STRENGTHENING THE SCIENCE-POLICY INTERFACE IN INTERNATIONAL CHEMICALS GOVERNANCE:

A Mapping and Gap Analysis

IPCP
International Panel on Chemical Pollution

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ETH, photo courtesy of Thomas Kast

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ABOUT THE IPCP

The IPCP is a global network of academic scientists working on issues related to chemical pollution. It aims to provide leadership in identifying priority topics of concern and bridging the gap between science, policy and the public. The IPCP strives to develop a scientifically sound and balanced view of major issues of chemical pollution and evaluate different options for chemicals management. Based on its scientific expertise, the IPCP supports political processes at both the national and international levels.

DESIGN AND LAYOUT

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EXECUTIVE SUMMARY

Over the next two decades, global chemical production is set to double, primarily outside of developed countries. Governments and stakeholders from industry, academia and civil society are striving to address safety concerns and manage the risks associated with the production and use of chemicals and associated wastes. In 2006, the international community adopted the Strategic Approach to International Chemicals Management (SAICM), which aims to ensure the management of chemicals throughout their life cycles and to minimize negative impacts on the environment and human health. The sound management of chemicals and waste is an important aspect of achieving sustainable, inclusive and resilient human development by 2030, as defined in the Sustainable Development Goals. However, SAICM will end in 2020. Currently, an intersessional process is taking place to define international efforts for the sound management of chemicals and waste beyond 2020. One key topic is whether the science-policy interface (SPI) should be strengthened and, if so, how this could best be achieved.

This report aims to inform governments and stakeholders about this topic. It outlines desirable objectives and functions of a strong, two-way SPI identified by a group of international experts, maps the existing science-policy interface bodies in the chemicals and waste cluster, identifies gaps based on desirable objectives and functions, discusses lessons learned from other clusters, and explores different scenarios for strengthening the interface.

KEY MESSAGES

- **Outlook:** over the next two decades, global chemicals production will double, increasing waste, safety concerns, and potential impacts on the environment and human health.

- **Needs:** to define a strong, two-way science-policy interface as part of the global efforts for the sound management of chemicals and waste beyond 2020.

- **Benefits:** science-policy interface bodies generate an enabling environment for science and policy to grow; build visibility, awareness, credibility, legitimacy, and confidence around issues; and they foster commitment, participation, exchanges, synergies and cooperation.

- **Much has been achieved, but some challenges remain:** limited two-way communication between science and policy; narrow range of objectives and functions; limited effective participation from developing and transition countries due to a lack of time, resources and expertise; limited alignment of communication and coordination; and limited awareness beyond the chemicals and waste cluster.

- **Possible options for strengthening the science-policy interface:**

  1. Establishing an intergovernmental panel
  2. Strengthening existing interface bodies using a network-of-networks approach
  3. Expanding activities of the IOMC organizations

Benefits of a strong, two-way interface

SPI bodies aim to raise awareness of risks and possible solutions associated with a particular issue among policy-makers and the general public. They provide a framework within which scientists assess scientific evidence, and they provide recommendations or offer consensus to policy-makers on a specific issue. Such interfaces increase the knowledge base, foster information exchange, and facilitate ownership, effective participation, and opportunities for stakeholders.

In particular, SPI bodies have the potential to generate enabling environments for scientists, policy-makers, and stakeholders to work more effectively, both individually and jointly. Through high-level political involvement of member states, the SPI bodies have points of contact within national governments, allowing them to gain visibility and foster political commitment. Due to regular exchange, scientists are better involved in decision-making processes, while policy-makers have direct access to experts in the scientific community. Policy-makers and stakeholders can access relevant information and tools on centralized platforms, allowing them to monitor progress and conduct searches, analyses and comparisons to answer their questions.

In addition, SPI bodies have the potential to increase public awareness, participation, and motivation necessary for society to accept, implement and comply with new legislation. Improved transparency, accountability and democratization of knowledge increases trust and public involvement in the policy-making process, and these improvements also support inclusion and opportunities for younger researchers and students, in particular also from developing countries, who can get involved through fellowships and scholarships.

Furthermore, SPI bodies foster credibility as they present reliable findings by using transparent practices complying with high scientific standards and technical integrity. They generate legitimacy because they benefit from stakeholders' support and carry out work that is relevant to stakeholders' needs. Stakeholders, in turn, are committed because they are involved in the SPI bodies' functions and initiatives. Prerequisites are efficient structures that minimize duplication of work and are flexible to adapt to new requirements and circumstances.

Current gaps and opportunities

A wide range of SPI bodies exist in the field of international chemicals and waste management. They cover individual chemicals, or groups of chemicals, along different stages of their life cycles, and they deal with their impacts on human health and/or the environment. Most SPI bodies address specific, well-known chemical pollution issues, while some also have additional mandates to identify issues with emerging evidence of concern. Because of insufficient and often one-way communication, scientists and policy-makers are many times not up-to-date with the developments and needs outside their respective fields. As a result, scientific expertise on pressing issues often

does not reach policy-makers in time. Moreover, scientists and policy-makers miss opportunities for synergies and joint strategies, leading to many issues not being addressed in the most effective and timely manner. In addition, many SPI bodies do not monitor and evaluate progress achieved by implementing policy measures, which hinders effective quality management and progress. Despite several mechanisms to improve coordination between different SPI bodies, they could benefit from better aligning interactions to create synergies and avoid duplication of efforts.

The interface bodies considered in this report have implemented rules, procedures and measures to address the needs and circumstances of developing and transition countries, and to facilitate their representation and participation in relevant processes. Inclusion, however, remains a challenge due to limited capacity to attend international meetings, a lack of scientific experts, insufficient language and literacy skills, as well as underrepresentation and limited visibility of scientific knowledge produced in developing and transition countries at the international level.

Extensive knowledge bases to support decision-making are available on the websites of many SPI bodies. It can, however, be challenging to find relevant data and reports on underlying frameworks, methodologies, processes and different subjects, as information on one specific topic is often scattered over several locations. This impairs effective access to data and efficient use of resources. A centralized repository linking existing databases could be useful, as it would create a platform for sharing knowledge to respond to the complex nature of international chemicals governance.

Other additional generic challenges of SPI bodies include limited awareness of activities beyond and even within the chemicals and waste cluster, as well as the fact that timelines do not necessarily match policymaking needs and that communication and outreach require time, resources, and expertise.

The analysis presented in this report shows that there is not one size and structure that fits every purpose. Institutional setups, functions, processes and outputs evolve over time based on experience, challenges, trial-and-error, external reviews, and feedback from stakeholders. Their structures are adapted to different needs and existing conditions within each setting, allowing the SPI bodies to fulfill their functions and mandates.

Outlook

Based on identified gaps in the current science-policy interface and lessons learned from other clusters, this report explores three options for strengthening the science-policy interface in international chemicals governance. They are not mutually exclusive, and hybrid solutions are possible.

- **Option 1:** An intergovernmental mechanism, modeled on the existing intergovernmental interface bodies in other clusters (such as the IPCC and IPBES).

  Pros: Such a panel would offer a comprehensive, global perspective and overview with high credibility and stakeholder commitment. It would raise awareness of chemical and waste management issues among politicians and the general public and increase participation.

  Cons: Such a mechanism can be costly and inflexible, which entails lengthy processes and would complicate production of up-to-date output.

- **Option 2:** A network-of-networks where a lean hub coordinates activities of existing and future SPI bodies.

  Pros: This structure increases efficiency and effectiveness of existing interface bodies and promotes synergies. It offers flexibility and agility, while keeping administration to a minimum. It may attract and engage new actors.

  Cons: It may be a challenge to motivate stakeholders to commit themselves to working at the interface.

- **Option 3:** Strengthen existing interface bodies under the UN's Inter-Organization Programme for the Sound Management of Chemicals (IOMC). Expand and formalize the activities of existing organizations to cover all chemicals and relevant issues.

  Pros: An extensive network already exists, and such a set-up would benefit from existing experience.

  Cons: Organizations and governing bodies would have to coordinate their activities closely, and limited resources and capacities may complicate such an endeavor. A focus on policies may restrict input from science.

LIST OF ACRONYMS

ACS	American Chemical Society
AMAP	Arctic Monitoring and Assessment Programme
BRS CONVENTIONS	Basel, Rotterdam and Stockholm Conventions
CAC	FAO/WHO Codex Alimentarius Commission
CAS	Chemical Abstracts Service
CFCs	Chlorofluorocarbons
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CRAN	Chemical Risk Assessment Network (WHO)
DDT	Dichlorodiphenyltrichloroethane
ECHA	European Chemicals Agency
EDCs	Endocrine Disrupting Chemicals
EHS	Environment, Health and Safety (EHS Division, OECD) or Evaluation of Harmful Substances (EHS Working Group – GESAMP)
EMEP	Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe
FAO	Food and Agriculture Organization of the United Nations
GAPS	Global Atmospheric Passive Sampling
GCO	Global Chemicals Outlook
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GEF	Global Environment Facility
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GMP	Global Mercury Partnership
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
ICCM	International Conference on Chemicals Management
IOMC	Inter-Organization Programme for the Sound Management of Chemicals
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change

LIST OF ACRONYMS

IPCP	International Panel on Chemical Pollution
IPCS	International Programme on Chemical Safety
IRP	International Resource Panel
JECFA	Joint FAO/WHO Expert Committee on Food Additives
JMPM	Joint FAO/WHO Meeting on Pesticide Management
JMPR	Joint FAO/WHO Meeting on Pesticide Residues
MEA	Multilateral Environmental Agreement
ODS	Ozone-Depleting Substance
OECD	Organisation for Economic Co-operation and Development
OEWG	Open-Ended Working Group of the Basel Convention
PEN	PCB Elimination Network
POPRC	Persistent Organic Pollutants Review Committee of the Stockholm Convention
POPs	Persistent Organic Pollutants
PRTR	Pollutant Release and Transfer Register
RAC	Committee for Risk Assessment (ECHA)
RSC	Royal Society of Chemistry
SAICM	Strategic Approach to International Chemicals Management
SAP	Scientific Assessment Panel of the Montreal Protocol
SCE	Sub-Committee of Experts on the GHS
SEAC	Committee for Socio-Economic Analysis (ECHA)
SPI	Science-Policy Interface
STAP	Scientific and Technical Advisory Panel (GEF)
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNEA	United Nations Environment Assembly
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research
WHO	World Health Organization

DEFINITIONS OF KEY TERMS

Chemicals governance: Governance of chemicals throughout their entire life cycles. Although the term "waste governance" is not explicitly mentioned in this report, waste governance is considered part of a comprehensive "chemicals governance" framework as it covers the end-of-life stage of chemicals and associated products. Therefore, the term "international chemicals governance" used throughout the report has largely the same, or a similar, scope as the commonly referred to "chemicals and waste" cluster (including chemicals waste, but not e.g., food waste).

Science: It refers to the "systematic pursuit of objective knowledge" [1], and encompasses both natural and social sciences. Scientific research is conducted not only by academic institutions such as universities and national research institutes, but also by certain governmental agencies, industry, civil society, and other organizations. Scientific knowledge may also include certain non-formal types of knowledge such as local, traditional and practical knowledge.

Policy: It refers to "commitments to definite courses or methods of action with broad implications, selected from among alternatives in light of given conditions, and taking account of norms, values and motives, to increase the certainty of realizing desired outcomes. Policies are adopted not only by governments and intergovernmental bodies, but are also made by companies, interest groups and other organized forms of society" [1].

Science-policy interface (SPI): Space of interactions between scientists and policy-makers to enhance science-based policy/decision-making as well as policy-relevant scientific research. A science-policy interface is facilitated by science-policy interface bodies, individuals and other science-policy interactions.

Science-policy interface body (interface body, or SPI body): A body, established permanently or in an ad-hoc manner, that undertakes certain activities at the science-policy interface; these activities do not necessarily need to be the sole function of the body.

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1. INTRODUCTION

1.1 BACKGROUND

Chemicals play important roles in contemporary societies: from pharmaceuticals that help to save lives from fatal diseases and increase life expectancy, to many agrochemicals that help to protect crops from harmful pests [2]. To date, it is estimated that the global chemical industry has produced over 100,000 individual and mixtures of chemicals [2], with an annual turnover between 3–4.1 trillion US Dollars in 2010 [3]. Over the next two decades, worldwide chemical production is projected to double from 2010 to 2030, with 71 percent of this new production expected outside of developed countries, particularly in countries with economies in transition such as Brazil, India and China [2], which generally have less resources and capacity to manage chemicals compared to developed countries. While chemicals provide many desired benefits, it has been increasingly recognized that some of them also cause undesired adverse effects on human health and the environment [4,5], while the full range of potential adverse effects of chemicals is not yet fully understood.

With increasing scientific understanding and public awareness of chemicals and their related issues, continuous efforts have been and are being made by many governments and stakeholders to assess and manage their risks and safety concerns, e.g. by reducing exposure and by restricting and/or phasing out chemicals with certain hazardous properties. At the international level, a common practice has been to establish legally-binding multilateral environmental agreements (MEAs) to address a variety of specific chemical-related issues on global and inter-regional scales (for examples, see [6]). The Montreal Protocol on Substances that Deplete the Ozone Layer is one such framework that was adopted in 1987 to reduce the production and consumption of ozone-depleting substances (ODSs) so as to lower their abundance in the atmosphere, thereby protecting the Earth's protective ozone layer [7].

However, the current legally-binding MEAs have a rather fragmented coordination, with two major gaps [8]: (1) Different levels of membership in the various agreements create membership gaps that make it difficult to link two or more agreements in attempts to save time and to benefit from previous work in setting up effective regulations; (2) Regulatory gaps result from current agreements focusing on a limited set of chemicals and from their diverse activities not covering an identical set of chemicals, which has resulted in a lack of regulation throughout the whole life cycle of many chemicals of concern, both internationally and within many countries (e.g. [9]). In response to this, it has long been discussed that efforts need to be made to establish and facilitate a comprehensive international chemicals governance framework for all chemicals throughout their entire life cycles [8,10], including the end-of-life stage of chemicals and associated products.[1]

This momentum led to the establishment of the Strategic Approach to International Chemicals Management (SAICM) in 2006, a voluntary policy framework with participation of more than 175 governments, as well as over 90 intergovernmental organizations and non-governmental organizations from industry, academia and civil society [11]. SAICM has the overall objective to achieve "the sound management of chemicals throughout their life cycle so that by the year 2020, chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health" [12]. It complements existing chemicals-related MEAs with one of its key goals being to ensure that all of these MEAs are ratified and subject to implementation legislation in countries [13]. At the same time, SAICM Stakeholders may identify any issues of concern (also known as Emerging Policy Issues) as they arise and call for cooperative action [12]. To date, eight issues of concern have been recognized, covering certain chemical groups or chemical management practices, and international cooperative actions have been initiated to address them. Thus, SAICM plays a substantial policy role in international chemicals governance; however, its mandate expires in the year 2020. To ensure the continuity of efforts and potentially create an enhanced platform to support the implementation of the 2030 Agenda for Sustainable Development, SAICM Stakeholders are currently engaged in an Intersessional Process to negotiate sound management of chemicals and waste beyond 2020 (as set out in ICCM Resolution IV/4), with its first meeting held in February 2017 in Brazil [14].

The participation of science has not been institutionalized in SAICM; instead, SAICM was designed with a minimalist governance structure aiming to catalyze support and action from existing bodies, including the role of science. Given the broad mandate of SAICM and its successor, it is relevant to ask whether the current model is sufficient or if the sound management of chemicals and waste beyond 2020 would benefit

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from greater institutionalization of scientific input into decision-making. Against this backdrop, a number of topics were discussed at the first Intersessional Process meeting (SAICM, 2017b), including the science-policy interface (SPI): in particular, it was discussed whether a new science-policy interface body (hereafter referred to as "interface body" or "SPI body"), similar to the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), would need to be established to strengthen the link between science and policy in international chemicals governance beyond 2020 [14].

1.2 WHY ARE SCIENCE-POLICY INTERFACES NEEDED?

Experience shows that policy development can benefit greatly from the engagement of and contributions from the scientific community in multiple areas. Some major areas and examples of such contributions are summarized in Table 1.

Table 1. Overview of areas where policy can benefit from interaction with the scientific community

AREAS WHERE POLICY CAN BENEFIT FROM INTERACTION WITH THE SCIENTIFIC COMMUNITY	EXAMPLES
EARLY WARNING / HORIZON SCANNING Monitor the state of the global environment, identify issues of concern, and inform policy-makers and other stakeholders	• the initial identification of ozone depletion and its chemical cause in the mid-1970s [15] • the book Silent Spring by Rachel Carson in the 1960s [16] • early identification of POPs (e.g. [17])
KNOWLEDGE GENERATION Generate necessary knowledge (including a better mechanistic understanding of the issues) and independent scientific assessment to reduce scientific uncertainty and support policy development (including providing solid scientific evidence for making problem formulation in a policy context more accurate and policy measures more relevant, as well as providing evidence on which decision makers can base their decisions)	• the research on the causes of acid rain in Norway and Sweden led to the establishment of the Convention on Long-Range Transboundary Air Pollution (CLRTAP), e.g. [18,19] • the research on ozone-depleting substances in the stratosphere led to the negotiation and adoption of the Montreal Protocol on Substances that Deplete the Ozone Layer (e.g. [15,20]) • costs of inaction studies on EDCs [21,22] • the development of summary documents for policy-makers (containing policy options) in addition to completed scientific assessments (e.g. [23,24])

AREAS WHERE POLICY CAN BENEFIT FROM INTERACTION WITH THE SCIENTIFIC COMMUNITY	EXAMPLES
RESEARCH AND DEVELOPMENT Help to develop innovative technical solutions to issues of concern and/or policy relevant tools and methodologies (e.g. those arising from assessments) for the implementation of cooperative actions	• the "MicroPoll" project in Switzerland helped to identify and develop advanced treatment technologies for removing micropollutants including pharmaceutical and personal care products from wastewater [25]
MONITORING Conduct long-term monitoring, providing quantitative scientific information for the evaluation of effectiveness of relevant policy measures	• recent identification of illegal production and use of CFC-11 [26] • various projects that monitor global mercury levels and prepare the Global Mercury Assessment, e.g. [27] • the Global Monitoring Plan under the Stockholm Convention [28] • the Global Atmospheric Passive Sampling Network for POPs [29]

In turn, the scientific community can also benefit from its engagement in relevant policy processes. Examples may range from: (1) the formulation of new research questions and the creation or development of areas of research due to the identification of research gaps and critical needs for scientific and technical advances in response to policy needs, to (2) obtaining financial resources for conducting policy-informing research and/or developing innovative solutions, to (3) nurturing a future generation of students equipped with both science and policy insights, as well as (4) growing recognition by international peers and by the education/research system that evaluates the performance of academic scientists. In this way, strong, two-way science-policy interactions may contribute to a productive co-development of science and policy.

The importance of science-policy interfaces is widely acknowledged throughout the UN system and regularly mentioned in high-level documents and decisions taken by the governing bodies of intergovernmental organizations. For example, Paragraph 88 of "The Future We Want" [30], the outcome document of the United Nations Conference on Environment and Development, calls for "a strong science-policy interface, building on existing international instruments, assessments, panels and information networks, including the global environment network, as one of the processes aimed at bringing together information and assessment to support informed decision-making". In addition, the United Nations Environment Assembly at its first meeting in 2014 recognized "the potential benefits of a scientifically sound and evidence-based detailed assessment of the state of the environment for awareness-raising, informed policy formulation and decision-making in the context of sustainable development" (UNEA Resolution 1/4 in [31]).

The Resolution further recognized “that there are gaps in our knowledge of the state of the environment resulting from a lack of current data and information generation and dissemination” and noted “that there is an urgent need for Governments to take action to bridge those gaps through the building of capacities, the strengthening of existing mechanisms, including those of the multilateral environmental agreements, for monitoring the state of the environment and producing policy-relevant environmental assessments, which should be based on the use of established comparable methods for data collection and analysis, paying particular attention to the needs and circumstances of developing countries” (UNEA Resolution 1/4 in [31]). A recent review shows that the IPCC is the most important institution within the science-policy interface of global climate governance, and that the strength of such an intergovernmental panel is that both scientists and policy-makers adopt the main findings of the scientific reports, creating ownership and stimulating action in both the policy and scientific arenas [32].

When it comes to international chemicals governance, various MEAs recognize the importance of science-policy interfaces and have thus established their own specialized subsidiary scientific advisory and/or assessment bodies, which have delivered many scientific assessments, syntheses and reviews to inform and guide the implementation of the respective conventions. Recently, at their meetings in 2015, the Conferences of the Parties to the Basel, Rotterdam and Stockholm Conventions (hereafter referred to as “BRS Conventions”) adopted identical decisions entitled “From science to action” (BC-12/22, RC-7/12, SC-7/30; see [33]), recognizing “the importance of the science-policy interface for the effectiveness of the Conventions” and “the need for greater access to scientific understanding in developing countries to enhance informed decision-making on the implementation of the Conventions”. The decisions further stressed “the need for scientific underpinning for decision-making and policy-making in the sound management of hazardous chemicals and wastes at the national and regional levels”. In addition, multiple intergovernmental organizations, e.g., the member organizations of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), have established respective units to address specific needs of the science-policy interface within their own mandates. Furthermore, science-policy interaction is also mentioned several times in the Overarching Policy Strategy (OPS) of SAICM, especially with respect to its objectives of risk reduction, knowledge and information, and capacity-building and technical cooperation. In particular, it is a built-in objective of SAICM to achieve a two-way exchange between science and policy (for examples, see Table 2 as well as OPS Para. 14c and 15g in [12]).

