

STUDY ON INDUSTRY INVOLVEMENT IN THE INTEGRATED APPROACH TO FINANCING THE SOUND MANAGEMENT OF CHEMICALS AND WASTE

APRIL 2022



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Suggested citation: United Nations Environment Programme (2022). Study on industry involvement in the integrated approach to financing the sound management of chemicals and waste. Geneva.

Production: Geneva

<https://www.saicm.org/>

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Abbreviations

CIEL	Center for International Environmental Law
EPR	extended producer responsibility
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
ICCA	International Council of Chemical Associations
ILO	International Labour Organization
IPEN	International Pollutants Elimination Network
ISO	International Organization for Standardization
LIRA	legal and institutional infrastructures and measures for recovering the costs of national administration
OECD	Organisation for Economic Co-operation and Development
PCBs	polychlorinated biphenyls
PFAS	perfluoroalkyl and polyfluoroalkyl substances
REACH	registration, evaluation, authorization and restriction of chemicals regulation
SAICM	Strategic Approach to International Chemicals Management
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
WHO	World Health Organization

Executive summary

The integrated approach to financing the sound management of chemicals and waste was proposed to the Governing Council of the United Nations Environment Programme (UNEP), at its twenty-seventh session in 2013, by the Executive Director of UNEP, in his report on the consultative process on financing options for chemicals and wastes (UNEP, 2012). In its decision 27/12, the Council invited Governments, relevant organizations and entities and other stakeholders to apply such an integrated approach in order "to support efforts at the national and international levels to secure sustainable, predictable, adequate and accessible financing for the sound management of chemicals and wastes" (UNEP, 2012). Industry involvement is one of the three pillars of the integrated approach, along with the mainstreaming of the sound management of chemicals and wastes into development planning and dedicated external financing, and it is central to the mobilization of the necessary funding. The UNEP Governing Council, in its decision 27/12, specifically invited Governments "to implement actions to further encourage industry involvement in the integrated approach, including the development of legislation on the responsibilities of industry and national administration, the provision of incentives for sound chemicals and wastes management, and the promotion of measures by industry to internalize costs as per the polluter pays principle".

Although, on paper, the integrated approach is an aspirational tool for involving industry in accordance with national needs and circumstances, its concrete implementation has been hampered by a lack of clarity regarding what constitutes industry involvement and the absence of a mechanism for monitoring progress. While specific activities for ensuring industry involvement are outlined in the proposal by the Executive Director (UNEP, 2012), there has been little in the way of further elaboration of the concept. The difficulty of implementing the polluter pays principle and the subsequent funding deficit have been highlighted in numerous evaluations and assessments, including an evaluation of the integrated approach (UNEP, 2019b), an independent evaluation of the Strategic Approach to International Chemicals Management (SAICM) from 2006 to 2015 (SAICM, 2019a) and both editions of the report *Global Chemicals Outlook* (UNEP, 2013b; UNEP, 2019c), with the first edition highlighting that "the vast majority of human health costs linked to chemicals production, consumption, and disposal are not borne by chemicals producers, nor shared down the value-chain".

The present study is the first that aims to provide a holistic description of the activities associated with industry involvement in the integrated approach, including options for action at various levels and for a variety of actors. The description is accompanied with a proposal for tracking progress in industry involvement in relation to the objectives and targets of a future framework/instrument for the sound management of chemicals and waste beyond 2020. The study has involved extensive data collection and broad consultation with SAICM stakeholders as further explained in section 1.2. on methodology. The analysis presented in the study does not provide definitive answers, but rather is intended to provide helpful context and recommendations to inform SAICM stakeholders in their preparations for the fifth session of the International Conference on Chemicals Management, at which the Conference will adopt a framework/instrument for the sound management of chemicals and waste beyond 2020. The study is also of relevance to delegations and stakeholders of the fifth session of the United Nations Environment Assembly of the United Nations Environment Programme, which identified pollution and waste as one of three main planetary crises to be addressed.

The long-term aims of the study are (i) to help finance ministries, international governmental organizations, the private sector, non-governmental organizations, financial institutions, academia, educational institutions and philanthropic institutions to understand better the economic case for involving industry in the sound management of chemical and waste; and (ii) to

accelerate the transformation of national economic models and industrial practices across the value chain of chemicals so that they appropriately internalize the cost of the production, use, trade, and disposal of chemicals and waste.

Activities for industry involvement

The table below lists the activities for industry involvement examined in the present study, grouped into regulatory measures, economic instruments and voluntary measures, as well as mixed measures that may be voluntary or mandatory, depending on the country. The study describes each of these measures in detail, provides examples and discusses how they can be applied to the sound management of chemicals and waste.

Suggested classification of activities for industry involvement and the related contribution in terms of financing

Category	Examples of measures (non-exhaustive)	Financial contribution
Regulatory measures (mandatory; domestic)	Definition of responsibilities for chemicals control	Indirect
	Development of legislation and monitoring of compliance	Indirect
Economic instruments (functioning as incentives; domestic)	Fees	Direct
	Taxes	Direct
	Subsidies	Indirect
	Tradable permits	Indirect
	Liability	Direct
Mixed measures (a combination of voluntary and mandatory measures)	Sustainable and transparent value chains	Indirect
	Testing to support risk assessment and the management of chemicals	Indirect
	Standards and certification schemes	Indirect
Voluntary measures (voluntary domestic and international investment)	Research, development and innovation	Indirect
	Strengthening of the knowledge base for action	Indirect
	Sustainable business models	Indirect
	Partnerships and coalitions	Indirect
	Engagement of financial institutions	Indirect
	Industry support for developing countries	Direct
	Programmatic support for SAICM	Direct

Tracking progress in industry involvement

To plan development interventions effectively and allocate scarce resources properly, it is indispensable to keep record of what is being done. The creation of indicators to measure inputs, activities, outcomes and impacts is important in the design of an efficient tracking system and for providing the necessary feedback to stakeholders. A possible way forward is to define a process in stages, initially setting high-level indicators that use data that can be easily collected through existing reporting mechanisms.

The measurement of broad financial inputs to track industry involvement could initially focus on three streams:

- 1) Funds collected through economic instruments (data to be found in reporting by Governments)
- 2) Costs faced by industry in complying with regulations (data to be found in reporting by industry)
- 3) Funds channelled through voluntary measures (data to be found in reporting by industry and

reports by relevant United Nations bodies, such as SAICM; the UNEP Special Programme to support institutional strengthening at the national level for implementation of the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, the Stockholm Convention on Persistent Organic Pollutants, the Minamata Convention on Mercury and SAICM; and the Global Environment Facility (GEF)).

Over time, as indicators are further refined and an outreach strategy to involve the private sector is developed, a more comprehensive reporting mechanism could be developed to measure financial inputs and performance. The present study offers a preliminary and non-exhaustive list of indicators on which Governments and industry could report. Stakeholders other than industry are also identified for the provision of data, such as Governments, intergovernmental organizations and non-governmental organizations. The study gives examples of specific organizations and existing sources of related information that could be used, at least partially, to obtain the data required and to identify the custodians of data collection. In addition to the design of the mechanism, a related communication and engagement strategy should be developed and implemented to increase reporting rates.

The way forward at the international level

There is an urgent need to increase the accountability of industry at the international level in terms of internalizing the externalities of unsound management of chemicals and waste. It must be borne in mind, however, that sovereignty dictates that each Government is free to determine what activities best meet its national needs. The fifth session of the International Conference on Chemicals Management represents a unique opportunity to articulate how the framework/instrument for the sound management of chemicals and waste beyond 2020 can foster accountability through a multi-stakeholder approach.

Stakeholders may thus wish to consider:

- 1) Implementing the industry involvement component of the integrated approach by articulating the activities that are needed and identifying the relevant stakeholders; promoting the design of model regulations, training and toolkits for each measure, with the involvement of all stakeholders, including unrepresented and vulnerable groups, regulatory cooperation and the use of best regulatory practices; elaborating a strategy for outreach to and the involvement of the private sector in the framework/instrument for the sound management of chemicals and waste beyond 2020. (International Conference on Chemicals Management);
- 2) Developing, step by step, a mechanism to track progress in industry involvement, endeavouring to measure outputs and outcomes (International Conference on Chemicals Management); conducting an in-depth assessment of the information that is currently collected or could be obtained through existing mechanisms, such as multilateral organizations or standardized reporting systems, and engaging with relevant organizations to harmonize methodologies for data collection (United Nations Environment Assembly);.
- 3) Establishing a capacity-building clearing-house mechanism, marketplace and/or global commitment platform for the development, implementation and monitoring of and communication about partnerships and other voluntary commitments. (International Conference on Chemicals Management);
- 4) Developing and promoting the use of a comprehensive and harmonized set of recommendations for chemicals-related sustainability disclosures in order to help translate the objectives and targets of the framework/instrument for the sound management of

chemicals and waste beyond 2020 into clear guidelines for investment and financing decisions. (International Conference on Chemicals Management);

- 5) Creating a technical expert group to expedite the mobilization of the funds needed by developing countries, with a focus on innovative forms of financing that involve primarily the private and financial sectors, including, but not limited to, blended finance, a global coordinated tax and an international fund for chemicals and waste. (United Nations Environment Assembly).

A more exhaustive list of the possible actions by key stakeholder groups is presented in section 4 of the present study, on the way forward. These proposed activities would benefit from further discussion with a view to ascertaining what is most important for stakeholders in the implementation of the framework/instrument for the sound management of chemicals and waste beyond 2020.

1. Introduction

The integrated approach to financing the sound management of chemicals and waste was proposed to the Governing Council of UNEP, at its twenty-seventh session in 2013, by the Executive Director of UNEP in his report on the consultative process on financing options for chemicals and wastes (UNEP, 2012). In its decision 27/12, the Council invited Governments, relevant organizations and entities and other stakeholders to apply such an integrated approach in order “to support efforts at the national and international levels to secure sustainable, predictable, adequate and accessible financing for the sound management of chemicals and wastes” (UNEP, 2012). Industry involvement is one of the three pillars of the integrated approach, along with the mainstreaming of the sound management of chemicals and wastes into development planning and dedicated external financing, and it is central to the mobilization of the necessary funding.

1.1. Objective

The objective of the present study is to provide clarity with respect to the activities that could be undertaken, at various levels, to implement the industry involvement component of the integrated approach.

The study also seeks to elaborate on the possibilities for monitoring industry involvement in conjunction with the framework/instrument for the sound management of chemicals and waste beyond 2020, with a view to increasing international accountability in relation to industry involvement. The study does not aim to provide definitive answers about the scope of and the precise activities that constitute industry involvement. Instead, it aims to give helpful context and recommendations to support decision-making on industry involvement in preparation for the fifth session of the International Conference on Chemicals Management. It can also be used as input for the development of guidelines on implementing industry involvement. Additionally, the present study can inform discussions on financing in relation to the framework/instrument for the sound management of chemicals and waste beyond 2020.

The study has been conducted subsequent to the 2019 evaluation of implementation of the integrated approach to financing the sound management of chemicals and waste (UNEP, 2019b). The evaluation identified challenges for implementation of the industry involvement component, including a lack of clarity regarding what constitutes an industry contribution; the absence of a mechanism for tracking activities and financial flows; and a poor understanding of the mechanisms for industry participation at the national level, including in relation to taxes, chemicals and waste legislation, public–private partnerships and capacity development (UNEP, 2019b; para. 25). Moreover, the study responds to the independent evaluation of SAICM from 2006–2015, which highlighted that during that period “insufficient progress had been made on taking forward the mainstreaming and industry involvement components of funding identified in the integrated approach to the sustainable financing of sound management of chemicals and waste proposal” (SAICM, 2019a; para. 420).

The study is aimed at SAICM stakeholders that have a role in industry involvement, such as representatives of Governments, industry, the private sector, non-governmental organizations, intergovernmental organizations and academia. The document aims to describe the activities that could be undertaken by the various actors across the value-chain to contribute to the integrated approach to financing the sound management of chemicals and waste.

1.2. Methodology

The present study involved extensive data collection and broad consultation with the SAICM stakeholders as described below. Taking on board stakeholders' views and input was an important part of the process to develop this study and contributions are reflected, anonymously, in the different sections of the study. The conduct of the study comprised five main stages.

Stage 1. Literature review

The study began with a review of United Nations documents on the integrated approach to identify the activities that needed to be assessed. Such documents included decision 27/12 of the UNEP Governing Council, the report of the Executive Director of UNEP on the consultative process on financing options for chemicals and wastes (UNEP, 2012), the evaluation of the implementation of the integrated approach (UNEP, 2019b) and the independent evaluation of SAICM from 2006–2015 (SAICM 2019a). Section 3 of the present study, on tracking progress, was aligned with the work done by the Technical Working Group on targets, indicators, and milestones for SAICM and the sound management of chemicals and waste beyond 2020 (SAICM, 2020c). A literature review was then conducted focusing on academic and policy-related sources. The literature review involved searches in the online platform EBSCOhost using relevant key words and phrases, such as "integrated approach", "polluter pays principle" and "financing chemicals safety". Data collection focused on definition of the scope of activities and the possibilities for tracking progress in their implementation. Relevant examples of industry involvement in the financing of the sound management of chemicals and waste and of experience outside the chemicals and waste sector were used as inspiration and are reflected throughout the document as examples and case studies. The literature review continued until finalization of the study.

Stage 2. Survey

In December 2020, a self-administered online survey was circulated to all SAICM stakeholders. The survey generated 56 responses that were used as a basis for the draft outline of the study. Although responses were received from all stakeholder groups and all regions, they were generic in nature, making the interview stage (stage 4) more important. The main results of the survey are set out in annex I.

Stage 3. Online consultations

In March 2021, the draft outline was posted online for comment by all SAICM stakeholders. A total of 14 responses were received, from Bangladesh, Canada, Colombia, Estonia, Finland, Germany, Japan, Mexico, Sweden, the United Kingdom of Great Britain and Northern Ireland, the United States of America, the Centre for Research and Education for Development Cameroon, the International Council of Chemical Associations (ICCA) and the International Pollutants Elimination Network (IPEN). The comments were taken on board in the development of a revised draft of the outline, which was used as the basis for stage 4.

Stage 4. Interviews

A set of 22 semi-structured interviews with 35 experts (18 women and 17 men) were conducted to delve deeper in terms of data collection. The selection of experts focused on government representatives in line with the country-led nature of the integrated approach and respected balanced geographical representation (experts hailed from five developing countries or countries with emerging economies, three developed countries and one regional economic integration organization). In addition, there was balanced representation of major stakeholder groups, namely industry, comprising representatives of chemical and pesticides associations and companies from the mining, fragrance and service sectors (four), non-governmental organizations (four), intergovernmental organizations (three), and international financial institutions and funding

mechanisms (two). The selection of the experts from the aforementioned groups, in addition to efforts to maintain a gender balance, focused on individuals that had voiced a strong interest in or had received international acclaim for their efforts to advance the financing of the sound management of chemicals and waste. The results of the interviews included in this study have been made anonymous through a random, three-digit designation. The background to and protocols used for conducting the semi-structured interviews are set out in annex II. Owing to the limited number of interviews and the multiplicity of actors that are considered to be “industry” across the life cycle of a chemical or waste, the conduct of a follow-up study could be considered to deepen data collection and to obtain a better understanding of sector-specific approaches.

Stage 5. Webinar and input for the draft report

In September 2021, the draft study was posted online for comment by all SAICM stakeholders, and a webinar was conducted to present the draft study and provide clarifications. Comments on the draft were received from 11 stakeholders (Canada, Germany, Japan, Mexico, South Africa, Sweden, the United Kingdom, the United States, ICCA, IPEN and the UNEP Special Programme to support institutional strengthening at the national level for implementation of the Basel, Rotterdam and Stockholm conventions, the Minamata Convention and SAICM).

1.3. Scope

The scope of the study includes all activities related to the industry involvement component of the integrated approach and all industry actors in the value chain. The rationale for this is explained below.

1.3.1. Scope of the activities

The integrated approach to financing the sound management of chemicals and waste conceptualizes industry involvement. It articulates the need to undertake activities that “spur the mobilization of resources” and/or “reduce the cost of the sound management of chemicals and waste” (UNEP, 2012). This means that many of the activities that fall under the concept of industry involvement are not linked to the generation of revenue, but they are still needed to instil in industry representatives responsibility for reducing the overall financing needed to achieve sound management of chemicals and waste in the long run.

During the conduct of the present study, there were divergent views on whether it should focus solely on the specific activities that generate funding or whether it should have a broader scope. As most interviewees favoured the examination of industry involvement through a broader lens, in line with the report of the Executive Director of UNEP, the scope of the study was set accordingly. Another option would have been to shortlist the activities that are directly relevant to financing and that would help to track the financial contributions related to industry involvement, but such an approach would not have tracked industry involvement in a holistic way as articulated in the integrated approach.

1.3.2. Scope of industry actors

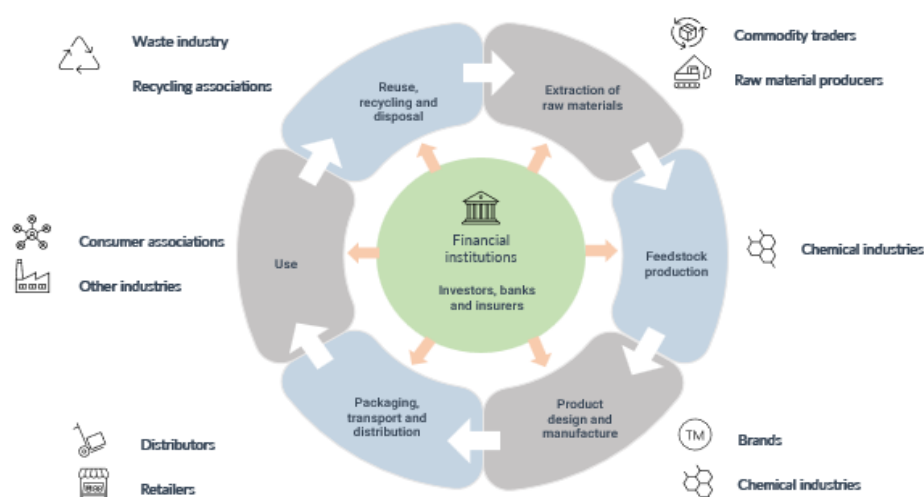
The integrated approach uses the term “industry” and specifies that it includes “industries at all points in the chemicals sector value chain” (UNEP, 2012; para. 23). This has been interpreted in a significantly broader manner than the traditional definition of industry in the chemicals context, which focuses on upstream process and thus refers to feedstock production and product design and manufacture. To this end, while most of the study does focus on the upstream portion of the value chain, the scope of the study allows for the broader interpretation of “industry”, namely the

entire private sector that is involved across the entire value chain of chemicals, extending from the producers of raw materials to the waste industry and recycling associations.

Moreover, the interviews confirmed that industry involvement must be understood to include not only actors across the value chain, but also financial institutions, including institutional investors, banks and insurers. The need to engage financial institutions is outlined in the mainstreaming component of the integrated approach, but such institutions have been included in the present study owing to growing interest and the acknowledgement that financial institutions greatly influence the operations of the private sector across the value chain of chemicals through their financial decision-making. Figure 1 provides an overview of the private sector actors throughout the value chain and product life cycle and the financial institutions included in the scope of the study.

Figure 1

Private-sector actors throughout the value chain and the product life cycle and financial institutions included in the scope of the present study



Source: UNEP (2020b).

The following actions can help in determining the scope of the industry actors to be involved and in articulating expectations:

- A change in terminology to refer to the “private sector” instead of “industry” in order to reach a broader audience
- Preparation of a detailed mapping of activities across the value chains of key sectors in order to improve understanding of how the various actors are expected to act and to report on their progress
- More in-depth study of the possibilities for engaging financial institutions

1.4. Background to the integrated approach

A consultative process on financing options for chemicals and wastes was launched by the Executive Director of UNEP at the fourth meeting of the Conference of the Parties to the Stockholm Convention in May 2009. The consultative process consisted of five meetings between 2009 and 2011 and the outcome is described in a report of the Executive Director, in which he proposed the

integrated approach to financing the sound management of chemicals and wastes, seeking to incorporate advice from Governments and other stakeholders (UNEP, 2012). In 2013, the UNEP Governing Council, in its decision 27/12, welcomed an integrated approach to financing the sound management of chemicals and waste composed of three complementary and interlinked components: (i) mainstreaming the sound management of chemicals and wastes into development planning; (ii) industry involvement; and (iii) dedicated external financing.

Although it is not a negotiated and agreed text, the report of the Executive Director of UNEP provides clarity with regard to the rationale for industry involvement and lists related activities that could be undertaken by Governments and other stakeholders, as outlined in table 1.

Table 1

Areas of industry involvement mentioned in decision 27/12 of the UNEP Governing Council along with the rationale and activities set out in the report of the Executive Director of UNEP on the consultative process on financing options for chemicals and wastes

Decision 27/12 (section VIII, para. 5)	Rationale	Activities (non-exhaustive list)
The development of legislation on the responsibilities of industry and national administration .	The effective and cost-efficient involvement of industry requires clarity and coherence in the allocation of mandates and responsibilities between public bodies and industry. Hence there is a need to clearly identify the mandate of public bodies involved in any related activities, at every stage of a chemical's life cycle, and to ensure a clear allocation of responsibilities between national administrations and industry (para. 24)	• Develop legislation that clearly defines the responsibilities of Governments and industry in order to establish the authority and national ability to control chemicals with the aim of ensuring cost-efficient management efforts to protect human health and the environment (para. 29 (b)) • Develop legislation and enforce and monitor industry compliance (para. 29 (a)) • Make use of existing tools and guidance to build legal and national infrastructures for the sound management of chemicals and wastes through cost recovery systems (para. 29 (j))
The provision of incentives for sound chemicals and wastes management.	Economic instruments are a set of policy mechanisms that can provide financing for chemicals and wastes management through, in particular, cost recovery. Cost recovery measures seek to shift the hidden public costs of managing chemicals from government budgets to private sources. Cost recovery mechanisms may not cover the full costs of such systems but promote a more appropriate sharing of costs between the public and private sectors (para. 27)	• Develop cost recovery measures at the national level to fund the administrative process of providing and maintaining systems for governing the marketing of chemicals at the national level, in order to shift the administrative and operational costs of activities from government budgets to producers and importers that benefit from those activities (para. 29 (c)) • Further incorporate chemicals and wastes considerations into extended corporate responsibilities "downstream", including corporate social responsibility initiatives such as the United Nations Global Compact and triple-bottom-line accounting (para. 29 (d)) • Undertake measures and develop incentives to strengthen the role of industry in financing research, development and innovation, co-financing projects and direct contributions to relevant funds (para. 29 (i))
The promotion of measures by industry to internalize costs as per the polluter pays principle.	The main activity expected of industry is to take further measures to internalize costs, in accordance with the polluter pays principle, and to broaden and multiply voluntary agreements on the sound management of chemicals and wastes. Furthermore,	• Enhance private–public relationships and partnerships, including through in-kind contributions and partnerships that support the chemicals and wastes agenda internationally and nationally (para. 29 (e)) • Promote and undertake voluntary industry and capacity-building initiatives (para. 29 (f))

Decision 27/12 (section VIII, para. 5)	Rationale	Activities (non-exhaustive list)
	financing contributions by industry through dedicated external financing as called for by the integrated approach would be strongly encouraged (para. 30)	• Strengthen the role of industry as a capital investor through the transfer of technology, as appropriate, best practices and expertise, recognizing that technology transfer occurs through established legal structures taking into account intellectual property rights (para. 29 (g)) • Recognize industry activities that internalize the cost of complying with chemicals and wastes regulations and standards and adhering to international good practices and national laws and regulations (para. 29 (k)) • Promote increased resource-efficiency and process optimization through, for instance, best available techniques and green economy initiatives (para. 29 (h))

Source: UNEP (2012).

Although the concept of industry involvement is afforded greater clarity in the integrated approach, it already features in the main SAICM policy instruments that were adopted in 2006 at the first session of the International Conference on Chemicals Management, including the Dubai Declaration on International Chemicals Management and the Overarching Policy Strategy (SAICM, 2006). The former commits to the continued mobilization of financial resources from the private sector, and the latter invites industry to provide resources for implementation of SAICM. In addition, the Global Plan of Action of SAICM, adopted at the same time (SAICM, 2006), includes an area of work dedicated to the promotion of industry participation and responsibility. Table 2 sets out the relevant sections on industry involvement in the main SAICM policy instruments.

Table 2

References to industry involvement in the main SAICM policy instruments adopted in 2006 at the first session of the International Conference on Chemicals Management

SAICM policy instrument	Text relevant to industry involvement
Dubai Declaration on International Chemicals Management	• The private sector has made considerable efforts to promote chemical safety through voluntary programmes and initiatives such as product stewardship and the chemicals industry's Responsible Care programme (para. 4). • We will continue to mobilize national and international financing from public and private sources for the lifecycle management of chemicals (para. 16). • We will engage actively in partnerships between Governments, the private sector and civil society, including strengthening participation in the implementation of the Strategic Approach by small and medium-sized enterprises and the informal sector (para. 19). • We stress the responsibility of industry to make available to stakeholders such data and information on health and environmental effects of chemicals as are needed safely to use chemicals and the products made from them (para. 20). • We will ensure that, when information is made available, confidential commercial and industrial information and knowledge are protected in accordance with national laws or regulations or, in the absence of such laws and regulations, are protected in accordance with international provisions. In making information available, information on chemicals relating to the health and safety of humans and the environment should not be regarded as confidential (para. 22).
Overarching Policy Strategy	Section V on financial considerations invites the industry to enhance partnerships and financial and technical participation to help deliver the SAICM objectives through the following activities (para. 19 (b)):

SAICM policy instrument	Text relevant to industry involvement
	• To review and strengthen current voluntary industry initiatives to address the considerable challenges associated with the implementation of SAICM objectives. • To develop new initiatives, including in partnership with foundations, academia and non-governmental organizations, for the implementation of SAICM objectives. • To provide resources, including in-kind contributions, for the implementation of SAICM objectives, continuing and building upon its initiatives on good corporate social and environmental responsibility.
Global Plan of Action	The promotion of industry participation and responsibility constitutes a specific work area in the Global Plan of Action that includes the following activities: • Encourage industry to generate new science-based knowledge, building on existing initiatives (activity 98). • Encourage use of voluntary initiatives (e.g., the Responsible Care programme and the Code of Conduct of the Food and Agriculture Organization of the United Nations (FAO)) (activity 189). • Promote corporate social responsibility for the safe production and use of all products, including through the development of approaches that reduce human and environmental risks for all and do not simply transfer risks to those least able to address them (activity 190). • Promote innovations and continuous improvement of chemicals management across the product chain (activity 191). • Promote within the industrial sector the adoption of pollutant release and transfer registers and cleaner production methods (activity 192).

Source: SAICM (2006).

The issue of secure and sustainable financing has been discussed at each of the sessions of the International Conference on Chemicals Management (SAICM, 2019a). In 2015, at its fourth session, the International Conference on Chemicals Management welcomed the integrated approach to financing the sound management of chemicals and wastes and highlighted its applicability to SAICM. The Conference also endorsed the overall orientation and guidance for achieving the 2020 goal of sound management of chemicals (SAICM, 2015), which includes, as one of its 11 basic elements, "industry participation and defined responsibility across the life cycle, including cost recovery policies and systems as well as the incorporation of sound chemicals management into corporate policies and practices". The overall orientation and guidance document reiterates the need to define the responsibilities of industry and national administrations and to develop economic instruments including cost recovery systems. It further specifies that "all those involved in national planning processes must internalize the costs and integrate the economic benefits of providing resources for sound chemicals management. In doing so, they should include ... the development of capacity for assessing costs of inaction and benefits of action".

At present, financing is being discussed in context of the intersessional process considering the Strategic Approach and the sound management of chemicals and waste beyond 2020. At the first meeting of the intersessional process that took place in 2017, there was already general agreement that financial resources would be critical to the success of chemicals and waste management beyond 2020 and for narrowing the gap between developed and developing countries in terms of chemicals and waste management. Representatives also said that the range of funding sources needed to be broadened, to include, in particular, the chemicals industry (SAICM, 2017).

In 2018, at the second meeting of the intersessional process, the SAICM secretariat presented a report on financing the sound management of chemicals and waste beyond 2020, which outlined preliminary ideas for fostering industry involvement, such as the development of policies to change investment patterns (e.g., direct emission restrictions on investments), the adoption of

pricing of environmental externalities and implementation of green and sustainable chemistry principles (SAICM, 2018).

In 2020, in response to a call made by the Open-ended Working Group of the International Conference on Chemicals Management at its third meeting in April 2019, the SAICM secretariat published a review of cost recovery mechanisms and other economic policy instruments for the financing of the sound management of chemicals and waste (SAICM, 2020b). The report provides examples of successful cost recovery and the use of other economic instruments and recommends promotion of their further use by increasing information, outreach and capacity support, while commending existing guidance produced by UNEP. Moreover, the review provides recommendations for policy development and follow-up, including action to explore the development of a global cost internalization programme, develop targets and indicators for use of economic instruments for beyond 2020 and encourage research to assess the effectiveness of existing fiscal measures.

1.5. How industry involvement is linked to the other components of the integrated approach

The mainstreaming component of the integrated approach (UNEP, 2012) aims, inter alia, to enhance institutional and technical capacity for coordination, decision-making and the monitoring of chemicals and to ensure the integration of chemicals and waste management into national development plans, country assistance plans, national budgets and other sectoral activities (para. 20). The mainstreaming component does not specifically refer to industry involvement, but states that mainstreaming is expected to lead to the alignment of regulation, economic instruments and other policy instruments (para. 22). Ultimately, this should lead to a more appropriate sharing of costs between the public and private sectors through cost recovery mechanisms, as specified in the text on the industry involvement component (para. 27). The two components are also closely linked by their endeavour to increase the commitment of a variety of actors to the sound management of chemicals and waste. In this sense, the industry involvement component can be viewed as a means of implementing the mainstreaming component, dedicated to the specific audience of industry. Other activities under the mainstreaming component that relate indirectly to the industry involvement component include the promotion of overall engagement, coordination and partnerships in respect of international financial institutions (para. 20 (k)) and analytical and diagnostic work to increase awareness of the benefits of sound management, such as the 2013 UNEP report *Costs of Inaction on the Sound Management of Chemicals* (para. 20 (b)).

The dedicated external financing component of the integrated approach includes three elements: (i) institutional strengthening; (ii) an integrated chemicals and wastes focal area under GEF; and (iii) the trust fund for the Special Programme. The text on the industry involvement component states that financial contributions by industry through dedicated external financing would be strongly encouraged (para. 30). The elements of the component on dedicated external financing have the following goals and links to the component on industry involvement:

- 1) Institutional strengthening aims to provide the resources necessary to enable recipient countries to establish chemicals and wastes institutional structures (para. 33). The main functions of the national institutional structures eligible for financial support include the promotion of mainstreaming and of industry involvement and the facilitation of funding for the development of externally financed projects, including through securing the commitment of private-sector stakeholders (paras. 36 (a)–(c)).
- 2) In relation to the integrated chemicals and wastes focal area under GEF, it was proposed that funding to SAICM could be broadened, without jeopardizing funding for activities under

the Stockholm Convention (para. 42). In practice, mainstreaming has been achieved primarily through the adoption and enforcement of laws and regulations focused on sound chemicals and waste management and industry involvement through co-financing, capacity-building, direct support and/or participation in project design and implementation (GEF, 2017b).

