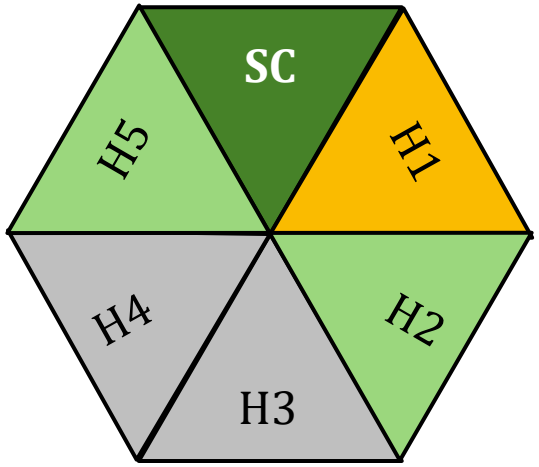
Target 12.6

Progress in the EU Chemicals Sector

SMCW (SC)

Example of an indicator on Material Footprint

Material footprint, material footprint per capita, and per GDP (SDG indicator 12.2.1)



SC – Sustainable Chemistry

H1 - Responsible innovation

H2 - Inter- and multidisciplinary, holistic approach

H3 - Social responsibility

H4 - Transparency and information exchange

H5 - Resource management & circularity

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Target 12.2

Progress in the Chemicals Sector

SMCW

Summary

- 18 Indicators address exclusively SMCW
- 6 Indicators address SMCW and Sustainable Chemistry (SC)
- 12 Indicators address exclusively aspects of SC

Thank you !

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Back-up

SMCW-SC-SDG Allocation

	Indicator	SMCW/SC	SDGs	H1 - Innovation	H2 - Holistic	H3 - Social	H4 - Transparency	H5 - Resource
G2	Share of ... chemical enterprises … that report on their sustainability performance using GRI SRS	SMCW/SC	12.6 12.6.1	x	x	x	x	x
G6	DMC per capita / per GDP	SC	12.2 12.2.2	x	x	x		x
W3	CO2eq. Scope 1 & 2 per unit of value added... of the chemical industry	SC	9.4	(x)	x		(x)	
W4	Number of companies publicly reporting their chemical footprint	SC	12.6	(x)			x	
W7	% of chemical production [Mg/yr.] which is based on renewable materials …	SC	12.2	x	x	x		
W8	Reduction of the amount of hazardous chemicals used in design and manufacturing…	SMCW/SC	12.4 (6.3)	x	x	x		x
W10	Number of countries using sustainable chemistry principles	SC	12.4 (8.2,8.3,9.5)	x				
W11	Material footprint, material footprint per capita, and per GDP	SC	12.2 12.2.1	x	(x)			x
W13 W14	Number of member states whose laws and regulations… on occupational safety and health include the prevention of chemical risks.	SMCW/SC	(3.9, 12.4)	(x)	(x)	x		
W16	Number of countries that implement Circular Economy… without toxic chemicals recycling	SC	12.5 (12.4)	(x)	x	x		x

SMCW-SC Allocation – deep dive

Indicator	SMCW/SC	SDGs	Contribution to chemical safety (H1), H3	Environmental impacts (besides GHG) (H1), H2	Reduction of (hazardous) waste (H1), (H3), H5	Innovation towards sustainability H1	Climate: less GHG emissions H2	Occupational and public health (H2), H3	Impacts on biodiversity H1, H2, H3	Resource consumption (H1), H5	Impacts on energy consumption (H5)	Decent work H3	Gender equality H3	(Un-)sustainable finance (H1), (H4)	Transparency (production, products,…) (H1), H4
Share of … chemical enterprises … that report on their sustainability performance using GRI SRS	SMCW/SC	12.6 *12.6.1*	x	x	x		x	x				x	x		x
DMC per capita / per GDP	SC	12.2 *12.2.2*							x	x	x				
CO2eq. Scope 1 & 2 per unit of value added... of the chemical industry	SC	9.4					x							x	
Number of companies publicly reporting their chemical footprint	SC	12.6													x
% of chemical production [Mg/yr.] which is based on renewable materials …	SC	12.2				x	x		x						
Reduction of the amount of hazardous chemicals used in design and manufacturing…	SMCW/SC	12.4 (6.3)	x	x	x	x		x	x						

Agenda 2030: Chemicals play a role everywhere…

The SDGs "...are integrated and indivisible and balance the three dimensions of of sustainable development".

IOMC. (2018). *Chemicals and Waste Management: Essential to Achieving The Sustainable Development Goals (SDGs)*. http://www.who.int/iomc/Chemicals_SDGs_interactive_Feb2018.pdf (accessed 5 June 2018)