To date, SAICM has to a certain extent supported engagement of the scientific community, particularly through the establishment of several interface bodies around the identified Emerging Policy Issues and Other Issues of Concern (e.g. OECD/UNEP Global PFC Group, Advisory Group for UNEP on the Environmental Exposure and Impact of Endocrine Disrupting Chemicals). However, it has been argued that the achievement

of this objective of a more comprehensive and complete two-way science-policy exchange is likely to have been hindered under the current structure of SAICM. A recent review suggested that a core weakness of SAICM is that it has no mechanisms to comprehensively assess progress or to identify emerging problems and bring them to the attention of governments, which hampers its ability to monitor progress and direct resources and attention to the most pressing areas of concern [32]. In addition, the participation of academic scientists and institutions, a key stakeholder group in the sound management of chemicals and waste, is currently very limited in the SAICM processes, particularly in the process of identifying issues of concern. In practice, scientific evidence, which is to a large extent generated by academic scientists and institutions, is mostly presented and debated by stakeholders other than academic scientists to justify, or argue against, the listing of a new issue of concern. This may lead to a mixture of both scientific and political debates occurring within the same discussion and very limited to no feedback flowing back to academic institutions in terms of key scientific needs [34].

TABLE 2. SAICM objectives that are related to a science-policy interface, as listed in the Overarching Policy Strategy [12]

SAICM OBJECTIVES RELATED TO A SCIENCE-POLICY INTERFACE	
RISK REDUCTION	**Para 14c:** to implement transparent, comprehensive, efficient and effective risk management strategies based on appropriate scientific understanding … and appropriate social and economic analysis aimed at pollution prevention, risk reduction and risk elimination … to prevent unsafe and unnecessary exposures to chemicals;
KNOWLEDGE AND INFORMATION	**Para 15d:** to make objective scientific information available for appropriate integration into risk assessments and associated decision-making relating to chemical policy; **Para 15e:** to ensure that science-based standards, risk assessment and management procedures and the results of hazard and risk assessments are available to all actors; **Para 15f:** to make objective scientific methods and information available to assess the effects of chemicals on people and the environment, particularly through the development and use of indicators; **Para 15g:** to accelerate the pace of scientific research on identifying and assessing the effects of chemicals on human beings and the environment, including emerging issues, and to ensure that research and development are undertaken in relation to chemical control technologies, development of safer chemicals and cleaner technologies and non-chemical alternatives and technologies.
CAPACITY-BUILDING AND TECHNICAL CO-OPERATION	**Para 18g:** to encourage stakeholders to develop and promote programmes on chemical safety and scientific research and analysis and to assist with capacity-building programmes in developing countries and countries with economies in transition.

1.3 THE CURRENT DISCUSSION ON STRENGTHENING THE TWO-WAY SCIENCE-POLICY INTERFACE

The current discussion on the science-policy interface in international chemicals governance has taken place both within and outside of the Intersessional Process for considering SAICM and the sound management of chemicals and waste beyond 2020. This section provides a brief summary below. In brief, the ongoing discussion shows that a number of stakeholders are interested in reviewing and exploring options to strengthen the two-way science-policy interface in international chemicals governance. With the ongoing discussions on the sound management of chemicals and waste beyond 2020, now is likely an ideal time to do so.

Discussion within the Intersessional Process

Before the first meeting of the Intersessional Process, a thought starter document was developed by the SAICM Secretariat including a dedicated section on the role of science and its link to both policy and implementation (see Annex 1). In response to the thought starter document, a number of stakeholders from intergovernmental organizations, governments, industry, civil society and academia provided their feedback during and after the first meeting (see Annexes 2 and 3). In particular, the co-chairs of the Intersessional Process summarized the discussion at the first meeting with the following points:

- "Explore how to strengthen the link between science, public health and policy in global chemicals and waste governance.
- Recognize the existing mechanisms for provision of scien[tific] advice on chemicals and waste by intergovernmental and international bodies such [as] UNEP, WHO and the chemicals and wastes conventions secretariats.
- Consider the social interface and the full range of scientific and public health disciplines.
- Explore approaches [to] the use of science to inform policy-making and action, including existing mechanisms in other clusters such as climate change and biodiversity.
- There were also comments regarding the need to focus on scientific capacity-building and caution about diverting resources from implementation."

Before the second meeting of the Intersessional Process, two documents were made available to the participants: (1) A review of the science-policy interfaces in other fields such as climate change and biodiversity including their missions, objectives, management, products and procedure [35], and (2) "a brief outline of selected existing

fora and mechanisms to provide science advice on chemicals and waste issues and how these interface with the decision making processes of intergovernmental and international bodies as well as multilateral environmental agreements" [36]. The latter document focused on the work of the Food and Agriculture Organization (FAO), the World Health Organization (WHO), the FAO/WHO Codex Alimentarius Commission (CAC), the Organisation for Economic Cooperation and Development (OECD), the United Nations Environment Programme (UN Environment, hereafter referred to as "UNEP"), and the science-policy interfaces of the BRS Conventions and the Montreal Protocol. It suggested the following questions to be further considered:

- "What are the key gaps that are currently not covered by existing fora/organizations? Could the existing bodies be modified to fill these gaps?
- How would a new forum work with existing specialized agencies/expert bodies? What would be the value-added of such a forum?
- Where would the funding for a new interface come from?
- How would scientific integrity of the advice be assured?
- Science-policy interfaces are complex, and evidence alone may not be sufficient, for example when there are divergent viewpoints among stakeholders, and national or local economic and in some cases political drivers can be in play. How can the international community help countries to overcome/change these drivers?"

The second meeting built on these documents and previous discussions from during and after the first meeting. The meeting report [37] noted that "many participants [further] stressed the need to integrate science in the beyond 2020 framework and to increase the science policy interface and engage academia in activities related to sound management of chemicals and waste. It was noted that the effects of chemicals and waste mis-management must be appreciated by government officials and a good way to achieve that was by raising the profile of the science-policy interface. While some participants proposed the establishment of a stand-alone scientific panel similar to the Intergovernmental Panel on Climate Change or the Intergovernmental Science-policy Platform on Biodiversity and Ecosystem Services, others recalled the high costs involved in establishing and running a new body". Some participants further "urged caution that the work of existing scientific bodies established under the chemicals conventions and other international bodies should not be undermined nor duplicated. While there was a need for improved integration of scientific advice and policy making in the area of chemicals and waste, these should address the gaps and issues that went beyond existing bodies". It was also "noted that gathering lacking information might need some time and hence requires a long-standing engagement of academia and policy-makers". Furthermore, during the discussion groups, it was "suggested that there is further untapped potential within academia that should

be considered, including at the national level". Some participants further called "for increased transparent, flexible, scientifically sound and academically robust engagement beyond 2020. This would include the need for two-way dialogue, in particular at the national level, between the science community and policy-makers as well as awareness raising amongst scientists".

Discussion outside of the Intersessional Process (1) - under the BRS Conventions

Currently, a roadmap [38] is being developed for further engaging Parties and other stakeholders in an informed dialogue for enhanced science-based action in the implementation of the Basel, Rotterdam and Stockholm Conventions at the regional and national levels. This was mandated by the Conferences of the Parties to the BRS Conventions at their meetings in 2015 and 2017. In particular, an online survey was conducted, and the following challenges were identified from the 127 responses received (governments: 72; intergovernmental organizations: 6; regional centers: 9; industry: 11; civil society: 13; academia: 13; others: 3):

- The cost of obtaining information;
- The many data gaps, especially data relevant to countries that are non-OECD countries and the lack of capacity to generate data in developing and transition countries;
- The lack of information in national languages;
- The need for improved networking, exchange of information and communication among Parties to the Conventions and all stakeholders involved in the sound management of chemicals and waste (private sectors, civil society, academia), as well as increased participation of youth;
- The lack of national capacity to review and assess information including the capacity to undertake systematic reviews of evidence (including developing the search strategy, assessment of articles, and synthesis of the information); and
- Knowledge translation, i.e. making scientific information understandable to policy-makers as well as a general audience, so that it can be used effectively in decision-making.

The online survey further suggested that "an improved science-policy interface could facilitate the decision-making in the BRS Conventions and support their effective implementation".

Discussion outside of the Intersessional Process (2) - findings in the Global Chemicals Outlook II

During the preparation of the Global Chemicals Outlook (GCO) II[2], the authors of Section 1 noted that "large amounts of data, studies and reports are available regarding chemicals production, consumption, pollution, concentrations and effects. However, a number of challenges have been encountered in identifying, reviewing and consolidating knowledge, and in establishing global baselines. Disparities can be observed in data availability across countries and regions, making the identification of trends and comparability difficult, for example, regarding chemical releases and concentrations. Research is often undertaken using different protocols and methods, for example, in determining the effects of chemicals on human health and the environment and translating these effects into economic costs and benefits". The authors further noted that "while significant progress has already been made in addressing challenges of data collection and harmonization – the OECD test guidelines being a good example – questions and opportunities for strengthening the role of science include the following:

- For which topics is there potential to standardize units of analysis and harmonize tools and methods to facilitate comparability of results?
- Which steps need to be taken to gather available data in a more systematic manner?
- How can capacities in developing countries be strengthened to enable data collection, analysis and sharing in all countries and regions?
- How can existing knowledge be synthesized and consolidated at the global level to establish a global baseline and track progress over time?"

Discussion outside of the Intersessional Process (3) – discussion by the Ad Hoc Open-ended Expert Group on Marine Litter and Microplastics

During the second meeting of the group on 3–7 December 2018 in Geneva[3], Switzerland, the experts "agreed that there was a need to strengthen the science/policy interface at the international level and to do more to support evidence-based approaches, improve understanding of the impacts of plastic litter on the marine environment, and promote local, national, regional and global action on eliminating marine

2 At the time of preparation and revision of this report, the Global Chemicals Outlook (GCO) II was still in the final stage before publication. Therefore, the quotes here were taken from a close-to-final draft and may differ from the final version of the GCO II.

3 At the time of preparation and revision of this report, the outcome document of the second meeting was still in the final stage before publication. Therefore, the quotes here were taken from a close-to-final draft (after one round of revision) and may differ from the final version of the outcome document.

litter". The experts further proposed to "consider the establishment of a scientific and technical advisory group on marine litter and microplastics, benefiting from the work of existing mechanisms such as [the] Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection". In addition, the experts proposed that enhanced coordination and governance "should be supported by and grounded in: a science/policy interface; international cooperation; multi-stakeholder engagement; realities of differences in regional and local contexts and (technical/financial) capacities".

1.4 INTERNATIONAL CHEMICALS GOVERNANCE VS. OTHER CLUSTERS

In comparison to other clusters such as those concerning climate or biodiversity, international chemicals governance presents both similarities and differences. Commonalities with these other clusters include the high stakes involved (i.e. the risks to human health and environment) and the urgency of decision-making and implementation of improvement measures. However, the chemicals (and waste) cluster also faces many of its own unique challenges, including (1) the existence of a large number of highly diverse chemicals, with over 100,000 CAS numbers [2] to be assessed and managed, (2) many new types of chemicals under development, (3) many diverse potential physical, chemical and biological effects (acute, chronic and cross-generational) on the environment, wildlife and human health, and (4) mixture effects of simultaneous exposure to many chemicals. These complexities often require a large body of knowledge from diverse disciplines, as well as agility to quickly respond to issues with emerging evidence of concern. In addition, in comparison to climate change and biodiversity loss, the adverse effects of chemicals are abstract and often invisible to most people, resulting in little public awareness or pressure for action. Therefore, the science-policy interface in international chemicals governance not only needs to draw lessons learned from the science-policy interfaces in other clusters, but also consider and address its own specificities, as mentioned above.

1.5 MOTIVATION, AIM AND SCOPE OF THE PRESENT STUDY

As introduced above, various stakeholders have expressed broad support for a strong, two-way science-policy interface in international chemicals governance, while recognizing the achievements of existing interface bodies, particularly those under the MEAs and those established by various intergovernmental organizations. In addition, there is general agreement among stakeholders that duplicated efforts should be avoided, as also indicated by the overview paper prepared by the WHO, UNEP, BRS Secretariat and OECD [36]. However, currently there is no clear, common understanding of the desired overall objectives and functions of the science-policy interface in international chemicals governance and whether existing bodies already cover all, or a part, of these objectives and functions. This lack of clarity with regard to the overall objectives and existing gaps motivates the study presented here, i.e. to clarify them as a solid basis for further consideration and discussion on the necessity and

feasibility of options to strengthen the two-way science-policy interface in international chemicals governance.

This report presents the results of a mapping and gap analysis of existing science-policy interface bodies in international chemicals governance and a review of lessons learned from science-policy interfaces in other clusters (e.g. biodiversity, climate) as a reference point for further consideration. In particular, this report aims to inform international policy-makers by investigating the following two main questions:

1) What are the desired needs/objectives and functions of a strong two-way science-policy interface in international chemicals governance? (Section 3)

2) How and to what extent are these objectives and functions fulfilled by existing interface bodies/processes? Based on this, what are the major gaps? (Section 4)

Building on the review of the scope, functions, organization and other aspects of existing science-policy interface bodies as well as lessons learned from other clusters (Section 5), this report then explores several options on where improvements could be made to strengthen the overall science-policy interface (Section 6). It should be noted that the options included in this report are intended to be comprehensive and illustrative, but not necessarily exhaustive.

2. METHODS & PROCESS

2.1 METHODS

The analysis presented here was completed in four major steps: (1) identification of desired objectives and functions of a strong two-way science-policy interface in international chemicals governance (Section 3), (2) a mapping and gap analysis of existing interface bodies (Section 4), (3) a review of lessons learned from the interfaces/interface bodies in other clusters (Section 5), and (4) exploration of options for a way forward in strengthening the science-policy interface (Section 6).

In the first step, the desired objectives and functions of a strong science-policy interface were identified through a literature review and inputs from stakeholders during a dedicated workshop on this topic (for details of the workshop, see Section 2.2).

In the second step, the mapping and gap analysis involved the mapping of existing science-policy interface bodies in the realm of chemicals governance on the global, inter-regional, regional and national levels. The analysis then took a closer look at the interface bodies with the aim of gaining an overview, particularly with regard to their: i) overall scope, ii) work areas, iii) mechanisms for addressing the needs of and circumstances within developing and transition countries, and iv) networking, coordination, and knowledge sharing with other interface bodies. By comparing the status quo against the desired objectives and functions of a strong, two-way SPI (from the first step), gaps were identified that indicate areas where improvements could be made in order to achieve a strengthened two-way interface.

Because of the breadth and complexity of the institutional landscape in the field of international chemicals governance, and due to the restricted time and resources available, not all existing interface bodies were included in the gap analysis, particularly the

many bodies that exist on the regional, national and local levels. Focus was instead placed on reviewing those interface bodies that have global to inter-regional coverage (see Table 3). Thus, the analysis is meant to be comprehensive for the international context, but not necessarily exhaustive. Information about each interface body was collected through a review of publicly accessible online information and personal communication with representatives from the interface bodies (including a questionnaire sent to some of the interface bodies; see Annex 4). The quality and completeness of the data sets considered depends on the availability and (online) accessibility of data and the survey responses received. In some cases (e.g. with regard to active expansion of interface bodies' networks), a complete analysis for all interface bodies considered could not be completed due to data gaps; such data gaps are clearly indicated in the respective discussion later in this section. The full, detailed results for all guiding questions are not presented in this report; instead the key trends, common practices, and identified gaps are summarized.

In the third step, a desk review was conducted for four existing international interface bodies from the climate, biodiversity, ocean and desertification clusters to draw lessons from (1) their institutional setup and outputs, (2) their positive impacts, (3) factors contributing to their effectiveness, and (4) limitations and challenges within and beyond them. Information was collected from peer-reviewed scientific literature and documents published by the bodies and their associated MEAs (e.g. workshop and plenary documents, resolutions, reports, and summaries). Additionally, representatives from individual bodies were contacted for clarification(s), where needed.

Building on an integration of the previous three steps, the fourth step explored options for strengthening the science-policy interface in international chemicals governance. Additional information related to the interface bodies considered in this study, including their outputs, organizational structure, and rules and procedures, was collected and is summarized in Annex 5. This information may also be used to inform the design of a strengthened science-policy interface in the future.

2.2 PROCESS

The first draft of this report was presented and discussed at the "Workshop on Strengthening the Science-Policy Interface in International Chemicals Governance" on November 15–16, 2018 in Geneva, Switzerland, with the participation of experts from 10 intergovernmental organizations, 14 national and regional governments, and 6 international non-governmental organizations representing academia, the chemical industry and civil society (hereafter referred to as the November 2018 workshop). Prior to the workshop, participants were provided with a thought starter document (see the website of the International Panel on Chemical Pollution (IPCP); [39]). In particular, during the workshop, experts discussed and exchanged views on (1) needs for a strong, two-way science-policy interface, (2) the current science-policy interface, (3) possible functions of a strengthened science-policy interface, (4) specifics to be

considered in the design of a strengthened science-policy interface, and (5) institutional arrangements. Input from stakeholders during and after the workshop was used to inform the final version of this report. In addition, a separate workshop summary document has also been made available on the website of the IPCP [40].

TABLE 3. Overview of the science-policy interface bodies included in this study: their associated MEA/host organization/sponsoring organization, homepage, and mandates

ASSOCIATED MEA / HOST ORGANIZATION / SPONSORING ORGANIZATION | HOMEPAGE | MANDATE OF THE SPI BODY
UNDER MEAS
OPEN-ENDED WORKING GROUP (OEWG)
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
http://www.basel.int/TheConvention/OpenendedWorkingGroup(OEWG)/OverviewandMandate/tabid/2295/Default.aspx
(1) To assist the Conference of the Parties (COP) in developing and keeping under continuous review the implementation of the Convention's work plan, specific operational policies and decisions taken by the COP for the implementation of the Convention, as specified in Article 15; (2) to consider and advise the COP on issues relating to policy, technical, scientific, legal, institutional, administration, finance, budgetary and other aspects of the implementation of the Convention within the approved budget, including identification of the specific needs of different regions and subregions for training and technology transfer and to consider ways and means of ensuring the establishment and functioning of the Basel Convention Regional Centres for Training and Technology Transfer; (3) to prepare its work plan for consideration by the COP; (4) to report to the COP on the activities it has carried out between meetings of the COP (Decision VI/36).
CHEMICAL REVIEW COMMITTEE (CRC)
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
http://www.pic.int/TheConvention/ChemicalReviewCommittee/OverviewandMandate/tabid/1059/language/en-US/Default.aspx
To review chemicals and pesticide formulations according to the criteria in Annexes II and IV respectively and make recommendations to the COP for listing such chemicals in Annex III (Paragraph 6, Article 18 of the Convention).