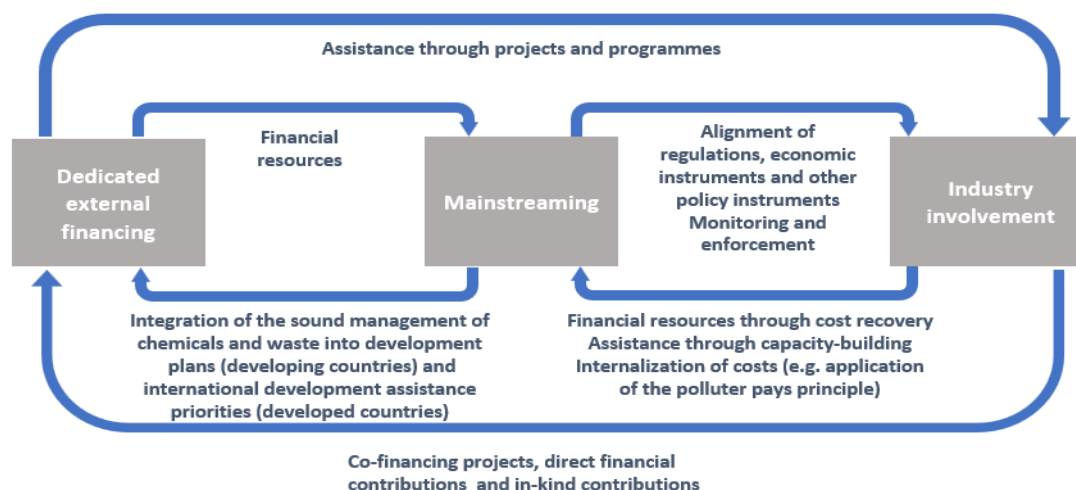
- 3) The trust fund for the Special Programme is intended to fund activities for institutional strengthening, encompassing both the mainstreaming and industry involvement components and other activities related to institutional strengthening that are not eligible for funding through existing funding sources (para. 46). To date, under the Special Programme, however, there has been significant industry involvement in only a handful of projects, and the private sector has not made any financial contribution.

Against this backdrop, the industry involvement component can be viewed as a hybrid that aims both to mainstream sound management of chemicals and waste across industry and its value chains and to make industry commit to mobilizing finance. In other words, industry involvement is to be seen as supportive of the two other components of the integrated approach.

Together, the three components of the integrated approach are to be implemented simultaneously and in a complementary manner. The implementation of one component strengthens the others, and none can be implemented effectively in isolation. More concretely, for many countries, dedicated external financing is a prerequisite for successful mainstreaming, which in turn is needed for the successful promotion of industry involvement, through the development of legislation and the definition of responsibilities, and for spurring voluntary activities by industry to go beyond regulatory compliance. Figure 2 summarizes the links among the components.

Figure 2

Interlinkages among the three components of the integrated approach



1.6. How industry involvement has progressed

In 2019, the United Nations Environment Assembly, at its fourth session, adopted resolution 4/8 in which it welcomed the evaluation of the implementation of the integrated approach (UNEP, 2019b) and encouraged countries to promote the involvement of industry and the private sector and the allocation of responsibilities to them. The evaluation recognized that the integrated approach was not a formal programme and that it did not have specific goals, objectives, targets and agreed monitoring mechanisms on which a full evaluation could be based; instead, it was termed "a guiding concept" that could be adopted by any organization at any level. The lack of

clarity or agreement regarding what should constitute industry contributions, however, has posed a challenge to implementation of the component. Owing to the absence of metrics for measuring progress (baseline and indicators) and verification methods, the evaluation was not able to measure industry participation and its financial outcomes and, as such, failed to provide sufficient evidence of implementation of the industry component by national Governments on a scale large enough to trigger new financial and in-kind participation by industry. The evaluation called for a more strategic approach to enhancing the integrated approach, including accompanying its implementation with outcome and impact monitoring. It also recommended the establishment of a baseline against which the next iteration of the integrated approach could be evaluated. Furthermore, the evaluation recommended the development of guidelines for industry involvement; identification of opportunities in which there was an economic case for industry participation in clean-up and other activities; and a deepening of the knowledge base with regard to market-based instruments for cost internalization and incentives for sustainable consumption and production.

The independent evaluation of SAICM from 2006 to 2015 (SAICM, 2019a), which was also finalized in 2019, highlighted that “insufficient progress had been made in taking forward the mainstreaming and industry involvement components of funding identified in the integrated approach to the sustainable financing of sound management of chemicals and waste proposal”. It also stated that “many Governments are yet to fully mainstream SAICM into national plans and budgets, and few Governments have applied economic instruments to fully internalize the externalities generated by chemicals production, use, and disposal”. Furthermore, the evaluation highlighted that it had been challenging to secure sufficient funds and that future success would require secure and sustainable funding, inter alia, through the introduction of appropriate economic instruments based on the polluter pays principle.

In 2015, the impact evaluation of the Quick Start Programme, which had been established by the International Conference on Chemicals Management at its first session in 2006, found that industry involvement in project coordination and delivery under the Programme was common if not universal and that the provision of information was an important contribution by industry stakeholders (Nurick and Touni, 2015). It also found that more substantive industry involvement had been achieved by projects that focused on industry-relevant themes (e.g., the projects of the Globally Harmonized System for Classification and Labelling of Chemicals (GHS) involved importers, while the projects of the Chemical Accident Prevention Plan involved users of chemicals). A very small minority of countries, however, reported examples of the development and introduction of economic instruments to promote industry participation in the financing of chemical management.

As shown in the report *Global Chemical Outlook II: From Legacies to Innovative Solutions* (UNEP, 2019c), SAICM progress reports for 2009–2010 and 2011–2013 reveal some trends in industry involvement; a 10 per cent increase in private-sector finance and a 6 per cent increase in industry participation in multi-stakeholder committees were observed between the two reporting periods. Nevertheless, the data are limited owing to low reporting rates, and progress is mainly driven by developed countries in 2013. *Global Chemicals Outlook II* also highlighted that “industry involvement has not been sufficient, and challenges have been noted regarding voluntary industry standards and initiatives”. Furthermore, “gaps remain in regard to increasing industry contributions to match responsibility and the required level of support”. The report recommends the scaling-up of financing through the promotion of extended producer responsibility and the internalization of costs by industry, that new opportunities be explored, such as sovereign wealth funds, philanthropic finance and strengthened engagement of the financial sector and investors and that the use of market-based instruments be increased. The preceding edition of the report, *Global Chemicals Outlook: Towards Sound Management of*

Chemicals (UNEP, 2013b) had already noted that “the vast majority of human health costs linked to chemicals production, consumption and disposal are not borne by chemicals producers, or shared down the value-chain” and emphasized that “uncompensated harms to human health and the environment are market failures that need correction”.

The survey conducted for the present study revealed many challenges to and opportunities for greater industry involvement. These are summarized in table 3 on page 20.

Table 3

Summary of stakeholder views on industry involvement expressed during the online survey

Thematic area	Stakeholder views
Existing challenges to industry involvement	There is a lack of: • A clear definition of what is to be understood by "industry involvement" • Mutual trust between regulators and the industry • International coordination of efforts to achieve industry internalization of costs • Enforcement of laws • Financial resources and technological information for developing the industry • A level playing field: global companies usually apply the same safety, health, environmental and quality standards in all regions, but have to compete with local companies that have lower standards • Avenues for communication, making the industry "unreachable" • Use of data on importations Transparency and sharing of the information needed for regulation
Opportunities for improving implementation of industry involvement	Proposals included the following: • Expand and strengthen the engagement of industry in a wider sense, looking beyond the chemicals industry to high-intensity chemical users in the value chain and to the downstream part of the value chain • Develop legislation, monitor and enforce industry compliance; define the roles of Governments and industry in legislation; develop and implement cost recovery measures, etc. • Develop alliances/pacts of mutual commitment between Governments and industry, including clear rules for the stakeholders involved and goals of mutual benefit • Institute a coordinated tax on basic chemicals • Increase efforts towards regulatory harmonization or regulatory cooperation (e.g., using GHS) and explore new areas/opportunities for harmonization or cooperation, including in relation to data requirements for the registration of chemicals • Develop clear policies and institutional mechanisms for engaging the industry at all levels (national, subregional, regional and international) • Improve national-level reporting on industry involvement by Governments and by private-sector actors, preferably in an integrated report that includes information from all relevant stakeholders • Design targets and indicators for the industry, relating, for example, to take-back mechanisms, public education, ecosystem restoration and product design • Develop clear indicators against which cost internalization by the industry can be measured and reported periodically to the International Conference on Chemicals Management • Ensure the industry support monitoring of environmental media – for example, by providing access to sites for sample-taking and/or bearing the costs of chemical analysis • Develop the capacity to analyse the quantities of chemicals in products – for example, lead in paint • Make proactive use of the decision-making capacities of the International Conference on Chemicals Management, the United Nations Environment Assembly and the conferences of the parties to multilateral environmental agreements on chemicals and waste, including in order to develop international law • Provide guidance through the targets and indicators of the framework/instrument for the

Thematic area	Stakeholder views
	sound management of chemicals and waste beyond 2020 • Develop international guidance to address industry involvement at the national and regional levels, taking into account the outcome of the negotiations on the process for the sound management of chemicals and waste beyond 2020 • Set up an international fund to support chemicals and waste management in developing countries that generates funding via a coordinated tax on basic chemicals • Develop international standards and technical guidelines • Develop a mechanism for establishing a clear commitment on the part of industry • Develop certification schemes for quality assurance, quality control and verification • Develop education and training systems that match the needs of industry Promote initiatives such as green chemistry and the concept of "safe by design"

2. Activities for industry involvement

The present section outlines activities relating to industry involvement and options for specific actions by various stakeholders to help implement the industry involvement component of the integrated approach. In his proposal on the integrated approach, the Executive Director of UNEP stated that "industry involvement through command and control, economic instruments and voluntary agreements will reduce the cost of the sound management of chemicals and wastes along the whole value chain. The main activity expected of industry is to take further measures to internalize costs, in accordance with the polluter pays principle" (UNEP, 2012; para. 30). To this end, the present section articulates regulatory, market-based and voluntary measures. Not all activities fall neatly into only one of these categories, however, so a category of mixed measures has been included for activities that can be either defined in legislation or implemented voluntarily. Activities to be undertaken in relation to the other components of the integrated approach have also been analysed and have been included when there are clear links to the industry involvement component. Most of the activities derive from the integrated approach, but they have been complemented with activities mentioned in the interviews conducted for the study. Table 4 provides a summary of activities addressed in the present section and indicates their links with other components. In terms of the financial contribution of the activities, direct financial contribution refers to activities that generate funds through industry involvement, and indirect financial contribution refers to those that reduce the cost of the overall management of chemicals through compliance and voluntary action. For each activity, indicators are suggested in section 3, on tracking progress, to increase international accountability.

Table 4

Suggested classification of activities under the industry involvement component and the related contribution in terms of financing

Category	Examples of measures (non-exhaustive)	Financial contribution
Regulatory measures (mandatory; domestic)	Definition of responsibilities for chemicals control	Indirect
	Development of legislation and monitoring of compliance	Indirect
Economic instruments (functioning as incentives; domestic)	Fees	Direct
	Taxes	Direct
	Subsidies	Indirect
	Tradable permits	Indirect
	Liability	Direct
Mixed measures (a combination of voluntary and mandatory measures)	Sustainable and transparent value chains	Indirect
	Testing to support risk assessment and the management of chemicals	Indirect
	Standards and certification schemes	Indirect
	Research, development and innovation	Indirect
	Strengthening of the knowledge base for action	Indirect
	Sustainable business models	Indirect
	Partnerships and coalitions	Indirect
	Engagement of financial institutions	Indirect
	Industry support for developing countries	Direct
	Programmatic support for SAICM	Direct

2.1. Regulatory measures

Industry involvement does not occur in isolation. It is closely linked to the evolution of and dependent on dialogue on public policy. Regulatory measures (i.e., command-and-control measures) by Governments are the most important aspect of industry involvement as they set the parameters within which the industry is to operate. Enforcement of legislation is needed to provide a level playing field and to ensure successful industry compliance. The present section aims to clarify the interdependence of private-sector involvement and public-sector action through regulatory measures.

2.1.1. Definition of responsibilities for chemicals control

The integrated approach emphasizes the need for Governments to “develop legislation that clearly defines the responsibilities of Governments and industry in order to establish the authority and national ability to control chemicals” (UNEP, 2012; para. 29 (b)).

National administration of the sound management of chemicals requires sustained financing. To this end, every country should establish a budget and define sources of financing, including what is to be allocated from the national budget and the costs to be recovered with fees (UNEP, 2019g). The development of legislation giving companies clear responsibilities is intended to ensure that most of the costs of chemicals control are internalized and that daily chemical safety operations are more autonomous. In the words of one interviewee: “If that kind of responsibility is placed on the industry, it will perform a large part of the chemicals control in the country” (interview 532). The term “chemicals control” is used to refer to the regulation of industrial and consumer chemicals before or at the point at which they are placed on the market, including import, production, and product design (UNEP, 2019f). Its focus on upstream measures provides a preventive approach, with emphasis on bans and restrictions on the production and use of certain chemicals and the classification and labelling of chemicals in line with GHS (see box 1).

Box 1

Implementation of GHS is central to chemicals control

GHS is a non-binding global policy instrument that sets criteria for the classification of health, physical and environmental hazards and specifies what information should be included on the labels of hazardous chemicals and in safety data sheets. Implementation of GHS has three stages: formal adoption by a country; incorporation into its national legislation; and facilitation and enforcement of the uptake and use of the system by companies and any other relevant actors. To date, 51 countries have fully implemented GHS and 16 others have partially implemented it. The vast majority of countries, however, have not yet implemented the system. Insufficient progress can be attributed, inter alia, to a lack of financial and regulatory capacities and a trade environment that is less open.

Source: Economic Commission for Europe (n.d.).

UNEP has advanced work in this area with the development of its *Guidance on the Development of Legal and Institutional Infrastructures and Measures for Recovering Costs of National Administration for Sound Management of Chemicals* (LIRA-Guidance). The guidance aims to “provide practical, step-by-step support to policymakers in strengthening national legislation and institutional set-ups for achieving sound management of chemicals, including measures for financing necessary national administrative support” (UNEP, 2015). In 2019, the guidance was supplemented with four additional documents that provide practical guidance on the development of national administration, including the basic requirements and budgetary considerations (UNEP, 2019a and f–h). Together, these documents outline a pathway for creating a national chemicals authority and the ability to control chemicals within a country. Table 5 on

page 24 provides a non-exhaustive list of the basic requirements for industry and Governments in implementing the industry involvement component that need to be considered in the allocation of responsibilities.

Table 5

Basic requirements for industry and Governments

Requirements for industry (manufacturers, importers and retailers)	Requirements for national administrations
• Generate knowledge and disseminate information on chemical properties, hazards, risks and safe handling procedures • Classify and label chemicals in accordance with GHS • Supply the information on chemicals in products needed to ensure safe management across the value chain • Ensure that no banned substances are produced, traded or placed on the market • Use safer chemicals or processes whenever possible, in accordance with the substitution principle • Organize and ensure the safe use of chemicals, their storage, transport and appropriate disposal	• Adopt framework legislation clarifying the roles and responsibilities of industry and those of the national administration • Adopt legislation implementing GHS • Introduce bans and restrictions for substances when needed • Supervise and enforce compliance with existing national measures and with any international obligations regarding chemicals management and control • Implement risk reduction measures for chemicals where there are risks to human health or the environment • Provide information and guidance on chemical risks and the industry's responsibilities

Source: UNEP (2019f).

While many developed countries have established national chemicals authorities, there is insufficient evidence of successes in developing countries and countries with economies in transition in terms of defining responsibilities, setting up a national chemicals authority and implementing adequate legislation and enforcement mechanisms. There is undoubtedly a lack of technical and financial resources in developing countries, which hinders development of legislation and enforcement. A strengthened and diversified financial base is needed for scaling up efforts and addressing prevailing challenges. The interviews undertaken in the present study revealed, however, that funding alone may not solve the root problem. In many developing countries, regulation appears to be feasible only if there is political will, which is usually linked to social pressure or to an international decision. Many interviewees from developing countries were of the view that national chemicals authorities could be most effectively empowered by international decisions on the restriction of hazardous substances.

An easy first step could be to place greater emphasis on communication. In particular, the UNEP LIRA-Guidance would benefit from wider dissemination as they "often seem to be forgotten", as one interviewee pointed out (interview 903). For example, the United Nations Institute for Training and Research, the regional and subregional offices of UNEP and the regional centres of the Basel and Rotterdam conventions could play greater roles in promoting the implementation of necessary instruments. Funding and training through the Special Programme could also be considered for operationalizing of the LIRA-Guidance.

Possible action related to the definition of responsibilities

- Define the responsibilities of the public and private sectors in legislation to help increase the availability of the funding needed for chemicals control, paying particular attention to advancing the classification and labelling of chemicals in line with GHS and to bans and restrictions on the production and use of substances of concern. (governments, industry)

- Increase communication, outreach and advocacy, in particular in relation to the UNEP LIRA-Guidance and associated guidance by actively engaging the regional offices of UNEP, the regional centres of the Basel and Rotterdam conventions and other relevant United Nations bodies and funds. (United Nations Institute for Training and Research (UNITAR), UNEP, Basel and Rotterdam conventions, Special Programme)

2.1.2. *Development of legislation and monitoring of compliance*

The integrated approach outlines the need to “develop legislation and enforce and monitor industry compliance” (UNEP, 2012; para. 29 (a)), which is closely related to the definition of responsibilities.

According to the survey conducted as part of the present study, the development of legislation and the monitoring of compliance are considered as the most important activities of the integrated approach. A lack of environmental policy or the existence of conflicting regulations between countries that are trade partners can exacerbate environmental threats and make it difficult for safer and innovative chemical products to reach the countries that need them the most.

One of the main objectives of regulatory frameworks on chemicals is to ensure that chemical products already on the market are safe or managed in a safe way and that new ones are properly assessed before being placed on the market. The creation of such a rigorous and comprehensive framework is very resource-intensive and time-consuming for Governments and industry. As many chemicals are produced in more than one country, or are traded between countries, differing national chemical control policies can lead to the duplication of testing and government assessments, thereby wasting the resources of the industry and Governments alike. Differing national policies also create non-tariff or technical barriers to the trade in chemicals. In 2018, the Trade and Agriculture Directorate of the Organisation for Economic Co-operation and Development (OECD) issued a working paper demonstrating that, on average, the cost (*ad valorem* equivalent) of technical barriers in chemicals was 9.3 per cent of the unit value (OECD, 2019).

Cooperation with regard to regulations on chemicals can promote the achievement of high levels of protection for human health and the environment through high-quality science-based instruments and can reduce trade barriers. Better dialogue between regulators and the industry during the design stage of the regulation and during its implementation would result in more efficient public policies with higher compliance rates. Indeed, the “unreachable nature of the industry”, as cited by one of the survey respondents, is a main challenge for industry involvement. A government official from a developed country noted that “not only in my country, but all over the world, such dialogue would be very helpful, because not all private-sector stakeholders are aware of what they have to do or of what they could do” (interview 559). Increased dialogue can also help regulators understand how legislation and policy can be enhanced to create a level playing field, enabling forerunners in green and sustainable chemistry to detoxify the markets more rapidly.

At the national level, industry should be represented in the coordination mechanisms established for the setting of priorities, design of national plans and development and implementation of legislation and programmes and for any other activity related to the objectives of the process for the sound management of chemicals and waste beyond 2020. Industry must commit to engaging actively in these processes and collaborating constructively to create a climate of trust and mutually beneficial cooperation among all stakeholders. While the need for and value of cooperation in the development of legislation must be recognized, it should also be noted that such cooperation can also lead to reduced ambition, to an overstatement of the costs for industry and eventually to watered-down legislation (ChemSec, 2015). A widely cited example is the

chemical industry's opposition, on economic grounds, to the regulation of ozone-depleting substances, starting in the late 1970s (ChemSec, 2015). To this end, safeguards need to be developed to ensure that there is transparency and commitment by industry to increasing its level of ambition over time through such cooperation. Civil society needs to be actively engaged as an equal partner to enrich cooperation. The publication *OECD Best Practice Principles for Regulatory Policy: The Governance of Regulators* (OECD, 2014b) lists seven principles that need to be considered in supporting the good governance of regulators, including ensuring that decision-making is objective, impartial and consistent and avoids risks of conflict, bias or improper influence.

Legislation provides the basis for enforcement activities. A first step towards effective enforcement is to communicate all requirements to the regulated community so that it clearly understands its responsibilities. Enforcement involves the monitoring of compliance and the use of traditional disincentives, such as fines. Enforcement has been a challenge, however, in many developing countries, as highlighted by one interviewee: "There's one thing I know about legislation – however good it is, if you don't have adequate resources to enforce it, then forget it" (interview 844). It is therefore important to establish a sustainable funding mechanism to provide support for adequate enforcement activities over time. Moreover, a regional approach to enforcement may help combat illegal trade that may occur because of the restrictions, as mentioned by another interviewee: "Sometimes putting a ban on a substance means that it is going to go through informal channels" (interview 119).

The attitude of industry towards regulation is a critical factor in its success, but varies from region to region. One interviewee from the global North highlighted that "industry sees legislation as an asset because it creates transparency and clarity about what will happen if it sets up a business in a country. Clear legislation can serve to attract industry to establish activities within a country" (interview 532). More awareness of the benefits of legislation is needed; a key barrier has been the misperception that regulation will impede innovation, reducing economic growth, competitiveness and employment, as highlighted by one interviewee from the global South: "Examples of industry threatening the Government not to regulate it too much as this would cut jobs and so forth are very real" (interview 844). Several studies on the effects of regulation show that it benefits industry and does not entail a significant cost, as summarized below:

- Statistical data indicate that environmental policy accounts for a relatively low percentage of the costs incurred by different sectors (ChemSec, 2015). The annualized environmental costs in the four sectors studied (oil, textile, power generation and metal) were typically less than 2 per cent of the production value.
- A clear and predictable regulatory framework for chemicals management is considered beneficial for businesses as it creates transparency about the local business environment. It has a minor impact on the location of the chemicals industry (Persson, Vilchis Tella and Varnäs, 2013).
- According to an examination of patents, stricter legal restrictions on chemicals spark invention, development and the adoption of safer alternatives within industry (Tuncak, 2013).

Gaps between developed and developing economies usually lead to very different levels of legal requirements for companies. A subject of long-term debate is whether multinational companies should go beyond the regulatory requirements and voluntarily raise their standards in developing economies. For example, in 1984–1985, a Swedish company paid a local company in Arica, Chile, to receive nearly 20,000 tonnes of toxic waste that affected an estimated 12,000 people (Office of the High Commissioner for Human Rights, 2021). A very relevant concern is that, if this raising of standards is not done in a global and coordinated manner, levelling the playing field for fair

competition, then other companies could step in and take advantage of the minimum national standards or weak enforcement capacities in developing countries, thereby exacerbating environmental threats and again making it difficult for safer and innovative chemical products to reach the countries that need them the most.

The framework/instrument for the sound management of chemicals and waste beyond 2020 and organizations such as the World Trade Organization (WTO) have a unique opportunity to become platforms for addressing prevailing concerns. They can be used to promote high-quality science-based regulatory instruments for adoption in all countries, with a view to achieving high levels of protection of human rights, health and the environment, while ensuring that trade flows as freely, smoothly and predictably as possible. The United Nations Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes (Special Rapporteur on toxics and human rights) has developed principles to protect workers from occupational toxic exposure and to provide remedies for violations of their rights to be universally applied by Governments, businesses and other actors (United Nations, 2019). Recently, several European countries have enacted legislation relating to due diligence enabling them to enforce their domestic norms outside their territories (see section 2.3.1.1. on due diligence).

Possible action related to regulatory measures

- Develop closer dialogue between regulators and industry, through national and regional mechanisms, with a view to designing effective regulations and strengthening regulatory compliance; develop the necessary safeguards to ensure that cooperation will lead to an increased level of ambition over time; partner with civil society in an equal manner to enrich cooperation. (Governments, industry)
- Apply good regulatory practices and engage in international regulatory cooperation when designing policies; develop, for example, impact assessments that involve cost–benefit analysis. (Governments)
- Increase understanding of the importance of safety regulation for chemicals in attracting businesses and investments. (Governments, industry, academia)
- Boost national capacities to monitor and enforce compliance by improving and implementing inspection mechanisms and other compliance controls and penalty clauses and enhancing collaboration between national enforcement authorities for the exchange of best practices. (Governments)
- Promote high-quality science-based regulatory instruments for adoption by all countries to reduce the extent of the differences between developed and developing economies and achieve high levels of protection of human rights, health and the environment, while ensuring that trade flows as freely, smoothly and predictably as possible. (WTO and other United Nations bodies, the framework/instrument for the sound management of chemicals and waste beyond 2020)
- Promote the design of model regulations, training and toolkits for each measure and involve all stakeholders, including unrepresented and vulnerable groups, in these processes; promote regulatory cooperation and the use of best regulatory practices. (The framework/instrument for the sound management of chemicals and waste beyond 2020)
- Proactively use national and international industry associations and expand their networks so that there is better coverage in developing countries to enable companies to support

Governments in institutional strengthening and in setting up chemicals and waste regulatory systems. (Industry)

2.2. Economic instruments

The integrated approach specifies that “economic instruments are a set of policy mechanisms that can provide financing for chemicals and wastes management through, in particular, cost recovery” (UNEP, 2012; para. 27).

Economic instruments consist of fees, taxes, subsidies, tradable permits and liability. Table 6 on page 28 provides an overview of the economic instruments that can be used for sound management of chemicals and waste. The development of economic instruments is the responsibility of Governments. Acceptability to key stakeholders is important, but full consensus should not be the goal; policymakers need to be cognizant of the groups that have the most power and work around constraints to achieve their policy objectives (UNEP, 2004). Voluntary industry action is welcome, particularly in creating a proof of concept for extended producer responsibility schemes that can eventually be turned into legislation (Ocean Conservancy, 2019).

Table 6

Overview of economic instruments for sound management of chemicals and waste

Instrument	Type	Description	Internalization potential for sound management of chemicals and waste	Application
Fees	Cost recovery for chemicals control	Compulsory required payments to the Government that are levied in proportion to the public services provided for chemicals control	Intended to cover the costs of managing a national chemical authority responsible for enforcement of regulations for placing chemicals on the market. Fees may not cover the full costs of such systems but will promote more appropriate sharing of costs between the public and private sectors	Annual fees and/or fees per service (e.g., registration fees, licensing fees, authorization fees and inspection fees)
	Extended producer responsibility	Policy approach under which producers are given significant responsibility (financial and/or physical) for the treatment or disposal of post-consumer products	Intended to cover the costs associated with end-of-life products, including their collection and sorting, treatment operations, disposal of waste and clean-up	Packaging and products (e.g., electronic and electrical equipment, batteries and tyres)
	Deposit-refund	Fee for consumers and retailers levied on an individual product or container at the point of purchase that is refunded upon return of the item concerned	Intended to provide a financial incentive for the return of end-of-life products or materials to reduce illegal and improper disposal	Products (e.g., batteries, tyres, bottles, cans) and containers (e.g., agro-chemical containers)
Taxes	Environmental taxes	Payment required by law from individuals, groups or companies in order to provide the State and municipalities with revenue	Intended to cover the costs of dealing with damage that the substance causes to human health and the environment. Owing to difficulties in assessing external costs, taxes are often set at a rate that should influence behaviour	Chemicals (e.g., chlorinated solvents and agrochemicals) and chemicals in products (e.g., flame retardants and phthalates)

Instrument	Type	Description	Internalization potential for sound management of chemicals and waste	Application
Subsidies	For the use of alternatives	Financial support to incentivize the use of safer alternatives to harmful chemicals	Increases governmental expenditure on the provision of loans, grants and tax relief	Organic farming and removal of lead paint
	Removal of harmful subsidies	Reduces directly or indirectly the use of substances with a proven, specific negative impact on the environment	Intended to help reflect more accurately the true cost of the hazardous substances. Subsidy reform is expected to free up funds that can be redirected	Fertilizers and pesticides
Tradable permits	Cap-and-trade systems	A limit on pollutant emissions is determined and allocated to firms in the form of permits. Permits can be traded on a market at market prices	Intended to lead to phase-out of pollutants through the gradual reduction of the permissible limits	Lead in petrol, ozone-depleting substances and nitrogen pollution
	Baseline-and-credit systems	There is no fixed limit, but polluters that reduce their emissions more than is required earn credits that can be sold to companies that need them in order to comply with regulations	Intended to expedite the reduction of pollutant emissions. When more companies enter the market, however, emissions can increase owing to the absence of an overall cap on total emissions	Pollutants (nitrogen oxides, sulfur dioxide, carbon dioxide, volatile organic compounds) and greenhouse gas emissions
Liability	Environmental liability	Requires the parties causing the environmental damage to compensate for the harm that it causes to the environment and human health	Intended to assign liability for clean-up costs to the parties responsible and to provide compensation for victims of hazardous chemicals and waste. The clean-up of contaminated sites may not always be attributed to the parties responsible	Superfund in the United States of America

Sources: OECD (2016); OECD (n.d.); Slunge and Alpizar (2019); United States (2021a).

2.2.1. Fees

Cost recovery refers to the use of fees. Fees are “compulsory required payments to the Government that are levied more or less in proportion to the services provided” (OECD, 2016). Fees can be used to generate the services needed for the sound management of chemicals and waste at various stages of the chemical life cycle. The integrated approach focuses on using fees to recover the costs of chemicals control upstream. Fees can also be used to recover costs of waste management and clean-up downstream.

2.2.1.1. Cost recovery for chemicals control

The integrated approach states that “cost recovery measures seek to shift the hidden public costs of managing chemicals from government budgets to private sources” (UNEP, 2012; para. 27) and specifies that they are needed to “fund the administrative process of providing and maintaining systems for governing the marketing of chemicals at the national level, in order to shift the administrative and operational costs of activities from government budgets to producers and importers that benefit from those activities” (UNEP, 2012; para. 29 (c)).

The integrated approach focuses on cost recovery measures to govern the marketing of chemicals. This is closely linked to the process of defining responsibilities for chemicals control, as fees associated with the various tasks will also be determined in this context. A fee-based mechanism can help fund operations for chemicals control, including the collection of data on the health- and environment-related properties of the chemicals, dissemination of this information and efforts to limit the risks posed by the chemicals. It is critical for countries to prioritize the funding of chemicals control and to ensure that fees collected through chemical-management

systems are used for and proportionate to their intended purpose and are not redirected to other government priorities. The inclusion of industry stakeholders in the setting of the fee levels in cost recovery instruments is pivotal to their acceptability and success (UNEP, 2015).

The integrated approach recommends that stakeholders “make use of existing tools and guidance to build legal and national infrastructures for the sound management of chemicals and wastes through cost recovery systems” (UNEP, 2012; para. 29 (j)). Guidance has been made available (in particular the UNEP LIRA-Guidance and the related supplementary documents), but these guidelines have not been well disseminated nor implemented. Most of the literature assessed in the present study specifies types of fees that can be used to recover the costs of managing a system for chemicals control governed by legislation. One example is the charging of a fee for the registration of a chemical. Cost recovery fees are charged not only in developed countries, but also in developing countries, including in Costa Rica, Kenya, Mozambique and Zambia (Center for International Environmental Law (CIEL) and IPEN, 2020; UNEP, 2020c). Table 7 provides an overview of types of cost recovery fee.

Table 7
Overview of types of cost recovery fee

Type	Payer	Service paid for	Examples
Annual fee	Companies that place chemicals on the market, both chemical producers and chemical importers.	The issuing of licences, maintenance of registries, inspections and helpdesk services.	Sweden has an annual fee that is based on the quantity of chemicals produced and imported and that helps finance the Swedish Chemicals Agency.
Registration fee (fee per service)	Manufacturers and importers that aim to introduce a new substance on to the market.	The processing of applications requesting registration.	Costa Rica has a fee (the equivalent of €192) for the registration of new pesticides, fertilizers and other chemicals, which helps finance the maintenance of the registration system's online platform.
Authorization fee (fee per service)	Companies requesting authorization to use chemicals with known hazardous properties.	The processing of the application for authorization.	The European Union has a fee (€5,400–54,000) for authorization of the use of substances of very high concern, which helps finance the European Chemicals Agency.
Inspection fee (fee per service)	Companies that have placed chemicals on the domestic market	Market surveillance of chemicals on the domestic market, including the testing and verification of products.	
Import licence fee (fee per service)	Importers requesting a licence to import and sell chemicals on the domestic market. It is paid at the border.	The processing the application for a licence.	Kenya has an import fee (the equivalent of US\$ 500) for pesticides. Part of the revenue is channelled into training and inspections.

