

V. Scaling up collaborative action under the 2030 Agenda for Sustainable Development

About Part V

Part V places the insights generated in Parts I-IV within the context of the 2030 Agenda for Sustainable Development, focusing on opportunities for collaborative action to achieve the sound management of chemicals and waste. Emphasis is put on collaborative action to integrate chemicals and waste considerations into key economic and enabling sectors. A forward-looking discussion follows with respect to securing commitments by key stakeholders relevant to the future framework on chemicals and waste beyond 2020. Part V concludes by presenting a range of options for implementation of actions (referred to as “actions”) to reach relevant Sustainable Development Goals (SDGs) and targets up to and beyond 2020. The listed actions have been identified based on the findings presented in Parts I-IV of the GCO-II.

Highlights

The 2030 Agenda provides a renewed opportunity to integrate chemicals and waste considerations into national development planning and sectoral policies and programmes.

A growing number of stakeholders are using the 2030 Agenda to document their chemicals and waste related actions, but further momentum is needed and questions arise how to measure results.

Strengthening chemicals and waste management programmes at all levels is critical to achieve SGD Targets 12.4 and 3.9, which focus on chemicals and waste.

A comprehensive global framework is needed, with ambitious priorities, coherent indicators, and incentives to foster commitment and engagement by all relevant actors.

Ten action areas with specific options for the implementation of actions to reach relevant SDGs and targets, up to and beyond 2020, have been identified by the GCO-II.

Country and stakeholder driven action plans and roadmaps to achieve the sound management of chemicals and waste could be the foundation for reviewing progress at the global level.

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1/ The 2030 Agenda for Sustainable Development: an integrated framework for action

1.1 Advancing chemicals and waste within the 2030 Agenda for Sustainable Development

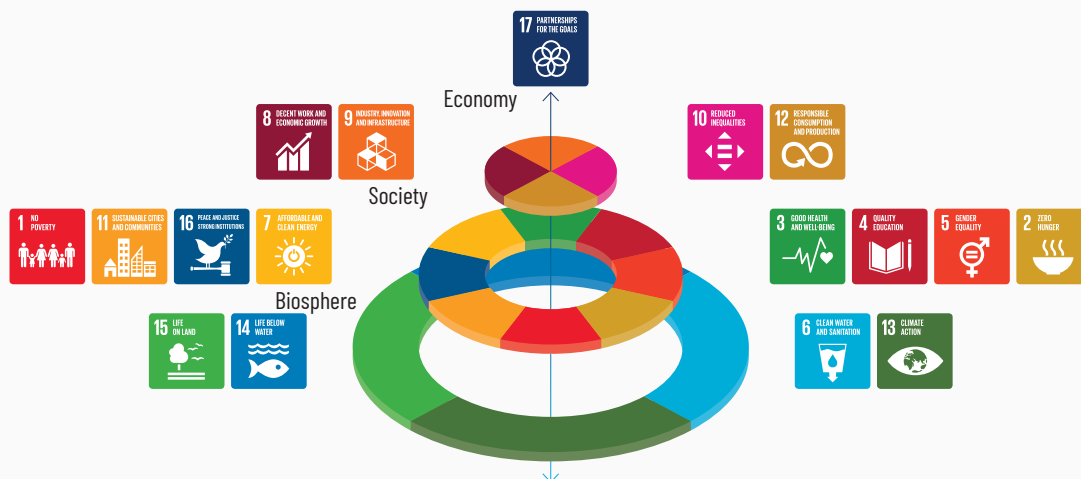
The integrated nature of the Sustainable Development Goals (SDGs)

The 2030 Agenda emphasizes that development needs to be compatible with all three dimensions of sustainability: economic, social and environmental. Sustainable development is integrated and indivisible, meaning that it needs to be implemented as a whole rather than in a fragmented manner. Figure 1.1 illustrates the three dimensions of sustainable development as three interdependent systems, with the biosphere serving as a foundation for the development of societies and economies. A logic whereby social, economic and ecological development are distinct is replaced by a view in which the economy serves society within the safe operating space of the planet (Stockholm Resilience Centre [SRC] 2016).

The SDGs are a robust framework for addressing chemicals and waste

The sound management of chemicals and waste cuts across the 17 SDGs. It is a crucial element underpinning the implementation of the 2030 Agenda, as chemicals and waste affect many aspects of development (Figure 1.2). This is reflected directly or indirectly in a number of goals and targets. While SDG Targets 12.4 and 3.9 are of direct relevance for a range of chemicals and waste management issues, SDG Target 6.3 focuses specifically on improving water quality. Equally relevant, a number of SDGs and targets are relevant for chemical-intensive sectors, for example those pertaining to access to food, clean energy and safe housing. These SDGs and targets cannot be achieved in a sustainable manner without due consideration of the sound management of chemicals and waste. Furthermore, chemicals and waste issues are relevant for a number of enabling SDGs and targets, including those concerned with access to information, education and financing.

Figure 1.1 The three dimensions of sustainability (adapted from SRC 2016)



The SDGs provide an opportunity to mainstream chemicals and waste management in policymaking

The significance of mainstreaming chemicals and waste considerations in national development policies, plans and sectoral policies for chemical-intensive economic sectors has been recognized by, among others, the Dubai Declaration and the Overarching Policy Strategy adopted in 2006. It is also addressed in the Overall Orientation and Guidance adopted by Strategic Approach to International Chemicals Management (SAICM) stakeholders in 2015. Despite these calls for action, gaps remain in achieving that ambition.

The 2030 Agenda creates new opportunities to integrate sound chemicals and waste management in national development policies and plans, as well as in sectoral policies and actions. Linkages exist, for example, with ending poverty (SDG 1); promoting sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all (SDG 8); and building resilient infrastructure, promoting inclusive and sustainable industrialization, and

fostering innovation (SDG 9). The 2030 Agenda also creates opportunities to include chemicals and waste management considerations in national and sub-national budgeting, and in the allocation of national financial resources, in line with the integrated approach to financing across its three components (mainstreaming, industry involvement, and dedicated external financing). Equally important is the integration of chemicals and waste management considerations in international development assistance and capacity building programmes (SDG Targets 17.6 and 17.8).