ASSOCIATED MEA / HOST ORGANIZATION / SPONSORING ORGANIZATION | HOMEPAGE | MANDATE OF THE SPI BODY
PERSISTENT ORGANIC POLLUTANTS REVIEW COMMITTEE (POPRC)
Stockholm Convention on Persistent Organic Pollutants
http://chm.pops.int/TheConvention/POPsReviewCommittee/OverviewandMandate/tabid/2806/Default.aspx
To perform the functions assigned to it by the Convention, including the scientific review of the proposals and related information submitted by Parties to the Convention for listing new chemicals in Annex A, B, and/or C according to Article 8 of the Convention and to make recommendations to the COP (Handbook for effective participation in the POPs Review Committee of the Stockholm Convention, [41]).
SCIENTIFIC ASSESSMENT PANEL (SAP)
Montreal Protocol on Substances that Deplete the Ozone Layer
http://ozone.unep.org/science/assessment/sap
To undertake the review of the scientific knowledge in a timely manner as dictated by the needs of the Parties to the Protocol (Terms of Reference for the Panels; Annex VI of the report of the First Meeting of the Parties), assess the status of the depletion of the ozone layer and relevant atmospheric science issues, and prepare a report every 3-4 years pursuant to Article 6 of the Protocol). Any emerging scientific issues of importance are brought to the attention of the Parties by the SAP Co-Chairs for consideration at the Meetings of the Parties (see homepage).
CO-OPERATIVE PROGRAMME FOR MONITORING AND EVALUATION OF THE LONG-RANGE TRANSMISSION OF AIR POLLUTANTS IN EUROPE (EMEP)
Convention on Long-Range Transboundary Air Pollution (CLRTAP)
http://www.emep.int
To provide sound scientific support to the Convention, in particular in the areas of: atmospheric monitoring and modeling, emission inventories and emission projections, and integrated assessment; to inform policy developments under the Convention [42]

ASSOCIATED MEA / HOST ORGANIZATION / SPONSORING ORGANIZATION | HOMEPAGE | MANDATE OF THE SPI BODY
WORKING GROUP ON EFFECTS (WG EFFECTS)
Convention on Long-Range Transboundary Air Pollution (CLRTAP)
https://www.unece.org/environmental-policy/conventions/envlrtapwelcome/convention-bodies/working-group-on-effects.html
To develop the necessary international cooperation in the research on and the monitoring of pollutant effects; to provide information on the degree and geographic extent of the impacts of major air pollutants on human health and the environment; to identify the most endangered areas, ecosystems and other receptors by considering damage to human health, terrestrial and aquatic ecosystems and materials (see homepage).
PROTOCOL ON POLLUTANT RELEASE AND TRANSFER REGISTERS, A.K.A. KIEV PROTOCOL (PROTOCOL ON PRTRS)[1]
Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention)
https://www.unece.org/env/pp/prtr.html
Mandate of the Protocol (see note I): To enhance public access to information through the establishment of coherent, integrated, nationwide pollutant release and transfer registers (PRTRs) in accordance with the provisions of this Protocol, which could facilitate public participation in environmental decision-making as well as contribute to the prevention and reduction of pollution of the environment (Article 1)
SUB-COMMITTEE OF EXPERTS ON THE GHS (SCE GHS)
Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
https://www.unece.org/trans/main/dgdb/dgsubc4/activities.html
To act as custodian of the GHS, managing and giving direction to the harmonization process; to keep the system up to date, considering the need to introduce changes to ensure its continued relevance and practical utility, and determining the need for and timing of the updating of technical criteria; to promote understanding and use of the system and encourage feedback; to make the system available for worldwide use and application; to make guidance available on the application of the system, and on the interpretation and use of technical criteria to support consistency of application; to prepare work programmes and submit recommendations to the Committee on the Transport of Dangerous Goods and the Globally Harmonized System of Classification and Labelling of Chemicals (CETDGGHS) (Resolution 1999/65 as in E/1999/INF/2/Add.3; ST/SG/AC.10/30/Rev.4)

ASSOCIATED MEA / HOST ORGANIZATION / SPONSORING ORGANIZATION | HOMEPAGE | MANDATE OF THE SPI BODY
ASSOCIATED WITH MEAS
GLOBAL MERCURY PARTNERSHIP (GMP)
United Nations Environment Programme (UNEP), Chemicals and Health Branch
https://web.unep.org/globalmercurypartnership/#parentHorizontalTab2
To protect human health and the global environment from the release of mercury and its compounds by minimizing and, where feasible, ultimately eliminating global, anthropogenic mercury releases to air, water and land (UNEP Governing Council 25/5).
PCB ELIMINATION NETWORK (PEN)
UNEP, Chemicals and Health Branch
http://chm.pops.int/Implementation/IndustrialPOPs/PCBs/PCBEliminationNetwork/PENOverview/tabid/438/Default.aspx; *https://www.unenvironment.org/explore-topics/chemicals-waste/what-we-do/persistent-organic-pollutants/pcb-elimination-network*
To prepare a progress report on the work and future plans of the PEN for the United Nations Environment Assembly (UNEA), the Basel and Stockholm COPs (Decision SC-4/9 and Decision SC-5/7 of the COP to the Stockholm Convention).
GLOBAL ALLIANCE FOR THE DEVELOPMENT AND DEPLOYMENT OF PRODUCTS, METHODS AND STRATEGIES AS ALTERNATIVES TO DDT FOR DISEASE VECTOR CONTROL (DDT ALLIANCE)
UNEP, Chemicals and Health Branch
http://chm.pops.int/Implementation/PesticidePOPs/DDT/GlobalAlliance/tabid/621/mctl/ViewDetails/EventModID/1421/EventID/136/xmid/6821/Default.aspx
To strengthen the base of knowledge available to inform policy formulation and decision making; to overcome the complexity and cost of deploying alternatives to DDT; to make available new alternative vector control chemicals; to develop non-chemical products and approaches for vector control (Decision SC-4/2 and Decision SC-5/6 of the Conference of the Parties to the Stockholm Convention).

ASSOCIATED MEA / HOST ORGANIZATION / SPONSORING ORGANIZATION | HOMEPAGE | MANDATE OF THE SPI BODY
NOT DIRECTLY ASSOCIATED WITH MEAS
ADVISORY GROUP ON THE ENVIRONMENTAL EXPOSURE AND IMPACT OF ENDOCRINE DISRUPTING CHEMICALS (EDC AG)
UNEP, Chemicals and Health Branch
https://www.unenvironment.org/explore-topics/chemicals-waste/what-we-do/emerging-issues/advisory-group-endocrine-disrupting
To provide strategic and policy advice on approaches related to the implementation of UN Environment's activities concerning environmental exposure and impact of Endocrine Disrupting Chemicals (EDCs) (see homepage).
GLOBAL CHEMICALS OUTLOOK (GCO)[II]
UNEP, Chemicals and Health Branch
https://www.unenvironment.org/explore-topics/chemicals-waste/what-we-do/policy-and-governance/global-chemicals-outlook
Global Chemicals Outlook II: To continue work on the Global Chemicals Outlook, particularly in areas where data were found to be lacking or inadequate, and to enhance transparency through regionally balanced stakeholder involvement, inter alia, with a view to developing in the future a tool for assessing progress towards the achievement of the sound management of chemicals and hazardous wastes, including the existing 2020 goal, taking into account and building upon other existing sources of information. (UNEA-2, via Resolution 2/7 and United Nations Environment Programme's Governing Council decision 27/12).
ENVIRONMENT, HEALTH AND SAFETY (EHS) DIVISION
Organisation for Economic Co-operation and Development (OECD)
http://www.oecd.org/env/ehs/organisationoftheenvironmenthealthandsafetyprogramme.htm
Chemicals Committee: To provide a forum for co-operation between those countries wishing jointly to carry out work to develop and harmonize practices in order to improve the management of chemicals. The mission is to contribute to green growth and sustainable development by protecting human health and the environment from the risks of chemicals, preventing the creation of non-tariff barriers to trade, saving costs to countries participating in the Programme and industry, and promoting harmonization among countries participating in the Programme of their chemicals management systems (Decision of the Council [C(2016)3 and C/M(2016)8, item xx]) [43].

ASSOCIATED MEA / HOST ORGANIZATION / SPONSORING ORGANIZATION | HOMEPAGE | MANDATE OF THE SPI BODY
CHEMICAL RISK ASSESSMENT NETWORK (CRAN)
World Health Organization (WHO)
https://www.who.int/ipcs/network/en/
To provide a forum for scientific and technical exchange, facilitate and contribute to capacity building, promote best practices and the harmonization of methodologies, assist in the identification of research needs and promote the application of new science in risk assessment practices, assist in the identification of emerging risks to human health from chemicals, share information about work programmes to avoid duplication of effort, and upon request, assist WHO in the development of training and other materials in support of the above (see homepage).
INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY (IPCS)
WHO
https://www.who.int/ipcs/en/
To conduct evaluations of risks posed by priority chemicals to human health and environmental integrity, to establish the scientific basis for the safe use of chemicals by means of health and environmental risk assessment (normative functions) and to strengthen national capabilities (technical cooperation) to respond to chemical emergencies and deal with the harmful effects of exposure to chemicals (resolutions WHA30.47, WHA31.28 and EB63.R19).
JOINT EXPERT COMMITTEE ON FOOD ADDITIVES (JECFA)
Food and Agriculture Organization (FAO)/WHO
https://www.who.int/foodsafety/areas_work/chemical-risks/jecfa/en/; *http://www.fao.org/food/food-safety-quality/scientific-advice/jecfa/en/*
To evaluate the safety of food additives and contaminants, naturally occurring toxicants and residues of veterinary drugs in food [44].
JOINT MEETING ON PESTICIDE RESIDUES (JMPR)
FAO/WHO
https://www.who.int/foodsafety/areas_work/chemical-risks/jmpr/en/; *http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/jmpr/en/*
To conduct scientific evaluations of pesticide residues in food, to provide advice on the acceptable levels of pesticide residues in food moving in international trade, to review analytical aspects of pesticides, to review toxicological data and estimate acceptable daily intakes (ADIs) for humans of the pesticides under consideration (see homepages).

ASSOCIATED MEA / HOST ORGANIZATION / SPONSORING ORGANIZATION | HOMEPAGE | MANDATE OF THE SPI BODY
PANEL OF EXPERTS ON PESTICIDE MANAGEMENT (JMPM)
FAO/WHO
http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/panelcode/zh/
To discuss and strengthen particular areas of pesticide management; to advise FAO and WHO on the implementation of the FAO/WHO International Code of Conduct on Pesticide Management and on matters pertaining to pesticide regulation and management, alerting them to new developments, problems or issues that merit attention (see homepage).
UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH (UNITAR)
UNITAR
https://unitar.org/cwm/
To provide support to governments and stakeholders to strengthen their institutional, technical, and legal infrastructure and capacities for sound management of chemicals (see homepage).
SCIENTIFIC AND TECHNICAL ADVISORY PANEL (GEF STAP)
Global Environment Facility (GEF)
http://www.stapgef.org
To provide the GEF with scientific and technical advice on policies, operational strategies, programs and projects, to review the scientific and technical rationale of GEF full-sized projects coming into the pipeline at concept stage and to report on this to the GEF Council, to develop advice on future program strategies and reports to the GEF Assembly (Paragraph 11 of the Instrument for the Establishment of the Global Environment Facility and personal communication).
INTERNATIONAL RESOURCE PANEL (IRP)
UNEP
http://www.resourcepanel.org; http://www.resourcepanel.org/policies-and-procedures-irp
To prepare independent, coherent and authoritative scientific studies and assessments of policy relevance on the sustainable use and management of natural resources and in particular their environmental impacts over the full life cycle, to inform international policy discourse and development on emerging challenges and opportunities for the sustainable use, management of and equitable access to natural resources (see homepage).

ASSOCIATED MEA / HOST ORGANIZATION / SPONSORING ORGANIZATION | HOMEPAGE | MANDATE OF THE SPI BODY
JOINT GROUP OF EXPERTS ON THE SCIENTIFIC ASPECTS OF MARINE ENVIRONMENTAL PROTECTION (GESAMP)
IMO (host), FAO, UNESCO/IOC, WMO, IAEA, UNEP, UNIDO, UNDP, ISA
http://www.gesamp.org
As a mechanism for coordination and collaboration among ten UN organizations, to conduct and support marine environmental assessments; to undertake in-depth studies, analyses, and reviews of specific topics; and to identify emerging issues regarding the state of the marine environment (see homepage).
INTERNATIONAL PANEL ON CHEMICAL POLLUTION (IPCP)
IPCP
https://www.ipcp.ch
To initiate, prepare and disseminate condensed state-of-the-science documentation on all aspects of environmentally relevant chemicals, to act internationally and in countries with particular needs for improving knowledge regarding chemicals for them to manage issues related to chemicals, to offer the scientific expertise accumulated within IPCP to international organizations, national governments and other parties for discussions and review of all aspects of the scientific basis for regional and/or global management of chemicals (see homepage).
ARCTIC MONITORING AND ASSESSMENT PROGRAMME (AMAP)
Arctic Council
https://www.amap.no
To monitor and assess the status of the Arctic region with respect to pollution and climate change issues, to document levels and trends, pathways and processes, and effects on ecosystems and humans and propose actions to reduce associated threats for consideration by governments, and to produce sound science-based, policy-relevant assessments and public outreach products to inform policy and decision-making processes (see homepage).

I. The Protocol on PRTRs does not have its own distinct SPI body but UNECE's work on the Protocol does encompass various activities at the science-policy interface.

II. The Global Chemicals Outlook is not technically an SPI body but rather a process. However, due to its importance for the field of international chemicals management, it is included in this mapping and gap analysis report.

3. DESIRED OBJECTIVES AND FUNCTIONS OF A STRONG, TWO-WAY SCIENCE-POLICY INTERFACE

3.1 DESIRED OBJECTIVES AND FUNCTIONS

Based on the input from experts during and after the November 2018 workshop, a list of desired objectives and functions of a strong, two-way science-policy interface in international chemicals governance was compiled. In particular, the identified objectives (in the following list) and functions (in Table 4) help to describe an ideal, strong two-way science-policy interface. They serve as a reference against which to compare existing science-policy interface bodies and thus help to understand the gaps in, or limitations of, the current science-policy interface landscape. The desired objectives of an ideal science-policy interface include the following:

1) **Scientific assessment:** to provide rigorous, authoritative assessments that collect, digest and process fragmented pieces of scientific information on specific issues into a comprehensive, yet easily accessible format for policy-makers. These assessments should help to reduce the complexity and ambiguity of such scientific information for non-experts and to raise policy-makers' confidence and trust in using such scientific evidence;

2) **Awareness raising:** to raise awareness of chemicals and waste issues among policy-makers and the general public;

3) **Ownership and buy-in:** to increase governmental ownership and stakeholder buy-in of final products (e.g. scientific assessments) through early involvement in the development process;

4) **Scientist participation:** to enable scientists to better understand and be confident in their roles, to be aware of opportunities to be involved, and to understand the specific needs, languages and dynamics (e.g. timelines and key actors) of policy processes in order to participate more effectively in them;

5) **Knowledge base:** to provide a reference point for stakeholders/governments to locate and gain access to specific information; to provide a (centralized) location to facilitate updating of the knowledge base in a timely manner as changes occur in the rapidly developing, often cross-cutting chemical landscape;

6) **Future generations:** to raise the profile of and demand for relevant natural and social science disciplines at universities, not only to create incentives for scientists to participate in policy processes in addition to their research work, but also to keep these disciplines attractive for future generations of students; and

7) **Scientific consensus:** to build and communicate scientific consensus on chemicals issues, while ensuring that the work toward consensus does not preclude timely action (e.g. in consideration of the precautionary principle, a focus on consensus should not delay action).

Table 4. Identified functions of a strong, two-way science-policy interface and the objectives they address

FUNCTION	DESCRIPTION	OBJECTIVES ADDRESSED
	SCIENCE TO POLICY	
Scientific assessments and translation of scientific results for different audiences	Conducting peer-reviewed scientific assessments (including of emerging and legacy issues of concern and general chemical management issues) and translating results for different audiences (e.g. from scientific data into policy-relevant information) including in languages other than English	1: Scientific assessment, 5: Knowledge base
Monitoring and assessment of progress	Monitoring and assessment of progress in the implementation and/or of the effectiveness of relevant measures	1: Scientific assessment, 5: Knowledge base
Early warning and horizon scanning	Early warning and horizon scanning to identify issues of concern as they arise, with outcomes brought to the attention of policy communities	1: Scientific assessment, 5: Knowledge base
Overview of the chemicals field	Providing an overview of the chemicals field, rather than just of individual issues	5: Knowledge base
Reducing scientific uncertainty and reaching scientific consensus	Contributing to reducing scientific uncertainty and to reaching scientific consensus, but also recognizing that uncertainty is inherent to scientific data, and timely policy action should be ensured despite this uncertainty	7: Scientific consensus

FUNCTION	DESCRIPTION	OBJECTIVES ADDRESSED
Integration of science from different fields (e.g. human health and the environment as well as labor and agriculture)	Integration of science from different fields (e.g. human health and the environment as well as labor and agriculture)	1: Scientific assessment, 5: Knowledge base, 6: Future generations
BETWEEN SCIENCE AND POLICY		
Facilitation of communication between scientists and policy-makers	Ensuring and facilitating communication between scientists and policy-makers (as well as with the public) when needs arise, including the organization of conferences to address knowledge gaps	2: Awareness raising, 3: Ownership, buy-in, 4: Scientist participation, 6: Future generations
Contextualization	Collecting, reviewing, digesting, synthesizing and translating i) specific policy needs/questions into research questions and ii) scientific information into actionable information for policy-makers	1: Scientific assessment, 2: Awareness raising, 3: Ownership, buy-in, 4: Scientist participation, 6: Future generations
Knowledge management	Providing knowledge management (including capacity building) to ensure easy accessibility to the extensive range of existing information and knowledge (including on the local level), including options for the context-specific prioritization of data for different communities/countries	5: Knowledge base
Capacity-building	Capacity-building for i) scientists to allow them to propose/understand policies, to participate in the policy and science-policy sphere; nurturing the next generation of scientists and ii) policy-makers to allow them to understand scientific processes, including timescales for data production, scientific jargon, the limits of scientific knowledge (e.g. uncertainty), and the specific needs of the scientific community, etc.	1: Scientific assessment, 4: Scientist participation, 6: Future generations
POLICY TO SCIENCE		
Inform scientists about policy developments	Inform scientists about new policies and regulations, ongoing policy debates and other developments in the policy sphere	4: Scientist participation, 6: Future generations
Coordinate scientific inputs in response to policy calls	Coordinate scientific inputs for calls from the policy sphere for information/evidence	4: Scientist participation, 6: Future generations

4. UNDERSTANDING THE CURRENT STATE OF THE SCIENCE-POLICY INTERFACE

4.1 KEY FINDINGS FROM THE MAPPING ANALYSIS

Finding A: Multiple science-policy interfaces

General findings: A wide range of science-policy interface bodies of varying types, sizes and purposes already exist on the global, inter-regional, regional, national and local levels (for examples, see Table 5). They have, to a certain extent, informed decision/policy-making, raised awareness of chemicals and waste, and assisted in the implementation of actions. The specific findings are as follows:

Finding A.1: The existing landscape of science-policy interface bodies and interactions provides an important basis that can be built upon and strengthened.

Finding A.2: Many existing science-policy interface bodies have been established either under a legally-binding instrument (e.g. the MEAs, the European Chemicals Regulation – REACH) with specific mandates to assist the implementation of such instruments, or by an organization on a legally-binding or non-legally-binding basis with varied mandates.

Finding A.3: The variety of the many existing science-policy interface bodies derives in part from past and ongoing common practice within chemicals management of addressing specific issues by establishing institutions on an ad hoc basis as they emerge, i.e. in a rather reactive manner. Recently, other types of interface bodies (e.g. WHO Chemical Risk Assessment Network, IPCP, AMAP) have also been established to address chemicals and waste in a proactive manner. Much of this variety is, however, likely to be inherent, given the complexity of governance arrangements, the multiple levels of governance, the broad range of sectoral interests and the variety of purposes.

TABLE 5. A non-exhaustive list of existing science-policy interface bodies in chemicals management categorized by scale and hosting institution

GLOBAL	**Under the MEAs (MEAs in brackets)** OEWG (Basel Convention), CRC (Rotterdam Convention), POPRC (Stockholm Convention), SAP (Montreal Protocol)
	Established/hosted by intergovernmental/international non-governmental organizations (hosting organizations in brackets) IGOs: JMPM (FAO/WHO), GMP (UNEP), EDC AG (UNEP), CRAN (WHO), IRP (UNEP), GESAMP (10 UN sponsoring organizations), GEF STAP (GEF) International NGOs: IPCP, Endocrine Society, International Science Council
INTER-REGIONAL	**Under the MEAs** EMEP and WG Effects (CLRTAP), SCE GHS (GHS)
	Established/hosted by intergovernmental/international non-governmental organizations OECD EHS Programme
REGIONAL	**Under regulations/legislations** Committee for Risk Assessment and Socio-Economic Assessment Committee (RAC and SEAC) to the European Chemicals Agency, Basel and Stockholm Convention Regional Centers
	Established/hosted by intergovernmental/international non-governmental organizations AMAP (Arctic Council), Africa Institute, European Joint Research Centre, European Commission Science Hub, Scientific Committees and Panels to the European Food Safety Authority, Thematic Working Group on Chemicals under the Asia Pacific Regional Forum on Health and Environment, ASEAN Technical Working Group on Chemicals and Waste
NATIONAL	**Established/hosted by intergovernmental organizations / national governments** National Cleaner Production Centres (NCPCs), Hazardous Substances Advisory Committee (HSAC) to the UK Government
	Established/hosted by non-governmental organizations Scientific and professional societies in various countries such as the American Chemical Society (ACS) and Royal Society of Chemistry (RSC)
LOCAL	Great Lakes Commission, C8 Science Panel

4.2 KEY FINDINGS FROM THE GAP ANALYSIS

Finding B: Scope of the science-policy interface bodies

Guiding questions used in the analysis: Which chemicals (or groups of chemicals) and stage(s) of the chemical lifecycle are covered by the science-policy interface bodies? What are their protection goals (the environment or human health)? Are general chemical management issues addressed by the interface bodies in addition to the chemicals (or groups of chemicals) themselves?

General findings: A broad range of chemicals and groups of chemicals along different stages of their life cycles, as well as their impacts on the environment and or human health, are unequally covered by different numbers of existing interface bodies. In addition, some interface bodies also address generic chemical management issues that may be applicable to a larger set of chemicals than they themselves cover, whereas others do not. In general, interface bodies under, or associated with, MEAs have a specific scope, whereas many interface bodies with no direct association to MEAs are often flexible and can theoretically cover any chemicals and any generic chemical management issues, subject to their work areas, resources and capacity. The specific findings are as follows:

Finding B.1: Existing science-policy interface bodies cover a broad range of chemicals and groups of chemicals along different stages of the chemical life cycle (see Tables 6 and 7).

In particular, interface bodies under the MEAs generally cover only chemicals and groups of chemicals that are specifically defined in the respective MEAs (with the exception of UNECE's work on the Protocol on PRTRs and the Sub-Committee of Experts on the GHS, as their associated frameworks intend to address chemical management issues, i.e. reporting, and classification and labeling, respectively, rather than specific chemicals or groups of chemicals). Currently, interface bodies under the MEAs cover only a limited set of chemicals. However, it can be possible to extend the chemical scope of these interface bodies when the Parties of the MEAs agree. For example, hydrofluorocarbons (HFCs) are not ozone depleting substances, but are replacements of ozone depleting hydrochlorofluorocarbons (HCFCs). Due to their strong greenhouse gas effects, they were included in the scientific assessment by the SAP of the Montreal Protocol.

Similarly, interface bodies established or hosted by intergovernmental and international non-government organizations can be categorized into two groups: (1) interface bodies with a focus on pre-defined chemicals or groups of chemicals (e.g. Global Mercury Partnership, PCB Elimination Network, FAO/WHO JMPM) and (2) interface bodies with flexible mandates that can theoretically address any chemicals or groups of chemicals, subject to their work areas, resources and capacity (e.g. WHO Chemical Risk Assessment Network, OECD EHS Division, GEF STAP, IPCP).