Sources: Sweden (2020); SAICM (2020b); UNEP (2019g); UNEP (2020c).

The integrated approach specifies that “cost recovery mechanisms may not cover the full costs of such systems but promote a more appropriate sharing of costs between the public and private sectors” (UNEP, 2012; para. 27). This is the case in the REACH legislation in the European Union, which stands for registration, evaluation, authorization and restriction of chemicals. In paying at least part of the cost of managing the placement of chemicals on the market to reduce risks across the chemical life cycle, industry can expect an adequate service in return, such as the administration of chemical inventories or registries, authorization and licensing systems and training in regulations, inspection and enforcement activities. In this way, the principle of a level

playing field is upheld. There is no competitive advantage for those that do not play by the rules. This was highlighted by one interviewee from a developed country: "Our experience is that industry is willing to pay to have government inspections, and so on, just to ensure that there is a level playing field and no unjust competition from companies that would seek to take advantage of a weak inspection force" (interview 532).

Practical challenges to the introduction of recovery measures were raised by several interviewees from developing countries. First, a fee-based mechanism was considered to be challenging to design as extensive assessment would be required in order to properly and fairly define the amount to be charged for the service provided. Second, it was considered that the administrative process of putting in place such a system would be time-consuming and could slow down the adoption of other legislation in the pipeline. Third, it was considered possible that the funds collected might not be directed to the sound management of chemicals and waste owing to other priorities requiring funding or corruption. One interviewee from a developed country highlighted that very issue: "Money that is collected falls into a black hole, channelled for purposes other than the protection of health and the environment" (interview 231).

A more systemic barrier to the introduction of cost recovery measures was also raised, namely the lack of scale. It was feared that the charging of a fee at the entry point would cause a rise in prices and would "finally make the national industry less competitive" (interview 231). The success of cost recovery mechanisms in developed countries can be credited to scale; the European Union has a huge market and there is an incentive for industry to register its products. If, however, individual developing countries were to put in place a similar mechanism, it could trigger an economic imbalance. One interviewee expressed the view that "doing it at the national level does not provide a sufficient degree of fairness – a guarantee of equity and success" (interview 922). By taking a regional approach, countries could introduce a harmonized fee structure and provide a level playing field for countries and industries, as highlighted by another interviewee: "It makes more sense for these types of funds to go to a regional agency. There would be an advantage to contributing regionally or internationally versus at the local level, in the sense that we can be sure of the destination of these resources" (interview 474). Other opportunities offered by a regional approach to chemical registration and the payment of fees would benefit from further analysis to see what lessons have been learned in other areas, to identify how regional organizations could take on such a system and to understand the possible trade benefits of a regional approach.

2.2.1.2. *Extended producer responsibility*

The integrated approach articulates the need to "incorporate chemicals and wastes considerations into extended corporate responsibilities 'downstream'" (UNEP, 2012; para. 29 (d)).

Extended producer responsibility (EPR) is a policy approach under which producers are given significant responsibility, financial and/or physical, for the treatment or disposal of post-consumer products (OECD, n.d.). EPR policies seek to shift the burden of managing certain wastes from municipalities and taxpayers to producers, in line with the polluter pays principle (UNEP, 2019d). In practice, it means that the producers of a product are held responsible for the collection and disposal of that product once it has become waste.

Mandatory EPR schemes may be implemented through various means, such as take-back requirements and recycling fees that producers, importers and retailers must pay for placing a specific product or packaging on the market. A key element in the success of EPR is the design and constitution of the producer responsibility organization that is assigned the responsibility of collecting and processing end-of-life products and handling the sorting, dismantling and

recycling activities (OECD, 2014a). If a fee structure is used, fees are pooled to fund the producer responsibility organization. A voluntary EPR scheme may be established to create proof of concept before eventually being made mandatory (Ocean Conservancy, 2019).

Currently, there are about 400 EPR systems in operation across the world (Hilton and others, 2019). In countries such as Chile, Colombia, Kenya and South Africa, EPR legislation has already been adopted for packaging (Ellen MacArthur Foundation, 2021). Moreover, during the past decade, several low- and middle-income countries have introduced legislation on hazardous waste management by learning from the EPR system implemented in many high-income countries (Slunge and Alpizar, 2019). An interviewee in the present study highlighted that "it works when there is scale" and referred to successes in introducing EPR for the management of waste electrical and electronic equipment in China and India (interview 083).

In addition to financing waste management, the aim of EPR is to give the producer an incentive to reduce waste generation and to improve product design in order to facilitate recycling and resource recovery (Slunge and Alpizar, 2019). The prevention of waste is an area that requires more attention. It can be achieved by regulating the sustainable design of products, taking into account hazardous material content and energy and material efficiency, and by influencing consumer needs and behaviour (UNEP, 2019d).

The way EPR schemes are designed and implemented is inextricably linked to their effectiveness. Key considerations include the following (UNEP, 2019d; Ellen MacArthur Foundation, 2021):

- 1) Identification of products suitable for EPR and clear definition of the product concerned. The majority of EPR schemes relate to electronic and electrical equipment, packaging, tyres or batteries.
- 2) Definition of the objectives and the scope of responsibilities and the setting of measurable and achievable targets.
- 3) Definition of the financial and operational responsibilities, for fulfilling the objectives and meeting targets, of all stakeholders, including producers, the producer responsibility organization, the Government, local authorities, waste management operators, citizens and the informal sector.
- 4) Establishment of a robust and transparent reporting, monitoring and enforcement mechanism to track performance and ensure compliance.

2.2.1.3. Deposit-refund schemes

A deposit-refund scheme is intended to provide a financial incentive to return end-of-life products or materials to reduce illegal and improper disposal. It consists of a refundable fee levied on an individual product or container at the point of purchase that is refunded when the used product or container is returned to the point of sale or taken to a specific drop-off site (Ocean Conservancy, 2019). This system is widely used in the beverage industry as an incentive for consumers to return empty cans and bottles (Slunge and Alpizar, 2019). Other applications include agrochemical containers, scrapped tyres and lead-acid batteries. Deposit-refund schemes can be mandatory or instituted on an entirely voluntary basis by the producers themselves.

2.2.1.4. Other fees

There are many other fees that are intended to subsidize waste management that are not discussed in detail in the present study. Examples of such fees are provided below:

- Landfill fees charged by national Governments to private or public landfill operators to help drive waste away from landfill towards preferable disposal alternatives, such as composting, recycling and reuse.
- "Pay as you throw" is a policy instrument, typically used at the local level, whereby households are charged a fee for waste collection. This could be a flat monthly fee, an amount based on the frequency of waste collection or an amount calculated according to the quantity of waste generated (e.g., the weight, the number of bins, etc.) (Ocean Conservancy, 2019).
- Tourist visitor fees may also be directed to environmental protection. For example, tourists visiting Palau are charged an environmental fee of US\$ 100.
- Environmental remediation fees can be used to clean up contaminated sites. In Viet Nam, for instance, the Government collects an environmental fee in relation to mining to mobilize revenues for environmental rehabilitation activities (Cottrell and Falcão, 2018).

2.2.2. Taxes

Environmental taxes are an important fiscal policy instrument that can create incentives for producers and consumers to shift their behaviour towards the production and use of less polluting substances. This also stimulates innovation and drives cost-effective reductions in pollution while generating revenue that can be used for various purposes (UNEP, 2020c).

Ideally, the level of the tax should reflect damage caused by the production, use and disposal of the chemical that, in the absence of the tax, would not be reflected in the market price of the input or final product (known as a Pigouvian tax). Owing to the difficulties in assessing the cost of associated environmental damage, taxes are often set at a rate that should influence behaviour (known as the Baumol-Oates approach). In both cases, the taxes provide a strong market signal that the chemicals that they apply to are not welcome in the long run, thereby promoting the transition to safer alternatives.

A chemical tax may follow a risk-based approach, such as the pesticide tax in Denmark, whereby the greater the risk to human health and the environment posed by the chemical, the higher the value of the tax (Denmark, 2017). The Danish pesticide tax has led to a significant reduction in the sales of pesticides and a reduction in the pesticide load in relation to human health, nature and groundwater (UNEP, 2020c). A risk-based approach links taxation more closely to external effects and can increase the political legitimacy of such taxes, but it is administratively more burdensome than per-unit taxation both for regulators and industry (Slunge and Alpizar, 2019).

The development of taxes for chemicals is still relatively new, thus research into their effectiveness is scarce. They have been inspired by pollution taxes, which have a longer history and have proven to be useful. For instance, the first carbon tax was introduced in 1990, and, to date, 65 carbon-taxing initiatives have been developed, covering over 20 per cent of global greenhouse gas emissions and generating US\$ 53 billion in revenue (World Bank, 2021).

In designing fiscal measures, scholars argue the need to factor in equity and ensure the fair distribution of costs by placing the burden on industry rather than the consumer (Khan, 2015; Nils and others, 2021). This can be difficult to achieve, however, as highlighted by an interviewee in the present study: "Even if we were to achieve half of what is needed, the money would likely not be coming from the industry per se, but rather from consumers. Prices would be exorbitant, as you would be taxing at the end, not at the beginning" (interview 128). A global coordinated tax on chemicals has been proposed by IPEN and is intended to keep costs marginal in relation to the substances sold. It may provide an equitable solution to the distribution of costs (see section 2.4.6.1. on funding).

Taxation may also be part of other economic instruments. For instance, the use of subsidies may include tax relief (see section 2.2.3.1. on subsidy use) and liability may be accompanied by the taxation of specific substances earmarked for the remediation of orphan sites (see section 2.2.5. on liability).

2.2.3. Subsidies

2.2.3.1. Subsidy use

The integrated approach proposes the recognition of “industry activities that internalize the cost of complying with chemicals and wastes regulations and standards and adhering to international good practices and national laws and regulations” (UNEP, 2012; para. 29 (k)).

Subsidies are forms of government financial support for activities that aim to achieve environmental or other types of benefit. Rather than charging a polluter for emissions, a subsidy rewards a polluter for reducing emissions (United States, 2021a). Subsidies typically come in the form of grants, loans (including soft loans) or tax relief (Canada, 2021).

Subsidies should be used to encourage the use of safer chemicals and other practices that decrease dependence on substances of concern. The role of incentives was highlighted by an interviewee in the present study, as follows: “We can use regulation not as a stick for the bad guy, but as the carrot for the good guy, which would influence other industries” (interview 566). Specific examples of subsidies include support for organic farming (e.g., in Chile and the European Union) and for lead paint removal (e.g., in several states in the United States in relation to private properties). Payments for ecosystem services is a closely related concept that has been introduced

Box 2

Is there a role for chemicals in payments of ecosystem services?

Payments of ecosystem services is an increasingly popular conservation and resource management tool in developing countries that consists of providing compensation to farmers and landowners who take specific action to provide an ecological service. An example is the payments made to farmers to encourage them to minimize the use of fertilizers and pesticides. In payments for ecosystem services schemes, the beneficiary of the ecosystem services provides the payment. This might be the Government, businesses or households. In addition, many businesses are choosing to participate in such schemes on philanthropic grounds. Such schemes provide a valuable opportunity to increase business involvement in efforts to minimize the use of agrochemicals to support pollination.

in many developing countries (see box 2 on page 33). The sound management of chemicals should be mainstreamed in broader government stimulus measures, but it is important to be aware that subsidies meant to stimulate economic development can also result in unintended side effects (Canada, 2021). For instance, tax relief for specific industries and types of investment can have negative effects by encouraging the installation of harmful industries, increasing the environmental and health burden and depriving the Government of the resources that it needs to deal with them. To prevent and mitigate negative environmental impacts of subsidy use, an environmental impact assessment must be carried out before any major policy changes are put in place (Canada, 2021).

2.2.3.2. Removal of harmful subsidies

It is particularly important to remove harmful subsidies relating to high-risk substances in order to level the playing field. Harmful subsidies commonly take the form of one of three methods: (i) support based on production levels or prices; (ii) income support; or (iii) indirect support (Deutz

and others, 2020). Harmful subsidies commonly relate to agrochemicals, but better understanding of other possible areas of use is needed. Many industrial chemicals are derivatives of the oil and gas sector, which benefits from fuel subsidies estimated to have amounted to US\$ 5.9 trillion in 2020 (Parry, Black and Vernon, 2021).

Many countries have taken steps towards reforming their producer subsidy programmes, particularly countries members of OECD, but also many developing countries, including Bangladesh, Indonesia, the Philippines, and Sri Lanka (UNEP, 2020c). Not all countries have been

Box 3

Developing a road map for subsidy reform for the sound management of chemicals and waste

Determine if a subsidy is causing damage

1. Is there harm to the environment and human health?
2. Is there a subsidy in place that contributes to environmental damage and to impairing human health (e.g., by influencing the production and use of substances of concern) and, if so, what is it?

Determine whether the subsidy should be the target of reform

3. Does the subsidy fulfil its objectives (social/economic/environmental)? If not, it needs reform.
4. Does the subsidy lack an in-built review process and has it been in place for a long time? If so, it is likely to need reform as it already has locked-in inefficient practices.
5. How does the subsidy distribute social welfare? If there are equity issues, it might be worth reforming.
6. Do any of the subsidy impacts lead to social or other economic losses?
7. Are there less harmful substances or other more sustainable practices available that are hindered by the subsidy's existence? If so, it might be slowing innovation and creating technological lock-in and reform could help to solve the issue.
8. Does it offer value for money? Where there is still a valid rationale for the subsidy, could the same or less money be used to achieve the same objectives with a lesser environmental impact?

Assess reform scenarios and likelihood for success

9. What are the benefits (in terms of the environment, ethics, competitiveness and innovation, etc.) and the socioeconomic costs (in terms of gross domestic product, jobs, availability of goods, etc.)?
10. What would the reform entail (measure changed and compensatory measures)?
11. Is the reform practical and enforceable?
12. Would the reform be understandable for policymakers and the public?
13. Is there sufficient political will for its success, including a potential policy champion?
14. Is there an opportunity to redirect identified harmful subsidies to encourage the sound management of chemicals and waste?

Source: Secretariat of the Convention on Biological Diversity (2011).

able to sustain their efforts, however. In the 1980s, Indonesia initiated a national programme of integrated pest management that halved pesticide use and led to US\$ 100 million in fiscal savings. After 1999, however support for the programme wavered and the situation quickly worsened, again reaching levels of use that preceded the programme (UNEP, 2020c). Governments may consider developing and implementing a road map for subsidy reform (see box 3), including the redesign, reduction or redirection of existing subsidies. The impact on the poor and marginalized groups in society should be considered in the design of subsidy reforms, and subsidies should be redirected if they incentivize the use of substances of concern (Deutz and others, 2020). Businesses should recognize the global momentum and support for the reform of harmful subsidies and should review, disclose and implement their commitment to transition away from dependence on harmful subsidies (Deutz and others, 2020). Once subsidies have been introduced, however, it is often difficult to reduce or remove them as their long-term use

encourages the formation of lobby groups made up of beneficiaries striving to protect the subsidies (Slunge and Alpizar, 2019). Analysis of the impact of the subsidies can help to increase support for subsidy reform. Several studies have shown that fossil-fuel subsidies benefit high-income households, which has helped to increase political support for their removal (Coady, Flamini and Sears, 2015).

2.2.4. Tradable permits

Tradable permits are “market-based instruments that provide allowance or permission to engage in an activity” (OECD, 2016). There are two main types of trading systems: “cap-and-trade” systems and “baseline-and-credit” systems.

A cap-and-trade system involves the setting of a cap on pollution that is equal to the combined total of quotas allocated to companies in the form of permits that can be traded on the market at market prices. The level of pollution is reduced as the cap is gradually reduced. It is a cost-effective approach to environmental protection because firms are granted the flexibility either to reduce their own emissions or to purchase additional pollution allowances from other firms that have reduced their emissions below the required level (United States, 2021a). The use of tradable permits for chemicals and waste is scarce compared with other fields such as climate change, where emissions-trading systems have accelerated industry transformation and reduced greenhouse gas emissions (World Bank, 2021). For instance, since the European Union Emissions Trading System was introduced in 2005, emissions have been cut by 43 per cent in the main sectors covered: power and heat generation and energy-intensive industrial installations (European Commission, 2021b).

There is a need to understand better how tradable permits can be used for controlling chemical pollution, including the development of the necessary technical guidance and other tools. The following encouraging experiences can be built upon:

- Lead in petrol was phased out in the United States through a tradable permit system that is estimated to save hundreds of millions of dollars compared with the use of a command-and-control policy.
- Agricultural pollution has been successfully controlled using nutrients-trading programmes, such as the tradable emission quotas for nitrogen pollution from agriculture employed in New Zealand.
- Ozone-depleting substances have been controlled using tradable permits in the United States to help the country comply with the provisions of the Montreal Protocol on Substances that Deplete the Ozone Layer.

In a baseline-and-credit system there is no fixed limit, but polluters that reduce their emissions more than required earn credits that can be sold to companies who need them to comply with regulations. The largest criticism of such a system is that the absence of a cap on total emissions means that overall emissions can increase if more companies enter the market.

2.2.5. Liability

Liability assignment most often targets the producers carrying out dangerous activities that are easily identifiable and pose a risk to human health or the environment. The purpose of liability is to hold polluters accountable not only for the proper management and adequate disposal of their waste or emissions, but also for clean-up and remediation costs, if needed. Many environmental statutes worldwide have liability provisions. In developing countries, however, environmental liability actions are often weak. Table 8 provides examples of liability schemes.

Table 8

Examples of liability schemes for remediation of chemical pollution

Name of scheme	Established	Overview
The Comprehensive Environment Response, Compensation, and Liability Act, known as the Superfund law (United States)	1980	The Superfund law imposes liability on parties responsible for release of hazardous substances to cover the cost of clean-up, damage to natural resources and certain health assessments. The Superfund enforcement programme aims to identify potentially responsible parties and compel them to clean up identified contaminated sites. The programme may undertake the clean-up itself and then seek to recover those costs from the parties responsible through legal means. Historically, approximately 70 per cent of Superfund clean-up activities have been paid for by the potentially responsible parties, in line with the polluter pays principle. In addition, the law established a trust fund for the remediation of contaminated sites when a responsible party cannot be identified. From 1981–1995, funding for the remediation of these orphan sites was raised through a tax on petroleum and feedstock chemicals. By 2003, the fund was depleted, and since that time funding for the remediation of orphan sites has been appropriated by Congress out of the general revenues.
Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage	2004	The directive establishes a framework based on the polluter pays principle to prevent and remedy environmental damage. Operators carrying out dangerous activities listed in annex III to the directive fall under strict liability (no need to prove fault). Operators carrying out occupational activities other than those listed in annex III are liable for fault-based damage to protected species or natural habitats. The establishment of a causal link between the activity and the damage is always required. Natural or legal persons and environmental non-governmental organizations affected have the right to request the competent authority to decide about remedial action.

Sources: United States (2021b); European Commission (n.d.).

Possible action related to economic instruments

Assess existing economic instruments and empower the Ministry of Finance to carry out the necessary reforms in consultation with research institutes, the private sector and other stakeholders, with a view to:

- Introducing fees to recover the cost of chemicals control and ensuring that the revenue collected is earmarked to the provision of the necessary public services, including registration, inspections and the licensing of chemicals. It is necessary to consider such mechanisms also at the regional level and undertake further analysis to gather lessons learned in other areas and to identify how regional organizations could take on such a system and the possible trade benefits of a regional approach. (Governments)
- Developing EPR schemes for products and packaging that may cause harm to the environment and human health if not properly disposed of (e.g., electrical and electronic waste, packaging, tyres and batteries), enabling the transfer of the cost of waste management and clean-up from municipalities and taxpayers to producers. (Governments, industry, United Nations Industrial Development Organization (UNIDO))
- Introducing deposit-refund systems to provide a financial incentive for the return of end-of-life products or materials thereby reducing illegal and improper disposal of bottles, cans, agrochemical containers, scrapped tyres, lead-acid batteries and other relevant products. (Governments, industry, UNIDO)
- Developing and implementing a road map for the redesign, reduction or redirection of existing subsidies to prevent them from incentivizing the use of substances of concern, in particular

harmful agrochemicals. (Governments, FAO, Convention on Biological Diversity, non-governmental organizations)

- Introducing taxes, earmarked to the sound management of chemicals and waste, on substances that do not need to be phased out completely, which, ideally, are proportional to the risk that the substances pose. Such substances will include many flame retardants, pesticides, fertilizers and chlorinated solvents. (Governments)
- Using subsidies in the form of grants, loans and tax relief, including possible resources derived from the redirection of identified harmful subsidies, to encourage the use of safer chemicals and more sustainable practices and to mainstream the sound management of chemical and waste in government stimulus measures. (Governments)
- Examining how tradable permits can be used for controlling chemical pollution, including developing the necessary technical guidance and other tools. (UNEP, World Bank)
- Developing liability schemes to transfer to industry the cost of remediation of contaminated sites and to ensure that victims of chemical pollution and waste receive adequate compensation. (Governments, Inter-Organization Programme for the Sound Management of Chemicals)

2.3. Mixed measures

2.3.1. Sustainable and transparent value chains

The integrated approach highlights that “industries at all points in the chemicals sector value chain have critical roles to play in supporting the chemicals and wastes agenda” (UNEP, 2012; para. 23).

Due diligence, information disclosure, and trade are cross-cutting issues that need to be addressed for sustainable value chain management, as explained in the present section. Figure 3 on page 38 illustrates the value chain for chemicals. The midstream section focuses on chemicals in products, although chemicals are also marketed directly. The figure does not integrate international trade, although it manifests itself at various stages of the value chain.

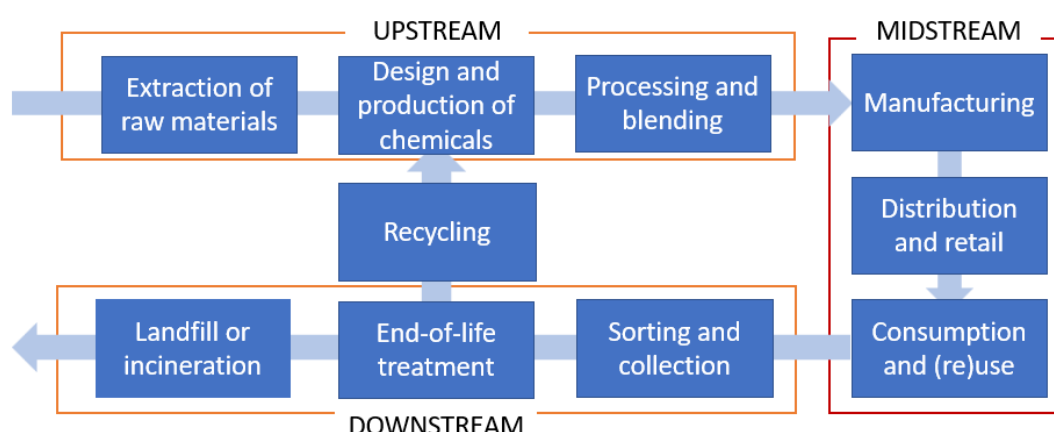
Box 4

German Act on Corporate Due Diligence in Supply Chains of 11 June 2021 (Lieferkettensorgfaltspflichtengesetz)

As of 1 January 2023, companies and their suppliers will be obliged by law to observe human rights and environmental due diligence along the supply chain. The supply chain covers all the inputs that the company uses to manufacture a product or provide a service, from the acquisition of the raw materials to delivery of the product or service to the end customers. In the event of a violation, a company must immediately take steps to remedy the situation in its own area of business, steps that will cause the violation to cease. The Supply Chain Due Diligence Act provides for fines that can amount to 2 per cent of a company's annual turnover when it exceeds €400 million.

Source: Germany (2021).

Figure 3
Chemicals sector value chain



2.3.1.1. Due diligence

The introduction of due diligence schemes across the chemical supply chain has the potential to green the global supply chain. Due diligence is a continuous, proactive and reactive process by which companies avoid and address adverse effects associated with their operations, supply chains and other business relationships that might be related to workers, human rights, the environment, bribery, consumers and corporate governance (OECD, 2018a). The Special Rapporteur on toxics and human rights has reported that abuse of workers' rights in the value chain is especially common, including through exposure to hazardous chemicals in upstream sourcing of raw materials and the sale and use of substances downstream. This indicates that companies face particular challenges in monitoring and conducting due diligence throughout their value chains (Business and Human Rights Resource Centre, 2018). Mandatory or voluntary due diligence schemes can help to eliminate from the value chain or, when that is not possible, reduce substances of concern, while protecting human rights and taking into account gender-specific risks.

An early example of mandatory due diligence is the European Union timber regulation of 2010 (European Union, 2010), which, for a decade, has required traders who place timber products on the market of the European Union to exercise due diligence, namely to ensure that the timber is sustainably harvested. Moreover, European Union legislation on batteries is being updated so that rechargeable batteries on the market will require due diligence policies for supply chains of cobalt, natural graphite, lithium, nickel and other chemical compounds (European Union, 2020). Germany has recently made due diligence mandatory to enable the enforcement of domestic standards across the value chain by extending their jurisdiction beyond the territory of Germany (see box 4 on page 37). In practice, this means that, irrespective of the geographical location of the production, importers and vendors must ensure that minimum standards relating to human rights and the environment are met. Several voluntary, international due diligence guidelines have been developed to help companies increase sustainability in their supply-chain management. The guidelines are applicable to all sectors but have been complemented with sector-specific guidance. Table 9 provides an overview of voluntary international guidelines on due diligence and specifies their relevance for the sound management of chemicals and waste. Due diligence measures to protect workers from toxic occupational exposures are articulated in the set of principles on human rights and the protection of workers from exposure to toxic substances prepared by the Special Rapporteur on toxics and human rights (United Nations, 2019).

Table 9

International guidelines for due diligence and their relevance for chemicals

Document	Released	Description	Relevance for chemicals
OECD Due Diligence Guidance for Responsible Business Conduct	2018	Provides practical guidance for enterprises on implementation of the OECD Guidelines for Multinational Enterprises (OECD, 2011) to help address and avoid adverse impacts related to workers, human rights, the environment, bribery, consumers, and corporate governance.	Addresses the environment, in accordance with chapter VI of the OECD Guidelines for Multinational Enterprises, which encourages substitution or reduction of the use of toxic substances.
The Ten Principles of the United Nations Global Compact	2000	Consists of 10 due diligence principles in the areas of human rights, labour, environment and anticorruption, intended to help companies track the sustainability of their products across the supply chain.	Does not specifically address chemicals but includes three principles on the environment.
Guidelines for Social Life Cycle Assessment of Products	2009	Was the first voluntary, international guidance document to assess social impacts along the life cycle of products in a global context.	Encourages the use of life cycle assessment to assess environmental impacts throughout a product's life cycle.
Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy of the International Labour Organization (ILO)	1977 (fifth edition 2017)	Provides guidance for multinational enterprises, Governments and employers' and workers' organizations in areas such as employment, training, conditions of work and life and industrial relations.	Refers to the following ILO conventions: the Asbestos Convention (No. 162); the Chemicals Convention (No. 170), and the Prevention of Major Industrial Accidents Convention (No. 174).
OECD–FAO Guidance for Responsible Agricultural Supply Chains	2016	Intended to help enterprises observe existing standards for responsible business conduct along agricultural supply chains.	Includes a section on improving environmental performance with a generic call for the substitution or the reduction in use of toxic substances.
OECD Due Diligence Guidance for Responsible Supply Chains in the Garment & Footwear Sector	2018	Intended to support a common understanding of due diligence in the garment and footwear sector along the supply chain, presented in 12 modules.	Includes environmental modules that comprehensively address hazardous chemicals, water, and greenhouse gas emissions.

Sources: OECD (2018a); United Nations Global Compact (2000); UNEP (2009); ILO (2017); OECD and FAO (2016); OECD (2018b).

2.3.1.2. Information disclosure of chemicals in commerce and products

The Dubai Declaration on International Chemicals Management (SAICM, 2006) stresses “the responsibility of industry to make available to stakeholders such data and information on health and environmental effects of chemicals as are needed to safely use chemicals and the products made from them” (para. 20), taking into account that “confidential commercial and industrial information and knowledge are protected in accordance with national laws or regulations or, in the absence of such laws and regulations, are protected in accordance with international provisions”, and that “information on chemicals relating to the health and safety of humans and the environment should not be regarded as confidential (para. 22). Furthermore, the Overarching Policy Strategy (SAICM, 2006) notes that “there is often limited or no information on many chemicals currently in use and often limited or no access to information that already exists” (para. 6 (j)) and outlines the objective of ensuring “that information on chemicals throughout their

life cycle, including, where appropriate, chemicals in products, is available, accessible, user-friendly, adequate, and appropriate to the needs of all stakeholders" (para. 15 (b)).

According to a 2019 study (UNEP and ICCA, 2019), there are an estimated 40,000 to 60,000 industrial chemicals in commerce globally, and 6,000 of those chemicals account for more than 99 per cent of the total volume. A scientific review published in 2020 (Wang and others, 2020) reveals that 350,000 chemicals were listed in the 22 national and regional chemical inventories examined; some 69,000 of those had been registered during the period 2010–2019 and were therefore considered to be in commerce. A global inventory of the amounts of chemicals used in commerce does not, however, exist and would be needed to enable the tracking and management of chemicals in commerce (see section 2.4.2.3. on inventories).

Information disclosure is closely linked to the right to know, one of the basic human rights defined by the United Nations (UNEP, 2020a). Moreover, in his document on principles on human rights and the protection of workers from exposure to toxic substances (United Nations, 2019), the Special Rapporteur on toxics and human rights specifies that health and safety information about toxic substances must never be confidential. There is a need to increase transparency by sharing the information needed for the removal of harmful practices while ensuring that confidential business information is well protected. It is imperative to increase understanding of chemicals in commerce and transparency of information on chemicals of concern contained in products to help actors in the value chain make informed decisions and to incentivize action towards the use of safer alternatives.

At its second session in 2009, the International Conference on Chemicals Management established the Chemicals in Products programme. In resolution II/4 on emerging policy issues, the Conference agreed to "consider further the need to improve the availability of and access to information on chemicals in products in the supply chain and throughout their life cycle". The Chemicals in Products programme is led by UNEP, and initial work has focused on textiles, toys, building products, and electronics. The survey conducted for the independent evaluation of SAICM revealed that half of respondents considered that they had had at least some success in addressing chemicals in products. Many respondents from developing countries, however, highlighted the lack of capacity and resources, noting that most products were imported and that the authorities were not able to verify the chemical composition (SAICM, 2019a). The preparation of an evaluation of the Chemicals in Products programme could demonstrate its influence in ensuring transparency and in identifying the means to address challenges. Currently, new modalities for dealing with issues of concern are being discussed within the intersessional process considering the Strategic Approach and the sound management of chemicals and waste beyond 2020. Attention is being paid to the creation of more robust mechanism for implementation, which is also of relevance for the future of the Chemicals in Products programme (SAICM, 2021a).

To support transparency with regard to chemicals in products, both mandatory and voluntary information disclosure programmes have been developed, although the latter are more prevalent:

- Mandatory information disclosure is prevalent in some sectors (e.g., cosmetics, personal care products and food additives), with the chemicals used in products being communicated through labelling that shows the full ingredient list (UNEP, 2020a). In other sectors, however, legal requirements for information disclosure have been narrower in terms of geographical, chemicals and sectoral coverage (UNEP, 2020a).
- Voluntary information disclosure is led by sectors or individual companies. It can be done passively by providing suppliers with a declarable or restricted substance list, or companies may actively invest in knowing which chemicals are used by their suppliers and set up or join

an existing system for information disclosure (UNEP, 2020a). The Principles for Chemical Ingredient Disclosure is a voluntary initiative to encourage product transparency (see box 5).