SDG 17: A call for new partnerships and an opportunity for collaborative action

The 2030 Agenda is built on the premise that sustainable development can only be achieved by bringing together all countries and stakeholders. Given the diversity of the challenges related to chemicals and waste and the resources needed, protecting human health and the environment from the adverse effects of chemicals and waste, and maximizing the contributions of chemistry to sustainable development, require collaborative

Figure 1.2 Linkages between chemicals and waste and the SDGs (adapted from Inter-Organization Programme for the Sound Management of Chemicals [IOMC] 2018, p. 3)





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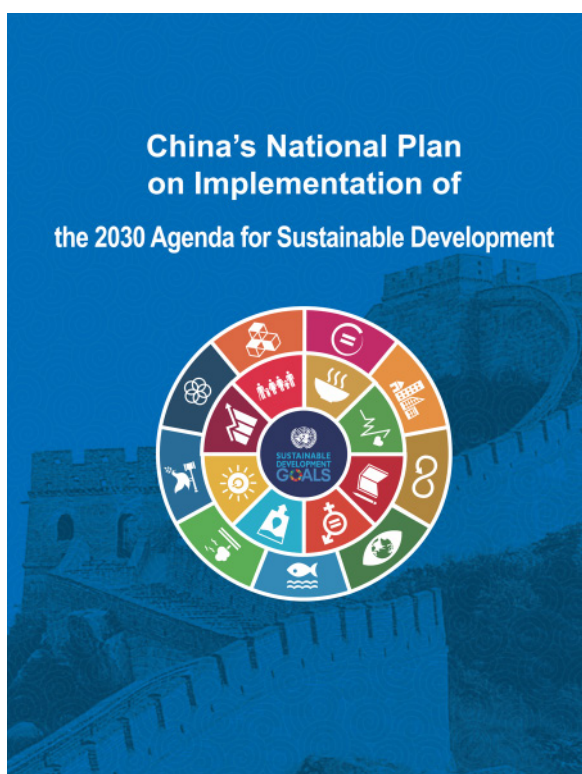
action to advance the sound management of chemicals and waste, bringing together all relevant stakeholders across sectors and with a common vision. Providing a global vision that brings together all countries and all stakeholders, the 2030 Agenda thus presents an opportunity for collaborative action at all levels to achieve a sustainable future with and through chemicals.

Sustainable Development Goal 17 calls on the global community to strengthen the means to implement and revitalize the global partnership for sustainable development. The complexity and magnitude of the SDGs can only be adequately addressed through the coordinated efforts of multiple stakeholders working in close collaboration (World Economic Forum 2018). Partnerships and collaborative action are equally critical in addressing chemicals and waste issues. They can provide an enabling environment that cuts across sectors. An expanded and results-based global collaborative framework for the sound management of chemicals and waste would therefore be a critical step forward with

respect to addressing legacies and advancing innovative solutions. Therefore, the period up to the conclusion of the intersessional process to prepare recommendations regarding the Strategic Approach and the sound management of chemicals and waste beyond 2020 provides a brief but critical window in which to develop an ambitious and comprehensive global framework – as well as to increase engagement by all stakeholders.

1.2 Chemicals and waste stakeholders are starting to use the SDG framework

The 2030 Agenda has been widely endorsed. It has also started to inspire stakeholders, including in the area of sound management of chemicals and waste. Although initiatives are still at an early stage, some stakeholders engaged in the sound management of chemicals (including governments, the private sector, civil society,



academia and intergovernmental organizations) are undertaking activities to use the 2030 Agenda as an organizing framework and as a framework to communicate how their initiatives and actions contribute to achieving relevant SDGs and targets.

Initial government actions to link chemicals and waste to the 2030 Agenda

Governments have begun to link sound management of chemicals and waste with the broader sustainable development context. For example, China's National Plan on Implementation of the 2030 Agenda maps action plans against the targets, noting, among others, under Target 3.9 the establishment of a monitoring system and, under Target 12.4, improving the level of green chemical industry technologies (Government of China 2016). In their Voluntary National Reviews for the High Level Political Forum, some governments have indicated how actions related to the sound management of chemicals and waste help achieve progress towards meeting various SDGs and targets. Thailand, for example, recognizes chemicals and waste in its review as a cross-cutting issue relevant to achieving, among others, SDGs 3, 11 and 12 (Government of Thailand 2017).

In the context of an exercise to outline how the EU contributes to the implementation of the 2030 Agenda, mapping has been prepared to show how various EU policies and actions support the implementation of SDG Target 12.4. Nigeria has compiled data concerning national progress on indicator 12.4.1 (hazardous waste generated per capita) as part of a broader exercise to establish a baseline for the SDG indicators (Government of the Federal Republic of Nigeria 2017). It is also making efforts to monitor progress at the sub-national level (Kaduna State Government 2017). In Denmark, statistical information is presented on a dedicated website, where national information related to the indicators under Target 12.4 is compiled (Statistics Denmark 2018). Canada has compiled data related to indicator 3.9.3 and is transmitting information required by relevant international agreements, as measured by indicator 12.4.1 (Government of Canada 2018)

Early signs of private sector use of the SDG framework



Several companies and industry associations are using the 2030 Agenda as a framework to communicate corporate policies concerned with advancing sound chemicals and waste

management (United Nations Global Compact and Accenture Strategy 2016). Within the framework of the World Business Council for Sustainable Development (WBCSD), for example, chemical companies and industry associations from a number of countries have developed a roadmap exploring how the chemical sector can contribute to achieving various SDGs and targets (WBCSD 2017). In the context of the ChemistryCAN initiative, the European Chemical Industry Council (Cefic) has reiterated

its commitment to the 2030 Agenda, describing the SDGs as a guiding framework for industry.

Companies and associations including BASF (2018), Cefic (2016), Dow (2018), Sumitomo (2018) and the International Council of Chemical Associations (2017) are establishing how they can contribute to meeting the SDGs (Figure 1.3). On its webpage, CropLife International explores linkages between the sustainable use and effective management of pesticides

Figure 1.3 Alignment of the Dow 2025 Sustainability Goals with the SDGs (Dow 2018, p. 41)

The SDGs	Leading the blueprint	Delivering breakthrough innovations	Advancing in circular economy	Valuing nature	Safe materials for a sustainable planet	Engaging impact communities, employees, customers	World-leading operations performance
1 No Poverty		●			●	●	
2 Zero Hunger		●			●		
3 Good Health and Well-being		●		●	●		●
4 Quality Education	●					●	
5 Gender Equality	●					●	
6 Clean Water and Sanitation	●	●					●
7 Affordable and Clean Energy		●					●
8 Decent Work and Economic Growth	●					●	
9 Industry, Innovation and Infrastructure	●	●	●				
10 Reduced Inequalities	●	●		●		●	
11 Sustainable Cities and Communities	●	●			●		
12 Responsible Consumption and Production	●	●			●		
13 Climate Action	●	●					●
14 Life Below Water	●		●	●			●
15 Life on Land	●		●	●			●
16 Peace, Justice and Strong Institutions						●	
17 Partnerships for the Goals	●						

and the SDGs (CropLife International 2019). VinylPlus, the European polyvinyl chloride (PVC) industry's voluntary commitment to sustainable development, reports annually on a set of sustainability goals and targets and is communicating on how these align with and contribute to the SDGs (VinylPlus 2018). Chemical-intensive downstream industries, such as textile production (Textile Exchange 2018), are also communicating on the linkages of their corporate strategies with the 2030 Agenda and making efforts to identify opportunities to contribute to the SDGs.