Furthermore, most science-policy interface bodies cover all life cycle stages of a chemical, whereas several bodies, particularly those under the MEAs, focus on only one part of the life cycle. In addition, most science-policy interface bodies aim to protect both the environment and human health, whereas only a few aim to specifically protect either the environment or human health, due to the nature of the chemicals that they tackle (e.g. SAP) or the mandate of the host organization (e.g. WHO).

Finding B.2: The varying degree of coverage of certain chemicals or groups of chemicals by the different interface bodies can be explained by 1) different levels of knowledge availability (i.e. certain chemical and waste issues are not well, or only recently, recognized as requiring policy action and are therefore only addressed by one or two interface bodies) and 2) the historic development of the science-policy institutional landscape (i.e. several interface bodies may specialize in different aspects/life cycle stages of a chemical, e.g. in the case of the Basel, Rotterdam and Stockholm Convention and their subsidiary interface bodies).

Finding B.3: In addition to addressing certain chemicals, several interface bodies also address generic chemical management issues that may be applicable to a larger set of chemicals (e.g. information exchange on emissions and mitigation strategies, risk reduction and communication).

Finding B.4: Some interface bodies deal with legacy environmental and health issues, such as the PCB Elimination Network and DDT Alliance, but it is likely that not all legacy issues are addressed by a dedicated body. Legacy issues are important and need to be considered more extensively.

TABLE 6. Overview of existing science-policy interface bodies analyzed and the chemical scope that they cover. Unlimited = able to cover all chemicals; GHG = greenhouse gas; ODS = ozone depleting substances; POPs = persistent organic pollutants; EDCs = endocrine disrupting chemicals; PPCPs = pharmaceuticals and personal care products; PFASs = per- and polyfluoroalkyl substances; PAHs = polycyclic aromatic hydrocarbons; PBT = persistent, bioaccumulative and toxic chemicals, PCBs = polychlorinated biphenyls

SPI BODY	CHEMICAL SCOPE													
	Unlimited	Air pollutants	GHGs	ODS	POPs	EDCs	PPCPs	Pesticides	PFASs	PAHs	Nanomaterials	Metals and metalloids	Radionuclides	Others
Under MEAs														
BASEL OEWG[I]				●	●			●	●			●		PBTs
CRC[II]					●			●				● (mercury)		●
POPRC					●									
SAP[III]				●										●
EMEP[IV]		●	●		●			●		●		● (heavy metals)		●
CLRTAP WG EFFECTS[IV]		●	●		●			●		●		● (heavy metals)		●
PROTOCOL ON PRTRS[V]	●	●	●		●	●		●		●		● (heavy metals)		●
SCE GHS	●													

SPI BODY	CHEMICAL SCOPE													
	Unlimited	Air pollutants	GHGs	ODS	POPs	EDCs	PPCPs	Pesticides	PFASs	PAHs	Nanomaterials	Metals and metalloids	Radionuclides	Others
Associated with MEAs														
GMP												● (mercury)		
PEN					● (PCBs)									
DDT ALLIANCE					● (DDT)									
Not directly associated with MEAs														
UNEP EDC AG						●								
GCO	●													
OECD EHS [VI]	●													
WHO CRAN	●													
WHO IPCS	●													
FAO/WHO JECFA [VII]														●
FAO/WHO JMPR [VIII]								●						
FAO/WHO JMPM								●						
UNITAR					●						●	● (mercury)		

SPI BODY	CHEMICAL SCOPE													
	Unlimited	Air pollutants	GHGs	ODS	POPs	EDCs	PPCPs	Pesticides	PFASs	PAHs	Nanomaterials	Metals and metalloids	Radionuclides	Others
GEF STAP[IX]					●	●	●				●	●		●
IRP[X]												●		●
GESAMP[XI]														●
IPCP	●													
AMAP[XII]		●	●		●							● (heavy metals)	●	●

I. Upon becoming waste, in accordance with the Annexes to the Basel Convention
II. CRC addresses pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons by two or more Parties. The full list of 50 chemicals is listed in Annex III of the Rotterdam Convention, see [45].
III. Others = substances of special interest to the Parties (e.g. N2O, substitutes to ODS such as HFCs).
IV. Air pollutants = all those covered by the seven substantive protocols to the Convention, namely: sulfur, ground-level ozone precursors (nitrogen oxides, volatile organic compounds), POPs, heavy metals, ammonia, and particulate matter (including black carbon).
V. Under the Protocol, "pollutant" is defined as a substance or a group of substances that may be harmful to the environment or to human health on account of its properties and of its introduction into the environment. For the full list of 86 chemicals and groups of chemicals listed, see Annex II of the Kiev Protocol [46].
VI. The OECD EHS Division addresses all types of chemicals except pharmaceuticals and veterinary medicines.
VII. Others = Food additives, contaminants, naturally occurring toxicants and residues of veterinary drugs in food.
VIII. Pesticide residues
IX. Metals and metalloids = arsenic, mercury, cadmium, organotins, lead in paints. Others = all chemicals relevant to the GEF including those that are relevant to SAICM and plastics
X. Others = Natural Resources: biomass (wood, crops, including food, fuel, and feed, and plant-based materials), fossil fuels (coal, gas, and oil), metals (such as iron, aluminum, and copper), non-metallic minerals (including sand, gravel, and limestone), water, and land
XI. Others = harmful substances carried by ship and as requested, particularly by the IMO, see [47].
XII. Others = chemicals of emerging Arctic concern, see [48].

Table 7. Overview of existing science-policy interface bodies analyzed and the life cycle stages, chemical management issues and protection goals they consider.

SPI BODY	CHEMICAL LIFE CYCLE STAGE CONSIDERED						GENERAL CHEMICAL MANAGEMENT ISSUES	PROTECTION GOALS		
	Production and packaging	Transport and storage	Trade	Use	Reuse, recycling and recovery	Disposal		Environment	Human health	Other
Under MEAs										
BASEL OEWG [I]					●	●	No	●	●	
CRC			●				Yes - Prior Informed Consent Procedure	●	●	
POPRC	●	●	●	●			No	●	●	
SAP [II]	●			●			No	●		
EMEP	●	●	●	●	●	●	Yes – Information exchange on pollutant emissions and mitigation strategies	●	●	Materials (e.g. monuments, cultural heritage)
CLRTAP WG EFFECTS		●	●	●	●	●		●	●	
PROTOCOL ON PRTRS [II]	●	●	●	●	●	●	Yes – Pollutant release and transfer registers	●	●	
SCE GHS	Not applicable						Yes – Labeling and classification, hazard communication	●	●	
Associated with MEAs										
GMP	●	●	●	●	●	●	No	●	●	
PEN	●	●	●	●	●	●	No	●	●	
DDT ALLIANCE	●	●	●	●	●	●	Yes – Development of safer alternatives to DDT for vector control	●	●	

SPI BODY	CHEMICAL LIFE CYCLE STAGE CONSIDERED						GENERAL CHEMICAL MANAGEMENT ISSUES	PROTECTION GOALS		
	Production and packaging	Transport and storage	Trade	Use	Reuse, recycling and recovery	Disposal		Environment	Human health	Other
Not directly associated with MEAs										
UNEP EDC AG	●	●	●	●	●	●	No	●	●	
GCO	●	●	●	●	●	●	Yes – e.g. chemical testing, risk reduction, assessment of alternatives, innovation, business models, economic incentives, reform of chemistry curricula	●	●	
OECD EHS	●	●	●	●	●	●	Yes – Information exchange along the value chain	●	●	
WHO CRAN [III]	●	●	●	●	●	●	Yes – Risk assessment methodologies; development of IOMC toolbox		●	
WHO IPCS [IV]	●	●	●	●	●	●	Yes – development of IOMC toolbox		●	
FAO/WHO JECFA				●			Yes – development of principles for evaluating safety and quantifying risk of products		●	
FAO/WHO JMPR			●	●			Yes – e.g. performing risk assessments on pesticide residues in food		●	
FAO/WHO JMPM [V]	●	●	●	●	●	●	Yes – e.g. guidelines on registration of pesticides, compliance and enforcement of pesticide regulations	●	●	
UNITAR [VI]	●			●	●	●	Yes – e.g. waste management, pollution release and transfer registers	●	●	
GEF STAP	●	●	●	●	●	●	Yes – e.g. the publication "Emerging Chemicals Management Issues in Developing Countries and Countries with Economics in Transition"	●	●	

SPI BODY	CHEMICAL LIFE CYCLE STAGE CONSIDERED						GENERAL CHEMICAL MANAGEMENT ISSUES	PROTECTION GOALS		
	Production and packaging	Transport and storage	Trade	Use	Reuse, recycling and recovery	Disposal		Environment	Human health	Other
IRP	●	●	●	●	●	●	No	●	●	
GESAMP				●	●	●	No	●	●	
IPCP	●	●	●	●	●	●	Yes – e.g. IPCP assisted UNEP Chemicals and Health Branch in projects on Chemicals in Products	●	●	
AMAP [VII]		●		●	●	●	Yes – Convention effectiveness evaluations and review processes; risk communication on human health issues	●	●	

I. also including transport and storage as well as trade of hazardous waste
II. also including emissions in whichever stage of the chemical life cycle they occur
III. also including exposure to chemicals through all pathways and routes of exposure, including in environmental media (air, water, soil) and food, through use of consumer products, in occupational settings, etc.
IV. also including exposure to chemicals through all pathways and routes of exposure, including in environmental media (air, water, soil)
V. recycling: treatment and recycling or disposal of empty pesticide containers and pesticide waste
VI. also release into the environment
VII. also including environmental fate and transport

Finding C: Work areas at the science-policy interface

Guiding questions used for the analysis: In which work areas at the science-policy interface are the existing interface bodies active? Do the interface bodies focus on one-way or two-way interactions?

General findings: The work areas of the existing science-policy interface bodies vary (see Table 8). The majority of the considered interface bodies provide scientific support to policy-makers, particularly with regard to the scientific assessment of issues of concern, including in some cases identification of issues of concern. However, there are also certain gaps, e.g. a general lack of scientific and technical support to policy-makers in monitoring and evaluation of progress in the implementation of relevant policy measures for all chemicals (or groups of chemicals) of concern and on a planetary scale, continuing difficulties in ensuring timely scientific advice on issues of concern, and that significant amounts of existing scientific information is not synthesized and brought into forms that policy-makers can use. Furthermore, there is a relative lack of interface bodies that work toward ensuring effective communication of policy-makers' needs back to the scientific community, as well as toward ensuring communication of results and decisions made by interface bodies to national policy-makers. As a result, scientists and decision/policy-makers are not always best informed of developments and needs in the other sphere. Opportunities for synergies and joint development of strategies may then be missed and issues not addressed in the most effective and timely manner. The specific findings are as follows:

Finding C.1: Many interface bodies work to provide scientific support in assessing issues of concern and in identifying issues of concern and have thus helped to initiate and advance the response to these issues (e.g. the WHO/IPCS reports on endocrine disrupting chemicals (EDCs) in 2002 and 2012 have contributed to the adoption of EDCs as an Emerging Policy Issue under SAICM).

However, there are continuing difficulties in ensuring timely scientific advice on issues of concern, whether in response to policy-makers' requests or resulting from concerns arising from the scientific community. For example, perfluorooctanoic acid (PFOA) and perfluorohexane sulfonic acid (PFHxS) are only now being evaluated by the POPs Review Committee (PORPC) of the Stockholm Convention, despite their large-scale production and use since as early as the 1950s and a substantial body of initial evidence of concern that emerged in the late 1990s and early 2000s. Several causes for such delayed responses can include:

i) Interface bodies under the MEAs may need a specific mandate to trigger their work (e.g. in the case of POPRC and CRC, at least one Party needs to submit a nomination proposal);

ii) While those interface bodies that are not under, or associated with, the MEAs are not constrained by such mandates, few of them have

exercised the function of identifying issues of concern on a regular basis. One reason for this could be that the long time-scale for the development and publication of global assessments such as the Global Chemicals Outlook may impede the timely response to issues of concern to assist decision/policy-making. In addition, few interface bodies have flexible mechanisms to allow rapid and targeted assessments of issues of concern as they emerge;

iii) Much of the existing science is not "policy-ready", i.e. not synthesized and brought into a form that policy-makers can readily use. Taking the example of scientific data on POPs: whereas for some chemicals scientific data have been synthesized and prepared by certain Parties and the POPRC for policy-makers to list them as POPs, for other chemicals, a large body of scientific evidence may have been generated, but may still be scattered over the literature, and is therefore not in policy-ready formats for Parties to nominate them for listing.

Furthermore, for those interface bodies that are not under, or associated with, the MEAs, additional challenges or barriers exist with regard to bringing their findings to the right decision/policy-makers. For example, AMAP recently identified many chemicals of emerging Arctic concern, many of which are not covered by existing MEAs and may be produced and used in countries outside of the jurisdictions of the Arctic Council. Therefore, in order to address these chemicals of emerging Arctic concern, additional efforts to inform international policy-makers may be needed.

Finding C.2: Most of the considered interface bodies assist in identifying and assessing issues of concern, but only some of them provide additional scientific support to policy-makers in the form of monitoring and evaluation of the effectiveness of policy implementation. Progress is thus being tracked for specific topics based on the mandates of individual interface bodies, and is not being monitored at a global level. One of the reasons for the paucity of monitoring and evaluation of progress is the fragmented institutional scope of different bodies that constitute the current science-policy interface.

Finding C.3: There is a relative lack of interface bodies that work toward ensuring effective communication of policy-makers' needs back to the scientific community (see Table 8). There is no apparent process providing common and regularly reviewed guidance on policy-oriented research priorities to ensure that the most important needs in terms of knowledge to support more effective governance at all levels are identified and responded to in a coordinated manner.

Finding C.4: In addition to traditional one-way communication, some interface bodies have also worked to facilitate two-way communication between science and policy (including developing joint strategies for co-development, capacity-building and knowledge management for both spheres; see Table 8), which are welcomed by, e.g.,

the UNEP Report “Strengthening the Science-Policy Interface: A gap analysis” [49] and can be built upon.

Finding C.5: An additional concern, as raised during the November 2018 workshop (see section 2.2), was a general lack of effective communication of outputs generated by many international science-policy interface bodies (e.g., scientific assessment reports) to national/local policy-makers. In addition, in some cases, an additional step to translate such international findings into a national/local context was missing. These factors often limit the translation of data and findings from, e.g., the Global Chemicals Outlook into national/local policies, particularly in developing and transition countries.

Table 8. Overview of the existing science-policy interface bodies analyzed in this study and their work areas.

SPI BODY	SCIENCE TO POLICY			SCIENCE-POLICY JOINT ACTIONS			POLICY TO SCIENCE		Others
	Provide scientific support in assessing substances of concern and policy implementation	Provide scientific support in monitoring and evaluating progress	Provide scientific support in (early) identification of issues of concern and inform policy-makers	Facilitate science-policy dialogue (e.g. development of joint strategies)	Information dissemination and knowledge management	Capacity building	Inform scientists about policy development	Coordinate scientific inputs for policy calls	
Under MEAs									
BASEL OEWG	●	●	●		●				
CRC	●								
POPRC	●		●						
SAP	●	●	●		●				
EMEP	●	●	●	●	●	●	●		
CLRTAP WG EFFECTS	●	●	●	●	●	●	●		
PROTOCOL ON PRTRS				●	●				
SCE GHS	●	●	●		●	●			
Associated with MEAs									
GMP	●		●	●		●	●	●	
PEN			●	●		●		●	
DDT ALLIANCE			●	●		●		●	

SPI BODY	SCIENCE TO POLICY			SCIENCE-POLICY JOINT ACTIONS			POLICY TO SCIENCE		Others
	Provide scientific support in assessing substances of concern and policy implementation	Provide scientific support in monitoring and evaluating progress	Provide scientific support in (early) identification of issues of concern and inform policy-makers	Facilitate science-policy dialogue (e.g. development of joint strategies)	Information dissemination and knowledge management	Capacity building	Inform scientists about policy development	Coordinate scientific inputs for policy calls	
Not directly associated with MEAs									
UNEP EDC AG	●		●	●		●		●	
GCO	●	●	●		●				
OECD EHS	●		●	●	●	●	●	●	
WHO CRAN			●		●	●	●		Research
WHO IPCS	●		●	●	●		●		
FAO/WHO JECFA	●		●						
FAO/WHO JMPR	●		●						
FAO/WHO JMPM	●	●	●						
UNITAR	●	●		●		●			Research
GEF STAP	●		●	●	●		●		
IRP	●	●	●	●	●	●	●	●	
GESAMP	●		●					●	Research
IPCP	●	●	●	●	●	●	●	●	Research
AMAP	●	●	●	●	●	●	●	●	

Finding D: Needs of and circumstances within developing and transition countries

Guiding questions used for the analysis: Are processes or rules in place to ensure that the needs of and circumstances within developing countries and countries with economies in transition (hereafter referred to as "developing and transition countries") are taken into account? Which challenges exist that prevent these needs from being met?

General findings: The considered interface bodies present a range of different rules and procedures for ensuring that the needs of and circumstances within developing and transition countries are taken into account. This is mostly through measures to support their participation in relevant processes/meetings (see Table 9). Exchange and mutual learning among interface bodies may help to further strengthen rules and procedures across different interface bodies and thus enhance representation and incorporation of needs of and circumstances within individual developing and transition countries at the international science-policy interface and associated work. Additional challenges to balanced and adequate involvement of developing and transition countries and representation of their needs and circumstances at the international science-policy interface include (1) lacking personnel capacity to attend meetings, (2) lacking scientific expertise and/or language literacy skills at the national level to effectively participate in relevant processes/meetings, and (3) lacking accessibility to existing scientific evidence produced on the national and local levels due to cultural, language and logistical barriers. The specific findings are as follows:

Finding D.1: Most of the interface bodies considered have explicit rules and/or procedures to ensure that the needs of and often different circumstances within developing and transition countries are taken into account, particularly through rules that stipulate co-chairpersonship of meetings, the provision of financial support to assist countries to participate in meetings, and the provision of using a language other than English at the meetings. Some interface bodies such as the POPRC have additional activities to support effective participation (for example, see [50]).

Finding D.2: Apart from rules, procedures and activities to increase participation of developing and transition countries in relevant processes, there are also other measures to ensure that the needs of and circumstances within developing and transition countries are specifically addressed. For example, the Rotterdam Convention set the rule that "a developing country or country with an economy in transition experiencing problems caused by a severely hazardous pesticide formulation under conditions of use in its territory may submit a proposal for listing in Annex III"; this is a direct way for developing and transition countries to put forward their own proposal to ensure that their specific situation is covered by the work program of the CRC.

Finding D.3: Several interface bodies have no specific procedures or rules in place to ensure that needs of and circumstances within developing and transition countries are taken into consideration. Additional rules and procedures in the other existing interface bodies could be introduced to ensure that these are considered.

Finding D.4: At the November 2018 workshop (see Section 2.2), experts highlighted the large discrepancy in the capacities to address chemicals-related problems between developed countries and developing and transition countries: e.g. in developed countries, capacity exists (albeit to varying degrees) to address both well-known chemicals issues and emerging issues such as nanotechnology and microplastics, whereas in many developing and transition countries, a lack of knowledge of which chemicals are present impedes these countries' abilities to address more fundamental issues, let alone emerging issues. Some of the specific challenges faced by developing and transition countries relating to the science-policy interface for chemicals management include (1) a lack of scientific experts at the national level, which makes it difficult for policy-makers to gain an adequate understanding of the relevant science, and (2) lacking capacity (specifically time and personnel) to attend international meetings (despite the awareness of and interest in participating in such meetings) [51]. Further challenges include limited English language and/or literacy skills, which restrict experts' ability to fully express themselves at international meetings, as raised by several experts from developing and transition countries at the November 2018 workshop.

Finding D.5: Expert statements at the November 2018 workshop, as well as literature research, highlighted that scientific knowledge produced in developing and transition countries is underrepresented in global assessments and generally has limited visibility in comparison to scientific knowledge produced in developed countries [52]. Part of the reason for this is that researchers in developing and transition countries often lack the capacity, confidence and support to publish in international journals. Instead, they tend to publish in local journals and often in local languages other than English, which are often not accessible from outside of the country, or in technical reports to local policy-makers only. This presents significant challenges to accessing and integrating scientific knowledge from developing and transition countries into global assessments and reviews.

Table 9. **Overview of the presence (or absence) of procedures or rules by the interface bodies considered to take into account the needs of and circumstances within developing and transition countries.**

SPI BODY	*ARE PROCEDURES OR RULES IN PLACE TO ENSURE THAT THE NEEDS OF AND CIRCUMSTANCES WITHIN DEVELOPING COUNTRIES AND COUNTRIES WITH ECONOMIES IN TRANSITION ARE TAKEN INTO ACCOUNT?*	
	Yes/No	Details
Under MEAs		
BASEL OEWG	Yes	The Secretariat ensures adequate representation of all Parties through (1) mobilizing funds for participation of developing and transition countries in meetings and (2) ensuring co-chairmanship of meeting and that sub-groups are balanced between developed and developing/transition country Parties. For the CRC, a developing country or country with an economy in transition experiencing problems caused by a severely hazardous pesticide formulation under conditions of use in its territory may submit a proposal for listing in Annex III. For the POPRC, the Secretariat continues activities to assist Parties that are developing and transition countries as listed in decision POPRC-4/8.
CRC		
POPRC		
SAP	Yes	The participants represent experts from both developed and developing/transition countries. Developing country experts are recognized as bringing an important perspective to the process, and their involvement has also contributed to capacity building in those regions and countries.
EMEP	Yes	All meeting sessions are held in the three official languages of UNECE (RU, EN, FR). In addition, there is a Coordinating Group for countries in Eastern Europe, the Caucasus and Central Asia that feed their views into the sessions. Delegates from these countries are supported financially to participate in the sessions and meetings under the Convention.
CLRTAP WG EFFECTS		
PROTOCOL ON PRTRS	Yes	The Parties to the Protocol shall encourage cooperation among each other and with relevant international organizations, as appropriate, to promote the provision of technical assistance to Parties that are developing countries and Parties with economies in transition in matters relating to this Protocol (Article 16 of the Protocol).
SCE GHS	No	No apparent procedures or rules. However, one of the functions in the Sub-Committee's mandate is to make the system available for worldwide use and application. Although not a part of the Sub-Committee, the UNITAR/ILO/IOMC GHS Capacity Building Programme is developing partnership activities and providing support to assist countries in developing and implementing the GHS. A few developing and transition countries are member states of the body.