Box 5**Principles for Chemical Ingredient Disclosure**

In July 2021, Clean Production Action, a non-profit organization based in Boston, Massachusetts, United States, launched the Principles for Chemicals Ingredient Disclosure. The six principles, which promote the development and use of safer chemicals in products, have, to date, been endorsed by more than 100 businesses, Governments, health-care organizations, investors and non-governmental organizations. Signatories are expected to expeditiously adopt and implement the following guiding principles:

- 1) Disclose all intentionally added chemical ingredients
- 2) Disclose non-functional constituents that are identified on specified lists of chemicals of concern
- 3) Proactively engage supply chains and interested stakeholders to increase full chemical ingredient information disclosure
- 4) Advocate for filling data gaps to characterize the hazards of chemicals
- 5) Make accurate chemical ingredient information easily accessible to consumers, government agencies, manufacturers, brands, retailers and others in the supply chain
- 6) Support public policies and industry standards that advance the above Principles

Source: Clean Production Action.

Labels may contain a logo or stamp highlighting the specific characteristic(s) of a product or service to guide informed consumer choices. While labelling is a critical component of information disclosure, its improper use can result in “greenwashing”. This can be mitigated by setting minimum labelling requirements. Labelling is mostly voluntary, but mandatory requirements are becoming more common. For example, China, the European Union, and Japan have adopted labelling requirements for electrical and electronic products that comply with their respective laws (UNEP, 2020a). Moreover, France aims to introduce mandatory environmental labelling of goods and services, with a focus on sectors that cause high levels of pollution, such as the textile industry.

The interviews conducted as part of the present study revealed that efforts to increase transparency with regard to chemicals in products have met with many obstacles. First, countries most commonly resort to voluntary information-disclosure mechanisms, but they appear to be ineffective. As pointed out by an interviewee: “No one is going to advertise or voluntarily report the fact that they are using hazardous chemicals in their production” (interview 870). Second, industry is keen to protect intellectual property rights with regard to the chemicals used in products. Claims of confidentiality should be justified and never granted for health and safety information. Nevertheless, this principle appears to be weakly executed, as remarked by the same interviewee: “I think that there is supposed to be agreement that health and environmental data are not confidential, but somehow they are” (interview 870). Lastly, regulators and waste managers may be overwhelmed by information on chemicals in products.

Against this backdrop, countries should aim to set minimum transparency requirements in legislation, in line with the principles enshrined in existing frameworks. They should endeavour gradually to transition from voluntary to mandatory requirements regarding information disclosure and the labelling of hazardous chemicals in order to eliminate or, when that is not possible, reduce the use of substances of concern in the value chain and transition to a circular economy. This involves ensuring that health and safety information is generated and made available to consumers, businesses and regulators, including information on products containing substances of concern and how to handle them properly. The role of industry is to ensure that health and safety information on toxic substances is never confidential, to disclose information

related to the entire product life cycle to comply with requirements, and to scale up voluntary initiatives.

Technological solutions may offer new opportunities, but they should support legislative requirements and not replace them. Further analysis is needed to identify scalable, cost-efficient, and environmentally viable technological solutions, such as smartphone applications, big data and blockchain technology. One possible option is the development of digital product passports that summarize data on components, materials, and chemicals to enable the provision of relevant information to different actors across the product life cycle, thereby helping to optimize design, production, use and disposal (Adisorn, Tholen and Götz, 2021). Quick response (QR) codes that can be read by smartphones or other electronic scanners could link the product to the product passport. For instance, the proposal for a new European Union regulatory framework on batteries envisages the use of QR codes to give access to information on the presence of hazardous substances (European Union, 2020). The concept of digital product passports requires further research, including in terms of the main elements to be included and the intended beneficiaries of such passports, identification of a cost-efficient mechanism for data storage, development of a road map with a clear timeline and potential actors for its implementation and understanding of such an initiative's contribution to achievement of a circular economy.

2.3.1.3. Trade

International trade manifests itself in all phases of the supply chain. Chemicals (upstream), products (midstream) and waste (downstream) flow relatively freely across the globalized market economy. Trade therefore needs to be considered in the context of sustainable management of the supply chain of chemicals and waste.

It is generally recognized that, in order to track the trade of chemicals and enhance sustainable trade, it is essential to increase the enforcement and national uptake of GHS and promote the establishment of national chemical inventories. A uniform labelling of hazardous chemicals and the identification of chemicals on the market in each country will not only improve health and environmental safety, but also allow for safer and more sustainable trade.

The lack of transparency in information about chemicals in products in international trade appears troubling, particularly for substances of concern that are beyond the scope of multilateral environmental agreements. Failure to recognize substances of concern in goods is a persistent challenge even for developed countries, as highlighted by one interviewee: "We have had cases where importers of chemicals were desirous of making sure that certain chemicals were not in their products, but in the country that the product was coming from there was no such requirement. They therefore faced the challenge of obtaining the information that they needed to be able to comply" (interview 550). Significant progress has been made in tracking trade through the development, under the Harmonized Commodity Description and Coding System, of customs codes for ozone-depleting substances listed in the Montreal Protocol. Similarly, many other international agreements and initiatives rely on Harmonized System codes that enable the tracking of the trade in hazardous wastes, chemical weapons, precursor chemicals for the manufacture of illicit drugs, narcotics, and psychotropic substances. SAICM has recognized several emerging policy issues and other issues of concern, including perfluorinated compounds and highly hazardous pesticides for which Harmonized System codes might be developed. Given the voluntary nature of SAICM, however, further support might be needed to create the traction required to achieve such an endeavour.

Numerous unregulated toxic chemicals continue to be traded, as many companies comply only with minimum standards and/or take advantage of weak enforcement capacity in developing countries. One interviewee in the present study stated that "developed countries are still

producing and manufacturing chemicals in their own countries for the sole purpose of selling them to developing countries" (interview 844). Continued support from the Green Customs Initiative is needed for the provision of training to build the capacities of customs officers in developing countries and countries with economies in transition in order to prevent illegal trade in toxic chemicals. At the same time, all countries should aim to assess their domestic and external chemical footprint in efforts to minimize trade in toxic chemicals. For example, the European Union Action Plan towards zero pollution for air, water, and soil aims to minimize the Union's external pollution footprint by restricting the export of certain products that are no longer allowed on its internal market (European Commission, 2021a). Section 2.4.2.2. discusses chemical footprint assessments.

A key component of enforcement and inspection activities is the use of laboratories. The development of a comprehensive network of national laboratories, however, may constitute a significant financial burden and has not happened in many developing countries. This can significantly impair the monitoring of trade, as explained by one interviewee: "At the border, I do not even have any form of testing in place to verify that the product in the container is what the bearer is claiming it to be" (interview 844). The acceptance and use of information generated in other countries, such as risk assessments from countries with relatively similar conditions, can reduce the need for complex laboratory systems. Countries, however, should ideally have at least a national reference laboratory capable of measuring chemical composition. Other options for reducing costs are to engage in regional cooperation for the establishment of joint laboratory infrastructure and/or to strengthen regional capacities to influence the types of products that might be entering the territories. The latter is one of the objectives of the GEF project described in box 6.

Box 6

GEF project: Implementing Sustainable Low and Non-Chemical Development in Small Island Developing States (ISLANDS)

The ISLANDS project aims to harmonize legislation and policies to create a single more transparent supply chain across 33 small island developing States. This involves, inter alia, strengthening the capacity of customs control and environmental agencies to limit the import, use, and disposal of banned chemicals and wastes and related products; generating data for reporting under international conventions; and reporting accordingly in collaboration with the World Customs Organization and the Green Customs Initiative. Efforts build on lessons learned from activities under the Montreal Protocol to improve the capacity of customs officers.

Source: Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region (2022).

Possible action related to sustainable and transparent value chains

- Countries should enshrine in domestic legislation minimum transparency requirements, in line with the international principles set out in existing frameworks, and endeavour gradually to move from voluntary measures for information disclosure and the labelling of hazardous chemicals to mandatory requirements. The industry should ensure that health and safety information on toxic substances is never confidential, disclose information related to the entire product life cycle to comply with requirements, and scale up voluntary initiatives. (Governments, industry)
- Technological solutions, such as smartphone applications, big data, blockchain technologies, and digital product passports should be explored with a view to identifying scalable, cost-efficient and environmentally viable options for increasing transparency. (Governments, industry)

- Countries should articulate due diligence duties across the supply chain of chemicals, obliging producers and importers to prevent harm to the environment and to respect human rights across their business operations. Even in the absence of national due diligence duties, all businesses have an independent responsibility to conduct due diligence and they should use their leverage to require suppliers and distributors to adhere to human rights, labour and environmental standards, communicate those expectations clearly and support such efforts. The preparation of case studies could help with the identification of options for advancing due diligence across the supply chain of chemicals. (Governments, industry)
- There should be greater enforcement and national uptake of GHS, and national chemical inventories should be established. (Governments)
- The Chemicals in Products programme could be evaluated with a view to understanding better its influence in generating transparency and identifying the means to address challenges. (SAICM)
- There is a need to update Harmonized System codes for substances of concern, following the example of ozone-depleting substances to enable customs officers better to track the movement of substances of concern in international commerce. (Green Customs Initiative)

2.3.2. Testing to support risk assessment and management of chemicals

The integrated approach states that “the allocation of cost needs to be based on what might be considered the common elements of sound chemicals management: provision of information; risk assessment and risk management; safe use; and in certain cases, remediation” (UNEP, 2012; para. 26).

The requirement that chemical manufacturers generate information about the intrinsic hazards, exposure scenarios, and risk assessments (including gender-specific considerations) in relation to both existing and new chemicals levels the playing field for new chemicals and enables a more meaningful assessment of alternatives. This information enables regulators to remove chemicals of concern, downstream users to deselect substances of concern from their supply chains and chemical manufacturers to innovate towards safer alternatives (Tuncak, 2013). The internalization of costs is achieved by requiring industry to finance risk assessments to demonstrate that their substances are safe and by requiring the payment of fees for the registration of new chemicals.

Countries have adopted various regulatory approaches to risk assessment and management. These include the Industrial Chemicals Environmental Management Standard (Australia); the 1999 Canadian Environmental Protection Act and the Chemicals Management Plan (Canada); the REACH (registration, evaluation, authorization and restriction of chemicals) regulation (European Union); and the 1976 Toxic Substances Control Act (United States). Some of the models shift the responsibility for assessing and managing chemical risks from the public authorities to the industry itself by requiring risk assessments for both existing and new chemicals. In other cases, industry is required to provide the information and it is the public authorities that conduct the risk assessment. Some countries apply a combination of the two models described. The main requirement is to prove that substances are safe and to enable risk management costs to be internalized in the product. Although progress has been made recently in some emerging economies, including in China and India, least developed countries still lack regulations on the internalization of risk assessment and management. Annex III sets out examples of policies on risk management. The harmonization of risk assessment methods through a regional approach could bring significant efficiency gains, as highlighted by one interviewee: “We have an example in the European Union of a harmonized approach in which each member State gets to make its

own final determinations on certain registrations with respect to different chemicals. Just imagine if there was a way for a regional group like Mercosur or the Association of Southeast Asian Nations to harmonize risk assessment standards" (interview 311).

Through CropLife and ICCA, the industry has supported the development of effective science and risk-based regulatory frameworks at all levels. This has included the creation of tools for building capacity in risk management, such as the Principles of Regulation of CropLife International (2012), which are intended to assist with the creation of new or the strengthening of existing pesticide regulation, and other guidance on the management of highly hazardous pesticides. CropLife has supported the implementation of such guidance by organizing workshops to train country regulators and other relevant stakeholders. CropLife also actively supported the drafting of the International Code of Conduct on Pesticide Management (FAO and World Health Organization (WHO), 2014). Furthermore, ICCA has developed the Guidance on Chemical Risk Assessment (ICCA, 2011), which provides the basis for a general methodology for risk assessment.

Intergovernmental organizations have supported risk assessment and the sharing of data through the OECD, as shown in Table 10. As many similar chemicals are produced in more than one country, different national chemicals control policies can lead to the duplication of testing, increasing overall costs. The cost for a pesticide company of testing one new active ingredient for its health and environmental impact is on average €21.5 million, and the time needed for a Government to review and assess the data is around 1.95 person-years (OECD, 2019). The harmonization of testing protocols and the sharing of data can help generate significant cost savings. As noted by one interviewee, "by harmonizing risk assessment and other procedures, you increase efficiency for the companies and for the manufacturers; the submission will be used and relied upon by numerous countries without them having to do 15 different full-pack dossiers" (interview 311).

Table 10

International initiatives to support risk assessment and the sharing of data

Initiative	Established	Overview
OECD Mutual Acceptance of Data system	1981	In 1981, the OECD Council adopted a decision concerning the mutual acceptance of data in the assessment of chemicals to ensure that test data generated in the testing of chemicals in an OECD Member country in accordance with OECD Test Guidelines and Principles of Good Laboratory Practice shall be accepted in other Member countries for purposes of assessment and other uses relating to the protection of human health and the environment. The Mutual Acceptance of Data system helps avoid conflicting or duplicative national requirements, provides a common basis for cooperation among national authorities and avoids the creation of non-tariff barriers to trade, which saves industry the expense of duplicate testing for products that are marketed in more than one country.
OECD High Production Volume Chemicals Programme	1991	Through the High Production Volume Chemicals Programme, the burden of testing and evaluating the safety of such substances was shared among countries according to the number of such chemicals that they produced and imported. The programme led to the generation of hazard assessments agreed by all member countries for 1,343 chemicals, helping to save considerable resources for Governments, experts and industry.

Source: OECD.

Possible action related to testing to support risk assessment and management of chemicals

- Harmonize risk assessment methods and procedures, and consider risk assessments completed by other jurisdictions, when appropriate, to create efficiency for companies and manufacturers, building on existing initiatives, including the OECD Mutual Acceptance of Data system. (Governments, industry, OECD)

- Promote regional cooperation to enable the pooling of resources for risk assessment and management to create efficiency and economies of scale. (Governments)

2.3.3. Standards and certification schemes

The integrated approach states that “although industry involvement is not directly governed through international agreements or financial mechanisms, industry is influenced by standards that are established and promoted globally through multilateral agreements, and their commerce is indirectly governed by standards or obligations established in national legislation” (UNEP, 2012; para. 25).

WTO defines a standard as a “document approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method” (WTO, 1994). In essence, a standard refers to specific criteria or norms relating to material goods or services, which may also serve as benchmarks. Standards can have many uses. They can be used for defining terminology, setting basic requirements for products and services, assuring health, safety and environmental protection, assuring compatibility and interchangeability and promoting innovation (Weissinger, 2021). Standards and certification schemes can help the private sector meet or go beyond regulatory requirements. Many voluntary standards, particularly those developed by international standards organizations, are eventually translated into legal requirements. Table 11 provides examples of some of the standards and certification schemes that are relevant to chemicals and waste.

Table 11

Examples of standards and certification schemes relevant to chemicals and waste

Name	Overview
International Code of Conduct on Pesticide Management	The International Code of Conduct on Pesticide Management (FAO and WHO, 2014) sets standards for the sound life cycle management of pesticides, particularly with respect to government and industry practices, which are especially relevant where there is inadequate or no national legislation on pesticide regulation.
Responsible Care	The Responsible Care programme is the global chemical industry's voluntary initiative to drive continuous improvement in safe chemicals management and achieve excellence in environmental, health, safety and security performance. Responsible Care began in Canada in 1984 and, today, national chemicals associations in nearly 70 economies around the world are implementing the initiative.
Standards on life cycle assessment of the International Organization for Standardization (ISO)	ISO standards on life cycle assessment include the ISO 14040 series standards (Life Cycle Assessment) that provide quantitative methods for assessing the environmental aspects of a product or service across all the stages of its life cycle.
Eco Declaration (Standard ECMA-370 of ECMA International – European association for standardizing information and communication systems and IT Företagen)	This standard specifies environmental attributes and measurement methods for information and communication technology and computer electronic products according to known regulations, standards, guidelines and currently accepted practices. The standard is also applicable to products used as subassemblies, components, accessories and optional parts.
Cradle to Cradle Certified	Cradle to Cradle Certified is a globally recognized measure of safer, more sustainable products made for the circular economy. To receive certification, products are assessed for environmental and social performance across five categories of sustainability: material health; product circularity; clean air and climate protection; water and soil stewardship; and social fairness.

Name	Overview
Together for Sustainability	Together for Sustainability is a joint initiative and global network of 33 chemical companies that delivers the de facto global standard for environmental, social, and governance performance of chemical supply chains. The programme is based on the principles of the United Nations Global Compact and the Responsible Care programme.
Safer Choice of the United States Environmental Protection Agency	Safer Choice is based on standards and conformity assessment and allows companies to receive an agency-approved label if their products are proven to meet stringent health and environmental safety criteria. The label is taken into account by consumers, including as a guide in making purchases for schools and other institutions. As part of the programme, the Environmental Protection Agency maintains a Safer Chemical Ingredients List consisting of chemicals that are among the safest available for their function. The addition of chemicals to the list encourages innovation and growth in the field of safer products, expands markets for manufacturers, and helps protect people and the environment.
EU Ecolabel of the European Union	The EU Ecolabel is a label of environmental excellence that is awarded to products and services meeting high environmental standards throughout their life cycle: from raw material extraction, to production, distribution, and disposal. The EU Ecolabel promotes the circular economy by encouraging producers to generate less waste and carbon dioxide during the manufacturing process. The EU Ecolabel criteria also encourage companies to develop products that are durable, easy to repair, and recyclable.
Nordic Swan Ecolabel of Nordic Ecolabelling	Nordic Ecolabelling works to reduce the environmental impact of the production and consumption of goods by means of the Nordic Swan Ecolabel. This makes it easy for consumers and professional buyers to choose the goods and services that are best environmentally. It sets strict environmental requirements in all relevant phases of a product's life cycle; sets strict requirements for chemicals used in ecolabelled products; continuously tightens requirements for goods and services to create sustainable development; and certifies and verifies that all requirements have been met before a product is approved.
Blue Angel: The German Ecolabel	The Blue Angel has been the ecolabel of the Federal Government of Germany since 1978. The Blue Angel sets high standards for environmentally friendly product design and has proven itself over the past 40 years as a reliable guide to more sustainable consumption. The Blue Angel guarantees that a product or service meets high standards when it comes to its environmental, health and performance characteristics, and products and services are always evaluated across their entire life cycle.

Sources: FAO and WHO (2014); Chemistry Industry Association of Canada; ISO; ECMA International; Cradle to Cradle Products Innovation Institute; Together for Sustainability; United States Environmental Protection Agency; European Union; Nordic Ecolabelling; Germany.

The implementation of standards may be verified through testing, while compliance may be assured through certification by independent parties that authorize the use of labels signalling to users the compliance of a product, process, service, or other with a particular standard (Weissinger, 2021). In essence, standards and certification schemes are voluntary instruments that help the private sector to go beyond regulatory compliance. To this end, they often align with the strictest market access requirements (e.g., the REACH regulation of the European Union) or even go beyond what international and national mandatory standards prescribe based on hazard assessment. Several initiatives use a life cycle perspective and can thus help connect actors across the value chain (SAICM, 2019b).

While standards are commonly developed by international standards organizations and industry or civil-society initiatives, Governments also have an important role. This might involve participation in the development of standards to encourage stronger protection for the environment, health and safety. The framework/instrument for the sound management of chemicals and waste beyond 2020 could help generate harmonized industry standards or principles, as highlighted by one interviewee: "SAICM could set out a pathway towards the establishment of an ideal minimum criterion or the development of guiding principles for moving to the use of lower-hazard or non-hazardous chemicals" (interview 083). For example, the European Union Circular Economy Action Plan outlines sustainability principles and highlights

that when countries come together as a bloc it provides the critical mass needed to influence product design and value chain management worldwide (European Commission, 2020). The planetGOLD programme provides a sector-specific example of the development of voluntary sustainability criteria for the sourcing of gold (see box 7), whereas the new European Union regulatory framework for batteries sets mandatory sustainability requirements (European Union, 2020).

Box 7

Criteria governing artisanal and small-scale gold mining operations

The planetGOLD programme sets out specific criteria to govern the operations of artisanal and small-scale gold mining entities engaged with the programme. Conformance with the criteria will ensure that artisanal and small-scale miners participating in the programme undertake sufficient efforts to avoid, minimize, mitigate and, where appropriate, offset adverse effects on people and the environment. By adhering to the criteria, mining entities will be able to implement the environmental and social safeguards required of GEF-funded projects and will enhance their ability to attract financing and sell their gold products on formal markets. The programme is aligned with the 2018 Code of Risk-mitigation for Artisanal and Small-scale Mining Engaging in Formal Trade (Alliance for Responsible Mining and Resolve, 2018), but includes three additional requirements: eliminating mercury in the mining process; respecting and protecting the rights of indigenous peoples; and minimizing impact on biodiversity.

Source: planetGOLD programme, 2021.

Lastly, a mapping of standards and certification schemes could help identify opportunities for aligning standards and addressing gaps. For instance, a mapping of the textile sector showed that it is guided by 77 standards and certification schemes, but only a few of them address chemicals safety (SAICM, 2019b).

Possible action related to standards and certification schemes

- Strengthen implementation of standards and strive to align them across countries and regions. (Industry, Governments)
- Develop high-level principles and/or criteria to influence product design and value chain management across the world in prioritized sectors. (The framework/instrument for the sound management of chemicals and waste beyond 2020)
- Map existing standards to identify opportunities for alignment between the standards and to address gaps. (Industry, academia, Governments)

2.4. Voluntary measures

2.4.1. Research, development and innovation

The integrated approach highlights the need to “undertake measures and develop incentives to strengthen the role of industry in financing research, development and innovation, co-financing projects and direct financial contributions to relevant funds” (UNEP, 2012; para. 29 (i)).

Research and development are critical for sustainability. In particular, green and sustainable chemistry provides opportunities to harness nature's solutions to make new societal and medical breakthroughs, such as the isolation of anticancer drugs from bark and recovering fertilizers from used alkaline batteries (Forum for Environmental Information, 2016). UNEP has developed 10 objectives for green and sustainable development, ranging from the minimization of chemical hazards to the maximization of social benefits, with recommendations for specific actions by various stakeholders (UNEP, 2020b).

The incorporation of green and sustainable chemistry into educational curricula could be a driver of change. The new Professional Master in Sustainable Chemistry developed by the International Sustainable Chemistry Collaborative Centre and Leuphana University in Lüneberg, Germany, could function as a model for other universities and is an opportunity to encourage women to engage in education and a career in the fields of science, technology, engineering and mathematics. Start-up incubators and accelerators and funding mechanisms could integrate green and sustainable chemistry objectives into their selection process, but private-sector support for universities is also valuable, through research funding, training partnerships and technical service contracts (UNEP, 2020b). Moreover, there will need to be continued research in the field of toxicology owing to increasing interest in risk reduction and management. One interviewee remarked that “it would be good to see some human investment, from industry or the Government, in the next generation of toxicologists” (interview 443). Table 12 provides examples of possibilities for investing in research and development in relation to chemicals safety.

Research, surveys, and estimates are often used for communication, but financially strong players may have more possibilities to present their views and to back them up with studies that may be presented as scientific even though they have not undergone any scrutiny such as an independent peer review (ChemSec, 2015). To this end, safeguards should be put in place to prevent industry from sponsoring fraudulent scientific research, as cautioned by one survey respondent: “It should be clear that the financing of research, development and innovation by industry needs to be from a “no strings attached” perspective and therefore, although funded by industry, implemented by a neutral body”.

Table 12

Examples of possibilities to invest in research and development for chemicals safety

Area	Overview	Case study
Principles of green and sustainable chemistry	According to the United States Environmental Protection Agency, green chemistry is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances. Green chemistry applies across the life cycle of a chemical product, including its design, manufacture, use and ultimate disposal. The 12 principles of green chemistry (Anastas and Warner, 1998) demonstrate the breadth of the concept. Sustainable chemistry has recently evolved as a closely related but more holistic concept (Blum and others, 2017; Kümmerer, 2017).	The mission of the American Chemistry Society Green Chemistry Institute is to catalyse and enable the implementation of green and sustainable chemistry and engineering throughout the global chemical enterprise and across society. It achieves this by advancing research and innovation for sustainability; advocating progress in education and the communication of the principles of green chemistry and engineering; and by accelerating industrial adoption of green chemistry.
Circular economy	Organizations and businesses often need inspiration to become involved in the circular transition. Several companies are exploring new circular economy systems around the globe.	Mitsui and IBM have announced a partnership to explore the use of blockchain to recycle plastics resources. They are looking to develop a platform that tracks material life cycles from their complete raw form through to the sale of products and subsequent recycling and reuse of the items. The platform will also have a feature that visualizes manufacturing processes for recycling raw materials, physical properties, quality-related data and examination methods. This system could provide manufacturers with data about the lifecycle of the material being used in production and give them assurance of its chemical composition. For regulators and sustainability-conscious consumers, blockchain gives an additional layer of trust in recycling

Area	Overview	Case study
Alternative substances	The substitution of substances is not necessarily a simple procedure. Huge efforts are needed and methods that work in one company may not work for others. Some organizations have achieved important progress in the field of technologies and tools that can help industry to switch to better alternatives, taking into account safety and sustainability across their entire lifecycle.	claims and minimizes greenwashing if data is properly audited in advance (Ledger Insights, 2021). The Safer Choice programme of the United States Environmental Protection Agency allows companies to receive an agency-approved label if their products are proven to meet stringent health and environmental safety criteria. As part of the programme, the Environmental Protection Agency maintains a Safer Chemical Ingredients List, consisting of chemicals that are among the safest available for their function. The addition of chemicals to the list encourages innovation and growth in the field of safer products, expands markets for manufacturers and helps protect people and the environment. The list offers manufacturers the ability to provide the market with best-in-class safer chemicals that carry the robust third-party verification of the United States Environmental Protection Agency.
Scientific knowledge regarding the impact on the environment and human health	Businesses and industry (e.g., producers, the manufacturing sector and waste treatment companies) have a pivotal role to play in increasing scientific knowledge as they possess the technical skills, know-how and infrastructure needed. There are various contributions that they can make to the work undertaken under the scientific and technical bodies of multilateral environmental agreements.	Industry and industrial associations are invited to submit information relevant for the implementation of the Basel, Rotterdam, and Stockholm conventions (such as for the review of chemicals under the Rotterdam and Stockholm conventions or the development and updating of technical guidelines under the Basel Convention).
Testing/screening methods	Several tools have been developed to support informed decision-making at the product design stage, during the replacement of hazardous chemicals in existing products, during procurement and in the drafting of chemicals management legislation.	GreenScreen for Safer Chemicals is a globally recognized tool that identifies hazardous chemicals and safer alternatives. GreenScreen for Safer Chemicals is used by a wide range of professionals, including governmental bodies, non-profit organizations, businesses, formulators and product developers that are interested in assessing the inherent hazards of chemicals and their potential effect on human health and the environment.
Predictive model of exposure and hazard	Industry can effectively contribute to establishing transparent frameworks for knowledge synthesis to enable effective decision-making through, for example, the development of models of exposure, hazards and risk assessment methodologies.	Risk Assessment in the Twenty-First Century (RISK21) of the Health and Environmental Sciences Institute is an initiative aimed at developing a scientific, transparent and efficient approach to the evolving world of human health risk assessment. The tool brings together international stakeholders from the Government, academia, industry and some non-governmental organizations to work together collaboratively. RISK21 was created to address a needed transition in toxicology, exposure and risk assessment methodology and communication.

Sources: American Chemistry Society Green Chemistry Institute; Ledger Insights (2021); United States Environmental Protection Agency; Secretariat of the Basel, Rotterdam and Stockholm conventions; GreenScreen for Safer Chemicals; Health and Environmental Sciences Institute.

Possible action related to research, development and innovation

- Channel funding to support research, development and innovation in the fields of green and sustainable chemistry and toxicology. (Governments, industry)

- Enhance curricula of primary, secondary and tertiary education and professional schools so that they include courses on green and sustainable chemistry and on toxicology, and increase collaboration between industry and academia. (Academia, industry)
- Ensure research and studies that are used for decision-making at the national and international level undergo independent peer review and comply with high standards of scientific and technical rigour. (Governments, United Nations bodies, intergovernmental organizations)
- Ensure the independence of research by putting in place safeguards against the sponsoring of fraudulent scientific research. (Governments)

2.4.2. Strengthening of the knowledge base for action

The mainstreaming component of the integrated approach proposes to “undertake analytical and diagnostic work to increase awareness of the benefits of the sound management of chemicals and wastes at all levels” (UNEP, 2012; para. 20 (b)) and refers explicitly to the *Global Chemicals Outlook* reports and the report *Costs of Inaction on the Sound Management of Chemicals* of UNEP.

To date, UNEP has prepared two editions of its *Global Chemicals Outlook* report (UNEP, 2013b; UNEP, 2019c) and the report *Costs of Inaction on the Sound Management of Chemicals* (UNEP, 2013a) to create awareness of the benefits and challenges of the sound management of chemicals and waste. Such analytical undertakings provide valuable information to assist Governments in designing effective policies to internalize the externalities of chemicals and waste management and to help companies understand and incorporate consideration of environmental and health effects into their decision-making processes.

2.4.2.1. Financial assessments

At the national level, it would be useful to develop tools for assessing overall funding needs, including the costs yet to be internalized; to design cost-recovery measures; and, ultimately, to align industry involvement with the polluter pays principle. Countries should strive to assess the total cost of the externalities generated by the chemicals and waste industry and to project future scenarios to help prevent their increasing. This can be compared with the cost of compliance with regulations, standards and norms. Initially these assessments could focus on selected policies, chemicals or sectors and gradually expand to more comprehensive estimations (see box 8). The World Bank has pioneered country studies and developed analytical tools for assessing the cost of environmental degradation and health damages that have enabled countries to develop environmental regulations (World Bank, 2021). The Nordic Council of Ministers has published an economic valuation related to perfluoroalkyl and polyfluoroalkyl substances (PFAS) and has estimated annual health costs to be €2.8 billion to €4.6 billion in Nordic countries alone (Goldenman and others, 2019). Natural accounting systems, such as the Economics of Ecosystem and Biodiversity, can also provide guidance for assessing national costs, including to inform policy.

Box 8

Assessing the cost of the Clean Air Act of 1970 in the United States

Although estimates of the benefits of environmental protection policies are not precise, they can still be revealing and can help generate political support. For example, the United States Environmental Protection Agency assessed the costs and benefits of the 1963 Clean Air Act between 1970 and 1990. It concluded that the total costs over that period were roughly \$500 billion, but found that a mid-range estimate of the health and other benefits stemming from the cleaner air amounted to \$22 trillion (about 44 times more than the costs). A more recent study by the Environmental Protection Agency estimated

that the environmental benefits of the Clean Air Act to Americans will exceed the costs to them by a margin of four to one.

Sources: United States (1997); Greenlaw and Shapiro (2017).

At the global level, there is no estimation of the investment needed to achieve the sound management of chemicals and waste nor any consensus on an amount to be targeted. In 2013, the UNEP report *Costs of Inaction Report on the Sound Management of Chemicals* provided the first assessment of the state of knowledge of the economic costs of such inaction (UNEP, 2013a). While the report was instrumental in raising awareness at the time, a more rigorous assessment is needed to help ascertain the real price tag. Further analytical work on the cost of inaction can help mobilize high-level political support, as evidenced by *The Economics of Climate Change: The Stern Review* (Stern; 2007) and, more recently, *The Economics of Biodiversity: The Dasgupta Review* (Dasgupta, 2021). It could also help identify differences in internalization between developing and developed economies. Related information can also be found in *The Public Health Impact of Chemicals: Knowns and Unknowns* (WHO, 2016), which has an addendum that presents an update of the main data tables and figures for the year 2019 (WHO, 2021).