Civil society stakeholders are using the SDGs to guide their actions

Non-governmental organizations (NGOs) are starting to use the SDGs as a framework to guide actions on chemicals and waste. For example, in a joint report the International POPs Elimination Network (IPEN) and the Pesticide Action Network (PAN) describe how actions related to chemical safety and toxic chemicals are relevant to many if not all of the SDGs (IPEN and PAN 2017). Another example is provided by WWF-Worldwide Fund for Nature, which has outlined business opportunities inherent in the 2030 Agenda, thereby highlighting how sound management of chemicals and waste can help achieve various SDGs and targets including agricultural productivity, food safety, air and water quality, and protection of ecosystems (Ugarte *et al.* 2017). Other NGOs have explored agroecology's potential to support the implementation of some SDGs and targets (Farrelly 2016).



Use of the 2030 Agenda by academia and the research community to advance chemistry

A number of articles published in scientific journals have explored the role of the chemical industry and of green/sustainable chemistry in achieving the SDGs (Matlin *et al.* 2015; Axon and James 2018; Hitce *et al.* 2018). Chemists for Sustainability was formed as an international group to explore the role of chemistry in implementing the 2030 Agenda (International Organization for Chemical Sciences in Development 2018). Moreover, chemists and

Box 1.1 Planetary boundaries, chemicals and waste, and the 2030 Agenda: a research perspective

In the research sector the concept of “planetary boundaries”, originally introduced by Rockström *et al.* (2009) and extended by Steffen *et al.* (2015), has been further developed to link with the implementation of the 2030 Agenda and its provision that each government set national targets guided by the global level of ambition (Hoff and Lobos Alva 2017). The concept already includes boundaries on biogeochemical flows (phosphorus and nitrogen), stratospheric ozone depletion and ocean acidification, which are all relevant to chemicals and waste management. A new boundary on “novel entities”, which has not yet been quantified, includes synthetic chemicals as well as naturally occurring elements mobilized by anthropogenic activities, such as heavy metals (Steffen *et al.* 2015).

other scientists are gathering to exchange ideas on the role of chemistry in the context of the 2030 Agenda. The 4th Green and Sustainable Chemistry Conference in Dresden, Germany, in May 2019 will specifically discuss the role of chemistry in achieving the SDGs (Elsevier 2018).

Intergovernmental organizations are mapping their actions against the SDGs

Intergovernmental organizations active in the area of chemicals and waste are looking at how their activities can contribute to achieving

Table 1.1 Indicative mapping of IOMC participating organizations' activities on the SDGs for sound chemicals and waste management (updated based on IOMC 2017)

SDG/IOMC participating organization	FAO	ILO	UNDP	UNEP	UNIDO	UNITAR	WHO	WB	OECD
No Poverty	L	A	A	A				A	
Zero Hunger	L			A					A
Good Health & Well-being	A	A	L	A	A	A	L		L
Quality Education	A							A	
Gender Equality	L		A		A	A	A	A	
Clean Water and Sanitation	A	A		A		A	L	A	L
Affordable and Clean Energy	A	A	A	A	A		A	A	
Decent Work and Economic Growth	A	L		A	A	A	A	A	
Industry, Innovation, and Infrastructure			A	A	L	A		A	
Reduced Inequalities	A							A	
Sustainable Cities and Communities	A	A	L	A	A	A	A		A
Responsible Consumption and Production	L	A	L	L	A	A	L		L
Climate Action	A	A	L		A	A	A	A	
Life Below Water	A	A	L	A	A				
Life on Land	A	A	L	A		A			
Peace, Justice, and Strong Institutions		A							
Partnership for the Goals	A		A	A	A	A		A	

The table provides an indicative mapping of IOMC participating organizations' activities on various SDGs. Organizations with a lead role with respect to chemicals and waste management related activities for a given goal are marked with a L. Organizations that contribute to or have some activities related to chemicals and waste management aspects within a given goal are marked with an A.

the SDGs. For example, the IOMC participating organizations have assessed the relevance of their policies and actions in regard to the 2030 Agenda and set out plans for future actions to implement the SDGs and targets (Table 1.1). A similar effort has been undertaken by the Secretariat of the Basel, Rotterdam and Stockholm Conventions (Secretariat of the Strategic Approach to International Chemicals Management [SAICM Secretariat] 2018).

1.3 Challenges in using the 2030 Agenda as a framework for action

While many stakeholders have embraced the 2030 Agenda, questions and challenges remain regarding its full implementation:

- › *Do corporate reporting efforts around the SDGs provide a sufficient level of detail?* For example, a 2017 report by the WBCSD (WBCSD and Radley Yeldar 2017) found that while 79 per cent of the sustainability reports of the companies surveyed acknowledged the SDGs in some way, only 6 per cent aligned their strategies and targets with specific target-level SDG criteria and measured their contributions to achieving key SDGs.
 - › *Is the 2030 Agenda used as more than a communication tool?* Some stakeholders have raised concerns that communication efforts may remain generic and difficult to quantify, focusing instead on selected stories (Verles and Vellacott 2018). The term “SDG-washing” has been introduced to draw attention to the potential use of the SDGs as a marketing tool (Machingura and Lally 2017; Nieuwenkamp 2017; Verles and Vellacott 2018).
 - › *Is the 2030 Agenda stimulating and driving change beyond what might otherwise have occurred?* Many companies adopting the SDGs tend to be setting sustainability goals and targets already. The possibility exists that efforts to align with the SDGs could simply be a “rebranding” of already committed efforts.
 - › *Are a sufficient number of stakeholders using the 2030 Agenda as a framework for action?* Despite significant progress, and initiatives undertaken in various sectors, many stakeholders have not yet aligned their strategies and reporting with the SDGs and targets.
 - › *To what extent are efforts to use the 2030 Agenda part of multi-stakeholder collaboration?* Multi-stakeholder collaboration could help move action beyond communication efforts and strengthen accountability. By facilitating a transparent exchange on prioritization, it could ensure that due consideration is given to the three dimensions of sustainability.
- › *Is there a common understanding of sustainability?* Currently agreement is lacking on how to measure or assess the sustainability of chemical processes and products (United States Government Accountability Office 2018). This lack may make it difficult to assess, compare and monitor progress in a coherent manner. A related question is how far the existing indicators under relevant SDG targets (notably Targets 3.9 and 12.4) provide a solid basis for measuring relevant stakeholders’ progress in a meaningful manner. Measuring the contributions of chemicals and waste related activities to other SDGs and targets may require additional indicators.
 - › *Are the three dimensions of sustainability adequately considered and approached holistically?* Given interactions between the SDGs and targets, the need to acknowledge both synergies and trade-offs, in order to reduce negative interactions while maximizing win-win situations, has been highlighted (Barbier and Burgess 2017; Morton, Pencheon and Squires 2017; Pradhan *et al.* 2017; Allen, Metternicht and Wiedmann 2018; Singh *et al.* 2018; Verles and Vellacott 2018). Inadequate consideration of, and reporting on, trade-offs may hamper credibility.