SPI BODY	ARE PROCEDURES OR RULES IN PLACE TO ENSURE THAT THE NEEDS OF AND CIRCUMSTANCES WITHIN DEVELOPING COUNTRIES AND COUNTRIES WITH ECONOMIES IN TRANSITION ARE TAKEN INTO ACCOUNT?	
	Yes/No	Details
Associated with MEAs		
GMP	No	No apparent procedures or rules.
PEN	Yes	Among its 19 members, the PEN Advisory Committee includes two representatives from each of the five UN Regions including regions with developing and transition countries.
DDT ALLIANCE	Yes	The composition of the Steering Committee is chosen with due consideration of malaria endemic countries (many of which are developing and transition countries).
Not directly associated with MEAs		
UNEP EDC AG	Yes	The Advisory Group on EDCs includes representatives from developing and transition countries. The Resolution adopted at ICCM4 invited UNEP and the WHO to address the needs identified by developing and transition countries by generating and disseminating information on EDCs.
GCO	Yes	To support the GCO work, UN Environment established a regionally balanced multi-stakeholder and intersectoral Steering Committee to ensure that regional (including from developing and transition countries) and sectoral concerns and perspectives are well reflected in the development of the report and particularly in the thematic review papers and the summary for policy-makers. The GCO II will address a range of chemicals and waste management issues that are of particular relevance to specific regions or countries. In addition, a regional contextualization process will be conducted to ensure the integration of the regional perspectives into the assessment and on the provision of policy options and insights.
OECD EHS	Yes	The Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology has an active strategy to involve Partner Countries in its work to ensure that the tools developed are relevant to developing and transition countries. This is anchored in a resolution by OECD Council on the implementation of SAICM.
WHO CRAN	Yes	WHO will work to ensure that each Network meeting provides a balance of views from different geographical regions and interests. The Network is intended to include participants from countries of all economic status, from the least developed to those with middle and high incomes.

SPI BODY	ARE PROCEDURES OR RULES IN PLACE TO ENSURE THAT THE NEEDS OF AND CIRCUMSTANCES WITHIN DEVELOPING COUNTRIES AND COUNTRIES WITH ECONOMIES IN TRANSITION ARE TAKEN INTO ACCOUNT?	
	Yes/No	Details
WHO IPCS	Yes	Expert meetings convened by IPCS are subject to WHO regulations which require that, as far as practicable, membership should have equitable geographical representation, gender balance and balance of experts from developed and developing countries.
FAO/WHO JECFA, JMPR, JMPM	Yes	The selection process for experts respects FAO and WHO policies on regional representation.
UNITAR	Yes	UNITAR's chemicals work predominantly involves project-based work at the national level, often in developing and transition countries. The concerns of local stakeholders are sought out and carefully considered before measures are developed.
GEF STAP	Yes	The GEF funds projects mainly in developing and transition countries. STAP-GEF ensures that all its outputs and recommendations are relevant to developing and transition countries.
IRP	Yes	The Panel has two Co-Chairs, one from a developed country and one from a developing country. To ensure developing country participation, funding for the participation of Steering Committee members from developing countries in IRP meetings and events is provided by the Secretariat. Rules also stipulate that Steering Committee members from non-OECD countries shall strive to provide annual financial or in-kind contributions to the IRP in accordance with their capacities (rather than a requirement for participation). Biannual meetings of the IRP are held on a rotating basis between developed and developing countries.
GESAMP	Yes	GESAMP seeks regional nominations of members for its Pool of Experts, and 9 out of its 17 current members are from developing countries. However, no official procedures or rules regarding regional representation were identified in the public domain.
IPCP	Yes	The IPCP includes and is open to membership from academic scientists of all countries; all members have equal voting rights in the General Assembly that governs IPCP's activities. Projects for capacity building specifically in developing and transition countries such as Armenia and Ghana have been conducted.
AMAP	Yes	Not independently, however joint work with e.g. UN Environment does address such needs.

Finding E: Networking, coordination and knowledge-sharing among interface bodies

Guiding questions used for the analysis: Is there communication, coordination and knowledge-sharing with other interface bodies? Does the interface body actively expand its network? Does it reach out to universities?

General findings: Several mechanisms exist to improve the coordination of the many and diverse science-policy interface bodies under the MEAs (e.g. the synergy process under the BRS Conventions) and by intergovernmental organizations (e.g. IOMC) (see examples in Table 10). However, there is still significant room to build on existing experiences and achieve better coordination between and across global and regional interface bodies and associated processes to strengthen synergies and avoid duplication of efforts. Similarly, an extensive knowledge base exists to support policy-making in each of the many science-policy interface bodies and is made to a certain extent publicly available via their own websites. However, locating such knowledge as well as information on the underlying frameworks, methodologies and processes can often be challenging. In addition, in certain cases, knowledge related to the different aspects of a specific issue may also be presented scattered over the websites of several bodies. These challenges generally limit the effective utilization of existing knowledge. A centralized knowledge base (or rather a centralized repository of links to existing knowledge bases generated by different interface bodies, i.e. a search engine specialized for chemicals and waste) for sharing knowledge, frameworks, methodologies and processes may be helpful. The specific findings are as follows:

Finding E.1: There are numerous collaboration and coordination efforts among different existing interface bodies (see examples in Table 10). Despite the non-exhaustive nature of this summary of links between interface bodies, the distribution of these efforts appears to be rather uneven: some interface bodies are connected more to certain interface bodies (e.g. AMAP, GEF STAP, GHS SCE) than to others. There is a general lack of coordination across all interface bodies (e.g., by one body) to allow for basic exchange of information and cooperative actions (e.g. joint creation of knowledge to the best possible extent) as well as to avoid the duplication of work. Thus, more coherent coordination of different interface bodies within and across their various work areas has significant potential to improve the effectiveness of the science-policy interactions within the existing interface bodies. These could benefit from, e.g., utilizing existing network structures and integrating elements such as cooperative research strategies, models and scenarios, assessments, knowledge-brokering and capacity-building.

Finding E.2: According to the (still limited) dataset describing the active expansion of interface bodies' networks (see Table 11), all of the interface bodies for which information is available do actively seek out new partners or members, and thus expand their

network. Some interface bodies were identified that actively reach out to academic institutions such as universities, whereas others do not actively reach out but are open to new members from academia (see Table 11). More data are needed to investigate whether outreach to academic institutions – an important means of communicating the needs of policy-makers to the scientific community (see Finding C.3) – is adequate within the current institutional landscape.

Finding E.3: While progress has been made, significant barriers remain to the effective communication and use of existing data and knowledge, particularly with regard to transferring existing data and knowledge from developed countries to developing and transition countries. Knowledge sharing can help to reduce duplication of work and be particularly beneficial for developing and transition countries in saving already scarce resources: for example, the sharing of existing chemical risk assessments can enable developing and transition countries to put in place national regulations for chemicals without the need to carry out their own costly and time-consuming risk assessments, as well as avoiding duplication of work for the private sector, which would not need to conduct new studies. In general, there are institutional and technical barriers to (1) the availability of data and information, and (2) the ability of users to gain awareness of and access to such information in meaningful ways. These barriers (especially at the national and regional levels) include a lack of standardization/harmonization of existing data and knowledge (although the GHS has achieved progress on this issue), insufficient sharing of knowledge, lack of information on datasets (e.g. metadata on collection and handling of data), insufficient (tools for providing) access to data, and lacking awareness of the existence of databases and information repositories.

Finding E.4: While awareness of the need to draw more systematically on a broad range of knowledge types is growing, there is a relative lack of processes for ensuring the effective incorporation of different sources of knowledge into a centralized knowledge base or centralized search engine specialized in finding existing information on chemicals and waste. The incorporation of knowledge from different sectors and disciplines as well as non-formal types of knowledge and mutual learning is particularly lacking. For example, there is little cooperation with interface bodies from other sectors and disciplines. Interdisciplinary knowledge production relevant to chemicals and waste also remains a challenge due, in part, to continued disciplinary boundaries in research institutions and societal conceptions of science, as well as different approaches and perspectives in different disciplines [53]. Processes to include local and indigenous knowledge (e.g. about ecosystems affected by chemical pollution) in the knowledge base are lacking (according to responses to survey questions regarding functions and mandates of interface bodies, as well as literature searches), with AMAP being a notable exception [54].

Table 10. **Examples of information exchange and/or coordination that exists between science-policy interface bodies analyzed in this study (non-exhaustive list)**

INTERFACE BODY	OTHER INTERFACE BODIES THAT IT EXCHANGES INFORMATION AND/OR COORDINATES WITH
BASEL OEWG	CRC, POPRC, GEF, GHS
CRC	OEWG, POPRC
POPRC	OEWG, CRC, GEF, AMAP
SAP	Intergovernmental Panel on Climate Change (IPCC)
EMEP	AMAP, UNEP, WHO, Minamata Convention, Secretariat of the Basel, Rotterdam and Stockholm Conventions (BRS Secretariat), World Meteorological Organization (WMO)
CLRTAP WG EFFECTS	UNEP, WHO, Minamata Convention, BRS Secretariat, WMO)
PROTOCOL ON PRTRS (UNECE)	AMAP, UNEP, UNITAR, SAICM
SCE GHS	OEWG, UNEP, OECD, FAO, WHO, UNITAR/International Labour Organization (ILO)
GEF	OEWG, POPRC, Minamata Convention, SAICM
GESAMP	IMO, UNESCO-IOC, WMO, FAO, IAEA, UN, UNEP, UNIDO, UNDP, ISA, GEF
AMAP	POPRC, EMEP, UNEP, UNECE, Minamata Convention, WMO

Table 11. Examples of science-policy interface bodies regarding their network expansion and outreach.

	DOES THE INTERFACE BODY ACTIVELY EXPAND ITS NETWORK?	DOES THE INTERFACE BODY REACH OUT TO UNIVERSITIES?
Under MEAs		
BASEL OEWG	Yes	Yes, outreach to universities may be undertaken in the course of fulfilling COP/OEWG mandates.
Associated with MEAs		
GMP	Yes	The GMP is actively seeking new partners, including in the academic sector.
PEN / DDT ALLIANCE	The PEN and the DDT Alliance are open to new members including from the academic sector and others.	
Not directly associated with MEAs		
UNEP EDC AG	Yes	The Advisory Group on EDCs invites individual experts to their meetings on the basis of expertise, previous work, and special interest in EDCs.
GCO	Yes	Universities, research institutions, individual academics and other academic actors working on topics directly or indirectly related to chemicals and waste management constitute another important target group of the GCO II.
OECD EHS	No	It is up to member country delegates to reach out to academia.

	DOES THE INTERFACE BODY ACTIVELY EXPAND ITS NETWORK?	DOES THE INTERFACE BODY REACH OUT TO UNIVERSITIES?
WHO CRAN	Yes. Network Participants will help identify new potential Network Participants.	Yes, many universities are participants in the Network.
WHO IPCS	No	Many university experts contribute to the work of IPCS.
FAO/WHO JECFA, JMPR, JMPM	The importance of developing new networks and channels and extending contacts with Codex Contact Points, universities, industry associations and other relevant parties is recognized.	Yes, many academic experts contribute to the work. The importance of developing new networks and channels, and extending contacts with universities is recognized.
GEF STAP	Yes	
IRP	The IRP is currently recruiting new panel members and representatives to its Steering Committee through an open call.	
GESAMP	Not known.	Yes. GESAMP's Working Groups hold workshops at universities, see [55].
IPCP	Yes. The Panel seeks to expand its membership and is open to academic scientists from all over the world to become members. In addition, stakeholders such as policy-makers, NGOs and industry will be invited to share their opinions and will be informed about outputs.	Yes. The Panel, a network of academic scientists, reaches out to universities. The IPCP wants to provide a global network of scientists within the field of environmental chemistry.
AMAP	Yes. Efforts to expand the network are continuous.AMAP products (data, publications, etc.) are widely available and used by universities in teaching courses, etc. AMAP co-sponsored the establishment of the University of the Arctic.	Yes. AMAP products are widely available and used by universities in teaching courses, etc. AMAP co-sponsored the establishment of the University of the Arctic.

4.3 SUMMARY OF IDENTIFIED GAPS AT THE CURRENT SCIENCE-POLICY INTERFACE

With regard to **scope and functions** of the science-policy interface / interface bodies:

1) A large number of interface bodies exist on the global, inter-regional, regional, national and local levels, covering a wide range of chemicals (or groups of chemicals) of concern and issues related to chemical management practice. Among them, interface bodies that are under or directly associated with the MEAs have highly specific mandates and cover a limited set of chemicals (or groups of chemicals) of concern. In contrast, many interface bodies established or hosted by intergovernmental and international non-governmental organizations have more flexible mandates and can theoretically address any issues of concern, subject to thematic domain and decisions of the governing body (or hosting institutions), and availability of resources and capacity (human and technical).

2) The functions of existing science-policy interface bodies vary considerably, with a major focus on providing scientific and technical support support to policy-makers and scientific assessment of issues of concern. However, major gaps exist with regard to the following aspects:

    a. Continuing challenges in ensuring timely scientific advice to policy-makers on issues of concern, particularly in terms of a timely identification of issues of concern in a policy-ready format;

    b. A general lack of scientific and technical support to policy-makers in monitoring and evaluation of progress in the implementation of relevant policy measures for all chemicals (or groups of chemicals) of concern and on a planetary scale;

    c. Continuing challenges in collecting, assessing, synthesizing and translating much existing scientific information into a policy-ready form;

    d. A general lack of effective communication of policy-makers' needs back to the scientific community;

    e. A general lack of effective communication of outputs generated by many international interface bodies to national policy-makers, particularly those in developing and transition countries;

As a result of the above, scientists and decision/policy-makers are not always best informed of developments and needs in the other sphere. Opportunities for synergies and joint development between science and policy are often missed and issues not addressed in the most effective and timely manner.

With regard to the **needs of and circumstances within developing and transition countries:**

1) A number of interface bodies have no specific procedures or rules in place to ensure that the needs of and circumstances within developing and transition countries are effectively taken into consideration;

2) Scientific knowledge produced in developing and transition countries generally lacks visibility in global assessments and international journals due to cultural, language and logistical barriers;

3) Capacity (specifically time, personnel, expertise and/or literacy skills) is often lacking in many developing and transition countries to effectively participate in relevant meetings and processes at the international science-policy interface (despite the awareness of and interest in participating in such meetings).

With regard to **networking, coordination and knowledge-sharing:**

1) There is a lack of coordination across all interface bodies (e.g., by one body) to allow for basic exchanges of information and cooperative efforts, as well as to avoid duplication of work;

1) Significant barriers remain to the effective communication and use of existing knowledge, data and tools generated by existing international science-policy interface bodies, e.g., institutional and technical barriers to (1) the availability of data and information and (2) the ability of users to gain awareness of and access to such information in meaningful ways.

2) There is a general lack of processes to ensure the effective inclusion and integration of scientific knowledge from different sources, sectors, disciplines and types (e.g., local and indigenous knowledge), often due to factors such as institutional barriers. This prevents the creation of a comprehensive and yet easily accessible overview of chemicals and waste-related issues, which are themselves often multi-disciplinary and multi-sectoral in nature.

5. LESSONS LEARNED FROM OTHER CLUSTERS

5.1 OVERVIEW

To strengthen the science-policy interface for chemicals management, it is helpful to review lessons learned from international science-policy interface bodies in different clusters. This was done for four bodies from other clusters with the overall aim of identifying best practices that may be useful in the context of the science-policy interface in international chemicals governance. The four interface bodies reviewed here are: the International Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Service (IPBES), the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), and the Science-Policy Interface of the United Nations Convention to Combat Desertification (UNCCD-SPI). This section provides a brief overview of these four interface bodies and their operating procedures. Then, it presents lessons learned from (1) their institutional setups and outputs, (2) positive impacts that they have created, (3) factors contributing to their effectiveness, and (4) limitations and challenges within and beyond them. This section serves by no means as an evaluation or a comparison of IPCC, IPBES, GESAMP, and UNCCD-SPI. Rather, readers are encouraged to focus on gaining insights into general aspects of what constitutes an effective/strong interface body, supported by evidence from real world examples.

5.2 A BRIEF OVERVIEW OF THE FOUR INTERFACE BODIES CONSIDERED

The four interface bodies represent a range of different approaches to institutional setup, governance, and operating procedures (see Table 12 and Figure 1). Table 12 gives an overview of the main aspects of each interface body's institutional setup and outputs. While it is beyond this report's scope to provide exhaustive details of each

interface body's historical development, many of the most pertinent points to the discussion on strengthening the science-policy interface in international chemicals governance are addressed. Figure 1 provides an overview of the interface bodies' operating procedures for carrying out their main activities (the latter are outlined in Table 12). While the figure shows general procedures, it does not necessarily show all iterative steps, all processes, nor all activities of each interface body. For more details on respective procedures, see the associated documents for IPCC [56], IPBES [57,58], GESAMP [59–61], and the UNCCD-SPI[1]. Different aspects of these procedures are further discussed in detail in the following sub-sections.

Table 12. Overview of the institutional setups and outputs of the science-policy interface bodies from other clusters

	IPCC	UNCCD-SPI	GESAMP	IPBES[I]
TYPE OF BODY (YEAR OF ESTABLISHMENT)	Independent intergovernmental body created by WMO and UNEP (1988), endorsed by the United Nations General Assembly	Interface body embedded within the UNCCD, established upon decision by COP11 (2013)	Inter-UN-agency scientific advisory body, established by UN Sponsor Organisations (1969)	Independent intergovernmental body established by UN Member States (2012)
INSTITUTIONAL ARRANGEMENT	Intergovernmental Panel	Independent / "stand-alone" interface body directly serving the Committee on Science and Technology (CST) within the UNCCD	Network-of-networks	Intergovernmental Panel
PRINCIPAL MANDATE	Assess scientific, technical, socio-economic information relevant to climate change [62].	Provide the UNCCD Committee on Science and Technology thematic guidance on knowledge requirements for implementing the UNCCD [63].	Provide advice to the UN system (i.e. Sponsors) on scientific aspects of marine environmental protection [59].	Assess knowledge on biodiversity and ecosystem services, prioritize key scientific information for policy-makers, support policy-making, and facilitate capacity-building [64].

1 See Annex 1 of [110] "Proposed Model for the Provision of Scientific Advice to the UNCCD decision-making process". It is unclear whether this proposed model was officially adopted, however a report from the Earth Negotiations Bulletin [142] indicates that the relevant decision was made. The authors of this report contacted UNCCD-SPI for clarification, but they did not receive a response before the report was finalized. For more details, see [143].

	IPCC	UNCCD-SPI	GESAMP	IPBES[I]
MAIN ACTIVITIES	Produce global reports reviewing and assessing climate change science (no own research or monitoring).	Analyze, synthesize, and translate relevant scientific findings and recommendations from desertification, land degradation and drought (DLDD)-specific conferences and relevant stakeholders and experts into proposals to be considered by CST for the consideration of the COP (no own research or monitoring).	(Produce reports on) scientific research performed by Working Group members on issues selected by Sponsors; provide overviews of environmental monitoring, assessment, and related activities of UN agencies [65] (members conduct own research, no monitoring).	Produce regional and subregional assessment reports and summaries for policy-makers related to biodiversity and ecosystem services, facilitating the use of policy-support tools, communications and outreach (no own research or monitoring).
MAIN OUTPUTS	Assessment Reports (every 3-5 years) with chapters corresponding to each Working Group; Special Reports; Summaries for Policy-makers, outreach activities through social media (all UN languages).	Synthesis reports of implementation of Work Programme for the CST (official COP documents[II]; scientific advice to the UNCCD decision-making processes (English only).	Journal series of reports and studies, contributions to other UN processes[III]; hazard assessments of harmful substances[IV] (English only).	(Sub)regional assessment reports; Summaries for Policy-makers; scientific journal articles; capacity building tools (all UN languages).
MEMBERS	Currently, 195 State Members (open to governments which are members of the UN or WMO).	Currently, 25 = 15 independent scientists (10 globally selected plus 1 from each of 5 regions), 5 CST Bureau members, 5 observers.	Currently, 17 experts including scientists, independent consultants, and government representatives.	Currently, 131 State Members (open to governments which are members of the UN).
FUNDING	Regular contributions from WMO and UNEP; voluntary contributions from Member States, UNFCC, and other UN bodies to the IPCC Trust Fund [66,67]	UNCCD-SPI[V]	UN Sponsor Organizations, resources organized within a Trust Fund.	Voluntary contributions from Member States, UN bodies, and other stakeholders to the IPBES Trust Fund [68].
NATIONAL FOCAL POINTS	Yes [69]	No, but UNCCD has national focal points.	No	Yes [70]

	IPCC	UNCCD-SPI	GESAMP	IPBES[I]
SUBSTRUCTURE	3 Working Groups each with own Technical Support Unit (TSU); Task Force on National Greenhouse Gas Inventories with own TSU and Bureau members; Data Distribution Centre	None apparent.	Working Groups active for determined/finite projects; Correspondence Groups to develop proposals; GESAMP Pool of Experts	Multidisciplinary Expert Panel – 25 members (5 from each UN region) [57,71,72]
MAIN MEETING(S)	Biannual "Session of the IPCC" and "Session of the IPCC Bureau"; Lead Author Meetings for respective reports, other expert group meetings; IPCC at the UNFCC COP [73]	Annual "Meeting of the Science-Policy Interface of the UNCCD"; UNCCD COP	Annual "Session of GESAMP"	Annual "IPBES Plenary"; Convention on Biological Diversity (CBD) COP
DEVELOPMENT OF WORK PROGRAM	Experts nominated by the Parties and Observers draft outline of reports, approved by the Panel [56]	Bureau and SPI Members draft Work Programme including proposals from invited Parties and stakeholders, approved by the COP[VI]	Pool of Experts and its Working Groups propose new/emerging issues, decided by Sponsors whether to pursue [60,65]	Bureau and Multidisciplinary Expert Panel draft Work Programme including proposals from stakeholders[VII], approved by the Plenary
REVIEW MECHANISM OF THE BODY AS AN ORGANIZATION	After 22 years (2010) by the independent InterAcademy Council, upon request of the UN Secretary General and the IPCC Chair [74].	After 4 years (2017) by an external team of consultants, upon request of the UNCCD Evaluation Office; next review in 2023 [75].	After 30 years (2001) by an independent Evaluation Team commissioned by Sponsors [76].	After 4 years and upon completion of the first Work Programme (2018) by the independent International Council for Science and an internal review team, to be presented in the forthcoming plenary IPBES-7 [77].