2.4.2.2. Chemical footprint assessments

The development of a methodology for chemical footprint assessments, building on existing methodologies for ecological risk assessments and material flow accounting, could help to expedite work to phase out use of substances of concern, (UNEP, 2021). For instance, the Chemical Footprint Project has developed a methodology for assessing the chemical footprint of an organization, which factors in the total mass of chemicals of high concern in products sold by that company, used in its manufacturing operations and facilities and by its suppliers and contained in its packaging (Chemical Footprint Project, n.d.). The development of an economy-wide chemical footprint assessment could provide a powerful tool for assessing both the domestic and the external trade-related footprint.

Sala and Goralczyk (2013) envisage two phases in the development of a chemical footprint assessment. In the first phase, the use and emissions of chemicals throughout the life cycle of a product, sector, company or entire economy are assessed to determine the potential impact on the environment and human health. In the second phase, the harm caused by chemical pollution is projected on to the carrying capacity of the system. Further research is needed, however, to quantify carrying capacity in relation to chemical pollution, building on work initiated over a decade ago by a group of scientists that defined “planetary boundaries” in nine areas, representing the safe operating space for humanity. Chemical pollution was identified as one of the areas in which, if the boundary was exceeded, the resilience of ecosystems and humanity could be eroded (Rockström and others, 2009; Steffen and others, 2015).

2.4.2.3. Inventories

There are gaps in the environmental, health and safety data needed to obtain a comprehensive global understanding of chemical pollution (UNEP and ICCA, 2019; Wang and others, 2020). In particular, the preparation of chemical inventories in most countries is still in its infancy or lacking (Wang and others, 2020). There is a need to develop and foster best practices for the creation of inventories and to develop a publicly accessible global inventory of all chemicals on the market, to which the owners of various inventories contribute information directly and which is managed by an independent third party (Wang and others, 2020). Furthermore, a comprehensive study could be conducted to evaluate how many of the substances in commerce have been assessed by a country or region in terms of the risk that they pose to the environment and human health. The establishment of a publicly accessible global catalogue of the results of risk assessments

and the risk management measures taken would not only provide relevant information to users and society in general, but also promote regulatory cooperation and the exchange of information, thus reducing duplication in terms of tests and resources needed.

Possible action related to strengthening the knowledge base for action

- Prepare economic valuations, at the national, regional and global levels, of the cost of unsound management of chemicals and waste, building on work carried out by UNEP and the World Bank, striving to raise the issue to a higher political level and enable countries to prioritize the action needed to effectively internalize environmental externalities and bring about other socioeconomic benefits. (Governments, UNEP, the World Bank)
- Develop a methodology for a chemical footprint assessment to help countries and companies take more targeted and cost-effective measures to restrict the production, use and trade of substances of concern, building on existing work. (UNEP, OECD, non-governmental organizations, Governments, the private sector, the framework/instrument for the sound management of chemicals and waste beyond 2020)
- Develop and foster best practices for the preparation of national and regional chemical inventories; develop also a publicly accessible global chemical inventory of all chemicals on the market managed by an independent third party. (Academia, intergovernmental organizations, SAICM, non-governmental organizations)

2.4.3. Sustainable business models

The industry involvement component of the integrated approach calls for the promotion of “increased resource-efficiency and process optimization through, for instance, best available techniques and green economy initiatives” (para. 29 (h)). The mainstreaming component specifies the need to “incorporate chemicals and wastes considerations in plans and programmes for the strengthening and growth of economic and natural resource sectors in the context of green economy initiatives and sustainable development goals” (para. 20 (g)).

2.4.3.1. Green economy initiatives

Green economy initiatives anchor chemicals safety firmly within efforts to achieve Sustainable Development Goal 12, which is to ensure responsible consumption and production patterns. Such initiatives focus on resource efficiency, safe circularity, zero waste and other relevant approaches that endeavour to decouple production from chemical pollution and waste. The green economy approaches applied in relation to climate change show that industry can be a driver of sustainable change, enabling both internalization of environmental externalities and the generation of economic and social co-benefits with purposefully designed incentives and a strong regulatory environment. Green economy initiatives can also be used to promote, more substantively in the context of chemicals and industry involvement, a just transition and the inclusion of gender considerations (as per Sustainable Development Goal 5, which is to achieve gender equality and empower all women and girls).

In promoting sustainable business models, many interviewees highlighted the role of UNIDO, in particular, with regard to its work in supporting the development of eco-industrial parks. One interviewee in the present study explained that “UNIDO has a lot of work in Peru and Viet Nam and other places where industrial parks are being built. The parks are eco-efficient and use the principles of circular economy so that the waste of one becomes the input of another” (interview 083). UNEP has also actively engaged in green economy efforts, in particular through the Partnership for Action on Green Economy.

Zero-waste approaches that engage retailers are gaining momentum as consumers demand a reduction in both packaging and food waste in their daily lives. For instance, Day by Day, a zero-waste bulk-food company, has been pioneering packaging-free grocery shopping since its inception in 2013 and can now be found in 50 locations across France. The zero-waste bulk-food movement has spread across Europe, with a growing number of businesses getting involved.

Table 13

Examples of sustainable business models for the sound management of chemicals and waste

Name	Overview	Case studies
Chemical leasing	According to the UNIDO definition, "chemical leasing is a service-oriented business model that shifts the focus from increasing sales volume of chemicals towards a value-added approach. The producer mainly sells the functions performed by the chemical and functional units are the main basis for payment. ... It aims at increasing the efficient use of chemicals while reducing the risks of chemicals and protecting human health".	Since 2005, pilot projects have been conducted in Latin America, Africa, Europe, and Asia. To date, more than 100 companies worldwide have included chemical leasing in their business strategies. For example, a Ugandan beverage company introduced chemical leasing for bottle washing and conveyor lubrication. A Serbian confectionary producer uses chemical leasing in the bonding process of packaging.
Eco-industrial parks	According to UNIDO, "an eco-industrial park is a community of businesses located on a common property in which businesses seek to enhance environmental, economic, and social performance through collaboration in managing environmental and resource issues. This is known as industrial symbiosis, which is a means by which companies can gain a competitive advantage through the physical exchange of materials, energy, water, and by-products, thereby fostering inclusive and sustainable development".	Viet Nam–Singapore Industrial Park I is a symbol of cooperation between Viet Nam and Singapore and has been considered one of the most successful industrial parks in Viet Nam from a sustainable development perspective. It has contributed to the socioeconomic growth of the region and the country with a total investment capital of US\$ 2.62 billion from 240 projects from 22 countries all over the world.
Sustainable public procurement	According to the United Kingdom (2006, p.10), "sustainable public procurement is a process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst significantly reducing negative impacts on the environment".	The One Planet Sustainable Public Procurement programme is a global multi-stakeholder platform of more than 130 partners that supports the implementation of sustainable public procurement around the world. UNEP is a co-lead of the programme and is in charge of its Monitoring Interest Group.

Sources: UNIDO-led Chemical Leasing initiative; UNIDO (2016); United Kingdom (2006); UNEP.

Specific tools have been developed to speed up companies' uptake of green economy models, such as life cycle assessments and portfolio sustainability assessments (World Business Council for Sustainable Development, 2017). The Chemical Footprint Project Assessment Tool provides a framework to guide companies in the safe use of chemicals in four steps: preparation of a strategy for managing chemicals; preparation of an inventory of chemicals in products; the quantification of chemicals of concern in products; and the disclosure of information and verification. Table 13 gives some examples of sustainable business models for the sound management of chemicals and waste.

2.4.3.2. *Science-based targets*

The setting of targets has proven invaluable for sustainable business transformation. The Science Based Targets initiative encourages companies to set measurable, actionable and time-bound climate targets (see box 9). Experience shows that companies that set targets are progressing towards sustainability at a faster rate than the companies that lack them. The Science Based Targets Network expands the focus beyond the climate to the protection of biodiversity, oceans, land and water. To increase their sustainability performance, it would be important for businesses to adopt science-based targets, such as the elimination or, when not that is not possible, reduction of substances of concern in their value chains and achievement of the objectives of the framework/instrument for the sound management of chemicals and waste beyond 2020.

Box 9

Science Based Targets initiative

Founded in 2015, the Science Based Targets initiative is a partnership between CDP, the United Nations Global Compact, the World Resources Institute and the World Wide Fund for Nature. It provides a framework that encourages companies to set reduction targets for carbon emissions based on the best available climate science, to monitor progress and to report against the targets on an annual basis. The targets set are submitted to the Science Based Targets initiative and undergo a process of review and validation to ensure that they are consistent with the level of decarbonization required to keep the global temperature below the thresholds defined by the Paris Agreement of parties to the United Nations Framework Convention on Climate Change. Over 1,000 companies across 60 countries and nearly 50 sectors, representing nearly 20 per cent of global market capitalization, have adopted the initiative. Analysis of 338 companies using science-based targets shows that they are delivering on ambitions aligned with the Paris Agreement: companies with science-based targets have reduced their combined emissions by 25 per cent since 2015, meaning that a typical company within the initiative is reducing emissions at a faster rate than needed to limit warming to 1.5°C.

Source: Science Based Targets (2021).

2.4.3.3. *Technical guidelines*

Technical guidelines can be developed to improve the environment-related performance of various actors in a particular industry. Guidelines on best available techniques and best environmental practices developed by the Minamata and Stockholm conventions are examples of government-led initiatives. Industry associations have also developed guidelines to help improve the performance of their members. Table 14 provides examples of technical guidelines relevant to the sound management of chemicals and waste.

Table 14

Examples of technical guidelines relevant to the sound management of chemicals and waste developed with industry participation

Guidance	Established	Overview
Best available techniques and best environmental practices for the elimination of lead paint	2019–2021	Lead in paint was one of the components of the SAICM–GEF project entitled “Global best practices on emerging chemical policy issues of concern under the Strategic Approach to International Chemicals Management”. The two other components were chemicals in products and knowledge management. The project objectives were for 40 countries to legislate and implement legislation on the restriction of the use of lead paint and for at least 50 small and medium-sized paint manufacturers in eight countries to phase out lead from their production processes. Through nationally focused interventions, working with small and medium-sized enterprises, the project demonstrated the replacement of lead paint with non-lead alternatives using best available techniques and best environmental practices. Through a globally coordinated approach with Governments and regional standards organizations, the project aimed to accelerate the adoption of legal limits to the use of lead in paint.
Guidance on best available techniques and best environmental practices under the Stockholm Convention	As of 2005	Under the Stockholm Convention, best available techniques are defined as “the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for release limitations designed to prevent and, where that is not practicable, generally to reduce releases of chemicals listed in Part I of Annex C and their impact on the environment as a whole”. Best environmental practices are defined as “the application of the most appropriate combination of environmental control measures and strategies”. The guidelines can be used by a variety of stakeholders involved in the implementation of the Convention at the national level, such as policymakers, regulatory authorities, engineers and other technical users.
Basel Convention Partnership Programme	As of 2003	The Basel Convention Partnership Programme is a public–private framework to address collectively emerging issues and activities associated with priority waste streams. Among other activities, this partnership brings together experts and policymakers to develop guidance and guidelines leveraging scarce resources at all levels in relation to mobile phones; computing equipment, illegal traffic and household waste.
Guidance produced by CropLife International	2006	CropLife International has developed several sets of guidelines, training manuals, posters and leaflets for use in stewardship programmes. These are freely available on the CropLife International website and can be adapted to local conditions. The material promotes the responsible use of crop protection products within an integrated pest management strategy in which pest management interventions are used only when needed, and, if crop protection products are used, they are handled and applied safely and effectively.
Responsible Care programme	1984	The Responsible Care programme offers a series of systems, codes, policies or guidance documents to assist companies in achieving better performance.

Sources: UNEP (n.d.); Stockholm Convention; Basel Convention; CropLife international; Chemistry Industry Association of Canada.

Possible action related to sustainable business models

- Promote green economy initiatives, through partnerships, eco-industrial park development, chemical leasing and relevant tools (e.g., life cycle assessments and portfolio sustainability assessments) and by setting science-based targets with a view to decoupling production from chemical pollution and waste. (Governments, industry, UNEP, UNIDO, the World Business Council for Sustainable Development, the Science Based Targets Network)
- Create awareness of technical guidelines for use along the supply chain and develop new technical guidelines for the design and implementation of the methodologies needed to

ensure the sound management of chemicals and waste, focusing on government officials and industry, but developing them in collaboration with all relevant stakeholders. (Industry, Governments)

2.4.4. Partnerships and coalitions

The integrated approach recommends the enhancement of “private–public relationships and partnerships ... that support the chemicals and wastes agenda internationally and nationally” (UNEP, 2012; para. 29 (e)).

There are numerous examples of multi-stakeholder partnerships involving industry that have been established to enhance the sound management of chemicals and waste. Some of those partnerships are described in table 15.

While the concept of a partnership is highly flexible in terms of its form and membership, the voluntary nature of partnerships has been criticized for its inability to generate a transformational shift to sustainability in comparison with binding agreements. There is also a lack of clarity regarding the effectiveness of partnerships and their net contribution to addressing the problems that they are intended to solve. To this end, it is important to identify parameters for successful and

Table 15
Examples of multi-stakeholder partnerships

Partnership	Overview
Global Alliance to Eliminate Lead Paint	The alliance, which is led jointly by UNEP and WHO, has the objective of promoting the phase-out of the manufacture and sale of paints containing lead, thereby eventually eliminating the risks that such paints pose. The alliance works with Governments to assist them in putting in place firm restrictions and providing technical guidance for industry on how to effect the change. The result is clear progress towards sound chemicals management, and countries that have acted on lead paint are now able to focus their resources on other issues of concern.
Global Partnership to Implement GHS	UNITAR, ILO and OECD have worked in a partnership since 2002 to support implementation of GHS. Among the goals of the Partnership are to mobilize support and catalyse partnerships for coordinated activities at the global, regional, and national levels and to strengthen capacities in developing countries towards effective implementation of GHS.
Plastic Waste Partnership under the Basel Convention	The goal of the partnership is to improve and promote the environmentally sound management of plastic waste at the global, regional, and national levels and to prevent and minimize its generation so as, among other things, to reduce significantly and in the long term eliminate the discharge of plastic pollution into the environment, in particular the marine environment. The partnership aims, inter alia, to advance collaboration with the private sector and strengthen policy and regulatory frameworks.
BizNGO	BizNGO is a unique collaboration of business and non-governmental organization leaders who are creating a road map for the widespread use of safer chemicals and sustainable materials. BizNGO includes leaders from environmental organizations and the electronics, health-care, building, apparel, outdoor-industry, cleaning-product and retail sectors.
Honduras partnership project of CropLife	In 2013, CropLife Latin America formed a partnership with the United States Agency for International Development to train Honduran farmers in good agricultural practices. The aim was to help lift 108,000 rural Hondurans out of extreme poverty by teaching farmers how to protect their crops from pests and disease. The national member of CropLife Latin America trained 120 field officers from the Agency for International Development in good agricultural practices and integrated pest management. Those field officers in turn trained more than 30,000 Honduran farmers. The farmers have been able to tackle pests and diseases to improve their yields and the quality of their crops, and they are now earning higher incomes.
Cocoa in West Africa partnership project of CropLife	In 2013, CropLife Africa–Middle East entered into a two-year partnership with the World Cocoa Foundation to train professional spray-service providers in Cameroon, Côte d'Ivoire, Ghana and Nigeria. It forms part of the African Cocoa Initiative of the World Cocoa Foundation.

Partnership	Overview
CropLife Obsolete Stocks Programme	CropLife International member companies together with Shell have been engaged in the clean-up of obsolete pesticide stocks and the prevention of new stockpiles for nearly three decades. Industry supports programmes in over 60 countries and has helped to establish over 24 pilot programmes. CropLife International actively contributed to the Africa Stockpiles Programme and continues to contribute to the safeguard and disposal of obsolete stocks in collaboration with national and international development agency partners, such as FAO and the World Bank. Programme areas encompass research and design for containers, training of distributors, retailers and end users and support for the development and implementation of empty-container collection and recycling options.

Sources: UNEP and WHO; UNITAR, ILO and OECD; Basel Convention; BizNGO; CropLife.

impactful partnerships and coalitions, while recognizing their critical role in complementing and reinforcing international agreements. This can be achieved by encouraging the industry to set targets and to report transparently, as mentioned by one interviewee in the present study: "This is something that you can bring to various industry councils and chemical consortiums in relation to setting goals and targets and aligning with some of the Sustainable Development Goals" (interview 525). The Fashion Pact provides a good example of a partnership that has been able to attract broad industry participation and political leadership to help set time-bound targets and develop outcome-oriented reporting across the value chain of the textile and fashion industry. The Pact has over 60 members, together representing over a third of the fashion industry, which represents the proportion needed to generate a transformation shift, as pointed out by one interviewee: "Literature on systems transformation¹ shows that, once you get 20–25 per cent of participants in the industry sector, you have reached the tipping point" (interview 525).

United Nations bodies have an important role to play in advancing industry involvement by leading partnerships and coalitions. For instance, UNIDO has been actively engaged in developing eco-industrial parks, FAO in promoting the International Code of Conduct on Pesticide Management and WHO in providing scientific evidence and risk-management recommendations on issues of concern. United Nations bodies could take a more active role in bringing together leaders of manufacturing companies in specific sectors with a view to agreeing on an approach to sustainability, across the whole value chain, through new partnerships. A sectoral approach could be beneficial, as would a focus on the 10 chemicals² of public health concern cited by WHO (2020) and the 11 "other issues where emerging evidence indicates a risk"³ identified in *Global Chemicals Outlook II* (UNEP, 2019c). At the same time, existing partnerships need to be scaled up. For instance, studies show major gaps in implementation of GHS, despite the dedicated partnership for its implementation, which has been in operation since 2002. Challenges include lack of political awareness concerning the importance of the system for sustainable development, including limited financial and technical support. This could be mitigated by the development of a strategy for implementation of GHS, accompanied with indicators for tracking progress (UNITAR, ILO and OECD, 2020). Partnerships present also a clear opportunity to achieve progress towards selected Sustainable Development Goals. As an example, IPEN and UNEP have formed a partnership on gender and chemicals. Similarly, industry can take a leading role in gender initiatives to empower women in their work to achieve a toxics-free future.

A global commitment platform could provide industry with the opportunity to make contributions and ensure a holistic approach to the development and tracking of voluntary commitments by all

¹ According to Rogers (1962), adoption of an innovation by 10–25 per cent of a system's members is followed by rapid adoption by the remaining members.

² Arsenic, asbestos, benzene, cadmium, dioxins and dioxin-like substances, inadequate or excess fluoride, lead, mercury, highly hazardous pesticides and air pollution.

³ Arsenic, bisphenol A in products, glyphosate in agriculture and residential use, cadmium, lead, microbeads in personal care products and cosmetics, neonicotinoids in indoor agriculture, organotins as biocides, phthalates in consumer products, polycyclic aromatic hydrocarbons in products, and triclosan in hygiene products.

stakeholders, particularly those that have not historically participated in the SAICM process (Urho, 2021). The Global Climate Action Agenda under the Paris Agreement provides a good example of the generation of voluntary commitments by industry, as pointed out by one interviewee: “With the Paris Agreement, we saw non-State actors come to the table with a whole raft of innovative approaches, commitments and methods that would address climate change, and it was completely voluntarily on their part” (interview 525). The proposed capacity-building clearing house (see section 2.4.6.2. on capacity-building and in-kind contributions) could also play a key role in the forging of partnerships. Moreover, industry could develop action plans for partnering with Governments to implement the objectives and targets of the framework/instrument for the sound management of chemicals and waste beyond 2020.

Possible action related to partnerships and coalitions

- Outline criteria for partnerships to ensure their success and enhance confidence. Ideally, partnerships should be transparent and focus on the objectives and targets of the framework/instrument for the sound management of chemicals and waste beyond 2020. They should also include time-bound targets and meaningful indicators, building on the existing knowledge base, such as the work done by the Donor Committee for Enterprise Development (Loveridge and Wilson, 2017). (The framework/instrument for the sound management of chemicals and waste beyond 2020)
- Develop multi-stakeholder partnerships with the active involvement of industry councils, chemical consortiums, non-governmental organizations, United Nations bodies and the World Economic Forum. There should be a focus on gaps (such as the 10 chemicals of public health concern identified by WHO and the 11 issues where emerging evidence indicates a risk identified in Global Chemicals Outlook II) and on areas where work is lagging (such as implementation of GHS), taking advantage of the momentum provided by the Stockholm+50 Conference to be held in June 2022. (Industry, non-governmental organizations, Governments, United Nations bodies)
- Consider a sectoral approach or chemical-specific approach to involve all actors in the value-chain, endeavouring to achieve the scale needed to generate a transformational shift towards chemicals safety. (The framework/instrument for the sound management of chemicals and waste beyond 2020)
- Build on the momentum to be provided by the fifth session of the International Conference on Chemicals Management and consider the establishment of a global commitment platform to ensure a systematic approach to the development, implementation, monitoring and communication of partnerships and other voluntary commitments. (The framework/instrument for the sound management of chemicals and waste beyond 2020)

2.4.5. Engagement of financial institutions

The industry involvement component of the integrated approach states the need to “strengthen the role of industry as a capital investor” (UNEP, 2012; para. 29 (g)). The mainstreaming component specifies the need to “promote overall engagement, coordination and partnerships in respect of international financial institutions (such as Bretton Woods), regional development banks and other financial institutions” (para. 20 (k)).

Financial institutions include a broad range of actors, such as insurers, banks and investors. Financial institutions can enhance chemicals safety not only by eliminating or, when that is not possible, reducing substances of concern from their portfolios, but also by investing in or financing companies that invest in green and sustainable chemistry and in those that adhere to environmental, health, and safety requirements.

Environmental, social and governance criteria have been developed under sustainability reporting frameworks to help investors and financiers review risks and make informed decisions so as to avoid investments or financing that may have a negative impact or invest in or finance areas that will create positive impacts. Environmental, social and governance initiatives encourage companies to provide consistent and comparable data to enable investors and financiers to benchmark performance, including in relation to the impacts caused by companies and the impacts to which they are subjected. Environmental, social and governance initiatives that incorporate metrics for assessing companies' chemicals safety practices include the Sustainability Accounting Standards Board and the Dow Jones Sustainability Indices. The development of dedicated environmental, social and governance initiatives in the areas of climate change and biodiversity has received high-level political attention through the work of the Taskforce on Climate-related Financial Disclosures and the Taskforce on Nature-related Financial Disclosures. Sustainability reporting frameworks with a broader audience may also help to inform financial institutions, including the

Table 16

Examples of sustainability reporting frameworks

Name of organization/body	Framework established	Description	Relevance to chemicals	Aims to inform
Sustainability Accounting Standards Board	2011	Encourages the disclosure, by companies to investors, of material sustainability information. Provides standards for 77 industries across 11 sectors.	Asks companies to report on the percentage of products that contain GHS category 1 and 2 health and environment hazardous substances; and the percentage of such products that have undergone a hazard assessment; and to report on efforts to develop a strategy to manage chemicals of concern and develop safer alternatives.	Investors
Dow Jones Sustainability Indices	1999	Evaluate the sustainability performance of the largest 2,500 companies listed on the Dow Jones Global Total Stock Market Index.	Ask companies to report on the percentage of products that contain substances regulated as hazardous, that are of international concern or that may become regulated in the future as contained in the Substitute It Now list of ChemSec.	Investors
United Nations Global Compact	2000	Is the world's largest corporate sustainability initiative, involving 14,672 companies to help embed 10 sustainability principles in their work.	Requires participating companies to produce an annual Communication of Progress that details their work to embed the 10 principles into their strategies and operations and their efforts to support societal priorities. Chemicals are not directly featured in the principles.	All stakeholders
Global Reporting Initiative	1997	Encourages companies to disclose the most significant economic, environmental and social impacts of their activities and thereby	The Basel, Rotterdam and Stockholm conventions are recognized as authoritative instruments, but no reporting disclosures on chemicals are outlined.	All stakeholders, including investors, labour organizations,

Name of organization/body	Framework established	Description	Relevance to chemicals	Aims to inform
		be held accountable for these impacts and responsible for managing them.	Standard 306 outlines five disclosures on waste.	civil society and Governments
Taskforce on Climate-related Financial Disclosures	2015 (recommendations released in 2017)	Developed recommendations consisting of 11 voluntary disclosures for companies to report on to give investors the data needed to determine how climate-related risks are assessed, priced and managed.	–	Investors, lenders and insurance underwriters
Taskforce on Nature-related Financial Disclosures	2021 (work to be completed in 2023)	Developing a framework that enables businesses to assess, manage and report on their dependencies and impacts on nature.	–	Financial institutions

Sources: Sustainability Accounting Standards Board; Dow Jones Sustainability Indices; United Nations Global Compact; Global Reporting Initiative; Taskforce on Climate-related Financial Disclosures; Taskforce on Nature-related Financial Disclosures.

Global Reporting Initiative and the United Nations Global Compact. Examples of sustainability reporting frameworks that aim to inform investors and those that have a broader audience are described in table 16.

Existing sustainability reporting frameworks are limited in scope and inconsistently used. The lack of transparency therefore makes it difficult for financial institutions to understand fully companies' impacts across the chemicals value chain. Examples in other areas, such as climate change and biodiversity, provide guidance for bringing chemicals safety to the attention of investors, as highlighted by one interviewee: "Investor frameworks like the Taskforce on Climate-related Financial Disclosures and the Taskforce on Nature-related Financial Disclosures provide real third-party accountability and the rewards and incentives that the industry needs to shift to the right areas and enhance nature -and climate-positive behaviour" (interview 525). Currently, sustainability disclosures are mainly voluntary, but there is widespread support in the private sector for mandatory, legally binding sustainability disclosures that will increase transparency (United Nations, 2021). To date, there are eight jurisdictions that have announced requirements for domestic organizations to report in alignment with the recommendation of the Task Force on Climate-related Financial Disclosures: Brazil, European Union, Hong Kong, Japan, New Zealand, Singapore, Switzerland and the United Kingdom (Task Force on Climate-related Financial Disclosures, 2021).

Information on companies' performance in terms of chemicals and waste management remains largely hidden behind paywalls, is not in the public domain and lacks reliability and comparability. Moving forward, the further development and more consistent use of sustainability disclosure frameworks is recommended. Existing frameworks and environmental, social and governance initiatives could amend and harmonize their criteria, and/or a dedicated framework for chemicals-related sustainability disclosures could be developed to help translate the objectives and targets of the framework/instrument for the sound management of chemicals and waste beyond 2020

into clear guidelines for investment decisions. The mobilization of sufficient political will is also important to create a movement capable of steering the financial sector.

Box 10

UNEP FI

UNEP FI is a partnership between UNEP and the global financial sector for the mobilization of private-sector finance for sustainable development. It has more than 400 members (banks, insurers and investors) and over 100 supporting institutions. It derives from the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, Brazil, where a group of visionary leaders saw that the transformation of private finance would be key to achieving sustainable development. UNEP FI has overseen the development of three frameworks for financial institutions: the Principles for Responsible Investment, the Principles for Responsible Banking and the Principles for Sustainable Insurance). These frameworks establish the norms for sustainable finance, providing the basis for standard-setting and helping ensure that private finance fulfils its potential in contributing to achieving the Sustainable Development Goals and the targets of the Paris Agreement. UNEP FI currently focuses on four key areas: climate change, biodiversity, the Sustainable Development Goals and social issues.

Source: UNEP FI.

Several initiatives have been developed to assist the finance community in accommodating environmental, social and governance issues. These include the Principles for Responsible Investment, comprising six aspirational principles and 25 possible actions for signatories, which are applied by half of the world's institutional investors. The Principles for Responsible Investment were developed in 2006 by the UNEP Finance Initiative (UNEP FI) and the United Nations Global Compact. UNEP FI and the Principles for Responsible Investment have recently joined forces to create the Investment Leadership Programme to accelerate the pace of collaboration among leading investors. UNEP FI has a proven track record in enhancing the responsibility taken by financial institutions (see box 10 on page 60). The organization has recently signalled its interest in helping the financial sector take into account the pollution-related impact of their portfolios. This could be an important step in addressing chemical pollution.

Possible action related to the engagement of financial institutions

- Conduct a study to improve understanding of the possibilities for guiding institutional investors, banks and insurers in enhancing chemical safety in the industry through their operations and decision-making. (UNEP FI, the World Bank, members of the Inter-Organization Programme for the Sound Management of Chemicals)
- Mainstream further the sound management of chemicals and waste into corporate sustainability reporting frameworks that aim to inform financial institutions (e.g., the Sustainability Accounting Standards Board and the Dow Jones Sustainability Indices) and those with a broader audience (e.g., the Global Reporting Initiative and the United Nations Global Compact). (UNEP FI, financial institutions, industry)
- Using the positive experiences of sustainability disclosure frameworks like the Taskforce on Climate-related Financial Disclosures and the Taskforce on Nature-related Financial Disclosures, establish an initiative to develop and promote the use of a comprehensive and harmonized set of recommendations for chemicals-related sustainability disclosures in order to help translate the objectives and targets of the framework/instrument for the sound management of chemicals and waste beyond 2020 into clear guidelines for investment and financing decisions; mobilize the high-level political support needed to create traction. (Governments, United Nations bodies, non-governmental organizations, financial institutions, environmental, social and governance initiatives, sustainability disclosure framework bodies, standards setters, industry)

2.4.6. *Industry support for developing countries*

The present section discusses how industry can support the sound management of chemicals and waste in developing countries, either in combination with public grants (such as under GEF or the Special Programme) or through in-kind contributions.

2.4.6.1. *Funding*

The industry involvement component states that “financing contributions by industry through dedicated external financing as called for by the integrated approach would be strongly encouraged” (UNEP, 2012; para. 30).

GEF is closely tied to industry involvement owing to its co-financing policy. This is reflected in the component on dedicated external financing in relation to the revised integrated chemicals and wastes focal area, which would “benefit from the application of co-financing for projects, in accordance with the incremental cost principle, to support a wide range of donor involvement and to leverage additional financing from all sources, including industry, for chemicals and wastes management” (UNEP, 2012; para. 43 (e)).

To date, 80 per cent of chemicals and waste projects have engaged the private sector, including through co-financing, capacity-building, direct support and/or participation in project design and implementation (GEF, 2017b). As at September 2016, the chemicals and waste portfolio had received US\$ 1.1 billion in grant funding and leveraged US\$ 3.1 billion in co-financing from the private sector, beneficiaries, Governments, donor agencies, GEF agencies, civil-society organizations and others (GEF, 2017b). On average, the private-sector share of the co-financing is 16–18 per cent of total GEF co-financing, although this is higher for the focal areas of climate change and chemicals and waste (GEF, 2017a). The GEF Programming Directions for the seventh replenishment of the GEF trust fund for the period 2018–2022 allocated US\$ 600 million for the chemicals and waste focal area, which has leveraged almost US\$ 1 billion of private-sector co-financing from the following sources: equity investment (36 per cent), grants (29 per cent), in-kind (9 per cent), loans (4 per cent) and other sources (22 per cent) (GEF, 2020b).

GEF operates as the financial mechanism of the Stockholm and Minamata conventions, but in doing so, and implementing projects under those conventions, it also supports indirectly the Basel and Rotterdam conventions. While SAICM lacks a dedicated funding mechanism, the GEF Programming Directions for the seventh replenishment highlight GEF support for SAICM (GEF, 2018). In 2018, the GEF approved a project that supports SAICM priorities by raising awareness of the need and encouraging action to eliminate lead in paint and enhance life cycle management of chemicals in products, and contributing to the development of a knowledge management platform.