1.4 Achieving progress through effective collaborative action

Towards collaborative action under the 2030 Agenda

Bringing together stakeholders representing different sectors and societal interests relevant to chemicals and waste is in line with the integrated policy nature of the 2030 Agenda and its spirit of collaboration and equity. Such a framework could provide a space, incentives and rewards to bring together relevant sectors and stakeholders, including vulnerable and marginalized groups. In establishing such a framework, stakeholders could draw on the experience of other existing initiatives and international instruments, such as the Strategic Plan for Biodiversity 2011-2020, the 2015 Paris Agreement on climate change, and the 2017 Marrakech Partnership for Global Climate Action.

Lessons from effective multi-stakeholder collaboration

Multi-stakeholder collaboration is a challenging endeavour. Different forms of collaborative action on sustainability objectives differ in their specific considerations and scope. Yet a number of experiences and lessons learned emerge from such initiatives, including elements that

make approaches effective. One model that has been proposed to help partnerships achieve their full potential highlights the importance of putting in place essential “building blocks” for a more collaborative society (Figure 1.4). This model highlights success factors (e.g. the policy context and the supporting infrastructure for partnerships); the design of partnerships; the maturity, or readiness to partner, of organizations; and the skills and competencies of individuals involved in the collaboration.

Numerous theories and frameworks exist that seek to support sustainable innovations, and to scale them up through collaboration to achieve change around a commonly identified objective. In reviewing these models, some common elements for successful multi-stakeholder collaboration emerge:

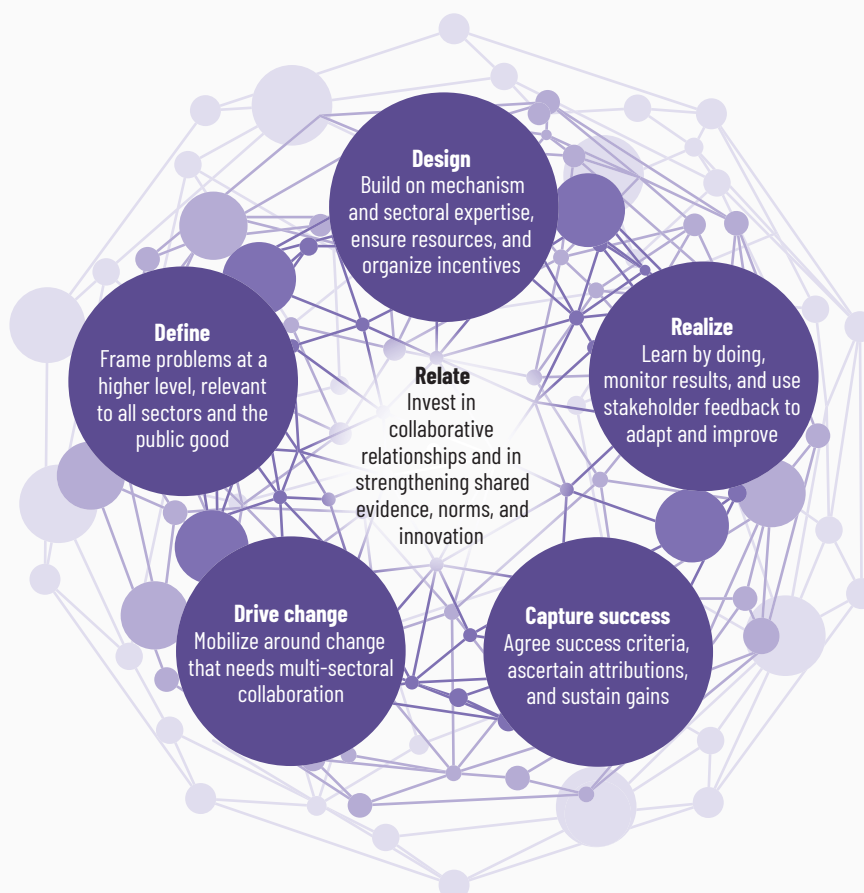
- › *People*: respecting the different viewpoints and skill sets of individuals and groups, and recognizing that a diversity of perspectives can give insights on the challenge and strengthen the outcomes.
- › *Perspective*: establishing a common awareness of the challenge, the need for collaboration and the shared value, i.e. what is to be gained from working together.

Figure 1.4 Building blocks for a collaborative society (based on Stibbe 2018)



- › *Purpose*: defining a collective purpose or vision, with aligned objectives for collaboration, taking into account the mutual benefits of collaboration as well as the individual interests of each actor.
 - › *Process*: establishing a transparent process that provides structure for different parties to engage, measure results, and scale up innovations together.
 - › *Partnering*: building the capacity of individuals to communicate and collaborate openly, and providing leadership to convene and facilitate collaboration.
 - › *Practice*: recognizing that establishing new ways of working together takes time and requires a commitment to learning and experimentation in order to break new ground.
- A recent study (Kuruvilla *et al.* 2018) explored means to ensure that multisectoral collaboration is effective, efficient, and contributes to transformative change in the context of sustainable development. Based on a review of a number of country case studies, success factors for multisectoral collaboration were identified (Figure 1.5).

Figure 1.5 A multisectoral collaboration model to achieve transformative change (adapted from Kuruvilla *et al.* 2018, p. 3)



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Based on multi-case study research, focusing on sustainable development and health issues, Kuruvilla *et al.* (2018) identified enabling factors that make “multi-sectoral collaboration work” in order to achieve transformational change. These insights could be of relevance in (re-)designing future collaborative action on chemicals and waste at all levels.

Based on multi-case study research, focusing on sustainable development and health issues, Kuruvilla *et al.* (2018) identified enabling factors that make “multi-sectoral collaboration work” in order to achieve transformational change. These insights could be of relevance in (re-)designing future collaborative action on chemicals and waste at all levels.

Challenges and opportunities for collaborative action on chemicals and waste

Lessons on multi-stakeholder collaboration are especially relevant for addressing chemicals and waste issues, as they cut across all societal and

economic sectors. Collaboration on chemicals also involves a number of unique considerations, such as addressing chemicals’ complexity and measuring their effects; the historical context of chemical pollution; public perceptions of chemicals; and the differing views of experts and generalists on chemicals’ sustainability potential. These and other factors can negatively influence, or at least complicate, efforts to achieve multi-stakeholder collaboration. The 2030 Agenda provides a new opportunity for a collaborative and integrated approach to chemicals and waste by allowing the topic to be viewed in the context of the broader objective of achieving sustainable development.

2/ Strengthening collaborative action on chemicals and waste in line with the 2030 Agenda

The 2030 Agenda provides a range of opportunities for scaling up collaborative action to achieve the sound management of chemicals and waste. These opportunities include collaborative action to achieve SDG Targets 12.4 and 3.9, focusing on chemicals and waste, which can be considered main drivers for developing and implementing effective and integrated chemicals and waste management programmes. They also include collaborative actions to implement the chemicals and waste dimension of SDG targets related to economic sectors (such as agriculture or housing) as well as to enabling sectors (such as education or financing). Finally, they include the development of a comprehensive global framework featuring ambitious priorities and coherent indicators.