I. General information for IPBES in this table is taken from [58].

II. See [78] and [79] as examples.

III. e.g. UN Regular Process, see the report of the 44th session [80].

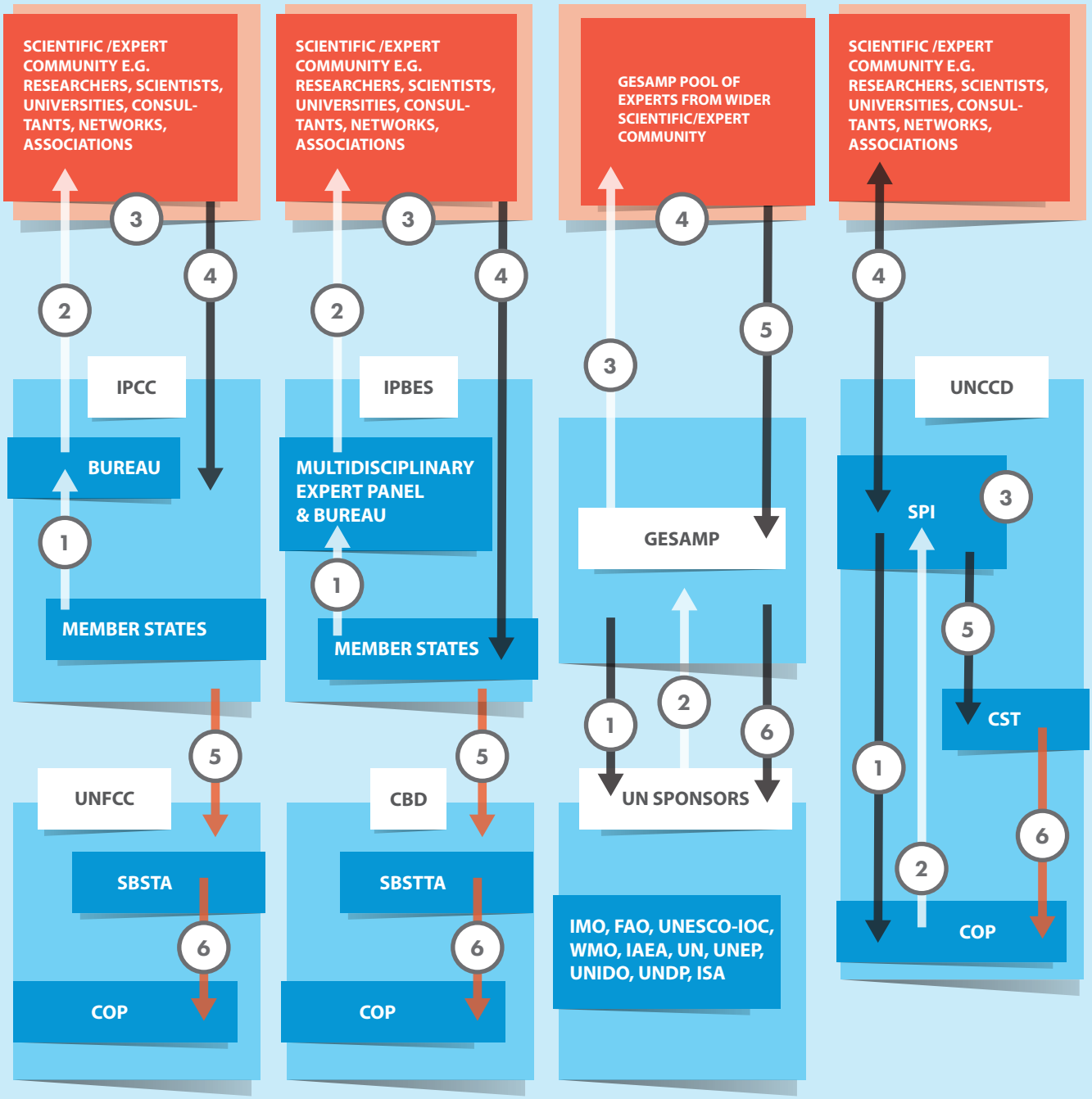
IV. See the EHS Working Group [47].

V. See item 6 in Decision 23/COP.11 [81].

VI. See item 24 in [82].

VII. See item 26 in [57].

Figure 1. **Overview of the operating procedures of the four considered interface bodies.**



1. Nominate scientific experts for i) scoping and ii) writing reports/ assessments
2. Select i) experts and ii) authors & reviewers
3. Review and assess current scientific knowledge
4. Submit report drafts for member states to review, comment, approve, accept
5. IPCC reports as input for UNFCC's Subsidiary Body for Scientific and Technological Advice
6. Provide inputs for COP

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2. Select i) experts and ii) authors & reviewers
3. Review and assess current scientific knowledge
4. Submit report drafts for member states to review, comment, approve, accept
5. IPBES reports as input for CBD's Subsidiary Body for Scientific, Technical, and Technological Advice
6. Provide inputs for COP

1. Propose topics for "new and emerging" issues
2. Sponsor selects issue(s), expresses support for/initiates scoping activities
3. Post-scoping, GESAMP draws from its pool to form Working Groups
4. Review and assess current, and/or generate new scientific knowledge
5. Produces scientific publications and/or assessments of existing scientific knowledge
6. Provides reports with summaries of scientific publications with separate policy recommendations, assessments, and/or advisory letters to sponsor(s)

1. Propose topics for biennial work program
2. Reviews and approves work program
3. Carries out evaluations and assessments related to UNCCD implementation
4. Engages with wider scientific community and/or selects members for expert meetings/ groups
5. Provides synthesis report(s) and policy proposals to Committee on Science and Technology (CST)
6. CST recommends policy options based on SPI inputs

Involves input from non-independent stakeholders i.e. with organizational / political / regional affiliation(s)

Involves input from independent stakeholders i.e. independent scientists

Involves input from both non-independent and independent stakeholders

5.3 LESSONS LEARNED REGARDING INSTITUTIONAL SETUP AND OUTPUTS

Two main lessons emerge from Table 12. Firstly, the different institutional setups, functions, and outputs of each interface body are attributed to the different needs and specific conditions within each cluster (e.g., MEAs already in force, maturity of scientific knowledge, and extent of consensus) at the time when they were set up and revised. This "no-one-size-fits-all" notion [83] does not preclude learning from others (e.g., IPBES frequently compares itself to the IPCC[2]). Crucial is that the functions and mandates of the interface body can be fulfilled by the respective institutional setup, i.e., "form-follows-function", as also mentioned by many experts at the November 2018 workshop in Geneva, Switzerland (see Section 2.2).

Secondly, Table 12 represents a static "snapshot" of the interface bodies at the time at which this report was prepared. In reality, their institutional arrangements and ways of working have evolved over time through trial-and-error and/or (external) review, including feedback from stakeholders. For example, GESAMP's mandate has been broadened over time to not just include the scientific aspects of marine pollution, but also the protection and management of marine resources [84]. Upon the recommendation of an external assessment [85], membership of the UNCCD-SPI was extended to include two additional observers in addition to the existing three observers and twenty scientific and bureau members [86]. A further example is IPBES, which for its next work program up to 2030 has a rolling basis that was proposed by some parties [87] to replace the previous practice of predefining the program at the beginning. This new format has already been incorporated into IPBES's latest work program draft [88]. This shows that it can be useful to have a mechanism in place that allows various aspects of an interface body to evolve over time [83], while building upon tools that are already being used at the decision-making and policy levels [89].

5.4 LESSONS LEARNED REGARDING POSITIVE IMPACTS OF THE DIFFERENT INTERFACE BODIES

There are a number of positive impacts that have been generated by these four interface bodies on processes, behaviors and ways of thinking within their respective science and/or policy fields. In the context of strengthening the science-policy interface in international chemicals governance, the six impacts highlighted here may serve as inspiration. .

2 According to [144], "To some extent IPBES does for biodiversity what the IPCC does for climate change."

Created positive feedback and enabling environments for (co-)development in both the science and policy spheres

Interface bodies can generate positive feedback and enabling environments that have multiplicative and sometimes catalytic effects on increasing the quantity and speed of (co-) development in both science and policy, respectively. On the one hand, by engaging scientists in topics of policy-relevance [90], interface bodies introduce potentially new avenues of scientific research and collaboration. On the other hand, by engaging policy-makers through their role in knowledge brokering [91], interface bodies foster timely uptake and application of scientific knowledge by policy-makers and enable timely, science-driven policy development and practical implementation.

An example of the first case is GESAMP's effect on catalyzing scientific research, specifically with reference to how new and emerging issues are addressed: Scoping of new and emerging issues (see Figure 1) occurs on an annual basis at the proposal of GESAMP's members and Pool of Experts (scientists) and support/approval of at least one UN sponsor [60]. Once the scoping of an issue is successful and complete, a working group of scientists selected from the Pool of Experts is formed. Scoping and the formation of a working group under the auspices of GESAMP creates positive feedbacks in the development of science because scoping ensures that research objectives will have policy relevance. In addition, the formation of GESAMP working groups gives the participating scientists formal and institutional recognition that is relevant for their own career development in academia, while also making financial resources available to them from the relevant UN sponsor(s).

Some of these financial resources go towards workshops which allow them to meet, discuss, and plan the writing of scientific research papers. For example, as of September 2017, twelve scientific papers intended for peer-reviewed publication were being "developed from the workshop discussions" of Working Group 38 (Atmospheric inputs to the ocean)'s 2017 workshop[3], in addition to the six other papers "resulting from the 2013 workshop" [92] under the group's Terms of Reference [80]. The formation of such a group through GESAMP provided scientists with additional opportunities for the validation/recognition of their work and/or financial resources for supporting collaboration.

Currently, the predominant means by which interface bodies achieve timely, science-driven policy development is by being an important producer of scientific materials dedicated to policy-makers within their respective domains. IPCC and IPBES are key examples of interface bodies that have been successful in this respect. In particular, they represent a unified and singular voice of up to thousands of scientists (e.g., through authoritative and easily accessible scientific assessments and accompanying summaries for policy-makers), which signals a high level of scientific authority and consensus to policy-makers [83]. In addition, GESAMP's "single 'shop front' for

3 See Appendix II in [55].

scientific advice on marine environmental issues from an international perspective" likely achieves a similar effect, while providing "access to expertise that may not be readily available nationally" [59].

In these ways, these interface bodies create enabling conditions and confidence for policy-makers to take up and use (new and emerging) scientific knowledge in policy development in a timely manner. Without such materials, policy-makers would have to dedicate significant time and resources and have sufficient expertise to collect, interpret, and synthesize scientific articles. This may become particularly challenging when relevant scientific articles are written in technical/specialist language and styles [90], loaded with details extraneous to decision- and policymaking, fragmented and scattered over 10,000s of scientific journals [89,93], or are at times (seemingly) contested. Especially noteworthy is the IPCC's calibrated language to convey levels of uncertainty [94] and their established protocols to deal with possible errors in reports [95]. Using such standards, scientific consensus documents can provide a common ground for more efficient and effective policy discussions, which helps avoid time-consuming scientific debate by policy-makers and stakeholders that may have different interests. This has also been the case for GESAMP, which is responsible for developing the definition of marine pollution, which has since been used in multiple global legal instruments [84,96]. At the same time, achieving consensus is also useful for the scientific community as it allows for the identification of knowledge gaps and research priorities for further scientific development [93].

Furthermore, interface bodies can also aid policy-makers by translating policy visions into means of practical implementation, as the UNCCD-SPI has done in the field of land degradation neutrality (LDN) [97]. In this specific example, the UNCCD-SPI provided a scientific basis for developing frameworks to understand, implement, and monitor LDN, including 'building blocks' for target setting at the national level by policy-makers [98]. These blocks have provided a means for analyzing progress, challenges, and opportunities of national implementation in practice [99].

Increased political commitment

Through high-level political involvement by making individual states official members and having focal points in national governments, IPCC and IPBES have gained visibility and fostered political commitment on climate change and biodiversity issues, respectively. IPCC and IPBES also require states' contributions in key processes, e.g., nominating authors for their scientific assessments and approving final drafts, particularly the summaries for policy-makers. These duties give states ownership, which increases the likelihood that results are translated into practice [100], and it encourages them to take responsibility for the results of the reports' findings and subsequent actions in response to these findings. Similarly, in the case of the UNCCD-SPI, member states of the UNCCD are responsible, through the COP, for official decisions that determine, e.g., the UNCCD-SPI's work program. Giving states such

authority over the work of the UNCCD-SPI increases their ownership of the outcomes of the UNCCD-SPI's work, thereby making states direct stakeholders invested in the UNCCD-SPI's performance.

Increased public awareness, participation, and confidence

IPCC and IPBES have been particularly successful in raising public awareness, participation, and confidence, which is vital for policy-makers to achieve effective implementation of legislation [101]. Members of the public need to have access to relevant information, be motivated, and be able to take action in order to make their interests clear to their governmental representatives and to change their own behavior [102]. IPCC and IPBES engage the public through strong social media presences (including Facebook, Instagram, Vimeo, and LinkedIn) that update 'followers' on their latest activities, findings, and events. Engaging the public at large can be seen as an act of transparency and democratization of knowledge that increases accountability in the policymaking process and in turn public confidence in the decisions taken.

The unified and cohesive front that these interface bodies present, in addition to serving as a conduit for scientific information in ways which are easy to understand, has likely also played a role in the increased media coverage of climate change and biodiversity issues. This increased coverage has further strengthened public awareness and encouraged dialogue amongst non-expert stakeholders. Another example of engaging the public at large is IPBES's informal 'Stakeholder Day' events held prior to each plenary session to give stakeholders the opportunity to receive updates on IPBES's work and processes. In an effort to increase accessibility, IPBES also provides free webcasts of the event for those who cannot attend in person [103]. Furthermore, the work of IPCC and IPBES in achieving consensus among scientists and policy-makers through their clear, inclusive and rigorous assessment processes can also raise public confidence and trust that decision-making processes are backed by rigorous scientific knowledge that was subjected to extensive peer-review by experts and governments [104].

Supported the development of future generations

Increasing public participation also supports the development of the next generation of leaders in the field. This can include, for example, policy-makers, engineers in industry, and scientists. In particular, the involvement of young scientists has been strengthened by IPBES through its fellowship programs (post-doctoral [105] and early-career [106]) and internships [107], and by IPCC through its doctoral scholarships for students from developing countries [108]. Such efforts effectively provide increased opportunities within and outside of the interface bodies for future generations to engage academically or occupationally with issues relating to climate change and biodiversity.

Supported the involvement of scientists in decision-making processes

Interface bodies are well-positioned to support decision-making processes because of their regular contact with (and independence of) key actors in both the science and policy spheres, in-depth knowledge of the actors as well as issues and challenges faced by these actors, and technical capabilities. The UNCCD-SPI is a pertinent example in these respects: recently, the interface body was tasked, within its mandate, to evaluate how the UNCCD's Scientific Conferences contribute to the decision-making processes of the UNCCD [109,110].

In brief, the UNCCD-SPI analyzed matters relating to productivity, e.g., to what extent its scientific conferences' recommendations were converted into decisions of the UNCCD COP and how attendees responded to the format of scientific conferences. Some of the key findings are particularly insightful and constructive: "[m]any scientists were also not aware of the format in which science needs to be delivered in order to be relevant to policy", and thus "led to the development of inadequately formulated recommendations by scientists, which may have hampered a stronger impact on the UNCCD decision-making process." It also found that "[q]uestions and comments raised by decision-makers were largely politically-driven (e.g. focusing on issues such as economics, law and procedural matters); rarely did these interventions promote scientific discussions, limiting the potential for synthesizing scientific findings."

To address these issues, the UNCCD-SPI proposed a decoupled model which would separate "the generation of scientific advice from political meetings, but not decouple the process of inputting policy-relevant scientific findings from the political process" [110]. The decoupled model operates in the following manner: after the UNCCD-SPI selects a mechanism to implement the COP's decision, scientists will be engaged and assembled possibly through scientific meetings that would take place either as stand-alone expert meetings, or in conjunction with scientific conferences that are separate from official sessions of the Committee on Science and Technology (CST). The outcomes of these meetings will then be included in a synthesis report by the UNCCD-SPI to the CST and the COP. Considering the real need for useful outcomes from these scientific conferences and investment of budgetary resources and time of conference attendees, the UNCCD-SPI's findings are critical toward improving the efficiency of such conferences, and thus involvement of scientists to maximize their contributions to the UNCCD decision-making processes.

Increased knowledge management and accessibility

Knowledge is often scattered across various resources, as it is generated by numerous experts around the world and published in different journals and on websites in various formats and languages. By providing a centralized platform for distributing knowledge and facilitating its use, science-policy interface bodies make it easier for

policy-makers and other stakeholders to find relevant knowledge, and they can help ensure the same knowledge and tools are considered by all stakeholders to facilitate consistency and for monitoring progress [91]. Examples of such knowledge management initiatives include the UNCCD's Knowledge Hub [111] (where the UNCCD-SPI's outputs are also hosted), the IPCC's Task Force on National Greenhouse Gas Inventories [112] (including methodologies, emission factors, etc.), and the IPBES's Policy Support Tools and Methodologies [113] (containing catalogues of publications, experts, and organizations providing policy support). These web platforms distribute products of the interface bodies such as assessments, methodologies, and software, and encourage their widespread use, which allows for comparisons. According to an internal review, the UNCCD's Knowledge Hub has had the ability to increase awareness of national and regional results, simplify information-finding processes, and consolidate search results for potential linking to mobile applications and other tools [114].

5.5 LESSONS LEARNED REGARDING FACTORS THAT CONTRIBUTE TO INCREASED EFFECTIVENESS

Four desirable qualities that an effective science-policy interface and its related interface body should have include: credibility, legitimacy, salience and agility [115–118]. The definitions for each of these as well as examples of how these qualities can be achieved in practice are presented here using the four interface bodies considered. This information is intended to be illustrative but not necessarily exhaustive. The examples included were selected primarily to demonstrate the breadth of options available. In addition, some of the examples may simultaneously represent multiple desirable qualities: for example, well-defined rules of procedures and codes of conduct can increase both credibility and legitimacy of the organization and its work. However, here the examples are each included only under a single category. Furthermore, it should also be noted that the examples included may not be of equal importance. Thus, when a new interface body is designed, the actual selection of means to achieve these desirable qualities depends on the mandate and goals of the body.

Credibility is defined as the trust in and recognition of the expertise of a body by stakeholders, achieved by the body through, e.g., transparent practices and the production of reliable findings with high standards of scientific and technical integrity. Examples of how this can be achieved in practice include:

1) Treat expert pool as a database and select members for assignments using transparent criteria (e.g. regional and gender balance, expertise) to avoid potential or perceived bias; see e.g. GESAMP's Pool of Experts [59].

2) Separate sections of scientific outputs from policy recommendations using a two-tier reporting system to avoid conflation; see e.g. GESAMP [119].

3) Subject scientific findings to established peer-review processes of the scientific community, independent of political influence; see e.g. GESAMP Working Groups' journal articles [120].

4) Subject scientific outputs to multiple sequential rounds of peer-review by the global scientific community and member states; see e.g. IPBES and IPCC [58,121].

5) Include observers amongst the official members in all meetings and processes, not just as participants of key meetings; see e.g. UNCCD-SPI [82].

6) Incorporate different knowledge systems and develop a participatory mechanism to facilitate an appropriate evaluation and inclusion of non-formal types of knowledge in the interface body's work; see e.g. IPBES and its use of indigenous and local knowledge [57].

7) Include clear and transparent rules of procedures and documentation from the beginning, including terms of reference, workplan, milestones, deadlines, provisions for peer review, marketing and distribution strategy; see e.g. GESAMP [59].

8) Adoption of a clear code of conduct and rules of procedure to avoid conflicts of interest by any individual directly involved in the body's work; see e.g. IPCC [122] and IPBES [123].