In 2020, the GEF Council adopted a new private-sector engagement strategy that is guided by the GEF Private Sector Advisory Group. The Group comprises 12 corporate leaders, including from small and medium-sized enterprises, spanning key sectors along the value chain (GEF, 2020a). The strategy places importance on the leveraging of private-sector co-financing, but also highlights the role of partnerships. For instance, GEF provided a grant of US\$ 2 million for a project that aims to green the fashion industry, including the development of clean supply chains, which is implemented by Conservation International and the Fashion Pact Association (GEF, 2021). Through partnerships, GEF also supports the development of standards and due diligence schemes, such as the planetGOLD programme, which sets out specific criteria to govern artisanal and small-scale gold mining operations.

The Special Programme to support institutional strengthening at the national level for implementation of the Basel, Rotterdam, Stockholm and Minamata conventions and SAICM was conceived as part of the dedicated external financing component of the integrated approach and formally established in 2014 by the first session of the United Nations Environment Assembly. The Assembly adopted the terms of reference of the Special Programme in its resolution 1/5. To date, the Special Programme trust fund has received pledges and contributions amounting to US\$ 32 million from donors (and has generated co-financing commitments of an additional US\$ 7.2 million from recipient countries), which has helped fund 57 projects across Africa, Asia and the Pacific, Central and Eastern Europe and Latin America and the Caribbean. The private sector has yet to provide cash contributions to the Special Programme trust fund, but it is encouraged to do so. A few projects have had explicit links to industry involvement, including in Angola, Argentina, Brazil, Burundi and Kenya (see box 11).

Currently, the Special Programme is investigating the possibility of developing a private-sector engagement strategy, which might include the development of guidelines on mapping stakeholders on the ground and then integrating them into a project. At the same time, there is a need to avoid possible or perceived conflicts of interest. The Special Programme plans to hold dialogue with key actors in the chemicals and waste industries to identify opportunities for cooperation, whether at the global level (such as through regional training workshops to promote best practices) or at the individual country level (such as through their contribution as a project partner to a specific Special Programme project).

Box 11

Special Programme project for the development of the Chemicals Directorate in Argentina

The main objective of the project was to generate capacity in the national environmental authority to promote the effective implementation of multilateral environmental agreements on chemicals and waste and SAICM. The Special Programme grant of US\$ 245,564 was complemented with US\$ 395,000 in national government and private financing. Industry also provided in-kind contributions to the project. In 2018, a second Directorate of Substances and Chemical Products was successfully established in Argentina, with a view to enabling the country to fulfil its obligations under the Basel, Rotterdam, Stockholm and Minamata conventions; fostering the involvement of a variety of ministries, with clear roles and responsibilities; and designing and systematizing processes. The project earned the support of several governmental and non-governmental actors such as the Ministries of Production, Foreign Affairs and Worship, Work, Employment and Human Resources Training and Health; and industrial associations, civil-society organizations and scientific academic organizations. Furthermore, it established the framework necessary for gaining access to financial and other resources available to the parties to the conventions for the implementation of those instruments.

Source: UNEP (2019b).

Blended finance is an innovative approach to financing sustainable development that aims to attract commercial capital for projects that benefit society while providing financial returns to investors (OECD, 2021). The OECD defines blended finance as “the strategic use of development finance for the mobilization of additional finance towards sustainable development in developing countries” (OECD, 2018c). To date, it has mobilized more than US\$ 126 billion in capital for development (Heinrich-Fernandes, 2019). Multilateral development banks provide the largest share of private-sector investments, but many other actors are engaging in blended finance, including foundations, institutional investors, philanthropic investors, commercial banks, private equity and venture capital funds and hedge funds (OECD, 2018c). The degree to which blended finance is used for the sound management of chemicals and waste in developing countries is, however, unclear. The Land Degradation Neutrality Fund provides an example of blended finance (see box 12).

Box 12**Land Degradation Neutrality Fund**

In 2017, after three years of development, the Land Degradation Neutrality Fund was officially launched at the thirteenth session of the Conference of the Parties of the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa. It is an impact investment fund for blending resources from the public, private and philanthropic sectors to support efforts to achieve land degradation neutrality through projects implemented by the private sector. The fund uses a blended finance approach, with a layered capital structure, to bring in private investors that might otherwise not have invested in sustainable land management projects. In total, investors have announced commitments of over US\$ 100 million out of a target of US\$ 300 million. The fund aims to create or support 100,000 jobs, predominantly in rural areas of developing countries, helping to lift people out of poverty.

Source: Secretariat of the United Nations Convention to Combat Desertification.

In 2019, at the third meeting of the Open-ended Working Group of the International Conference on Chemicals Management, the group of African States, the group of Latin America and Caribbean States and several other States proposed the establishment of an international fund to provide support for developing countries in implementing the sound management of chemicals and waste. The creation of a dedicated international fund may provide a unique opportunity to involve the private sector, development banks, philanthropic entities and venture capitalists alongside Governments, through financial and in-kind contributions, as in the Green Climate Fund (see box 13 on page 64). Experience gained during the implementation of multilateral environmental agreements shows that international funds have the best chance of succeeding and generating the financing required if they are accompanied by a legally binding framework. Past negotiations, however, have shown that it is difficult to achieve this, as explained by one interviewee: "We were

Box 13**Green Climate Fund**

The Green Climate Fund is the largest global fund dedicated to combating climate change in developing countries. It was established in 2010 by the United Nations Framework Convention on Climate Change to help limit or reduce greenhouse gas emissions in developing countries and to help vulnerable societies adapt to the unavoidable impacts of climate change. To date, the Green Climate Fund has received pledges of US\$ 8.8 billion and run 177 projects in 121 developing countries. The Green Climate Fund can structure its financial support through a flexible combination of grants, concessional debt, guarantees or equity instruments to leverage blended finance and crowd-in private investment. The Green Climate Fund has set up the Private Sector Facility, a dedicated division designed to fund and mobilize private-sector actors, including institutional investors, project sponsors and financial institutions.

Source: Green Climate Fund.

not so keen on having a convention only on mercury because we knew that it would cost US\$ 10 million dollars to negotiate: so why do it just for one substance? We therefore called for an open door in the mandate, which would allow other chemicals to be brought in, and for there to be a heavy metals convention or a set of criteria to enable other chemicals to be added, in an annex, for example. The idea was thus to have a global framework convention for chemicals, but it never happened" (interview 929).

National taxes that are earmarked to the specific needs of developing countries constitute another possible form of innovative finance. IPEN has proposed a global coordinated tax comprising 0.1 per cent of the sales value of 35 basic chemicals, which would be levied by all countries in which those chemicals are produced. The revenues would be directed to a new or existing international fund to support chemicals and waste management in developing countries

and countries with economies in transition (CIEL and IPEN, 2020). Similarly, the group of African States has proposed that the chemical industry contribute 0.5 per cent of its annual revenue to the implementation of SAICM. The rationale of the proposal is that the tax would provide a level playing field for industry and countries, helping to generate significant revenue for urgent development needs, with a minimal strain on the industry and a low risk of increased prices or the relocation of production. The rationale and background are well reflected in the following observation by an interviewee: "I know that there is GEF and there is the Special Programme. There has been the Quick Start Programme and other funds that have assisted in chemical management. But, quite frankly, the amount that they contributed to the sector is very small and the limitation is that most of the projects are carried out on a regional basis. Although there is a framework, most of the time, developing countries need more than a framework; they need a project to take implementation to the finishing line. If only these big companies could pay into a fund that would be accessible to all parties that require financial assistance" (interview 128).

The execution of such a concept, including the designation of a body to manage the funds and oversee project implementation, will require careful consideration to avoid challenges in administration, collection and enforcement. As with any other tax, it would need to be incorporated into legislation in order to take effect. The taxes collected would have to be earmarked to environmental programmes, which would require oversight and auditing for compliance purposes. In at least one instance, a domestic tax has been earmarked for support for sustainability efforts in developing countries; the French solidarity tax on air tickets has generated over €1 billion for the world's poor, but auditors claim that it unfairly penalizes Air France (Unitaid, 2013). The proposal for a coordinated national tax is intended to overcome this by creating a level playing field, which means that a large enough number of countries must agree to implement the tax.

The proposal for a coordinated global tax is challenging from the private-sector point of view as it does not give a direct return on investment. It is also worth differentiating between the proposed 0.1 per cent tax on annual revenue to fund implementation of SAICM, which would constitute a marginal burden on industry and consumers, and the proposed 0.5 per cent tax, which could translate into a significant burden, particularly on small and medium-sized enterprises. Moreover, developed countries with chemicals taxation systems may fear the effects of yet another taxation layer. Lastly, a tax on basic chemicals is not a direct incentive for behaviour change and substitution with safer chemicals.

2.4.6.2. Capacity-building and in-kind contributions

Capacity-building and technical cooperation is one of the thematic groupings of the strategic objectives of SAICM. The industry involvement component of the integrated approach states the need to "promote and undertake voluntary industry and capacity-building initiatives" and emphasizes the role of "in-kind contributions and partnerships that support the chemicals and wastes agenda internationally and nationally" (UNEP, 2012; paras. 29 (f) and (e)).

In addition to the critical work on building the capacity of Governments to achieve the sound management of chemicals and waste, efforts to build the capacity of industry in developing countries must be further enhanced. A commitment to the development of the knowledge, management skills, processes and capabilities needed for sustainable chemicals management in developing countries is required from the private sector across the chemicals value chain in order to respond effectively to the urgency and scale of the problem. To date, the capacity-building activities and in-kind contributions of the chemicals industry have been driven mainly by industry associations, namely CropLife International and ICCA. More information is needed, however, to understand the bigger landscape of private-sector actors and the various forms of private- and public-sector collaboration.

Since 2005, CropLife International has trained farmers in the responsible use of pesticides through a global network of partnerships and stewardship awareness campaigns. CropLife International has also developed a number of guidelines, training manuals, posters and leaflets for use in stewardship programmes that are available online. The material promotes the responsible use of crop protection products within an integrated pest management strategy, in which pest management interventions are used only when needed and, if crop protection products are used, they are handled and applied safely and effectively. No independent evaluation or study exists of the impact of the measures taken.

ICCA has long encouraged capacity-building activities in many developing countries with a view to supporting implementation of the Responsible Care programme and addressing regulatory controls and industry practices related to chemical manufacturing, use, distribution in commerce and disposal. There are gaps, however, especially in Africa and Latin America. This can be explained partly by the lack of major chemical company operations in many of the countries in those regions and partly by the difficulty of engaging local and regional chemical companies in the Responsible Care programme (UNEP, 2019c). ICCA has worked collaboratively with other regional associations to deliver capacity-building programmes in Eastern Europe, Central Asia and Asia and the Pacific. It has collaborated with UNEP on a two-year project to promote chemicals safety in East and West Africa that involved providing training in the handling of dangerous goods and capacity-building in emergency preparedness and response. It is also worth highlighting that long-term and sustained efforts have been achieved through the following two regional capacity-building initiatives established by ICCA:

- The Association of Southeast Asian Nations Regulatory Cooperation Project aims to address non-tariff barriers caused by divergent chemical management regulations by encouraging regulatory cooperation and convergence. It brings together 10 countries from the Association of Southeast Asian Nations with the aim of implementing GHS and sharing knowledge on priority topics, including chemical inventories and risk assessment.
- The Latin America Regulatory Cooperation Forum aims to promote the design and implementation of consistent, cost-efficient and science-based regulatory systems for chemicals in Latin American countries. The vision and objectives of the Forum focus on enhancing cooperation, sharing information and providing capacity-building. The Forum has also established a virtual working group for the sound management of chemicals in Latin America that brings together 50 representatives of Governments, chemical associations, downstream associations and intergovernmental organizations across the region aiming to promote a shared understanding of approaches and methodologies, including through the preparation of guidance documents and the conduct of webinars.

While the overall picture of the industry's capacity-building activities is still incomplete, it is evident that the private sector should provide in-kind support to innovation, training, safety and sustainability initiatives with a view to strengthening the sound management of chemicals and waste. The current piecemeal and ad hoc approach to capacity-building, however, cannot effectively respond to the growing needs of developing countries. A more holistic approach is required with the international collaboration of Governments, the private sector and other stakeholders.

Against this backdrop, the SAICM secretariat is investigating the feasibility of establishing a capacity-building clearing-house mechanism or marketplace to help match capacity-building needs with available expertise and resources. It could provide a common place that connects all stakeholders, including donor and recipient countries, in support of country-driven institutional strengthening. It could operate through an online platform and could perform a variety of functions. It could:

- Serve as a central repository for capacity-building activities
- Help identify funding needs and all available resources, including the private sector, international financial institutions, funds and other sources, including the philanthropic sector;
- Facilitate networking and partnering
- Provide assistance to recipient countries and donors, in particular during identification of potential matches
- Provide a common framework for monitoring progress, including the tracking of financial flows
- Facilitate the preparation of an iterative global assessment of financial needs
- Increase transparency and facilitate communication of achievements, building on existing online databases

The objective, scope, functions and operating principles of the capacity-building clearing-house mechanism will need to be clearly articulated to ensure that it is implemented effectively. This could involve the preparation and subsequent adoption of terms of reference by the International Conference on Chemicals Management. The experience of similar existing initiatives could be used to guide the process, such as the Global Partnership on Marine Litter. The Global Partnership has recently developed a digital platform that compiles a variety of resources, connects stakeholders and integrates data to guide action.⁴ Undoubtedly, a capacity-building clearing house will help to alleviate capacity-building needs, but it is unlikely, as a stand-alone initiative, to provide the revenue needed to cover the funding deficit.

Possible action related to industry support for developing countries

- Strengthen the knowledge base with regard to existing and possible new ways of accelerating the provision of innovative financing and investment, including through analysis of how chemicals can be addressed by blended finance, and seek opportunities for scaling up blended finance to promote sustainable chemistry, including job creation, in developing countries. (SAICM secretariat, non-governmental organizations, academia)
- Create a “group of friends” and/or a group of technical experts to expedite the mobilization of the funds needed to address the severe shortages in resources for achieving the sound management of chemicals and waste in developing countries; focus on innovative forms of financing and investment within the private and financial sectors, including, but not limited to, blended finance, a global coordinated tax and an international fund for the chemicals and waste cluster. (United Nations Environment Assembly)
- Specify the objective, functions and scope of a capacity-building clearing-house or marketplace mechanism for chemicals and waste; articulate and adopt terms of reference for its operation. (International Conference on Chemicals Management)
- Increasingly allocate resources for supporting developing economies through dedicated external financing mechanisms, namely GEF co-financing and the Special Programme trust fund. (Industry)
- Engage directly and strategically with the private sector, in particular industry and businesses, as partners for the achievement of a wide range of development outcomes. (Donors, United Nations bodies)

⁴ The platform is available at <https://digital.gpmarinelitter.org/>.

2.4.7. Programmatic support for SAICM

The programme of work and budget of SAICM guides the work of the SAICM secretariat. Some of the Secretariat functions outlined in the programme of work are highly relevant to industry, such as capacity-building (e.g., the development of a draft strategy for implementation of GHS worldwide and support for national-level projects to implement the SAICM overall orientation and guidance) and financial considerations that require further deliberation in relation to a capacity-building clearing-house mechanism and private-sector financial contributions generated by a global coordinated tax or an annual contribution based on revenue.

SAICM stakeholders are expected to contribute financially to ensure the smooth delivery of the programme of work and functioning of the Secretariat. In 2010, UNEP and ICCA signed a memorandum of understanding on furthering common goals and developing and implementing effective chemicals management systems. Recently, the memorandum of understanding has been revised and signed. ICCA has doubled its annual contribution to the SAICM secretariat from €150,000 to €300,000. The ICCA contribution during the triennium 2016–2018 was US\$ 198,597, which represented 3 per cent of all contributions.

It is recommended that a strategy be developed for outreach and the involvement of the private sector in the framework/instrument for the sound management of chemicals and waste beyond 2020, similar to the GEF and UNEP private-sector strategies (see box 14 on page 68). This will help draw in new partners and set clear objectives and principles to guide cooperation. It is key to reach out to relevant international associations along the chemicals and waste value chain and to those sectors that are not covered by international trade associations (e.g., the textile sector).

Possible options for action related to programmatic support for SAICM

- Prepare a strategy for SAICM engagement with the private sector, including the garnering of support for the implementation of its programme of work through partnerships, alliances and other forms of collaborative action. (SAICM secretariat)
- Seek opportunities to increase contributions from industry associations, including associations outside ICCA. (SAICM secretariat)

Box 14

UNEP strategy for private-sector engagement

In 2019, the UNEP private-sector strategy was developed in response to the increasing engagement with the private sector. While such engagement was seen as a welcome development, it also raised fears of “corporate takeover of the United Nations” if not managed properly (Ivanova, 2021). The strategy sets out a vision, mission and objectives and outlines principles that reflect core values for engagement with the private sector, including full transparency. The strategy aims to create positive, measurable and quantifiable impacts on environment and society. Its implementation is thus accompanied by monitoring in terms of risk management and the achievement of targets and subject to an annual progress report prepared by the UNEP secretariat. The strategy highlights that engagement with the private sector is needed for successful implementation of the UNEP programme of work and shows the desired outcome of private-sector engagement for each of the seven subprogrammes.

Source: UNEP (2019e).

3. Tracking progress

3.1. The framework/instrument for the sound management of chemicals and waste beyond 2020

As demands on industries, countries and organizations for greater accountability and real results in terms of sustainability increase, there is a concomitant need to improve the monitoring and evaluation of policies, programmes and projects. Monitoring systems help decision makers assess whether and how goals are being achieved over time and serve to respond to stakeholders' growing demands for results. Reporting is a good performance feedback system and can serve as a tool for information exchange. Reporting to stakeholders, publicly, in a transparent manner is fundamental for companies committed to sustainability. Reporting provides valuable information that can be used for obtaining political commitment and meeting ambitious, yet achievable, targets. For companies, the benefits of reporting on sustainability include an impetus for the integration of corporate sustainability into operations, improvement of a company's reputation, greater commitment from chief executive officers, improvement of internal information sharing and stronger relationships with stakeholders and investors.

As has been presented throughout the present study, there are numerous ways for industry to contribute to the integrated approach to financing the sound management of chemicals and waste. To plan development interventions effectively and allocate scarce resources properly, it is indispensable to keep record of what is being done. The establishment of a mechanism for taking stock of the progress of the framework/instrument for the sound management of chemicals and waste beyond 2020 is currently being discussed within the intersessional process. The purpose of this mechanism would be to assess progress against the objectives and targets, promote learning, enable improvement and the scaling-up of implementation and support stakeholders in setting priorities. The creation of indicators to measure inputs, activities, outcomes and impacts is important in the design of an efficient tracking system and for providing the necessary feedback to stakeholders.

3.2. Building a solid reporting system step by step

Reporting has repeatedly been recognized as a challenge for international organizations and stakeholders. The report *Global Chemicals Outlook II* reveals that rates of reporting under international agreements. High reporting rates have been achieved for the Montreal Protocol and the WHO International Health Regulations (UNEP, 2019b). However, the Basel and Stockholm Conventions reporting rates have not been optimal and show decreasing trends. While reporting for the Basel and Stockholm Conventions is mandatory, for SAICM it is voluntary, and so far, reporting rates so far have not been satisfactory. The SAICM secretariat circulated an online questionnaire to collect relevant data for the first progress report. The same questionnaire was also used to collect data for the second progress report with a view to obtaining comparable data that could be used to assess progress in relation to each of the 20 indicators. The response rate from Governments was 40 per cent for the first reporting round, which covered the period 2009–2010 (SAICM, 2012; para. 22), and 43 per cent for the second reporting round, which covered the period 2011–2013 (SAICM, 2014; para. 103).

Higher reporting rates may be associated with a variety of factors, including a well-considered preparatory process, active follow-up by the secretariat concerned, specific incentives for reporting, effective outreach and the sharing of results. The high reporting rates under the Montreal Protocol may be attributed to the existence of a compliance mechanism, but such a mechanism has not resulted in the same rates of reporting under the Basel Convention. More research is needed to understand what factors lead to high rates of reporting.

A step-by-step approach to developing the reporting system, as presented below, with a high level of engagement from the different industry sectors will enable learning and confidence-building and will gradually lead to the consolidation of the system. The goal should be to identify trends on the basis of market figures that allow the evaluation of industry involvement and a general progression towards achievement of the sound management of chemicals and waste.

3.2.1. Adopting targets and indicators that encompass industry involvement

Work on this topic has been conducted by the Technical Working Group on targets, indicators and milestones for SAICM and the sound management of chemicals and waste beyond 2020 (SAICM, 2020a; SAICM 2020c). The purpose of the present section is to provide views on the process and to present a preliminary, non-exhaustive list of possible indicators that could show the trend in terms of industry involvement in the integrated approach and that are aligned with the targets proposed by the Technical Working Group (SAICM, 2020c). The full set of suggested indicators for measuring industry involvement can be found in annex IV.

Further work, with the engagement of the various industry sectors, is required for the design of targets, indicators and milestones. The process has to consider the information needed and its availability, along with the ease of obtaining it. There is no sense in developing ambitious and comprehensive indicators if there is no way of collecting the information required to measure them. Definition of the scope of industry involvement in the integrated approach, however, is a prerequisite for creating adequate targets and indicators.

One of the key challenges will be the involvement of a sufficient number of representative actors from the various sectors of industry. This is necessary, however, for obtaining meaningful results from the monitoring process. Without industry buy-in both in the design and data-collection phases, the prospects of successful reporting are poor. Regular dialogue between industry, Governments and other stakeholders will be required. The creation of reporting obligations should go hand in hand with efforts to ensure that other downstream industries participate in SAICM. Traditionally, only CropLife and ICCA have submitted progress reports.

A possible way forward is to define a process in stages, initially setting high-level indicators that use data that can be easily collected through existing reporting mechanisms, even if they cover only a specific stage of the life cycle of chemicals and waste or a specific type of chemical or industry.

The measurement of financial inputs will be key to tracking industry involvement. As a first step a baseline can be created for the measurement of direct financial streams only. This can use quantitative data on the volume of funding allocated by industry in a given year to the sound management of chemicals and waste. This relates to targets E3 and E4 of the Technical Working Group under strategic objective E, on adequate financial and non-financial resources and partnerships. Initially, this could focus on three streams:

- 1) Funds collected through economic instruments (data to be found in reporting by Governments)
- 2) Costs faced by industry in complying with regulations (data to be found in reporting by industry)
- 3) Funds channelled through voluntary measures (data to be found in reporting by industry and reports by relevant United Nations bodies, such as SAICM and the Special Programme, and GEF)

Over time, as indicators are further refined and an outreach strategy to involve the private sector is developed, a more comprehensive reporting system could be developed to measure financial inputs.

The measurement of performance will require information on outputs and outcomes of activities relating to industry involvement. Annex IV presents a preliminary and non-exhaustive list of indicators on which Governments and industry could report. It further gives examples of existing sources of related information that could be used, at least partially, to obtain the data required and to identify the custodians of data collection. These include sources that may need some work to enhance data comparability or that come from individual sectors and companies, but are potentially relevant to the development of indicators with more universal application. The list is indicative. An exhaustive mapping should be conducted once there is agreement on industry involvement and related objectives and targets by the International Conference on Chemicals Management.

Below (on pages 72 and 74) are three examples⁵ of possible indicators for industry involvement aligned with the objectives and targets of the framework/instrument for the sound management of chemicals and waste beyond 2020 to be reported on by industry or trade associations. The complete list of indicators can be found in annex IV.

Guidance on the key terms used is provided below:

- "Suggested indicators" are presented for the two main stakeholders that will report on industry involvement: industry and Governments. The indicators suggested cover the various modalities for industry involvement presented in the study, both direct and indirect. Consequently, some indicators will have a more explicit link to financing, such as those that measure investment or expenses. Other indicators might have a less explicit link, but when evaluated over time they would show progress if there had been a reduction in the financial resources needed to achieve the sound management of chemicals and waste. An example of such an indicator is "the percentage/number of small and medium-sized enterprises that have received capacity-building and information from industry associations". To the extent possible, together with the suggested indicators for each target, a related financial indicator is provided that should be assessed in conjunction.
- "Percentage of companies" is based on the total number of companies assessed within the framework. It is therefore essential to define clearly the scope of "industry" and the companies that will be subject to reporting. A related milestone could be the achievement of a certain percentage of companies by a certain year in relation to a given activity.
- "Number of companies" would be used to show progression over time. A related milestone would be the percentage growth in the number of companies by a certain year in relation to a given activity.
- "Companies" refers to both industries and industry associations.

⁵ The examples are taken from the compilation of the outcomes of the Virtual Working Groups established by the ICCM5 Bureau, which is available on the SAICM website at https://www.saicm.org/Portals/12/Documents/meetings/Bureau/ICCM5B19/SAICM_ICCM5-Bureau_TC_11_2_Compilation%20of%20the%20outcomes%20of%20the%20VWGs%20-%20final_jan%202022.pdf.

Example 1

Proposed strategic objective A: [Measures are identified, implemented and enforced in order to prevent or, where not feasible, minimize harm from chemicals throughout their life cycle [and waste];]

Target A3: By [xx], measures ~~identified to prevent or minimize harm from chemicals throughout their life cycle [and waste]~~ are implemented and enforced by relevant stakeholders [countries] [governments].

Suggested indicator:

Percentage of fulfilment of pledges made by industry in action plans and road maps for the achievement of sound management of chemicals [and waste].

Alternative indicator:

Global score of companies implementing actions considered necessary to prevent, or minimize, harm from chemicals throughout their life cycle [and waste].

Related financial indicator:

Volume of investment allocated to activities to comply with action plans and road maps for the achievement of sound management of chemicals [and waste].

Alternative related financial indicator:

Percentage of revenue needed for the implementation of action considered necessary to prevent, or minimize, harm from chemicals throughout their life cycle [and waste].

Explanation: The report *Global Chemicals Outlook II* (UNEP, 2019c) highlights the fact that action plans could help to catalyse commitments and facilitate the monitoring of progress by the industry. The targets of the framework/instrument for the sound management of chemicals and waste beyond 2020 could guide industries and industry associations in the development, pledging and showcasing of action plans and road maps.⁶ Frontrunners would be rewarded, and space would be given for key actors to step up and provide leadership. As an alternative to the action plans or road maps, which could be difficult to collect, a standardized scoring system could be used.

In order to ensure that the data gathered are comparable, representative and can be integrated, contributions must be systematized. Activity-based indicators and the questions asked must be well defined to avoid variability in interpretation. It is recommended that guidelines for the design of such action plans, road maps or a scoring system be developed, identifying concrete measures that would be considered effective for preventing, or minimizing, harm from chemicals throughout their life cycle [and waste]. Table 17 provides examples of activities, desired outcomes and financial inputs related to target A3 of proposed strategic objective A. It formulates the activities, desired outcomes and inputs simultaneously as indicators, targets and questions, with a view to guiding action and facilitating reporting.

The action plans or scoring reports should be deposited in an open manner in a central repository, possibly the proposed clearing-house mechanism. Reporting on the progress made in fulfilling pledges should be harmonized with the reporting cycle of the framework/instrument for the sound management of chemicals and waste beyond 2020. Owing to the simplicity of the proposed questions, indicators and targets, data can be aggregated to show global trends.

Cooperation with the United Nations Global Compact, the Global Reporting Initiative and the Standards of the Sustainability Accounting Standards Board could help extend the reach of the action plans and associated reporting. Moreover, the reporting template could inspire the development of chemicals-related financial disclosures that could help inform and guide financial institutions.

⁶ Several of the tools developed to assess and benchmark chemicals and waste were used in the present study, such as GreenScreen for Safer Chemicals, designed to help companies and governments identify chemicals of concern, select safer alternatives and track and communicate progress, and the Chemical Footprint Project, designed to measure and disclose data on business progress to safer chemicals.

Table 17

Examples of activities, desired outcomes and financial inputs from action plans for industry implementation for use in tracking progress towards target A4 of proposed strategic objective A

Simple checklist based on activities (yes or no answers)	Outcomes to be quantified	Financial inputs
• GHS implemented, and safety data sheets and labels on product portfolios made available • Hazards of chemicals in products and/or packaging assessed • Risk assessments conducted for chemicals produced⁷ • A list of chemicals of concern/restricted substances list/manufacturing restricted substances list developed for reductions beyond regulatory requirements • Suppliers required to eliminate the chemicals on the restricted substances list from products, parts or components • Products, parts or components routinely tested to verify conformity with chemical requirements • Financial incentives developed for senior management to meet corporate sustainability goals related to chemicals and waste, and/or member(s) of senior management assigned responsibility for meeting chemical and waste policy goals and objectives • Strategy, with implementation plan, developed for the phase-out of existing substances of concern beyond the requirements for regulatory compliance • Involvement in the Responsible Care programme or similar initiatives and reporting undertaken on key performance indicators	• Substances of concern reduced within/eliminated from the product portfolio • Chemical footprint assessed and reduced • Use of packaging and materials reduced • Generation of waste reduced, and its recovery facilitated	• Financial resources allocated to the implementation of actions plans to achieve sound management of chemicals and waste • Percentage of revenue needed for the implementation of action considered necessary to prevent, or minimize, harm from chemicals throughout their life cycle [and waste]

⁷ The conduct of a risk assessment may be dependent on the hazardous properties and exposure scenarios of the chemical.

Example 2

Proposed strategic objective B: Comprehensive and sufficient knowledge, data and information are generated, available and accessible to all to enable informed decisions and actions.

Target B1: By 20xx, comprehensive data and information on chemicals ~~on the global market~~, throughout their lifecycle, are generated ~~[are shared]~~, made available and accessible.

Suggested indicator:

Percentage/number of companies that implement all actions considered necessary to generate, make available and accessible comprehensive data and information on chemicals on the global market.

Related financial indicator:

Percentage of revenue needed for the implementation of all action considered necessary to generate, make available and accessible comprehensive data and information on chemicals on the global market.

Note: It is recommended that the International Conference on Chemicals Management, at its fifth session, agree on the specific actions considered necessary "to generate, make available and accessible comprehensive data and information on chemicals on the global market". The creation of a scoring system for evaluating companies' performance and progress over time is recommended, along with the setting of related milestones.

Below is a list of possible actions for consideration:

- Ensure that safety data sheets and labels related to the company product portfolios exist and are fully available.
- Ensure full disclosure of all intentionally added chemicals in products (this may include or exclude fragrances and flavours).
- Make available to clients and the general public all information on the health and environmental impacts of the chemicals produced/commercialized at all stages of their life cycle.
- Collect full chemical ingredient information from suppliers.
- Publicly disclose chemicals of concern in products.
- Actively communicate on greener, sustainable products on the company's website.

Example 3

Proposed strategic objective E:

[The importance of the sound management of chemicals and waste as an essential element to achieving sustainable development is recognized by all; adequate, predictable and sustainable financial and non-financial resources are [identified and] mobilized; actions are accelerated; and necessary [transparent and accountable] partnerships are established to foster cooperation among stakeholders].]

[Target E4: Financial and non-financial resources needed to achieve [support] the sound management of chemicals [and waste] are identified and mobilized in all sectors by and for all stakeholders.]

Related financial indicator 1:

Percentage of revenue allocated to in-kind contributions, such as capacity-building activities.

Explanation: This could be measured within a capacity-building clearing-house mechanism or marketplace.

Alternative related financial indicator 2:

Volume of industry donations to dedicated external financing (e.g., Special Programme, GEF co-financing, programmatic support, etc.).

3.2.2. Identifying who should report

The present section elaborates on possible stakeholders and institutions that could provide valuable information to track industry involvement. During the development of the targets, indicators and milestones, however, more in-depth assessment will be required to ascertain which stakeholders would be the most appropriate to report on each element of the information required to measure each indicator.