2.1 Strengthening chemicals and waste management programmes at all levels



SDG Targets 12.4 and 3.9 are at the core of the sound management of chemicals and waste. They are the drivers for developing and implementing effective and integrated systems and programmes for the sound management of chemicals and waste covering all stages of the life cycle. Opportunities

therefore exist for all stakeholders, working in a collaborative manner, to strengthen national and international chemicals and waste management actions and programmes and so contribute to the achievement of these and other related SDG targets.

Establishing and strengthening national systems for sound management of chemicals and waste

The development of basic legislation and institutional capacity, in line with the Overall Orientation and Guidance and its 11 basic elements, has been recognized under the Strategic Approach to International Chemicals Management (SAICM) as critical at the national and regional levels to the attainment of sound chemicals and waste management. Many countries have already made important headway in enacting laws, creating programmes, and implementing policies to achieve the sound management of chemicals and waste. Valuable work has also been carried out by countries through the development of national chemicals management profiles and plans.

However, many other countries still lack effective national systems, including basic regulatory capacity and effective institutional structure. Such uneven progress puts vulnerable and marginalized groups at particular risk. Further steps to strengthen national systems for the sound management of chemicals and waste, particularly in developing countries and economies in transition, could include the following:

- › Intensify action at all levels to strengthen legislative and institutional capacities.
- › Strengthen country-driven processes via national chemicals management profiles and action plans on the sound management of chemicals and waste.

- › Advance policy learning, alignment and harmonization across countries and maximize opportunities for regional cooperation, drawing on existing institutional structures.

Filling data gaps and sharing knowledge globally

Although a wealth of data and knowledge has been generated, many data gaps and unknowns remain. These include gaps in regard to: chemical hazard data for a range of chemicals on the market; environmental, health and safety data; outdoor and indoor chemical releases; exposures and concentrations in humans and the environment; and adverse impacts of chemicals. Disparities remain in data collection and availability across time and countries, making the identification of baselines, trends, and emerging issues and priorities challenging. While a diverse set of mechanisms has been established at the international level to identify emerging issues and to set priorities for action, opportunities exist to explore the complementarity of processes and the use of science-based criteria for prioritization.

Various barriers pose challenges to making policy-relevant knowledge available for informed decision-making. Opportunities to strengthen the engagement of scientists and the science-policy interface include the following:

- › Take steps towards the cost-effective harmonization of data generation and collection, strengthen monitoring and surveillance capacities, and share data more systematically at all levels.
- › Scale up industry engagement in generating and disseminating relevant data.
- › Strengthen two-way communication, and support collaboration between scientists and policymakers.
- › Explore methodologies that facilitate more systematic identification of future priorities at the international level.

Enhancing the effectiveness and use of chemicals management tools and approaches

For many years governments, intergovernmental organizations, industry and other stakeholders have been developing and employing a range of science-based approaches, tools, methodologies and instruments to advance sound chemicals management and implement the 2020 goal. These approaches, and the related generation of new information, serve to identify chemical hazards, assess the exposures and risks of chemicals, promulgate risk management decisions and actions when necessary, and assess alternatives. Collectively, they have contributed significantly to protecting human health and the environment.

At the same time, concerns have been expressed that current approaches are at times complex and slow and do not result in the progress needed. Over the past decades, valuable lessons have been learned in the practical application of these approaches, and opportunities have emerged to enhance their effectiveness, streamline their use, and employ them more systematically in all countries. Developing countries and economies in transition, in particular, stand to benefit from progress in these areas. Opportunities include the following:

- › Accelerate chemical hazard assessment and harmonized classifications of substances.
- › Refine chemical risk assessment and risk management decision-making process.
- › Advance alternative assessments and informed substitution of chemicals of concern, including through non-chemical alternatives.

2.2 Mainstreaming chemicals and waste management into sector policies and actions

In addition to action to meet the SDG targets that directly address chemicals and waste management (SDG 12.4 and 3.9), the 2030 Agenda provides a renewed opportunity to strengthen inter-ministerial coordination mechanisms, and

to integrate chemicals and waste considerations into relevant sector policies and actions. Environment and Health Ministries in a number of countries have successfully reached out to sectoral Ministries and established inter-agency/inter-ministerial committees. Progress has thus been made in advancing chemicals and waste considerations in some sectors (e.g. in agriculture through the International Code of Conduct on Pesticide Management, and in health through the World Health Organization (WHO) Chemicals Road Map), while other sectors (e.g. housing) have so far received limited international attention.

2.2.1 Integrating chemicals and waste management into economic sectors

Chemical-intensive industry sectors, such as agriculture, construction, textiles, automobiles and electronics, are expanding globally, creating potential risks and opportunities. Mainstreaming sound management of chemicals and waste into these sectors can help ensure that economic growth and industrial development are sustainable and contribute to implementing the

2030 Agenda. However, many countries lack economic sector strategies and policies which ensure the sound management of chemicals and waste dimension.

Steps to integrate the sound management of chemicals and waste in economic sector policies and actions could include the following:

- › Establish and strengthen inter-ministerial coordination mechanisms and processes for regular dialogues with key sectoral stakeholders at the national level.
- › Take action to systematically integrate chemicals and waste management actions in sectoral policy frameworks.

Examples of opportunities to integrate chemicals and waste management, as well as green and sustainable chemistry innovation, in relevant economic sectors are shown in Table 2.1). In order to integrate chemicals and waste in economic sector policies and actions, concerned Ministries, working closely with respective policy communities, may consider initiating a structured

Box 2.1 The WHO Chemicals Road Map



On 30 May 2017, the Seventieth World Health Assembly approved the *Road map to enhance health sector engagement in the strategic approach to international chemicals management towards the 2020 goal and beyond* (the WHO Chemicals Road Map), as requested by Resolution WHA69.4.

The Road Map identifies actions where the health sector has either a lead or important supporting role to play, recognizing the need for multi-sectoral and multi-stakeholder cooperation. As a companion to the Road Map, WHO developed the *WHO Chemicals Road Map Workbook* which offers a structured way to work through the road map, choose priorities, and plan activities.

The Road Map has been recognized by stakeholders both within the health sector, and in other sectors, as useful for identifying actions for collaboration, and for advocating action from decision-makers.