Legitimacy is defined as having the support of stakeholders through their commitment to the interface body's initiatives by, e.g., being inclusive of all stakeholders and divergent views. Examples of how this can be achieved in practice include:

1) Scientists and policy-makers should co-develop work programs involving an initial proposal of topics by scientists/interface body members and inputs from stakeholders, followed by approval by policy-makers or vice-versa; see e.g. GESAMP and UNCCD-SPI (see Figure 1).

2) Select members following an open, public call; see e.g. UNCCD-SPI [124].

3) Draw from a global pool of experts and scientists and receive approval/endorsement of scientific outputs from governments; see e.g. IPCC and IPBES [125].

4) Potentially expand non-governmental stakeholders' rights and legal status beyond observer roles; see e.g. IPBES [83] and consider possibly involving them in scoping activities [126].

5) Hold web conferences that are open to all for the discussion of knowledge gaps, the consultation on knowledge needs of policy-makers and practitioners, and the identification of priority areas for relevant knowledge generation to inform research, policy and funding agencies, and to catalyze the generation of new knowledge; see e.g. IPBES [127].

Salience is defined as carrying out work that is relevant to the needs of relevant stakeholders. Examples of how this can be achieved in practice include:

1) Consider proposals from parties and stakeholders when developing work programs; see e.g. UNCCD-SPI [128].

2) Involve policy-makers in scoping processes, i.e., scientists propose topics and policy-makers must express support for a topic before it can be formally pursued (ensures existing mandates of other organizations are fulfilled); see e.g. GESAMP [60].

3) Tailor the outputs to suit the context-specific knowledge requirements and needs of the circumstances, i.e., not just scientific articles or reports, but potentially also other forms of grey literature such as advisory letters to the UN sponsors and hazard profiles [83,96,129]; see e.g. GESAMP [130,131].

4) Perform regional assessments that are tailored to specific conditions of these regions, making their findings directly relevant and applicable on a local scale; see e.g. IPBES [132].

5) Align the interface body's work and outputs with the 'currency' of its stakeholders [91]. For example, GESAMP's scientific members produce peer-reviewed publications as part of GESAMP work.

Agility is defined as having efficient organizational practices that minimize duplication of work and allow for flexibility and the ability to adapt to changing circumstances. Examples of how this can be achieved in practice include:

1) Form working groups with specific tasks and mandates of limited terms (e.g. 1-3 years) after which the group is disbanded [84], emphasize intersessional work, and schedule meetings according to the actual needs of the work and not at fixed time intervals; see e.g. GESAMP [59].

2) Incorporate a rolling basis for work programs that will rely on periodic open calls, inputs, and suggestions instead of pre-determining topics from the beginning; see e.g. IPBES's next work program (2020-2030) [88].

3) Renew work programs in the short-to-medium term, focus on a few selected topics instead of many, and coordinate with relevant organizations on topics of shared interest; see e.g. UNCCD-SPI [93,133].

4) Approve reports by correspondence using electronic communication (e.g. e-mail, online platform) instead of at formal, physical meetings; see e.g. GESAMP [59].

5.6 LESSONS LEARNED REGARDING LIMITATIONS AND CHALLENGES

In the following section, ongoing challenges and limitations are highlighted that may be shared among interface bodies in general, drawing from examples observed from the four selected interface bodies.

Limited awareness of the interface body's work within and beyond the cluster

Communication and outreach require time, resources, and expertise. The differing mandates of the interface bodies determine with whom and to what extent they carry out communication and outreach activities, including but not limited to: distribution of the knowledge and products generated by the interface body and sharing information on the interface body's activities.

Despite the UNCCD's aims to centralize knowledge management through its Knowledge Hub [111], and the UNCCD-SPI's communications strategy [134] that targets policy-makers, the scientific community, and broader audiences such as UN entities, reaching their primary audience remains a challenge. According to a recent assessment of the UNCCD-SPI, "policymakers and practitioners ... did not seem to be fully aware of the SPI documents" related to Land Degradation Neutrality (LDN) despite its work on LDN being considered "the most significant SPI work" [135]. This assessment also found that "many interviewees considered that the overall impact of the SPI products beyond those familiar with the UNCCD process and the activities of the secretariat is still low, as a wider audience of end users has not yet been reached."

Similarly, even amongst its target audience of policy-makers and scientists, the poor dissemination of GESAMP reports has been a concern [84,129]. GESAMP's outputs have only been communicated to public, non-scientific audiences only to a limited extent (although granted, this is not one of GESAMP's objectives [136]), and GESAMP was not found to have any social media presence. Although summaries of working group activities and publications are provided in their Reports and Studies series, which are freely available online, they are presented in a rather non-user-friendly format. Overall, there have been only limited outputs tailored to lay audiences with non-technical backgrounds in simple language, which may hinder the level of awareness of GESAMP's activities and findings within and beyond the cluster and amongst the general public.

Limited effective participation of developing and transition countries

Language barriers, cultural differences, and a lack of institutional and/or financial capacity may still limit representatives of developing and transition countries from fully participating and contributing to work within the interface body, despite there being nominally balanced regional representation in the interface body's membership, meetings and relevant processes. This observation was noted in the case of the UNCCD-SPI through interviews with UNCCD Secretariat members [137]. In addition, in the case of biodiversity beyond IPBES itself, developing and transition countries have been reported to be minimally represented in international scientific discourse in the form of publications in top scientific journals, although much of the world's biodiversity is located in these countries [138].

Timelines of interface body's work do not always match policymaking needs

Policy-makers require timely scientific guidance in the face of rapidly changing conditions, including economic and political priorities [89,139]. However, interface bodies are not always able to provide such guidance following timelines that match policy-makers' requirements [140], as has been the experience of the IPCC [141], whose "blockbuster" reports have come under criticism for the length of their preparation cycles (3–5 years), to which some stakeholders have in response proposed smaller but more frequent reports.

6. OPTIONS FOR STRENGTHENING THE SCIENCE-POLICY INTERFACE

6.1 OVERVIEW

Building on identified gaps in the current interface (Section 4) and lessons learned from other clusters (Section 5), here three options are explored for strengthening the science-policy interface in international chemicals governance, including a brief discussion of their pros and cons, as well as specificities to be considered in their design.

These three options are not mutually exclusive, i.e. two or more options can be simultaneously implemented, as also pointed out by experts during the November 2018 workshop in Geneva, Switzerland. In addition, neither the list of options nor the specificities to be considered in their design presented here are exhaustive. In other words, other options may arise from further discussion and be considered (e.g., hybrids of the three options). Additional specificities may also be considered in the design of possible options, with insights gained from existing interface bodies in international chemicals governance (for examples, see Annex 5) and in other clusters (e.g. Section 5), as well as from the summary document of the November 2018 workshop in Geneva [40].

Furthermore, informed by experience in other clusters (Section 5.2), it is generally recommended to select options based on a set of clearly defined objectives and functions (e.g., provision of an objective scientific assessment on broader chemicals and waste issues; identification of issues with emerging evidence of concern; for a more comprehensive list of desired objectives and functions, see Section 3). In this way, form follows function. It should also be noted that the form should have a certain flexibility (e.g., by having a periodic review mechanism) to allow the form to evolve as new needs/objectives arise. In other words, the form may start with a small set of core objectives and functions, but use a flexible structure to allow for the expansion of objective functions over time.

6.2 OPTION 1: ESTABLISH A DEDICATED INTERGOVERNMENTAL MECHANISM

In this option, IPCC and IPBES may be used as models for establishing a dedicated intergovernmental mechanism to connect the science and policy aspects of chemicals and waste.

Pros: As shown in Section 5.3, such an intergovernmental mechanism can result in a number of positive impacts, including raising the profile of the sound management of chemicals and waste to higher political levels; raising public awareness, participation and confidence on the matter; and helping to identify and highlight key challenges in this area globally. Such a formalized body can also provide additional incentives (e.g. formal recognition) and support for academic scientists and institutions to participate in activities at the science-policy interface. The intergovernmental nature (through formalized structures and procedures) can also ensure the salience, legitimacy and credibility of its outputs, as well as the ownership and buy-in of outputs.

Cons: Considering the complex nature of the cluster (e.g., different chemicals may require a different set of sectors, disciplines and expertise; see Section 1.3), such a formalized intergovernmental mechanism may easily become too rigid and not agile enough. In addition, a heavy institutional design entails costs. Considerable time-lag may exist between requests and final outputs, which are often outdated once published.

Specificities to be considered in the design:

- The nature of the mechanism, including the source of mandates: e.g., established under legally-binding or voluntary MEA(s), similarly to the Scientific Assessment Panel to the Montreal Protocol and UNCCD-SPI; or established as an independent body, but associated with legally-binding or voluntary MEA(s), similarly to IPBES to the CBD and IPCC to the UNFCCC;
- The desired objectives, functions and outputs of the mechanism;
- The composition of the mechanism (including rules and procedures to avoid conflicts of interest, ensure credibility, ensure the consideration of the needs of and circumstances within developing and transition countries);
- How to engage a broader range of scientists and provide relevant incentives (particularly for academic scientists);
- How to coordinate with existing interface bodies, particularly those under the MEAs to avoid duplication of work;
- Etc.

6.3 OPTION 2: ESTABLISH A "NETWORK-OF-NETWORKS" TO CONNECT EXISTING INTERFACE BODIES AND OTHERS

In this option, GESAMP as a mechanism for coordination and cooperation among ten UN agencies can be used as a model to establish a "network-of-networks" coordinated by a central hub to connect existing interface bodies and others (e.g. scientific networks, governments, industry, civil society; see Figure 2). In brief, the central hub would be independent of existing interface bodies. It does not duplicate existing work carried out by existing interface bodies, but rather helps to coordinate inputs for their work (e.g., by distributing the call for evidence/information to its academic networks), or coordinate cooperative actions across several existing interface bodies, as the need arises. For work areas that are not covered by existing interface bodies, the central hub may also establish time-limited, ad hoc Working Groups to quickly respond to needs, similarly to the Working Groups under GESAMP.

Pros: A network-of-networks can be coordinated by a lean, central hub, and would therefore be agile and flexible. This "may improve the willingness of organizations, networks and individual scientists to participate and to cooperate within the network" [100]. It can also increase the efficiency and effectiveness of existing interface bodies and promote synergies and cooperative actions. Furthermore, it can attract and actively engage new actors (e.g. national research foundations).

Cons: "knowledge holder organizations need to be committed to working at the interface, a task not necessarily in their mandate and often difficult to achieve" [100].

Specificities to be considered in the design:

- The nature of the "network-of-networks" including the source(s) of their mandates: e.g., established 1) in an intergovernmental setting (i.e. governments determine the mandates and approve the final outputs) to ensure its salience, legitimacy, credibility and participation, particularly from developing and transition countries; or 2) established as an independent body, but with a multi-stakeholder steering committee;
- The desired objectives, functions, and outputs of the network;
- The need for plenary meetings like those of the IPCC and IPBES;
- The structure of the network (including rules and procedures to avoid conflicts of interest, ensure salience, credibility and legitimacy, ensure the consideration of the needs of and circumstances within developing and transition countries);

- How to engage a broader range of scientists and provide relevant incentives (particularly for academic scientists), e.g., through coordination with funding agencies, formal recognition of participating scientists, generation/coordination of peer-reviewed articles;

- How to effectively and efficiently share information and ensure coordination among network members (e.g., ensure a mutual acceptance of data) and its visibility;

- Etc.

6.4 OPTION 3: EXPAND THE ACTIVITIES (AND MANDATES) OF THE IOMC ORGANIZATIONS

In this option, existing activities within the IOMC organizations can be expanded and formalized. For example, the Global Chemicals Outlook and Global Waste Management Outlook can be formalized as a regular process to bring scientific knowledge into a policy-relevant context. In addition, documents such as the WHO Environmental Health Criteria (EHC) documents and Concise International Chemical Assessment Documents (CICADs) can be used as a model to be formalized and expanded as a regular process to translate policy needs into relevant scientific questions and guide cooperative research efforts across relevant disciplines ensuring that the big picture is taken into consideration. Furthermore, the International Conference on Mercury as a Global Pollutant can be used as a model to be formalized as a regular process to coordinate and foster dialogue between scientists and policy-makers with regard to the needs of each sphere and encourage cooperative action for the co-development of science and policy.

Pros: Flexible mandates of the IOMC organizations can be extended to cover additional chemicals and related issues. Extensive networks, experience and lessons learned already exist.

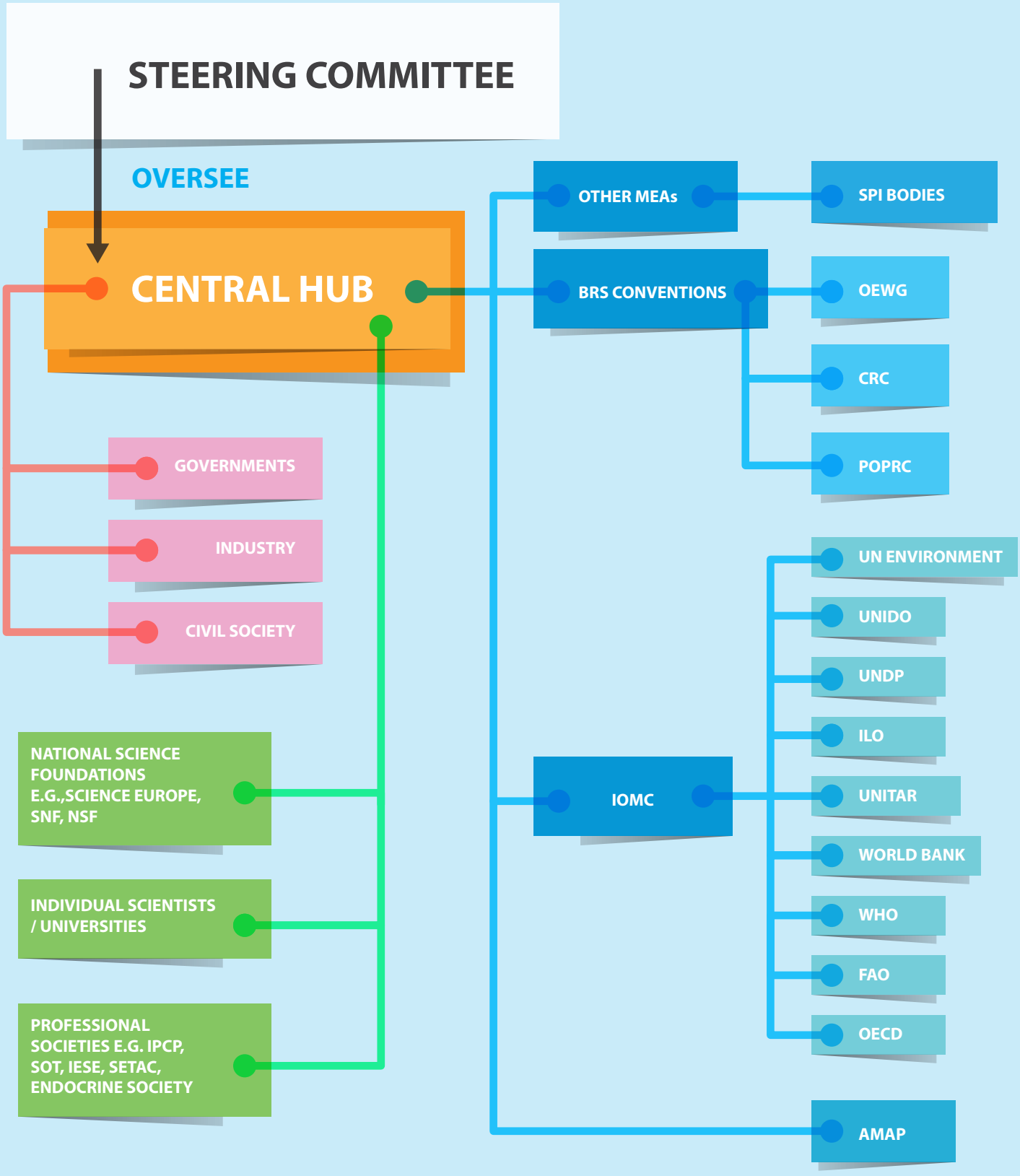
Cons: As individual IOMC organizations focus on different thematic domains, strong coordination across organizations and their governing bodies is continuously needed (i.e. the need for a coordination body similarly to GESAMP for chemicals and waste). As intergovernmental organizations, the IOMC organizations may focus predominantly on the policy needs, which might restrain the role of science. The IOMC organizations have limited funding and capacities, and they are generally already stretched to their limits.

Specificities to be considered in the design:

- The activities and outputs to be formalized, as well as how to standardize them;

- How to engage a broader range of scientists and provide relevant incentives (particularly for academic scientists).

Figure 2. A schematic illustration of a 'network of networks' coordinated by a central hub for chemicals and waste



7. REFERENCES

[1] IPBES, Report of the international expert workshop on the conceptual framework for the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services, 2013. https://www.ipbes.net/system/tdf/downloads/IPBES_2_INF_2.pdf?file=1&type=node&id=12799 (accessed January 30, 2019).

[2] OECD Environmental Outlook to 2050, OECD Publishing, 2012. doi:10.1787/9789264122246-en.

[3] European Chemical Industry Council (CEFIC), The European Chemical Industry in a Worldwide Perspective, (2011). http://www.cefic.org/Documents/FactsAndFigures/(Offline)%202011/FF2011_Full%20Report_Chapter/Cefic_FF%20Rapport%202011.pdf (accessed February 6, 2019).

[4] UNEP, Global Chemicals Outlook: Towards Sound Management of Chemicals, 2012. https://wedocs.unep.org/bitstream/handle/20.500.11822/8455/-Global%20chemicals%20outlook_%20towards%20sound%20management%20of%20chemicals-2013Global%20Chemicals%20Outlook.pdf?sequence=3&amp%3BisAllowed= (accessed January 27, 2019).

[5] UNEP, Towards a Pollution-Free Planet: Report of the Executive Director, 2017. https://wedocs.unep.org/bitstream/handle/20.500.11822/21800/UNEA_towardspollution_long%20version_Web.pdf?sequence=1&isAllowed=y (accessed January 27, 2019).

[6] United Nations, InforMEA, (2019). https://www.informea.org/ (accessed January 27, 2019).

[7] UN Environment, About Montreal Protocol, (2019). https://www.unenvironment.org/ozonaction/who-we-are/about-montreal-protocol (accessed January 27, 2019).

[8] J. Krueger, H. Selin, Governance for Sound Chemicals Management: The Need for a More Comprehensive Global Strategy, Glob. Gov. (2002) 323–342. http://people.bu.edu/selin/publications/KruegerSelinGlobalGovernance2002.pdf (accessed January 27, 2019).

[9] S. Strempel, M. Scheringer, C.A. Ng, K. Hungerbühler, Screening for PBT Chemicals among the “Existing” and “New” Chemicals of the EU, Environ. Sci. Technol. 46 (2012) 5680–5687. doi:10.1021/es3002713.

[10] K. Kummer Peiry, The Chemicals and Waste Regime as a Basis for a Comprehensive International Framework on Sustainable Management of Potentially Hazardous Materials?, Rev. Eur. Comp. Int. Environ. Law. 23 (2014) 172–180. doi:10.1111/reel.12084.

[11] SAICM, Home, (2019). http://www.saicm.org/Home/tabid/5410/language/en-US/Default.aspx (accessed January 27, 2019).

[12] UNEP, SAICM texts and resolutions of the International Conference on Chemicals Management, 2006. http://www.saicm.org/Portals/12/Documents/saicmtexts/New%20SAICM%20Text%20with%20ICCM%20resolutions_E.pdf (accessed January 27, 2019).

[13] A. Logomasini, Strategic Approach to International Chemicals Management: Lack of Interest Belies Importance, Sustain. Dev. Law Policy. 6 (2006). https://digitalcommons.wcl.american.edu/sdlp/ (accessed January 27, 2019).

[14] SAICM, Co-chairs' summary of the discussions during the first meeting in the intersessional process to consider the Strategic Approach and the sound management of chemicals and waste beyond 2020, 2017. http://www.saicm.org/Portals/12/documents/meetings/IP1/co-chair-summary/Co-chairs'%20summary%20english.pdf (accessed January 30, 2019).

[15] M.J. Molina, F.S. Rowland, Stratospheric sink for chlorofluoromethanes: chlorine atom-catalysed destruction of ozone, Nature. 249 (1974) 810–812. doi:10.1038/249810a0.

[16] R. Carson, L. Darling, Silent spring, Houghton Mifflin, 1962.

[17] N. Eckley, Traveling Toxics: The Science, Policy, an Management of Persistent Organic Pollutants, Environ. Sci. Policy Sustain. Dev. 43 (2001) 24–36. doi:10.1080/00139150109604496.

[18] H. Leivestad, I.P. Muniz, Fish kill at low pH in a Norwegian river, Nature. 259 (1976) 391–392. doi:10.1038/259391a0.

[19] K. Jensen, E. Snekvik, Low pH levels wipe out salmon and trout populations in southernmost Norway, Ambio. 1 (1972) 223–225. https://www.osti.gov/etdeweb/biblio/5528390 (accessed January 27, 2019).

[20] J.K. Hammitt, F. Camm, P.S. Connell, W.E. Mooz, K.A. Wolf, D.J. Wuebbles, A. Bamezai, Future emission scenarios for chemicals that may deplete stratospheric ozone, Nature. 330 (1987) 711–716. doi:10.1038/330711a0.

[21] I.-M. Olsson, The Cost of Inaction: A socioeconomic analysis of costs linked to effects of endocrine disrupting substances on male reproductive health, Nordic Council of Ministers, 2014. doi:10.6027/TN2014-557.