Industry

Broader “industry” (see section 1.3.2. on scope of industry actors) is made up of several hundred highly integrated multinational corporations and thousands of small and medium-sized chemical processing and compounding enterprises. Most types of industry are represented by industry associations, typically non-profit organizations. Industry associations provide members with a range of services, including support, training and lobbying on their behalf. In most cases, associations are organized by sector at the national level and are themselves members of international trade associations. International trade associations understand the issues faced by their members and are well equipped to offer sector-specific advice and guidance on key sustainability issues, including through the development of tools and the promotion of best practices. There are also relevant sectors that are not organized under an international trade association, such as the textile sector. Table 18 shows the international associations that exist along the chemical industry value chain. In terms of manufacturing, for example, ICCA represents national chemicals associations in nearly 70 economies around the world and its members account for more than 90 per cent of global chemical sales. Chemical distributors also play an important role in the increasingly globalized chemical industry; the International Chemical Trade Association represents the interests of over 1,500 chemical distributors worldwide.

To make data collection efficient, industry could report to SAICM through the relevant international trade associations in a consolidated manner. A separate reporting system should be built for reporting on indicators that cannot be managed by international trade associations and for use by companies and national associations that are not represented by any international trade association.

Table 18

Non-exhaustive list of international trade associations along the chemical industry value chain

Extraction	Manufacturing	Distribution	Consumer products
• International Association of Oil and Gas Producers • International Petroleum Industry Environmental Conservation Association	• International Council of Chemical Associations • CropLife	• International Chemical Trade Association • International Federation of Warehousing and Logistics Association • International Chamber of Shipping • International Road Transport Union • International Union of Railways • International Freight Forwarders Association	• CropLife • World Paint and Coatings Industry Association • International Organization of Motor Vehicle Manufacturers • International Association of Color Manufacturers • International Food Additives Council

The industry taxonomy of the Global Industry Classification Standard developed by MSCI Inc. and S&P Dow Jones Indices could be used to classify companies and their activities for reporting purposes. The Standard consists of 11 sectors, 24 industry groups, 69 industries and 158 subindustries. The GEF annual reporting on private-sector engagement uses this taxonomy. It is also used to show which sectors are represented in the GEF partnership and their relative weighting and to identify sectors that might need greater focus with a view to increasing engagement.

A classification according to the size of the company could also be used for reporting purposes. The United Nations Global Compact Strategy 2021–2023 uses the following categories in its classification: multinational companies; leading national companies; and small and medium-sized enterprises.

It is recommended that a strategy be elaborated for outreach to the private sector and its involvement in the framework/instrument for the sound management of chemicals and waste beyond 2020, similar to the private-sector strategies of GEF and UNEP. It is also important to reach out to the relevant international associations along the chemicals and waste value chain and to those sectors that are not covered by international trade associations, such as the textile sector.

A communication and engagement strategy to raise awareness of the mechanism should be developed and implemented to increase reporting rates. Companies will report only if they know about the reporting mechanism, where to find it and how to use it. The system should be available on a website, which would also allow the online submission of reports. The procedure should be explained in a clear and simple manner, for example, through a guidance document. It is also crucial to make sure that appropriate public agencies are aware of the process.

Reporting rates would increase if industry were aware of the associated benefits, such as: increased awareness of the activities conducted; advocacy; identification of trends for decision-making; support for implementation and facilitation of compliance with existing and future legal requirements and contractual obligations; greater transparency and accountability; leveraging of additional resources; and increased interest from investors owing to the provision of verifiable and consistent information to enable them to benchmark performance.

Governments

The use of regulatory and market-based measures is based on legislation. The primary responsibility for reporting on these matters thus lies with Governments. The involvement of finance ministries will be key for the collection of relevant data on the use of market-based instruments. Statistical agencies will also need to be involved.

Other institutions

To avoid duplication and increase reporting rates, it is recommended that there be an assessment of information that is currently collected or could be obtained through existing mechanisms that could serve to track industry involvement in the integrated approach to financing the sound management of chemicals and waste.

A broad range of institutions could report on specific indicators as they already collect valuable information. These include United Nations bodies, particularly secretariats of multilateral environmental agreements on chemicals and waste, intergovernmental organizations, scientific institutions and non-governmental organizations. Relevant multilateral bodies can be involved and empowered through resolutions adopted by the International Conference on Chemicals

Management and the United Nations Environment Assembly, or by their respective governing bodies. Annex IV includes examples of existing sources of information related to the indicators provided.

Although, at the moment, tailored information on industry involvement in the sound management of chemicals and waste is not being collected, there are many international environmental reporting systems, governed by institutions such as the International Organization for Standardization, UNEP FI and OECD, that are already capturing information that will be relevant. Furthermore, several industries are already reporting on sustainability or corporate social responsibility using internationally agreed standards. These frameworks include:

- Global Reporting Initiative standards. These are the world's most widely used standards for sustainability reporting
- International Financial Reporting Standards. The International Financial Reporting Standards Foundation is currently working on the creation of a new standard-setting board to meet investors' needs for sustainability-related disclosures
- International Integrated Reporting Framework of the International Integrated Reporting Council
- CDP, which provides a standard of environmental reporting for investors, companies, cities, states and regions
- Climate Disclosure Standards Board Framework for reporting environmental and climate change information

Finally, several reporting mechanisms have been developed for businesses around the world to help them identify, manage and communicate financial material sustainability information to investors. These include the Sustainability Accounting Standards Board standards and the Principles for Responsible Investment. In this context, it is also worth mentioning the Dow Jones Sustainability Indices, which track the stock performance of the world's leading companies in terms of economic, environmental and social criteria. In March 2021, the Acting Chair of the United States Securities and Exchange Commission solicited public input on the current state of climate change reporting by public companies and what steps the Commission should take to ensure that investors were adequately informed about climate risks. Annex V further elaborates on the examples of sustainability reporting systems listed above. The Center for Capital Markets Competitiveness of the United States Chamber of Commerce has partnered with a few organizations to better understand corporations' outlook in terms of climate change and environmental, social and governance reporting. Its 2021 survey report contains lessons learned that can be extrapolated for the chemicals and waste cluster (Center for Capital Markets Competitiveness, 2021). It concludes that the promulgation of rules that provide for effective disclosure without overburdening public companies and their shareholders would be an enormously difficult task for the Securities and Exchange Commission. It thus recommends proceeding with caution and including the input of those that would be most affected by new regulations.

The framework/instrument for the sound management of chemicals and waste beyond 2020 could be used to mobilize and influence standardized reporting mechanisms so that they enable better tracking of industry performance through the use of specific indicators and metrics on chemicals and waste adopted by the International Conference on Chemicals Management and to foster work on harmonized methodologies for data collection to ensure the availability of comparable information.

3.2.3. Initiating tracking

To ensure optimal results, it is proposed that any new system build on existing sources. The system could then progressively gather data from other sources and stakeholders. Efforts should begin with the identification and prioritization of indicators that could be measured with the information available to serve as a baseline for comparison over time and show trends. Initially, tracking could focus on smart indicators that capture outputs in order to illustrate global progress. The Ellen MacArthur Foundation (2021) provides an example of global progress in the development of EPR schemes for packaging, with data collection. Over time, tracking needs to evolve and to capture outcome-oriented information to enable trends and performance to be better understood.

To facilitate implementation of the global indicator framework for the Sustainable Development Goals, the indicators are classified into three tiers on the basis of their level of methodological development and the availability of related data at the global level. Such an approach could be used in relation to the framework/instrument for the sound management of chemicals and waste beyond 2020 to assist in the development of global implementation strategies.

The identification of actors and the clarification of roles in relation to the management and monitoring of the system is crucial to its success. Such actors and their roles could include the following:

- The SAICM secretariat (or another institution to be specified) could facilitate the collection of data from stakeholders in conjunction with regular reporting. In addition, the SAICM secretariat could encourage other institutions to provide data in a systematic manner, to fill in gaps related to specific targets and indicators agreed by the International Conference on Chemicals Management at its fifth or a future session.
- A broad range of institutions could function as champions or custodians of data collection for specific indicators, including United Nations bodies, particularly secretariats of multilateral environmental agreements on chemicals and waste, intergovernmental organizations, scientific institutions and non-governmental organizations. Relevant multilateral bodies can be involved and empowered through resolutions adopted by the International Conference on Chemicals Management and the United Nations Environment Assembly, or by their respective governing bodies.
- A multi-stakeholder task force and/or partnership could be established to analyse and synthesize the data for specific indicators or groups of indicators. For instance, by analysing voluntary initiatives, it is possible to learn lessons to build on, collect relevant data to establish a baseline and evaluate the feasibility of an integrated system where reporting mechanisms in place could be interconnected for the exchange of data.
- A group of countries may wish to volunteer to pioneer data collection with a view to understanding how useful data can be most effectively collected and collated. Ideally, this group would include both developed and developing countries. It would necessitate close collaboration among national finance ministries and statistical agencies.

3.2.4. Reporting to stakeholders

Regular feedback on the reporting system should be provided to all stakeholders to manage their expectations of what can and cannot be done, to encourage its use, to gather observations on how it might be improved and to share outcomes and results

4. Way forward

The present section enumerates the options for action that have been identified during the conduct of the study, namely during the interviews, survey and literature review, to help guide decision-making. It consolidates the recommendations outlined in sections 2 and 3 and addresses them to specific forums and audiences. The options presented are not listed in any order of priority.

There is an urgent need to increase the accountability of industry at the international level in terms of internalizing the externalities of unsound management of chemicals and waste. It must be borne in mind, however, that sovereignty dictates that each Government is free to determine the activities that best meet its national needs. The fifth session of the International Conference on Chemicals Management presents a unique opportunity to articulate how the framework/instrument for the sound management of chemicals and waste beyond 2020 can foster accountability through a multi-stakeholder approach.

Stakeholders may thus wish to consider:

- 1) Implementing the industry involvement component of the integrated approach by articulating the necessary activities, identifying the relevant stakeholders and designing indicators to track progress.
- 2) Promoting (a) the design of model regulations, training and toolkits for each measure, with the involvement of all stakeholders, including unrepresented and vulnerable groups; (b) regulatory cooperation; and (c) the use of best regulatory practices.
- 3) Establishing a capacity-building clearing-house mechanism, marketplace and/or global commitment platform for the development, implementation, monitoring and communication of partnerships and other voluntary commitments; developing related terms of reference.
- 4) Encouraging the development of recommendations for a framework for chemicals-related sustainability disclosures to help translate the objectives and targets of the framework/instrument for the sound management of chemicals and waste beyond 2020 into clear guidelines for investment decisions.
- 5) Elaborating a strategy for outreach to the private sector and its involvement in the framework/instrument for the sound management of chemicals and waste beyond 2020; engaging with relevant associations along the chemicals and waste value chain with a view to identifying opportunities for increasing financial and in-kind contributions from industry associations.

The International Conference on Chemicals Management may consider tasking UNEP, other relevant members of the Inter-Organization Programme for the Sound Management of Chemicals and/or the secretariat of the framework/instrument for the sound management of chemicals and waste beyond 2020 to undertake the following supporting measures:

- 6) Facilitating the monitoring of industry involvement by (a) conducting an in-depth assessment of the information that is currently collected or could be obtained through existing mechanisms, such as multilateral organizations or standardized reporting systems, and engaging with relevant organizations; and (b) enhancing inter-organizational cooperation with a view to harmonizing methodologies for data collection.
- 7) Deepening the involvement of UNEP in monitoring via its regional offices.

- 8) Creating a technical expert group to expedite the mobilization of the funds needed by developing countries, with a focus on innovative forms of financing that involve primarily the private and financial sectors, including, but not limited to, blended finance, a global coordinated tax and an international fund for chemicals and waste.

Actions expected from industry include:

- 9) Developing, pledging and showcasing action plans and road maps for achieving the sound management of chemicals and waste; proposing targets and reporting metrics for measuring progress through the framework/instrument for the sound management of chemicals and waste beyond 2020.
- 10) Internalizing the costs of the negative impacts of its activities (remediation activities, health-care costs, etc.), in accordance with the polluter pays principle.
- 11) Assuming greater responsibility and scaling up voluntary measures in order to go beyond the requirements for regulatory compliance and minimize externalities.
- 12) Financing the costs of, inter alia, domestic chemicals management schemes; data generation; identification and communication of hazards; comprehensive risk assessment and risk mitigation measures; strengthening all stakeholders' technical capacity; implementing pollution release and transfer registers; preventing exposure; compensation for resulting environmental and human harm; and contaminated site remediation.
- 13) Reviewing, identifying, disclosing and implementing commitments to transition away from dependence on harmful subsidies in recognition of the global momentum and support for the harmful subsidy reform.
- 14) Allocating resources to support developing countries through dedicated external financing mechanisms, namely GEF co-financing and the Special Programme trust fund, and through capacity building and in-kind contributions.
- 15) Advancing the sound management of chemicals and waste through in-kind commitments to innovation, training, safety and green and sustainable chemistry.
- 16) Using proactively national and international industry associations and expanding their networks so that there is better coverage in developing countries to enable companies to support governments in institutional strengthening and in setting up chemicals and waste regulatory systems.
- 17) Communicating more effectively on the precise nature, extent and impact of private-sector action and in-kind and monetary contributions for the sound management of chemicals and waste.
- 18) Ensuring that health and safety information about toxic substances is never confidential and disclosing information through voluntary initiatives across the product life cycle; expediting the use of new technological solutions, such as smartphone applications, big data, blockchain technologies and digital product passports that may offer opportunities to make broadly available to stakeholders data and information on the health and environmental effects and safe use of chemicals and the products made from them.
- 19) Working, using a range of approaches and through partnerships with specific goals related to the sound management of chemicals and waste, to develop sectoral knowledge exchange networks; ensuring that partnerships introduce time-bound targets and metrics to monitor progress and help increase impact, following the model of the Science Based Targets initiative.

Actions expected from Governments to facilitate industry involvement:

- 20) Setting up national coordination mechanisms to enable dialogue between regulators and industry; mapping private-sector stakeholders so that all the relevant sectors and actors in the value chain, at all levels, are involved, paying particular attention to the inclusion of downstream users and small and medium-sized enterprises, which are often underrepresented; developing the necessary safeguards to ensure that cooperation will lead to an increased level of ambition over time; partnering with civil society on an equal footing to enrich cooperation.
- 21) Defining, in legislation, the responsibilities of the public and private sectors to help increase funding for chemicals control, paying special attention to advancing the classification and labelling of chemicals, in line with GHS, and bans and restrictions on the production and use of substances of concern.
- 22) Conducting national assessments of the cost of externalities arising from the unsound management of chemicals and waste, focusing initially on selected policies, chemicals and/or sectors and gradually expanding to assess the full cost of the externalities.
- 23) Channelling funding to support research, development and innovation in the field of sustainable chemistry and to include courses on toxicology and green and sustainable chemistry in educational curricula; taking measures to secure the independence of research by preventing the sponsoring of fraudulent external scientific research.
- 24) Transitioning gradually from voluntary to mandatory requirements for information disclosure and the labelling of hazardous chemicals, in line with international transparency principles.
- 25) Making mandatory pre- and post-market risk assessment to help internalize the costs of achieving the sound management of chemicals and waste; examining risk assessments completed by other jurisdictions when appropriate; promoting regional cooperation to enable the pooling of resources for risk assessment and management to create efficiency and economies of scale.
- 26) Articulating due diligence duties across the supply chain of chemicals so that suppliers and distributors are obliged to adhere to human rights, labour and environmental standards.
- 27) Assessing existing economic instruments and empowering the Ministry of Finance to carry out the necessary reforms, in consultation with research institutes, the private sector and other stakeholders, with a view to:
 - (a) Introducing fees for recovering the cost of chemicals control and ensuring that the revenue collected is earmarked for the provision of the necessary public services, such as the registration, inspection and licensing of chemicals (such mechanisms at the regional level could also be considered);
 - (b) Developing EPR schemes for products and packaging that might cause harm to the environment and human health if not disposed of properly, such as electrical and electronic waste, packaging, tyres and batteries, in order to transfer the costs of waste management and clean-up from municipalities and taxpayers to the producers;
 - (c) Introducing deposit-refund systems to provide a financial incentive to return end-of-life products or materials thereby reducing illegal and improper disposal of bottles, cans, agrochemical containers, scrap tyres, lead-acid batteries and other items;

- (d) Introducing taxes, earmarked for the sound management of chemicals and waste, on substances that do not need to be phased out completely, which, ideally, are proportional to the risk that the substances pose. Such substances will include many flame retardants, pesticides, fertilizers and chlorinated solvents;
- (e) Developing and implementing a road map for the redesign, reduction or redirection of existing subsidies so that they no longer incentivize the use of substances of concern, particularly in relation to harmful agrochemicals;
- (f) Using subsidies to encourage the use of safer chemicals and more sustainable practices and mainstreaming sound management of chemicals and waste in government stimulus measures;
- (g) Developing liability schemes to transfer to industry the cost of remediation of contaminated sites and to ensure that victims of chemicals and waste pollution receive adequate compensation.

These contributions and others, provided through a range of approaches, including partnerships and dedicated external financing, should be used to support domestic chemicals and waste management schemes and to finance the cost of, inter alia, data generation, the identification and communication of hazards, comprehensive risk assessment and risk mitigation, the strengthening of the technical capacity of all stakeholders, implementation of pollutant release and transfer registers and the prevention of exposure, giving due attention to affected communities.

Actions expected from international organizations, including the participating organizations of the Inter-Organization Programme for the Sound Management of Chemicals, and non-governmental organizations, to facilitate industry involvement:

- 28) Increasing communication, outreach and advocacy in relation to the use of the UNEP LIRA-Guidance and any other relevant guidance by actively engaging the UNEP regional offices and the regional centres of the Basel and Rotterdam conventions and other relevant United Nations bodies and funds.
- 29) Developing a review on the economics of chemicals and waste similar to the Stern Review on climate change and the Dasgupta Review on biodiversity, accompanied by country pilots to estimate the domestic cost of unsound management of chemical and waste, building on work carried out by UNEP and the World Bank. This would help identify gaps between developing and developed economies, raise general awareness, increase political clout and enable the identification of priorities for the design policies that effectively internalize externalities and bring socioeconomic benefits.
- 30) Developing a methodology, which builds on existing work, for a chemical footprint assessment to help countries and companies take more targeted and cost-efficient measures to restrict the production, use and trade of substances of concern.
- 31) Developing and fostering best practices for the preparation of national chemical inventories; developing a publicly accessible global chemical inventory of all chemicals on the market that is managed by an independent third party.
- 32) Engaging directly and strategically with businesses and industries as partners in achieving a wide range of development outcomes, including by convening chief executive officers of major companies to establish high-impact partnerships on issues of concern, such as the ten chemicals of public health concern identified by WHO and/or the 11 issues where emerging evidence indicates a risk identified in the report *Global Chemicals Outlook II*. In

any multi-stakeholder partnership it is important to outline success criteria, such as time-bound targets and measurable indicators.

- 33) Updating Harmonized Commodity Description and Coding System codes for hazardous chemicals following the example of the ozone-depleting substances listed under the Montreal Protocol to enable customs to track more effectively the movement of chemicals in international commerce (Green Customs Initiative).
- 34) Harmonizing risk assessment methods and procedures to create efficiency for companies and manufacturers, building on existing initiatives, including the Mutual Acceptance of Data system (OECD).
- 35) Promoting green economy initiatives, such as the development of eco-industrial parks, chemicals leasing and use of relevant tools (e.g., life cycle assessments and portfolio sustainability assessments) and setting science-based targets endeavouring to decouple production from chemical pollution and waste (UNEP and UNIDO).
- 36) Mainstreaming the sound management of chemicals and waste into corporate sustainability reporting frameworks that aim to inform financial institutions (e.g., the Sustainability Accounting Standards Board and the Dow Jones Sustainability Indices) and those that have a broader audience (e.g., the Global Reporting Initiative and the United Nations Global Compact).

The following elements would benefit from further research and analysis to guide action on industry involvement:

- 37) The possibilities for aligning and addressing gaps in current standards and certification schemes.
- 38) Mechanisms to guide institutional investors, banks and insurers in enhancing chemicals safety in the private sector through their operations and decision-making.
- 39) The possibility of using innovative financial instruments to mobilize resources from the private sector.
- 40) The possibility of scaling up the use of tradable permits, in particular cap-and-trade systems, to control chemical pollution, along with development of the necessary technical guidance and other tools.
- 41) Lessons learned from other fields in developing a regional approach to the collection of fees to cover cost of chemicals control; how regional organizations could take on such a system; and the possible trade benefits of a regional approach.
- 42) The Chemicals in Products programme, with a view to understanding its influence in generating transparency across the value chain of chemicals and identifying ways of addressing the challenges faced.
- 43) Opportunities for mainstreaming the sound management of chemicals and waste into sustainability reporting frameworks.

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Annex I

Selected responses to the survey conducted for the study

Figure A-1
Responses to the survey received by stakeholder group

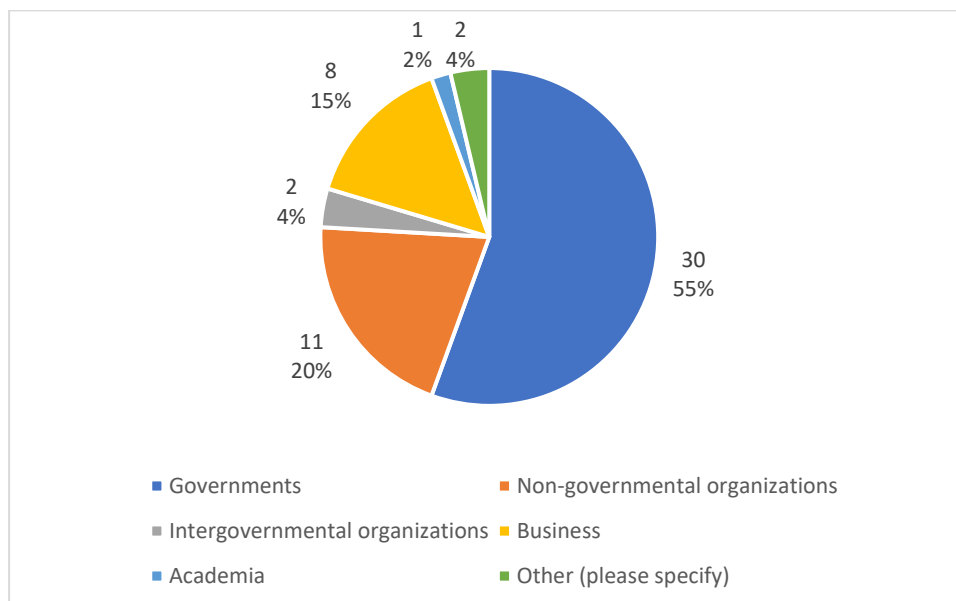


Figure A-2
Responses to the survey received by region

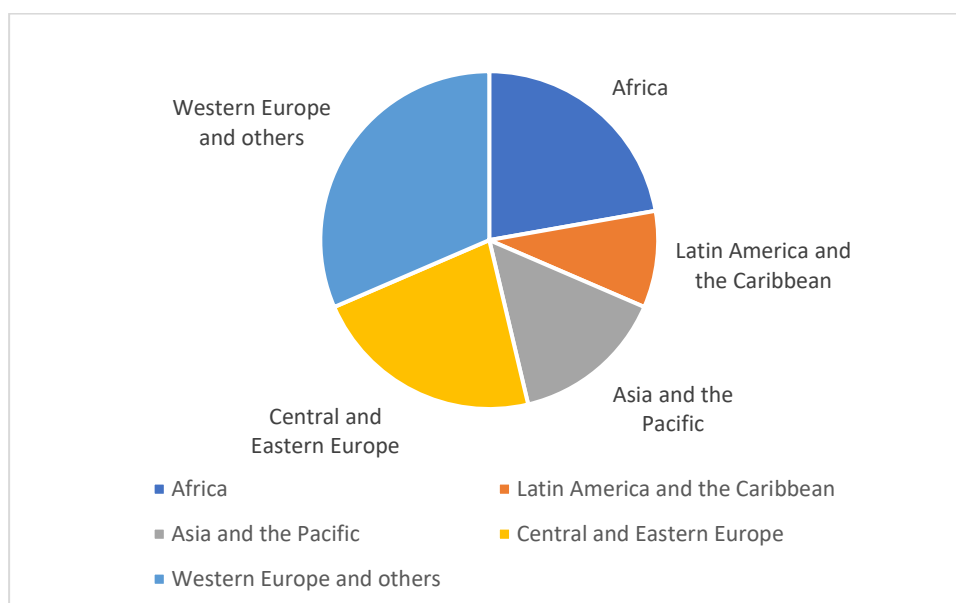


Figure A-3

Progress to date in achieving the activities listed in the report of the Executive Director of UNEP on the consultative process on financing options for chemicals and wastes (UNEP, 2012)

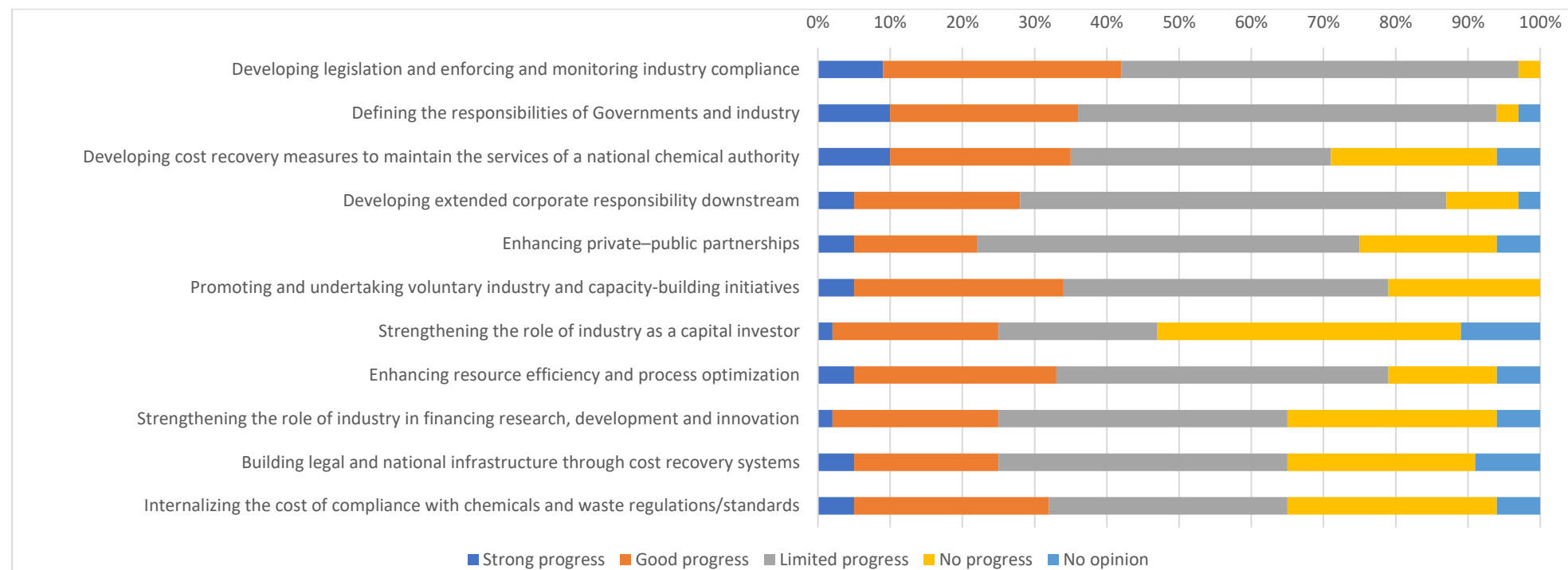
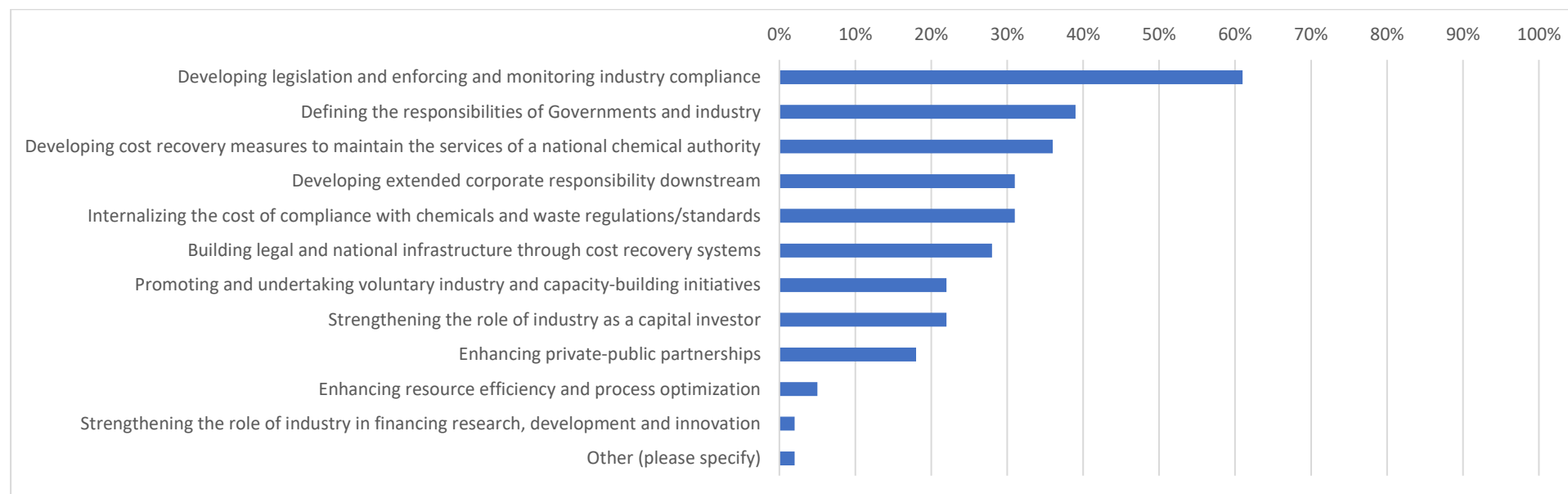


Figure A-4

Activities considered most important in the report of the Executive Director of UNEP on the consultative process on financing options for chemicals and wastes (UNEP, 2012)



Annex II

Background to the study and the interview protocol

Background

In 2013, the UNEP Governing Council, in its decision 27/12, welcomed an integrated approach to financing the sound management of chemicals and waste composed of three complementary and interlinked components: (1) mainstreaming the sound management of chemicals and waste into development planning; (2) industry involvement; and (3) dedicated external financing. The objective of the integrated approach is “to support efforts at the national and international levels to secure sustainable, predictable, adequate and accessible financing for the sound management of chemicals and wastes” (UNEP, 2012). In its decision 27/12, the Council invited Governments to implement actions to further encourage industry involvement in the integrated approach, including the development of legislation on the responsibilities of industry and national administration, the provision of incentives for sound chemicals and wastes management and the promotion of measures by industry to internalize costs as per the polluter pays principle. The report of the Executive Director of UNEP on the consultative process on financing options for chemicals and wastes (UNEP, 2012) provides more clarity with regard to industry involvement and lists possible activities to be taken by Governments and other stakeholders.

Objective

The overall objective of the study is to provide clarity with respect to the activities that could be undertaken, at various levels, to implement the industry involvement component of the integrated approach. The study also seeks to elaborate on the possibilities for monitoring industry involvement in conjunction with the framework/instrument for the sound management of chemicals and waste beyond 2020, with a view to increasing international accountability in relation to industry involvement. The study does not aim to provide definitive answers about the scope of and the precise activities that constitute industry involvement. Instead, it aims to give helpful context and recommendations to support decision-making on industry involvement in preparation for the fifth session of the International Conference on Chemicals Management. It can also be used as input for the development of guidelines on implementing industry involvement. Additionally, the present study can inform discussions on financing in relation to the framework/instrument for the sound management of chemicals and waste beyond 2020.