Table 2.1 Integrating chemicals and waste management, and green and sustainable chemistry innovation, in relevant economic sectors: some opportunities

Sectors	SDG targets	Examples of opportunities for management and innovation
Agriculture and food	 Target 2.4: sustainable food production	Scale up Integrated Pest Management (IPM) and agroecological approaches, including development and use of non-chemical alternatives and other good agricultural practices
Health	 Target 3.8: safe medicines and vaccines	Sound management of pharmaceuticals and disinfectants that contribute to antimicrobial resistance
Energy	 Target 7.a: clean energy research and technologies	Improve technologies using resource-efficient, sustainable materials when decarbonizing the energy sector
Infrastructure	 Target 9.1: sustainable infrastructures	Reduce raw material use and waste generation via advanced materials without creating future legacies
Industry	 Target 9.2: sustainable industrialization	Ensure that chemical-intensive industries rely on best available techniques and best environmental practices
Housing	 Target 11.1: safe housing	Reduce indoor air pollution through safer insulation and replace building materials of concern (e.g. asbestos)
Transport	 Target 11.2: sustainable transport systems	Advance clean mobility, for example based on sustainable chemistry solutions for batteries
Tourism	 Target 8.9: sustainable tourism	Adopt practices to reduce the chemical footprint of tourism services
Mining	 Target 12.2: Sustainable use of natural resources	Ensure environmentally sound management of tailings
Labour	 Target 8.8: safe working environments	Enhance risk assessment of chemicals of concern while promoting investment in green and sustainable chemistry to reduce hazardous occupational exposures
Education	 Target 4.7: education for sustainable development	Mainstream green and sustainable chemistry into relevant curricula
Finance	 Target 17.3: financial resources from multiple sources	Enhance use of green and sustainable chemistry metrics as criteria in investment

The sectors, SDG targets and opportunities shown in this table are not exhaustive. Other relevant sectors include (but are not limited to) technology and innovation, labour, trade, development cooperation, and justice. Some of these sectors are discussed in section 2.2.2.

- approach which could include the following considerations, among others:
- › Identify industry sectors where chemicals and waste issues cause concern, including hot spots.
 - › Engage concerned industry sectors, associations and groups to initiate a dialogue.
 - › Ensure hazard and risk communication according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).
 - › Identify risk management approaches and opportunities for safer alternatives.
 - › Consider sectoral policy reform and standards to encourage sustainable chemistry innovation.
- International agreements can support policies and actions in economic sectors**
- In developing economic sector policies and actions, relevant Ministries may benefit from considering linkages with relevant international agreements on chemicals and waste. Examples of

Table 2.2 Examples of opportunities for the contribution of international chemicals and waste agreements across economic sectors

	International instrument	Examples of opportunities
	Montreal Protocol on Substances that Deplete the Ozone Layer	Reduce use of ozone-depleting substances in insulation materials in the construction industry.
	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Ensure that hazardous wastes and other wastes from all sectors are managed in an environmentally sound manner.
	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Provide parties with opportunities to make informed decisions regarding imports of hazardous chemicals and pesticides (e.g. asbestos used in construction).
	Stockholm Convention on Persistent Organic Pollutants	Reduce use of persistent organic pollutants in agriculture.
	Minamata Convention on Mercury	Control mercury-added products and manufacturing processes in which mercury or mercury compounds are used.
	ILO Conventions concerning Safety and Health in Agriculture (No. 184), Safety in the use of Chemicals at Work (C170) and the Prevention of Major Industrial Accidents (C174)	Protect workers' health, e.g. in construction, agriculture and health care.
	WHO International Health Regulations (IHR) (2005)	Ensure that up-to-date information is available on public health risks, e.g. pesticide poisonings.
	International Code of Conduct on Pesticide Management	Assist countries to develop improved registration processes for pesticides.
	Globally Harmonized System of Classification and Labelling of Chemicals (GHS)	Make hazard information available to relevant stakeholders.

the opportunities that these instruments provide to advance sustainability in economic sectors are shown in Table 2.2. The IOMC participating organizations can also play a valuable role in facilitating the development of sectoral strategies, as well as in establishing and strengthening communication channels.

2.2.2 Integrating chemicals and waste management into enabling policies and actions

The 2030 Agenda also provides a renewed opportunity to strengthen inter-ministerial

coordination to integrate chemicals and waste considerations into enabling sectors. Enabling conditions to advance sustainable development are promoted through a number of SDGs and targets, including those on education, innovation and financing. Advancing innovative solutions through enabling policies and actions has significant potential to reduce chemical pollution, thus complementing traditional action to achieve the sound management of chemicals and waste. However, chemicals and waste considerations are often not explicitly mentioned and therefore may not be addressed in relevant implementation plans.

Strengthening green and sustainable chemistry education



Green and sustainable chemistry education has received increasing attention in recent years. However, gaps remain in further mainstreaming green and sustainable chemistry into curricula and replicating successful models, particularly in developing countries. Building on existing initiatives, further efforts are needed at all levels to mainstream green and sustainable chemistry education into chemistry and other education curricula and teaching, including gathering and disseminating best practices and forging new and strengthened partnerships at the national, regional and global levels.

Strengthening research and innovation policies and programmes



Numerous innovations in green and sustainable chemistry have been developed, commercialized, or are on the horizon that illustrate the potential of chemistry to make a contribution to sustainable development. Entrepreneurs, start-up initiatives and collaborative innovation mechanisms are emerging as new tools and actors to address legacies and advance innovative solutions. Yet innovations in chemistry may also have unintended and undesirable effects, and linkages between innovators and the chemicals and waste community are not sufficiently developed. Opportunities to drive innovation in the desired direction, and strengthen collaborative innovation for green and sustainable chemistry, include the following:

- › Integrate green and sustainable chemistry considerations into enabling policies, subsidy schemes or technology programmes.
- › Apply green and sustainable chemistry principles or considerations to drive innovation in the desired direction.
- › Strengthen the innovation ecosystem, including through public research funding.

Scaling up financing and fiscal incentives



Significant financial resources have been mobilized from various sources. However, the Integrated approach to financing the sound management of chemicals and waste has not been fully implemented. Limited progress has been made by countries in integrating chemicals and waste into their development plans and/or priorities; external funding has not matched the need and demand for support expressed by developing countries and economies in transition; and gaps remain in regard to increasing industry contributions to match responsibility and the required level of support. Further steps to scale up financing and fiscal incentives beyond 2020 could include the following:

- › Use linkages with the SDGs to secure national and dedicated external financing.
- › Promote extended producer responsibility and internalization of costs by industry.
- › Explore new opportunities such as sovereign wealth funds, philanthropic finance, and strengthened engagement of the financial sector and investors.
- › Scale up the use of market-based instruments.

Strengthening access to information, participation and access to justice



Providing enhanced access to robust information by workers, consumers and citizens, as well as fostering understanding of this information, is a prerequisite for ensuring effective public participation and informed decision-making and thus achieving the sound management of chemicals and waste. However, workers, consumers, citizens and other stakeholders still lack access to important information that would allow them to make informed decisions. In addition, they may not have access to justice. Enabling policies, including worker, consumer and community right-to-know, public participation, and access to justice, coupled with innovative technologies, can help reap the full

potential for consumers, workers and citizens to engage and to protect their rights to a healthy environment while taking account of legitimate commercial confidentiality needs. As stated in the Overarching Policy Strategy, “information on chemicals relating to the health and safety of humans and the environment should not be regarded as confidential”, while also “taking account of legitimate commercial confidentiality needs” (SAICM Secretariat, UNEP and WHO 2006). Relevant measures to empower and protect workers, consumers and citizens include the following:

- › Develop and strengthen worker, consumer and community right-to-know policies and laws.
- › Ensure access to justice in matters of chemical pollution and human health protection related to chemicals and waste.
- › Ensure that consumers, workers and citizens have access to robust information, including through new information technologies.

2.3 Strengthening corporate policies



The 2020 goal cannot be achieved without strengthened action in the private sector, including the chemical industry, downstream manufacturers, and retailers. Many companies in chemical-intensive sectors, including the chemical industry itself, product manufacturers and retailers,

have taken actions to strengthen chemicals and waste management. Initiatives include voluntary standard-setting beyond compliance, implementation of business models reducing the use of chemicals of concern in processes (e.g. Chemical Leasing), scaling up of efforts to develop green and sustainable chemistry alternatives, and commitments to phase out chemicals of concern in consumer products. Despite these efforts, voluntary actions and sustainability strategies beyond compliance that advance sound chemicals management are not yet being sufficiently developed and replicated, particularly

in developing countries. Furthermore, important private sector stakeholders are not yet fully engaged in relevant discussions at the national and international level. Strengthening corporate commitment at the highest level is therefore essential.

2.4 Developing a coherent and results-oriented global indicators and reporting framework

Establishing linkages across relevant agreements and initiatives

Governance under the current international framework for chemicals and waste management is characterized by an institutional architecture with a number of distinct indicator and reporting frameworks in place, making systematic assessment of progress and identification of the overarching priorities challenging (Honkonen and Khan 2017). The development of a framework for chemicals and waste beyond 2020 provides an opportunity to create linkages across all relevant agreements and initiatives related to chemicals and waste management. Of particular value would be a comprehensive framework bringing together and complementing chemicals and waste multilateral environmental agreements (MEAs) and other relevant instruments and initiatives, without interfering in matters addressed through these specialized instruments. Metrics and sustainability reporting that document progress and strengthen the accountability of the private sector could add further value and become an important aspect of measuring progress.

Towards a common agenda to guide actions beyond 2020

An overarching common vision, strategic goals (or strategic objectives), targets and indicators to achieve sound management of chemicals and waste could provide a common agenda, guiding actions towards a desirable future in line with the 2030 Agenda. Specific chemicals and waste targets could address legacies and foster innovative solutions, creating a common agenda to which each stakeholder can contribute

Box 2.2 The integrated results and indicator framework under the Strategic Plan for Biodiversity

In 2010 Parties to the Convention on Biological Diversity adopted the Strategic Plan for Biodiversity, which comprises a shared Vision, a Mission, five Strategic Goals and 20 targets, collectively known as the Aichi Targets. The Aichi Targets provide a coherence, results and indicators framework, as well as a reference point for developing National Biodiversity Action Plans. They have been endorsed by all key international agreements in the area of biodiversity and by key actors. The Parties to the various MEAs in the biodiversity field have also agreed to work together in advancing an integrated indicators framework.



The Biodiversity Indicators Partnership (BIP) is the principal mechanism to measure progress in achieving the Aichi Targets and provide cross-mapping to the SDGs. It also supports progress reporting for other biodiversity related MEAs. The BIP incorporates more than 60 indicators, mostly reflecting monitoring data, in an integrated framework including 10 official SDG indicators. The partnership includes, inter alia, NGOs, universities, research institutes, secretariats of relevant MEAs, and other intergovernmental bodies, including the UN Statistical Division.

A key feature is that there are active institutions which take responsibility for the continued production and communication of certain indicators. The BIP also provides support to countries in order to strengthen capacity at the national level. In collaboration with partner organizations, the BIP has successfully mobilized action to track changes in biodiversity (Tittensor *et al.* 2014; Butchart, Di Marco and Watson 2016). The outcomes of work undertaken under the BIP serve as important inputs for the *Global Biodiversity Outlook*, which is produced periodically.

based on individual strengths and capacities. Reference to principles agreed during major international conferences (e.g. those in the 1992 Rio Declaration) could provide points of reference underlying actions by all stakeholders. Valuable lessons can be learned from the development

of the Aichi Targets and the Strategic Plan for Biodiversity 2011-2020, which created an integrated and coherent international framework endorsed by all stakeholders in the biodiversity cluster (Box 2.2).



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Making country reporting meaningful

In order to inform national action, reporting schemes need to be simpler, country-driven and linked to global targets. Making reporting more meaningful could be achieved by using reporting data more systematically to monitor progress over time and across countries, identify best practices, and inform capacity building measures. Useful examples include the WHO International Health Regulations (IHR) model, reflecting progress with core capacities over time; the Aichi Targets, which provide a reference point for developing National Biodiversity Action Plans; and the United Nations Framework Convention on Climate Change, by means of which country reports are linked to international action.

Consolidating national data and making them available at the global level

Better accessibility and understandability of reporting information can help measure progress and identify good practices. This, in turn, can promote learning, facilitate action at the national level, and engage different stakeholders with the instruments designed for the sound management of chemicals and waste. Moreover, such a function could provide a way for the public, nationally as well as globally, to engage in implementation in a meaningful way and to demand action and accountability. Consolidating reporting mechanisms and data from various instruments, focusing on a limited number of indicators, and making this available at the global level, as done, for example, in the case of the Global Health Observatory, would help to ensure accountability, track progress, engage stakeholders and identify good practices (Secretariat of the Vienna Convention and the

Table 2.3 Example of a results chain to minimize adverse impacts

Activities	Outputs	Outcomes	Impacts
<ul style="list-style-type: none"> › Develop GHS awareness-raising and capacity building materials › Prepare an implementation strategy for the GHS in key sectors 	<ul style="list-style-type: none"> › GHS standards and regulation developed › Key stakeholders trained and have capacity to implement the GHS 	<ul style="list-style-type: none"> › GHS labels and safety data sheets available at the workplace › Companies and workers take precautionary measures 	<ul style="list-style-type: none"> › Reduced number of deaths and illnesses among workers and minimized impacts on the environment

Implementation of the GHS is a necessary, but in many cases not sufficient measure for reducing the number of deaths and illnesses among workers and minimizing impacts on the environment.

Montreal Protocol 2018). The Montreal Protocol Ozone Data Center is another example of a useful implementation information system (WHO 2018).

Towards a results framework that distinguishes measures taken and impacts

A coherent framework would benefit from distinguishing between outputs (e.g. adoption of legislation) and impacts (e.g. reduction of adverse impacts from hazardous chemicals), using impact indicators, where possible, to determine whether interventions are successful. Most indicators currently used to monitor progress under international chemicals and waste agreements are output-, activity- or instrument-based, making it difficult to assess progress in protecting human health and the environment from the adverse effects of chemicals and waste. A

number of intergovernmental organizations (e.g. World Bank 2007; UNDP 2011; OECD 2017) have identified the usefulness of considering a results chain in measuring progress against agreed objectives.