The study has been conducted subsequent to the 2019 evaluation of implementation of the integrated approach to financing the sound management of chemicals and waste (UNEP, 2019b). The evaluation identified challenges for implementation of the industry involvement component, including a lack of clarity regarding what constitutes an industry contribution; the absence of a mechanism for tracking activities and financial flows; and a poor understanding of the mechanisms for industry participation at the national level, including in relation to taxes, chemicals and waste legislation, public–private partnerships and capacity development (UNEP, 2019b; para. 25). Moreover, the study responds to the independent evaluation of SAICM from 2006–2015, which highlighted that during that period “insufficient progress had been made on taking forward the mainstreaming and industry involvement components of funding identified in the integrated approach to the sustainable financing of sound management of chemicals and waste proposal” (SAICM, 2019a; para. 420).

The study is aimed at SAICM stakeholders that have a role in industry involvement, such as representatives of Governments, industry, the private sector, non-governmental organizations, intergovernmental organizations and academia. The document aims to describe the activities

that could be undertaken by the various actors across the value-chain to contribute to the integrated approach to financing the sound management of chemicals and waste.

Study methodology

The study involved the collection of information through different means, including interviews, a survey, a literature review and a webinar. The interviews constituted the main part of the study. The aim was to ensure equitable regional representation and to involve the various stakeholder groups in an equal manner. Input provided during the various stages of the study was reflected in a final draft report presented and discussed in a webinar organized for all interested stakeholders before its finalization.

Interview guide

- The length of interview was based on the availability of the interviewee, but a minimum of 45 minutes was allocated for the discussion. If other experts were involved in the interview, a period of 60 to 90 minutes was recommended.
- The interviews were conducted via the platform Webex and interviewees received a link to participate in the video conference. Alternatively, the interviews were carried out using Skype, Zoom or other means.
- The interviews were ideally conducted with audio recording, but if the interviewees so wished they was done without. Interviewees were also able to contribute anonymously.
- The format of the interview was semi-structured. The following section provides an overview of the possible questions.

A. Common questions for all stakeholders:

General understanding

- In your view, what does industry involvement currently encompass in context of the integrated approach? And what should it encompass in the context of the framework/instrument for the sound management of chemicals and waste beyond 2020?
- Existing background documents refer both to activities that directly contribute to financing (e.g., taxes, fees, etc.) and to activities that contribute indirectly (e.g., research and development, partnerships, etc.). What is your opinion on this?

Moving forward

- Which best practices for enhancing industry involvement could be scaled up?
- Are there any examples of industry contributions made under other international environmental frameworks (e.g., the Montreal Protocol) that could be applied in context of the integrated approach?
- What are key barriers to industry involvement?
- What is your position on industry contributions being voluntary or mandatory for the financing of the sound management of chemicals and waste at different levels? What activities could be included in such a mechanism?
- Are there differentiated responsibilities in the chemicals value chain that could be translated into different forms of involvement of the most representative sectors (chemical industry, high-intensity chemical users and downstream retailers)?

- How do you see the role of the various stakeholders, in particular UNEP, in facilitating industry involvement?
- What steps would be required to further clarify the industry involvement component of the integrated approach with a view to stimulating the necessary action? What should be decided by the International Conference on Chemicals Management at its fifth session? What could be done prior to this? And what information is needed to inform decision-making?

Measuring progress

- Are the activities undertaken by industry known and properly communicated to stakeholders?
- What is your opinion on the development of a mechanism for tracking industry involvement? What would be the main opportunities for and barriers to its development?
- Which of the activities that constitute industry involvement (directly or indirectly contributing to financing) need to be tracked, how and by whom?
- Are there examples of outputs, outcomes and impacts of the activities of efforts to implement the industry involvement component? If so, what trends can be identified?

Relationship with other elements of the integrated approach?

- What is the role of industry involvement in implementation of the component on mainstreaming the sound management of chemicals and wastes into development planning and how could it be strengthened?
- What is the role of industry involvement in implementation of the component on dedicated external financing, and what are the options for strengthening it?

B. Additional questions for specific stakeholder groups:

Governments

- What kind of information and guidance is needed at the national level to enhance industry involvement?
- Has your country defined the responsibilities of industry and the public sector in legislation in order to establish the authority for controlling chemicals? Does your country have or is it planning to create a fee-based regulatory system? If so, how does/would it contribute to financing?
- What are the key barriers to enhancing industry involvement (e.g., to the introduction of national fee-based regulatory systems)?
- Are you familiar with the UNEP Guidance on the Development of Legal and Institutional Infrastructures and Measures for Recovering Costs of National Administration for Sound Management of Chemicals (LIRA-Guidance) and how have you applied it in the national context?

Industry

- What kind of information and guidance is needed for clarifying and enhancing industry involvement at different levels?
- How can the chemicals industry help support the introduction of fee-based regulatory systems, especially in developing countries?
- What is the position of industry regarding the establishment of a global tax on chemicals?

Non-governmental organizations

- How can non-governmental organization contribute to industry involvement?
- What specific activities should be allocated to non-governmental organizations in the context of advancing the industry involvement component of the integrated approach?

UNEP

- How does UNEP define its role in advancing industry involvement?
- What has been achieved so far? How successful has the industry involvement component of the integrated approach been?
- What have the main challenges been so far?

OECD

- What are the existing mechanisms for tracking industry financing for climate change and biodiversity? Do the data show trends, and are the data used by the parties to and secretariats of the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity, respectively?
- What opportunities exist for tracking industry financing for the sound management of chemicals and waste? What could be the role of OECD therein?
- What should SAICM stakeholders consider when developing a system for tracking financing for the sound management of chemicals and waste?

World Bank

- How are bonds used to finance sound management of chemicals and waste?
- Could you explain the activities related to the management of chemicals and waste carried out by the World Bank?
- How is financing for sound management of chemicals and waste tracked?

GEF

- What is the overall trend in the co-financing share of GEF projects on chemicals and waste?
- Are there any examples of projects that could be replicated and scaled up – for example, where the share of co-financing was particularly high?
- Are there any particular challenges to private sector engagement?
- How are you working to involve the entire value chain for chemicals throughout their life cycle?

Chemical Footprint Project

- How does the Chemical Footprint Project measure progress in industry involvement and responsibility? What is the difference between signatories and responders under the Project?
- Do you think the Chemicals Footprint Project could be mainstreamed into the framework/instrument for the sound management of chemicals and waste beyond 2020 as a global indicator for measuring progress?
- Could the concept of chemical footprint (i.e., the total mass of chemicals of high concern) be a global metric for measuring industry responsibility? Chemicals of high concern have not been defined globally: could this hinder agreement on its use as an indicator?
- How could the Chemical Footprint Project survey be used to assess global progress?
- SAICM is discussing the possibility of developing investment guidance to help promote chemical safety. Is there anything particular that should be taken into consideration in this regard?

Special Programme

- How do you define your role in advancing industry involvement in the context of the Special Programme?
- Does industry give funds to the Special Programme? If so, how much, and what could be done to raise more in the way of donations from industry? If not, why not? What needs to change?
- Is industry represented as an observer in the meeting of the Executive Board of the Special Programme?
- How has industry been involved in project design and/or implementation?
- Are there any examples of projects that have successfully advanced industry involvement that could be replicated?
- Have any of the projects of the Special Programme facilitated the development of a fee-based regulatory system for chemicals safety at the national level?
- Has the development of market-based instruments (e.g., taxes, fees, extended producer responsibility schemes (EPR) and the removal of harmful subsidies) been part of any project goals?
- Are any particular challenges encountered in terms of private sector engagement?

Annex III

Examples of risk management policies

Policy	Enacted	Overview
REACH of the European Union	2006	REACH stands for registration, evaluation, authorization and restriction of Chemicals. REACH is a regulation of the European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the European Union chemicals industry. In principle, REACH applies to all chemical substances, not only those used in industrial processes, but also those in people's day-to-day lives. REACH places the burden of proof on companies. To comply with the regulation, companies must identify and manage the risks linked to the substances that they manufacture and market in the European Union. They have to demonstrate to the European Chemicals Agency how the substance can be safely used, and they must communicate the risk management measures to the users. If the risks cannot be managed, authorities can restrict the use of substances in different ways.
Toxic Substances Control Act of the United States	1976, updated in 2016 by the Frank R. Lautenberg Chemical Safety for the 21 st Century Act	Under the Toxic Substances Control Act, the United States Environmental Protection Agency evaluates potential risks from new and existing chemicals and acts to address any unreasonable risks chemicals may have on human health and the environment. There are three framework rules in the Act that are designed to work together to set the stage for, and then deliver, efficient and streamlined risk evaluations of chemicals: (1) the inventory reset rule (the process for sorting the inventory so that the Environmental Protection Agency can focus on chemicals that are currently active in commerce; (2) the prioritization rule (the process for designating low-priority chemicals and the high-priority chemicals that will undergo risk evaluations; and (3) the risk evaluation rule (the process for conducting risk evaluations on high-priority chemicals).
Canadian Environmental Protection Act of Canada	1988, updated in 1999	The Canadian Environmental Protection Act 1999 is one of most important environmental laws of Canada. It covers a range of activities that can affect human health and the environment, including the management of chemical substances. The Act requires every new chemical substance made in Canada or that has been imported from other countries since 1994 to be assessed against specific criteria. Chemical substances have, however, been used in Canada for decades. Most were introduced in the decades before comprehensive environmental legislation was in place, as is the case in other countries around the world. These are known as "existing substances" and some of them had not been examined to determine if their use posed a risk to human health and/or the environment. In 2006, Canada completed the major task of systematically sorting through the approximately 23,000 existing substances introduced into Canada before the creation of stronger environmental legislation. This exercise was called the categorization process. Canada has a clear road map for assessing and managing chemical substances to better protect health and environment. The Chemicals Management Plan is aimed at reducing the risks posed by chemicals. It builds on previous initiatives by assessing chemicals used in Canada and by taking action on chemicals found to be harmful to human health and/or the environment. The current phase of the plan, launched in May 2016, is addressing the remaining 1,550 priority chemicals out of the original 4,300 chemicals identified as priorities during the categorization process.
The Industrial Chemicals Environment Management (Register) Act of Australia	2021	The Australian Government carries out risk assessments to determine how chemicals will affect the environment at various stages of the chemical life cycle. This helps it predict how the country's unique ecosystems will respond if they are exposed to chemicals, so that it can recommend the best way to manage the risks. The Industrial Chemicals Environmental Management Standard aims to help industry and governments manage the environmental risks of chemicals. The Standard is a national approach to managing chemical use, storage, handling and disposal. It will deliver more consistent regulation and make it

Policy	Enacted	Overview
		easier for industry to choose less harmful chemicals. Work is being delivered in two stages. Phase 1 includes the creation of legislation. The Industrial Chemicals Environment Management (Register) Act was passed in 2021. Under the Act, chemicals will be categorized and scheduled on the Industrial Chemicals Environment Management Standard Register on the basis of their level of concern for the environment. In phase 2, the Register will be incorporated into the laws of each jurisdiction so that environmental risks are managed consistently across states and territories, in Commonwealth areas and at the country's borders.

Sources: European Chemicals Agency; United States Environmental Protection Agency/American Chemistry Council; Canada; Australia, Department of Agriculture, Water and the Environment.

Annex IV

Suggested indicators for measuring industry involvement

The purpose of this section is to help prioritize indicators that could show the trend in terms of industry involvement according to the targets proposed by the Technical Working Group on targets, indicators and milestones for SAICM and the sound management of chemicals and waste beyond 2020 in document SAICM/ICCM.5/Bureau.TC.11/2 (SAICM, 2021c). The following information provides guidance on the tables in the present annex:

- “Relevant targets” are proposed targets in which industry is considered a relevant stakeholder group by the Technical Working Group on targets, indicators and milestones (SAICM, 2020c).
- “Suggested indicators” are presented for the two main stakeholders that will report on industry involvement: industry and Governments. The indicators suggested cover the various modalities for industry involvement presented in the study, both direct and indirect. Consequently, some indicators will have a more explicit link to financing, such as those that measure investment or expenses. Other indicators might have a less explicit link, but when evaluated over time they would show progress if there had been a reduction in the financial resources needed to achieve the sound management of chemicals and waste. An example of such an indicator is “the percentage/number of small and medium-sized enterprises that have received capacity-building and information from industry associations”.
- “Examples of existing sources of related information” present sources of information that could be used, at least partially, to obtain the data required and to identify the custodians of data collection. These include sources that might require work to enhance data comparability or that come from individual sectors and companies but are potentially relevant to the development of indicators with more universal application. The list is indicative. An exhaustive mapping should be conducted once there is agreement on industry involvement and related objectives and targets, at the fifth or another future session of the International Conference on Chemicals Management.⁸
- “Percentage of companies” is based on the total number of companies assessed within the framework. It is therefore essential to define clearly the scope of “industry” and the companies subject to reporting. A related milestone could be the achievement of a certain percentage of companies by a certain year in relation to a given activity.
- “Number of companies” would be used to show progression over time. A related milestone would be the percentage growth in the number of companies by a certain year in relation to a given activity.
- “Companies” refers to both industries and industry associations.

⁸ The participating organizations of the Inter-Organization Programme for the Sound Management of Chemicals and the United Nations Economic Commission for Europe have expressed their willingness to support the development of an inventory of currently available indicators. This was generally welcomed by the Virtual Working Group on targets, indicators and milestones (SAICM, 2021b).

Proposed strategic objective A: [Measures are identified, implemented and enforced in order to prevent or, where not feasible, minimize harm from chemicals throughout their life cycle [and waste];]		
Relevant targets	A3: By [xx], measures identified to prevent or, minimize harm from chemicals throughout their life cycle [and waste], are implemented and enforced by <u>relevant stakeholders</u> [countries] [governments].	A5: By xx, Countries <u>take measures and initiatives supportive of the effective implementation of</u> make and meet commitments and their obligations under the provisions of chemicals and waste-related multilateral environmental agreements to which they are a Party, as well as health, labour and other relevant instruments in which they participate.
Indicator for reporting by companies	<u>Suggested indicator:</u> Percentage of fulfilment of pledges made by industry in action plans and road maps for the achievement of sound management of chemicals [and waste]. <u>Alternative indicator:</u> Global score of companies implementing actions considered necessary to prevent, or minimize, harm from chemicals throughout their life cycle [and waste]. <i>Note:</i> As an alternative to the action plans or road maps, which could be difficult to collect, a standardized scoring system could be used. <u>Related financial indicator:</u> Volume of investment allocated to activities to comply with action plans and road maps for the achievement of sound management of chemicals [and waste]. <u>Alternative related financial indicator:</u> Percentage of revenue allocated to the implementation of actions considered necessary to prevent, or minimize, harm from chemicals throughout their life cycle [and waste]. <i>Note:</i> There are a variety of existing tools, guidelines and best available practices , so it is necessary to identify those that are the most relevant and that will be considered in the development of the baseline for this indicator (see section 3 of the present document on tracking progress).	NOT APPLICABLE
Indicator for reporting by Governments	<u>Suggested indicator:</u> Number of cases of compliance and non-compliance by companies resulting from the enforcement of measures identified to prevent, or minimize, harm from chemicals throughout their life cycle [and waste].	<u>Suggested indicator:</u> Level of national industry contributions to the implementation of multilateral environmental agreements and the meeting/reporting/information requirements of other instruments.
Examples of existing sources of related information	<i>Chemical Sector SDG Roadmap</i> of the World Business Council for Sustainable Development; Responsible Care programme; Roadmap to Zero Programme of Zero Discharge of Hazardous Chemicals; the Reporting on the Sustainable Development Goals initiative of the United Nations Global Compact and the Global Reporting Initiative.	Financial reports related to multilateral environmental agreements (e.g., the Basel, Rotterdam and Stockholm and Minamata conventions); reports of UNEP platforms (e.g., UNEP Global Mercury Partnership, Polychlorinated Biphenyl (PCB) Elimination Network, Global Alliance for Alternatives to DDT).

Proposed strategic objective B: Comprehensive and sufficient knowledge, data and information are generated, available and accessible to all to enable informed decisions and actions.			
Relevant targets	B1: By 20xx, comprehensive data and information on chemicals on the global market , throughout their lifecycle, are generated [are shared] , made available and accessible.	B2: By 20xx all stakeholders have and are using the most appropriate and standardized tools, guidelines and best available practices for assessments and sound management, as well as for the prevention of harm, risk reduction, monitoring and enforcement.	B4: By 20XX educational, training and public awareness programmes on chemical safety, sustainability, and safer alternatives <u>and benefit of chemicals</u> have been developed and implemented.
Indicator for reporting by companies	<u>Suggested indicator:</u> Percentage/number of companies that implement all actions considered necessary to generate [share], make available and accessible comprehensive data and information on chemicals on the global market. <u>Related financial indicator:</u> Percentage of revenue allocated to the implementation of action considered necessary to generate [share], make available and accessible comprehensive data and information on chemicals on the global market.	<u>Suggested indicator:</u> Percentage/number of companies that are using standardized tools, guidelines and best available practices for assessments, sound management, the prevention of harm, risk reduction, monitoring and enforcement. <u>Related financial indicator:</u> Percentage of revenue allocated to the implementation of standardized tools, guidelines, and best available practices for assessments, sound management, the prevention of harm, risk reduction, monitoring and enforcement. <i>Note:</i> There are a variety of existing tools, guidelines and best available practices available, so it is necessary to identify those that are most relevant and that will be considered in the development of the baseline for this indicator.	<u>Financial indicator:</u> Percentage of revenue allocated to educational, training and public awareness programmes on chemical safety, sustainability, safer alternatives and the benefit of chemicals.
Indicator for reporting by Governments	<u>Suggested indicator:</u> Percentage of companies that notify public or national databases/inventories/registries/pollutant release and transfer registers. <i>Note:</i> This indicator addresses both voluntary and mandatory systems.	NOT APPLICABLE	<u>Suggested indicator:</u> Percentage of contributions from industry allocated to educational, training, and public awareness programmes on chemical safety, sustainability, and safer alternatives (as a percentage of total national budget for such activities).
Examples of existing sources of related information	Standard ECMA-370; inventories and register/public dossiers; secretariat of the Sub-Committee of Experts on the Globally Harmonized System; the Chemical Hazard Data Commons; Toxnot; the Chemical Hazard and Alternatives Toolbox; the Safer Chemical Ingredients List of the United	Guidance by the Inter-Organization Programme for the Sound Management of Chemicals; Cradle to Cradle Certified; standards of the Sustainability Accounting Standards Board; OECD legal instruments, standards and guidelines; GreenScreen for Safer Chemicals;	Companies' and associations' financial reports; GEF trust fund reports; financial reports submitted under multilateral environmental agreements (e.g., the

	States Environmental Protection Agency; RISK21; <i>Knowledge Management and Information Sharing for the Sound Management of Industrial Chemicals</i> (UNEP and ICCA, 2019); the UNEP Global Environment Outlook for Business; companies and associations' financial reports; reports on implementation of the Sustainable Development Goals; the United Nations Global Compact.	companies' and associations' financial reports; reports on implementation of the Sustainable Development Goals; the United Nations Global Compact.	Basel, Rotterdam and Stockholm and Minamata conventions); reports of UNEP platforms (e.g., UNEP Global Mercury Partnership, PCB Elimination Network, Global Alliance for Alternatives to DDT).
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Proposed strategic objective D: Benefits to human health and the environment are maximized and risks are prevented or, where not feasible, minimized through safer alternatives, innovative and sustainable solutions and forward-thinking.

Relevant targets	D1: <u>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 and high resource efficiency.</u>	D3: <u>By 20xx</u>, companies, including from the investment sector, incorporate strategies and policies to implement the sound management of chemicals [and waste] in their investment approaches and business models and apply internationally- recognized reporting standards.	D5: Industry associations <u>Non-governmental stakeholders</u> facilitate change towards sustainability and the safe management of chemicals [and waste] and consumer products throughout their life cycles, and their value chain, including in sharing information and building the capacity of small, medium, and micro sized enterprises.
Indicator for reporting by companies	<u>Suggested indicator:</u> Number of instances of implementation of safer alternatives (e.g., chemical substitution) or cleaner production technologies, with a breakdown of whether those instances are in developed or developing countries. <u>Related financial indicator:</u> Investment in innovation to advance green and sustainable chemistry, cleaner production and the deployment of life cycle management approaches for chemicals.	<u>Suggested indicator 1:</u> Volume of investment incorporating strategies and policies to implement the sound management of chemicals. <u>Suggested indicator 2:</u> Percentage/number of companies that use internationally recognized standards incorporating indicators and metrics related to the sound management of chemicals [and waste] for reporting.	<u>Suggested indicator:</u> Percentage/number of small and medium-sized enterprises that have received capacity-building and information from industry associations. <u>Related financial indicator:</u> Volume of investment by industry associations in the sharing of information with and capacity-building of small, medium-sized and micro-sized enterprises. <i>Note:</i> As there are several measures that are being and could be implemented by industry associations, investment may not be a proper reflection of the achievement of this target. Specific activities that are considered effective in meeting this target should be decided on.

Indicator for reporting by Governments	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
Examples of existing sources of related information	UNEP Chemicals in Products Programme; Global Network for Resource Efficient and Cleaner Production; UNEP Life Cycle Initiative; Platform for Accelerating Circular Economy; Green Industry Platform; reports on implementation of the Sustainable Development Goals; Dow Sustainable Chemistry Index; GreenScreen for Safer Chemicals; Chemical Awareness toolkit of DuPont; Greenlist programme of S. C. Johnson.	Responsible Care programme; European Union Corporate Sustainability Reporting Directive; Chemical Footprint Project; Global Reporting Initiative; Principles for Responsible Investment by UNEP FI and United Nations Global Compact; Communication of Progress under the United Nations Global Compact.	ICCA; CropLife; Green Chemistry Institute of the American Chemical Society; Centre for Green Growth and Climate Change of the Kenya Association of Manufacturers; Council of Small and Medium-sized Enterprises of the American Chemistry Council.

Proposed strategic objective E: [The importance of the sound management of chemicals and waste as an essential element to achieving sustainable development is recognized by all; adequate, predictable and sustainable financial and non-financial resources are [identified and] mobilized; actions are accelerated; and necessary [transparent and accountable] partnerships are established to foster cooperation among stakeholders].]				
Relevant targets	E1: All countries and <u>non-governmental stakeholders organizations at the high[est] level</u> recognize the importance of and demonstrate their commitment to the sound management of chemicals [and waste] <u>as a contribution to sustainable development [and the 2030 Agenda]</u> .	E3: Partnerships and networks amongst sectors and stakeholders are strengthened to achieve the sound management of chemicals [and waste]. <u>ALT E3 Stakeholders scale up efforts to strengthen the inter-connectivity among sectors toward the adoption of sustainable approaches</u>	E4: [Financial and non-financial resources needed to achieve <u>support</u>] the sound management of chemicals [and waste] are identified and mobilized in all sectors by and for all stakeholders.]	E5: [Gaps between developed and developing countries in the implementation of sound management of chemicals [and waste] are identified and narrowed.]
Indicator for reporting by companies	<u>Suggested indicator:</u> Percentage/number of companies that clearly state their recognition of the importance of sound management of chemicals and waste in their written/recorded official statements, documents and/or messages.	<u>Suggested indicator:</u> Percentage/number of partnerships and networks in which companies are actively involved. <u>Related financial indicator:</u> The volume of the financial contributions made by companies to partnerships and networks.	<u>Suggested financial indicator 1:</u> Percentage of revenue allocated to in-kind contributions, such as capacity-building activities <i>Note:</i> This could be measured within the proposed clearing-house mechanism or marketplace. <u>Suggested financial indicator 2:</u> Volume of industry donations to dedicated external financing (e.g., Special Programme, GEF co-financing, programmatic support, etc.).	<u>Suggested indicator:</u> For companies that operate in developed and developing countries: number of countries that have fully implemented regulations to address sound life cycle management of chemicals [and waste] and the number of countries that lack full implementation of regulations to address the sound life cycle management of chemicals [and waste].

Indicator for reporting by Governments	NOT APPLICABLE	<u>Suggested indicator:</u> Percentage/number of intersectoral and intrasectoral partnerships, networks and collaborative mechanisms in which industry is represented.	<u>Suggested indicator:</u> Percentage of national budget allocated to the sound management of chemicals [and waste] that is recuperated from industry through cost recovery measures.	NOT APPLICABLE
Examples of existing sources of related information	Responsible Care Global Charter; Principles for Responsible Investment by UNEP FI and United Nations Global Compact; position papers on the Sustainable Development Goals.	Partnerships under the Basel, Rotterdam and Stockholm and Minamata conventions; SAICM; United Nations Global Compact partnerships e.g., with ILO and UNEP; reporting on Sustainable Development Goal 17 (Strengthen the means of implementation and revitalize the global partnership for sustainable development); Together for Sustainability; Green Chemistry and Commerce Council; BizNGO; Chemicals Group of the World Business Council for Sustainable Development.	OECD industry financing for climate change and biodiversity (if indicators related to chemicals and waste are included); GEF private-sector engagement; Special Programme; Basel, Rotterdam and Stockholm and Minamata conventions; SAICM; memorandum of understanding between ICCA and UNEP.	Companies' input to SAICM; companies' and associations' reports (e.g., Cefic (2019)).

Annex V

Examples of sustainability reporting systems

System	Brief description and mechanism	Relevant standards/pillars/indicators	Observations
Dow Jones Sustainability World Index/S&P Dow Jones Indices and RobecoSAM	Reporters: Companies. Brief description: S&P Dow Jones Index Environmental, Social and Governance Scores robustly measure related risk and performance factors for corporations, with a focus on financial materiality. They are a second set of environmental, social and governance scores calculated by S&P Global Environmental, Social and Governance Research, in addition to the S&P Global Environmental, Social and Governance Scores that are used to define the constituents of the Dow Jones Sustainability Indices. Mechanism: Each year, S&P Global conducts the Corporate Sustainability Assessment, which is analysis of environmental, social and governance factors in over 11,000 companies. The end product is a total company-level score for a financial year, comprising individual scores for the environmental, social, and governance dimensions, beneath which there are, on average, over 20 scores for industry-specific criteria that can be used as specific signals on environmental, social and governance issues.	The Environmental Dimension Criteria Topics include: Operational Eco-Efficiency - Waste disposal (waste generation: total waste generated in metric tonnes; total waste used/recycled/sold; total waste disposed of) Product Stewardship - Life cycle assessment - Resource efficiency benefits of products - Renewable raw materials - Use of recycled and sustainably sourced materials - Exposure to hazardous substances - Hazardous substances commitment - End of life cycle responsibility - Environmental labels and declarations - Recycling strategy encouraging sustainable building - Recycling strategy raw material substitution	• Relatively high participation (about 50 per cent of the total market capitalization of the S&P Global LargeMidCap benchmark)
Global Reporting Initiative	Reporters: Organizations – large or small, private or public. Brief description: The Global Reporting Initiative is an independent, international organization that helps businesses and other organizations take responsibility for their impacts, by providing them with a common global language for communicating those impacts. It provides some of the world's most widely used standards for sustainability reporting. Mechanism: The Global Reporting Initiative Standards are designed as an easy-to-use modular set, starting with the Universal Standards. Topic	• GRI 300: Environmental - GRI 301: Materials 2016 (effective date: 1 July 2018) - GRI 302: Energy 2016 (effective date: 1 July 2018) - GRI 303: Water and Effluents 2018 (effective date: 1 January 2021) - GRI 304: Biodiversity 2016 (effective date: 1 July 2018) - GRI 305: Emissions 2016 (effective date: 1 July 2018) - GRI 306: Waste 2020 (effective date: 1 January 2022) - GRI 307: Environmental Compliance 2016 (effective date: 1 July 2018) - GRI 308: Supplier Environmental Assessment 2016 (effective date: 1 July 2018) • GRI 400: Social - GRI 403: Occupational Health and Safety 2018 (effective date: 1 January 2021)	• A total of 73 per cent of the world's 250 largest companies report on sustainability using the Global Reporting Initiative framework • No specific indicators have been developed for chemicals

System	Brief description and mechanism	Relevant standards/pillars/indicators	Observations
	Standards are then selected on the basis of the organization's material topics – economic, environmental or social. This process ensures that the sustainability report provides an inclusive picture of material topics, their related impacts and how they are managed.	- GRI 404: Training and Education 2016 (effective date: 1 July 2018) - GRI 414: Supplier Social Assessment 2016 (effective date: 1 July 2018) - GRI 415: Public Policy 2016 (effective date: 1 July 2018) - GRI 416: Customer Health and Safety 2016 (effective date: 1 July 2018) - GRI 417: Marketing and Labelling 2016 (effective date: 1 July 2018) - GRI 419: Socioeconomic Compliance 2016 (effective date: 1 July 2018)	
Standards of the Sustainable Accounting Standards Board	Reporters/users: Companies/investors (desirable). Brief description: Standards that establish, guide and improve the disclosure, by companies to their investors, of financially material sustainability information. Mechanism: There are specific standards for 77 industries across 11 sectors. The 77 Industry Standards cover a wide range of topics and are divided into five broad "sustainability dimensions": environment, social capital, human capital, business model and innovation, and leadership and governance. These five dimensions are then broken down further into 26 general issue categories. The Sustainability Accounting Standards Board Materiality Map is an interactive tool that provides companies in various industries with a visual representation of the sustainability issues that are most likely to affect their financial condition or operating performance. This allows organizations to identify the specific environmental, social and governance issues on which it will be most important for them to focus and to understand the metrics that underpin each disclosure topic in order to make operations more sustainable and so that they can keep shareholders' desires in mind. While the Global Reporting Initiative focuses on the external impact that the business has on the world, the Standards of the Sustainability Accounting Standards Board focus more on the	Environment - Greenhouse gas emissions - Air quality - Energy management - Water and wastewater management - Waste and hazardous materials management - Ecological impacts Social capital - Human rights and community relations - Customer privacy - Data security - Access and affordability - Product quality and safety - Customer welfare - Selling practices and product labelling Human capital - Labour practices - Employee health and safety - Employee engagement, diversity and inclusion Business model and innovation - Product design and life cycle management - Business model resilience - Supply chain management - Materials sourcing and efficiency - Physical impacts of climate change Leadership and governance - Business ethics - Competitive behaviour	• In 2020, 557 companies disclosed metrics for the Standards • Companies' reports are available online • The Standards contain metrics for assessing the material sustainability of companies, including specific chemical-related metrics

System	Brief description and mechanism	Relevant standards/pillars/indicators	Observations
	impact of sustainability on the company itself (namely on its finances and operations).	- Management of the legal and regulatory environment - Critical incident risk management - Systemic risk management	
Principles for Responsible Investment of UNEP FI and the United Nations Global Compact	Users: Organizations that wish to demonstrate publicly their commitment to including environmental, social and governance factors in investment decision-making and ownership. Brief description: The six Principles for Responsible Investment are a voluntary and aspirational set of investment principles that offer a menu of possible actions for incorporating environmental, social and governance issues into investment practice. Mechanism: Since its launch in 2006, the Principles of Responsible Investment initiative has grown into the largest responsible investment reporting initiative globally. Its simple self-assessment survey has developed into a complex reporting and assessment tool. A new reporting framework with more sustainability outcomes questions was piloted in 2021.	Reporting on the sustainability outcomes module is voluntary for signatories. It consists of three sections: 1. Targets set for priority issues (the Sustainable Development Goals, the Paris Agreement, human rights, etc.), including for increasing positive outcomes and decreasing negative outcomes. 2. Actions taken to achieve those targets, through: - Investment/asset allocation; - Stewardship with investees; - Stewardship undertaken with other stakeholders (e.g., policymakers, businesses, governments, non-governmental organizations, the media, academia); - Any collaborative activities (e.g., collaborative engagements). 3. Progress made towards achieving targeted outcomes. Environmental issues: sustainable land use, plastics, water, fracking, methane and biodiversity.	• The assessment report drafted through the process is confidential, but signatories can choose to publish their assessment report • The environmental issues featured do not include chemicals

Sources: S&P Global; Global Reporting Initiative; Sustainable Accounting Standards Board; UNEP FI and the United Nations Global Compact.