In developing the framework, consideration also needs to be given to impact-focused targets in the 2030 Agenda. Concerning activity and output indicators, work under SAICM could serve as a starting point. It provides an example of indicators distinguishing between activities, outputs, outcomes and impacts to illustrate such a results chain. Further thinking could explore a comprehensive framework at the national level, as well as the interface of such a framework with tracking of progress at the global level. Important lessons can be learned from the global biodiversity cluster (Table 2.3).

3/ Engaging all sectors and actors in chemicals and waste management beyond 2020

Mobilizing additional stakeholders to shape chemicals and waste management beyond 2020

Protecting human health and the environment from the adverse effects of chemicals and waste requires the engagement of all relevant stakeholders at the national, regional and global levels. This includes not only the chemicals and waste community, such as Ministries of Environment and Health, intergovernmental organizations, civil society organizations engaged in chemicals and waste, the chemical industry and trade unions, but also actors in key economic and enabling sectors, some of which have so far not been sufficiently engaged. To advance ambitious and concerted commitment, a

global collaborative framework for the sound management of chemicals and waste would need to create mechanisms and incentives to foster the commitment and engagement of sectoral Ministries, retailers, downstream manufacturers and academia, as well as the broader global community.

Further engaging key economic and enabling sectors

Despite some efforts and success stories in reaching out to and engaging stakeholders in economic sectors, limited progress has so far been made at the national and global level. Stakeholders may wish to consider the following



measures to further engage key economic and enabling sectors beyond 2020:

- › *Strengthen partnerships through intergovernmental organizations:* Building on ownership and competitive advantages in the respective sectors, these organizations could take further steps to integrate chemicals and waste into their work streams and projects (as for example done with the WHO Chemicals Road Map). The IOMC organizations play an important role by providing the critical links to engage relevant sectoral Ministries already working on chemical and waste issues, as well as other stakeholders. Action plans could be drawn up to strengthen the chemicals and waste dimensions in the respective sectors.
- › *Focusing on specific sectors:* Attention and resources could be mobilized in a more efficient and effective manner by focusing on specific economic sectors at a given point in time. For example, yearly themes could be organized through SAICM, starting, for example, with the construction sector.
- › *Developing sectoral strategies:* Ministries of Environment and Health could take the lead in reaching out to sectoral Ministries in order to develop joint strategies for the integration of chemicals and waste issues in relevant national strategies and budgeting. This could be embedded in a global framework, providing overarching international strategies to advance the sound management of chemicals and waste in each sector.

Further engaging companies, industry groups and trade associations

The private sector has a critical role to play, not only in addressing past legacies and preventing future ones but also in advancing innovative solutions to maximize the benefits of chemistry. Stakeholders may wish to consider the following measures to further engage key companies, industry groups and trade associations beyond 2020:

- › *Creating a platform for frontrunners:* Giving a public platform to frontrunner retailers and downstream manufacturers that are excelling through innovative action to reduce the use of chemicals of concern, in order to showcase their achievements, may prove a useful tool to reward and further strengthen commitment and to motivate other companies to adopt similar practices, thus triggering a “race to the top”. Governments would have the possibility to require, at some stage, that the practices of frontrunners are to apply to all players in the field concerned.
- › *Strengthening voluntary standards:* The private sector can further step forward and show leadership by developing and implementing voluntary standards beyond compliance. These could be developed in close collaboration with the public sector and civil society, in order to enhance transparency and effectiveness.
- › *Replicating innovative business models:* Efforts can be made to gather and share, also internationally, best practices in implementing innovative business models, and to replicate them, particularly in developing countries. North-South (as well as South-South) public-private partnerships could be established for this purpose.

Further engaging the academic and research community

The full potential of the academic community to provide data and knowledge to inform decision-making has not yet materialized, given insufficient communication and engagement. Stakeholders may wish to consider the following measures to further engage the academic and research community beyond 2020:

- › *Providing incentives for scientists:* Scientists may be more interested and motivated to provide targeted and tailor-made inputs for chemicals and waste policymaking if concrete reward structures are in place. This could

include focusing the criteria of science funding agencies more on the sustainability aspect, and on giving due prominence to contributions made which advance sustainability.

- › *Involving scientists:* Proactive efforts can be made to foster dialogue between scientists and policymakers, including by inviting scientists to participate more prominently in relevant fora and thus give them a voice, e.g. in bodies implementing or overseeing national and international instruments, in science-based projects implemented by intergovernmental organizations, and in industry initiatives.
- › *Improving communication with scientists:* Policymakers could inform scientists more systematically about their needs, e.g. by writing guest articles in scientific journals or by speaking at academic conferences. Moreover, bodies could be established to organize regular exchanges between scientists and policymakers, both at the national and international level.

Further engaging the donor, investor and financial communities

The integrated approach to financing the sound management of chemicals and waste provides a valuable framework; however, insufficient resources have so far been mobilized and there is a need for new sources of financing as well as building capacity for innovative financing, which may include cost recovery systems and placing responsibilities on industry. Stakeholders may wish to consider the following measures to further engage the donor, investor and financial communities beyond 2020:

- › *Mobilizing new donors:* The linkages between chemicals and waste and the SDGs provide a valuable opportunity to tap into the large pools of funding available for implementation of the 2030 Agenda for chemicals and waste related projects in a wider context. This linkage can be particularly valuable in mobilizing resources from global public as well as private funds, including philanthropic finance. For example, linkages between chemicals and clean energy

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could help mobilize resources from the Green Climate Fund.

- › *Mobilizing new business angels and investors:* There are significant opportunities, for example, to link promising start-up companies in the field of sustainable chemistry with investors that base their decisions on sustainability criteria. Bringing these potential business angels into the chemicals and waste community could prove a win-win situation.
- › *Identifying new sources of financing:* Institutional investors have a large untapped potential to finance interventions for the sound management of chemicals and waste. It may thus prove beneficial to reach out to public pension funds and sovereign wealth funds and offer them investment opportunities that meet their sustainability criteria.

Engaging leaders in the media

Stakeholders may wish to consider the following measures to further engage leaders in the media beyond 2020:

- › *Scaling up collaboration with the media:* Media outlets continue to play a critical role in placing topics on the national and international agenda. Strengthened engagement of the media can help not only to multiply the effect of campaigns, but also to facilitate a more systematic information flow to ensure that citizens are able to track progress in reducing the adverse effects of chemicals and waste and exert pressure on regulators and the private sector.
- › *Implementing campaigns to stimulate action on priority topics:* The “Beat Plastic Pollution” and “Detox” campaigns are only two of many examples demonstrating the potential of public campaigns to raise awareness. Such campaigns can mobilize stakeholders and unite them behind a common goal at the local, national, regional and global levels.

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Chapter 1

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