[22] L. Trasande, R.T. Zoeller, U. Hass, A. Kortenkamp, P. Grandjean, J.P. Myers, J. DiGangi, P.M. Hunt, R. Rudel, S. Sathyanarayana, M. Bellanger, R. Hauser, J. Legler, N.E. Skakkebaek, J.J. Heindel, Burden of disease and costs of exposure to endocrine disrupting

chemicals in the European Union: an updated analysis., Andrology. 4 (2016) 565–72. doi:10.1111/andr.12178.

[23] IPCC, Summary for policymakers of IPCC special report on global warming of 1.5°C approved by governments, (2018). https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/ (accessed January 27, 2019).

[24] AMAP, Summary for Policy-makers: Arctic Pollution Issues 2015, 2015. https://www.amap.no/documents/doc/summary-for-policy-makers-arctic-pollution-issues-2015/1195 (accessed January 27, 2019).

[25] Eawag, MicroPoll Project, (2019). https://www.eawag.ch/en/department/uchem/projekte/micropoll/ (accessed January 27, 2019).

[26] Environmental Investigation Agency, CFC-11 illegal production and use in China: Blowing It, 2018. https://eia-international.org/report/blowing-it/ (accessed January 27, 2019).

[27] Group on Earth Observations, Global Observation System for Mercury (GOS4M), (2017). https://www.earthobservations.org/activity.php?id=131 (accessed January 27, 2019).

[28] Stockholm Convention, Global Monitoring Plan of the Stockholm Convention on Persistent Organic Pollutants, (2019). http://www.pops-gmp.org/ (accessed January 27, 2019).

[29] Environment and Climate Change Canada, Global Atmospheric Passive Sampling (GAPS) Network, (2010). http://www.ec.gc.ca/rs-mn/default.asp?lang=En&n=22D58893-1&pedisable=true (accessed January 27, 2019).

[30] United Nations General Assembly, Resolution adopted by the General Assembly on 27 July 2012: 62/288: The future we want, (2012). http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E.

[31] United Nations Environment Assembly, Resolutions and decisions adopted by the United Nations Environment Assembly of the United Nations Environment Programme at its first session on 27 June 2014, 2014. https://wedocs.unep.org/bitstream/handle/20.500.11822/17285/K1402364.pdf?sequence=3&isAllowed=y (accessed January 27, 2019).

[32] T. Honkonen, S.A. Khan, Chemicals and Waste Governance Beyond 2020, Nordic Council of Ministers, Copenhagen, 2017. doi:10.6027/TN2017-502.

[33] Basel Rotterdam and Stockholm Conventions, From Science to Action, (2017). http://www.brsmeas.org/Implementation/ScientificAndTechnicalActivities/FromSciencetoAction/

DraftRoadMapforSciencetoAction/tabid/6132/language/en-US/Default.aspx (accessed January 27, 2019).

[34] IPCP, Re.: Input in response to the co-chairs' summary of discussions at first meeting of the intersessional process, 2017. http://www.saicm.org/Portals/12/Documents/IP-consultation/Jul-Sep-2017/IPCP.pdf (accessed January 30, 2019).

[35] SAICM, Review of existing governance models of potential relevance to the sound management of chemicals and waste, including science-policy interfaces, 2017. http://www.saicm.org/Portals/12/documents/meetings/IP2/IP_2_10_governance%20structures.pdf.

[36] SAICM, Existing science-policy interfaces for international chemicals and waste issues, 2018. http://www.saicm.org/Portals/12/documents/meetings/IP2/IP_2_INF_12_Science_Policy_Interface.pdf.

[37] SAICM, Report of the second meeting in the intersessional process to consider the Strategic Approach and the sound management of chemicals and waste beyond 2020, 2018. http://www.saicm.org/Portals/12/Documents/meetings/Bureau/ICCM5B5/SAICM%20IP%202%20report%20FINAL.pdf.

[38] Stockholm Convention on Persistent Organic Pollutants, Updates to the work on "From Science to Action," 2018. http://chm.pops.int/TheConvention/POPsReviewCommittee/Meetings/POPRC14/Overview/tabid/7398/Default.aspx.

[39] IPCP, Strengthening the Science-Policy Interface in International Chemicals Governance: A Thought Starter on Options for a Way Forward, 2018. https://www.ipcp.ch/wp-content/uploads/2019/02/IPCP-Sci-Pol-WorkshopThoughtStarter2018.pdf.

[40] IPCP, Multi-Stakeholder Workshop on Strengthening the Science-Policy Interface in International Chemicals Governance: Summary, 2018. https://www.ipcp.ch/wp-content/uploads/2019/02/IPCP-Sci-Pol-WorkshopDoc2019.pdf.

[41] Stockholm Convention on Persistent Organic Pollutants, Persistent Organic Pollutants Review Committee Handbook, (2019). http://chm.pops.int/Default.aspx?tabid=2806#LiveContent%5BPOPRC-Handbook (accessed January 27, 2019).

[42] UNECE, EMEP - Overview and Mandate, (2019). http://www.unece.org/index.php?id=9968&type=111 (accessed January 27, 2019).

[43] OECD, On-Line Guide to OECD Intergovernmental Activity: Chemicals Committee, (2018). https://oecdgroups.oecd.org/Bodies/ShowBodyView.

aspx?BodyID=1559&BodyPID=11067&Lang=en&Book=True (accessed January 30, 2019).

[44] FAO, WHO, Joint FAO/WHO Expert Committee on Food Additives (JECFA)-Working Procedures, 2017. http://www.who.int/foodsafety/areas_work/chemical-risks/jecfa/en/ (accessed January 27, 2019).

[45] Rotterdam Convention, Annex III Chemicals, (2019). http://www.pic.int/TheConvention/Chemicals/AnnexIIIChemicals/tabid/1132/language/en-US/Default.aspx (accessed January 29, 2019).

[46] Kiev Protocol, Protocol on Pollutant Release and Transfer Registers, 2003. https://www.unece.org/fileadmin/DAM/env/pp/prtr/Protocol%20texts/PRTR_Protocol_e.pdf (accessed January 29, 2019).

[47] GESAMP, EHS Working Group: Environmental Hazards of Harmful Substances, (2019). http://www.gesamp.org/work/groups/1 (accessed January 28, 2019).

[48] AMAP, Chemicals of Emerging Arctic Concern: Summary for Policy-makers, 2017. https://www.amap.no/documents/doc/chemicals-of-emerging-arctic-concern.-summary-for-policy-makers/1533 (accessed January 29, 2019).

[49] UNEP, Strengthening the Science-Policy Interface: A gap analysis, 2017. http://wedocs.unep.org/handle/20.500.11822/22261 (accessed January 27, 2019).

[50] Stockholm Convention on Persistent Organic Pollutants, Report on activities for effective participation in the work of the Committee, 2018. http://chm.pops.int/Portals/0/download.aspx?d=UNEP-POPS-POPRC.14-INF-10.English.pdf.

[51] UNEP, Gap analysis for the purpose of facilitating the discussions on how to improve and strengthen the science-policy interface on biodiversity and ecosystem services, 2009. https://www.unep-wcmc.org/system/dataset_file_fields/files/000/000/121/original/IPBES_2_1_INF_1.pdf?1398681475.

[52] INASP, Academic publishing, (2019). https://www.inasp.info/theme/academic-publishing (accessed January 27, 2019).

[53] D.P. MacMynowski, Pausing at the brink of interdisciplinarity: power and knowledge at the meeting of social and biophysical science, Ecol. Soc. 12 (2007).

[54] AMAP, Monitoring and Assessment, (2019). https://www.amap.no/about/the-amap-programme/monitoring-and-assessment (accessed January 27, 2019).

[55] GESAMP, GESAMP Working Group 38: Report on two workshops on the changes in the acid/base balance of the atmosphere and ocean and their subsequent impacts on air/sea chemical exchange, 2017. http://www.gesamp.org/site/assets/files/1714/

report_on_the_wg_38_workshops_feb_march_2.pdf (accessed January 27, 2019).

[56] IPCC, Preparing Reports, (2019). https://www.ipcc.ch/about/preparingreports/ (accessed January 27, 2019).

[57] IPBES, Report of the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on the work of its sixth session, 2018. https://www.ipbes.net/system/tdf/ipbes-6-15_ipbes-6_final_report-en.pdf?file=1&type=node&id=22981 (accessed January 27, 2019).

[58] IPBES, Procedures for the preparation of Platform deliverables, 2015. https://www.ipbes.net/system/tdf/downloads/pdf/IPBES_Procedures_for_the_preparation_of_deliverables_consolidated.pdf?file=1&type=node&id=15255 (accessed January 27, 2019).

[59] GESAMP, The New GESAMP: Science for Sustainable Oceans, 2005. http://www.gesamp.org/publications/the-new-gesamp-science-for-sustainable-oceans (accessed January 7, 2019).

[60] GESAMP, Scoping Activities, (2019). http://www.gesamp.org/work/scoping-activities (accessed January 27, 2019).

[61] T. Jickells, B. Duce, GESAMP (presentation), (2017). https://www.wmo.int/pages/prog/arep/gaw/documents/GAWSymp2017P3Jickells.pdf (accessed January 30, 2019).

[62] IPCC, Principles Governing IPCC Work, 2013. https://archive.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf (accessed January 28, 2019).

[63] UNCCD, Mandate and TOR of the SPI, (2016). https://knowledge.unccd.int/science-policy-interface/mandate-and-tor-spi (accessed January 28, 2019).

[64] UNEP, Report of the second session of the plenary meeting to determine modalities and institutional arrangements for an intergovernmental science-policy platform on biodiversity and ecosystem services, 2012. https://www.ipbes.net/sites/default/files/downloads/UNEP_IPBES_MI_2_9_EN_0.pdf (accessed January 28, 2019).

[65] GESAMP, Work Programme, (2019). http://www.gesamp.org/work/programme (accessed January 28, 2019).

[66] IPCC, IPCC Trust Fund Programme and Budget, 2018. https://www.ipcc.ch/apps/eventmanager/documents/49/150120180711-p47_doc2_programme_and_budget.pdf (accessed January 28, 2019).

[67] IPCC, Financial Procedures for the Intergovernmental Panel on Climate Change (IPCC), 2011. https://archive.ipcc.ch/pdf/ipcc-

principles/ipcc-principles-appendix-b.pdf (accessed January 28, 2019).

[68] IPBES, Financial procedures for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2013. https://www.ipbes.net/system/tdf/downloads/IPBES_financial_procedures.pdf?file=1&type=node&id=15253 (accessed January 28, 2019).

[69] IPCC, IPCC Focal Points, (2019). https://www.ipcc.ch/apps/contact/interface/focalpoints.php (accessed February 6, 2019).

[70] IPBES, National Focal Points, (2019). https://www.ipbes.net/national-focal-points (accessed February 6, 2019).

[71] IPBES, Members, (2019). https://www.ipbes.net/members (accessed January 28, 2019).

[72] IPBES, Guidance document on the nomination and selection process for officers of the IPBES Bureau and members of the IPBES Multidisciplinary Expert Panel (MEP), 2012. http://jncc.defra.gov.uk/pdf/IPBES_Guidance_on_nomination_and_selection_of_Bureau_and_MEP_members.pdf (accessed January 28, 2019).

[73] IPCC, The IPCC at COP24, (2018). https://www.ipcc.ch/event/the-ipcc-at-cop24/ (accessed January 28, 2019).

[74] InterAcademy Council, Climate Change Assessments, Review of the Processes & Procedures of the IPCC, 2010. http://reviewipcc.interacademycouncil.net/report.html (accessed January 28, 2019).

[75] UNCCD, The Science-Policy Interface: Mandate extended and membership renewed, (2018). https://www.unccd.int/news-events/science-policy-interface-mandate-extended-and-membership-renewed (accessed January 28, 2019).

[76] GESAMP, A revitalized GESAMP, (2019). http://www.gesamp.org/about/history (accessed January 28, 2019).

[77] IPBES, Review of IPBES at the conclusion of its first work programme, (2018). https://www.ipbes.net/deliverables/4e-effectiveness (accessed January 28, 2019).

[78] UNCCD, Sustainable land management for addressing desertification/land degradation and drought, climate change mitigation and adaptation: Synthesis report by the Science-Policy Interface, 2017. https://www.unccd.int/sites/default/files/sessions/documents/2017-07/ICCD_COP%2813%29_CST_3-1710639E.pdf (accessed January 28, 2019).

[79] UNCCD, Rehabilitation, restoration and reclamation measures and practices in degraded lands, 2017. https://www.unccd.int/sites/default/files/sessions/documents/2017-07/ICCD_COP%2813%29_CST_4-1710023E.pdf (accessed January 30, 2019).

[80] GESAMP, Report of the 44th Session of GESAMP, 2018, 2018.

http://www.gesamp.org/publications/report-of-the-44th-session-of-gesamp-2018 (accessed January 28, 2019).

[81] ICCD, Measures to enable the United Nations Convention to Combat Desertification to become a global authority on scientific and technical knowledge pertaining to desertification/land degradation and mitigation of the effects of drought, 2013. https://knowledge.unccd.int/sites/default/files/inline-files/Decision23_COP11_0.pdf (accessed January 28, 2019).

[82] UNCCD, Terms of Reference of the Science-Policy Interface, 2017. https://knowledge.unccd.int/sites/default/files/inline-files/SPI%20Terms%20of%20Reference_110717.pdf (accessed January 28, 2019).

[83] S. Beck, M. Borie, J. Chilvers, A. Esguerra, K. Heubach, M. Hulme, R. Lidskog, E. Lövbrand, E. Marquard, C. Miller, T. Nadim, C. Neßhöver, J. Settele, E. Turnhout, E. Vasileiadou, C. Görg, Towards a Reflexive Turn in the Governance of Global Environmental Expertise. The Cases of the IPCC and the IPBES, GAIA - Ecol. Perspect. Sci. Soc. 23 (2014) 80–87. doi:10.14512/gaia.23.2.4.

[84] P.G. Wells, R.A. Duce, M.E. Huber, Caring for the sea—accomplishments, activities and future of the United Nations GESAMP (the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection), Ocean Coast. Manag. 45 (2002) 77–89. doi:10.1016/S0964-5691(02)00047-9.

[85] UNCCD, Assessment of the UNCCD Science-Policy Interface, 2017. https://www.unccd.int/sites/default/files/relevant-links/2017-05/FinalReportof%20the_SPI_Assessment.pdf (accessed January 28, 2019).

[86] UNCCD, Report of the Conference of the Parties on its thirteenth session, held in Ordos, China, from 6 to 16 September 2017, 2017. https://www.unccd.int/sites/default/files/sessions/documents/2017-11/cop21add1_eng.pdf (accessed January 28, 2019).

[87] IPBES, Report of the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on the work of its fifth session, 2017. https://www.ipbes.net/system/tdf/ipbes-5-15_en.pdf?file=1&type=node&id=15537 (accessed January 28, 2019).

[88] IPBES, Preamble, 2018. https://www.ipbes.net/sites/default/files/ipbes-work-programme-up-to-2030_20191129_for-consultation.pdf (accessed January 28, 2019).

[89] M. Akhtar-Schuster, R.J. Thomas, L.C. Stringer, P. Chasek, M. Seely, Improving the enabling environment to combat land

degradation: Institutional, financial, legal and science-policy challenges and solutions, L. Degrad. Dev. 22 (2011) 299–312. doi:10.1002/ldr.1058.

[90] J.G. Hering, D.A. Dzombak, S.A. Green, R.G. Luthy, D. Swackhamer, Engagement at the Science–Policy Interface, Environ. Sci. Technol. 48 (2014) 11031–11033. doi:10.1021/es504225t.

[91] J.G. Hering, Do we need “more research”; or better implementation through knowledge brokering?, Sustain. Sci. 11 (2016) 363–369. doi:10.1007/s11625-015-0314-8.

[92] GESAMP, Report of the Workshop of GESAMP Working Group 38 At The University of East Anglia, Norwich, United Kingdom, 2013. https://www.wmo.int/pages/prog/arep/gaw/documents/ReportFourthGESAMPWG38.pdf (accessed January 28, 2019).

[93] R.J. Thomas, M. Akhtar-Schuster, L.C. Stringer, M.J. Marques, R. Escadafal, E. Abraham, G. Enne, Fertile ground? Options for a science–policy platform for land, Environ. Sci. Policy. 16 (2012) 122–135. doi:10.1016/j.envsci.2011.11.002.

[94] M.D. Mastrandrea, C.B. Field, T.F. Stocker, K.L. Ebi, D.J. Frame, H. Held, E. Kriegler, K.J. Mach, P.R. Matschoss, G.-K. Plattner, G.W. Yohe, F.W. Zwiers, Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties, 2010. https://www.ipcc.ch/site/assets/uploads/2018/12/ar5_uncertainty-guidance-note.pdf (accessed January 28, 2019).

[95] IPCC, Annex 3: IPCC Protocol for Addressing Possible Errors in IPCC Assessment Reports, Synthesis Reports, Special Reports and Methodology Reports, 2013. https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc_error_protocol_en.pdf (accessed January 28, 2019).

[96] P.G. Wells, T. Höfer, M. Nauke, Evaluating the hazards of harmful substances carried by ships: The role of GESAMP and its EHS working group, Sci. Total Environ. 237–238 (1999) 329–350. doi:10.1016/S0048-9697(99)00147-3.

[97] UNCCD, Scientific Conceptual Framework for LDN released in English, French and Spanish, (2017). https://www.unccd.int/news-events/scientific-conceptual-framework-ldn-released-english-french-and-spanish (accessed January 28, 2019).

[98] UNCCD, Achieving Land Degradation Neutrality at the Country Level: Building Blocks for LDN Target Setting, 2016. https://www.unccd.int/publications/achieving-land-degradation-neutrality-country-level-building-blocks-ldn-target-setting (accessed January 28, 2019).

[99] P. Chasek, M. Akhtar-Schuster, B.J. Orr, A. Luise, H. Rakoto Ratsimba, U. Safriel, Land degradation neutrality: The science-

policy interface from the UNCCD to national implementation, Environ. Sci. Policy. 92 (2019) 182–190. doi:10.1016/J.ENVSCI.2018.11.017.

[100] C. Görg, H. Wittmer, C. Carter, E. Turnhout, M. Vandewalle, S. Schindler, B. Livorell, A. Lux, Governance options for science–policy interfaces on biodiversity and ecosystem services: comparing a network versus a platform approach, Biodivers. Conserv. 25 (2016) 1235–1252. doi:10.1007/s10531-016-1132-8.

[101] T.M. Brooks, J.F. Lamoreux, J. Soberón, IPBES ≠ IPCC, Trends Ecol. Evol. 29 (2014) 543–545. doi:10.1016/j.tree.2014.08.004.

[102] I. Lorenzoni, S. Nicholson-Cole, L. Whitmarsh, Barriers perceived to engaging with climate change among the UK public and their policy implications, Glob. Environ. Chang. 17 (2007) 445–459. doi:10.1016/J.GLOENVCHA.2007.01.004.

[103] IPBES, Stakeholder day, (2018). https://www.ipbes.net/stakeholder-day (accessed January 28, 2019).

[104] B. Macinnis, J.A. Krosnick, Trust in Scientists' Statements about the Environment and American Public Opinion on Global Warming, in: C.I. Krosnick JA, Stark TH (Ed.), Polit. Psychol. New Explor. (Frontiers Soc. Psychol., Psychology Press, 2014: pp. 487–526. https://pprg.stanford.edu/wp-content/uploads/GW-Trust-in-Scientists-Statements.pdf (accessed January 7, 2019).

[105] IPBES, Post doctoral fellowship programme, (2017). https://www.ipbes.net/post-doctoral-fellowship-programme (accessed January 29, 2019).

[106] IPBES, The IPBES Fellowship Programme, (2019). https://www.ipbes.net/ipbes-fellowship-programme (accessed January 29, 2019).

[107] IPBES, Intern, (2019). https://www.ipbes.net/secretariat-function/intern (accessed January 29, 2019).

[108] IPCC, Scholarship Programme, (2019). https://www.ipcc.ch/about/scholarship/ (accessed January 29, 2019).

[109] UNCCD, Assessment of the impacts of the outcomes of the UNCCD 1st and 2nd Scientific Conferences in supporting the UNCCD decision-making process, 2015. https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP12_CST_INF.2/cstINF2eng.pdf (accessed January 29, 2019).

[110] UNCCD, Improving the efficiency of the Committee on Science and Technology, including impacts from the previous conferences and recommendations for future institutional arrangements, 2015. https://knowledge.unccd.int/sites/default/files/inline-files/cst4eng_0.pdf (accessed January 27, 2019).

[111] UNCCD, Knowledge Hub, (2019). https://knowledge.unccd.int/

(accessed January 29, 2019).

[112] IPCC, Task Force on National Greenhouse Gas Inventories, (2019). https://www.ipcc-nggip.iges.or.jp/ (accessed January 29, 2019).

[113] IPBES, Policy support tools and methodologies, (2019). https://www.ipbes.net/policy-support-tools-methodologies (accessed January 29, 2019).

[114] UNCCD, Progress report on the Scientific Knowledge Brokering Portal, 2015. https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP12_CST_INF.5/cstINF5eng.pdf (accessed January 29, 2019).

[115] T. Koetz, K.N. Farrell, P. Bridgewater, Building better science-policy interfaces for international environmental governance: assessing potential within the Intergovernmental Platform for Biodiversity and Ecosystem Services, Int. Environ. Agreements Polit. Law Econ. 12 (2012) 1–21. doi:10.1007/s10784-011-9152-z.

[116] D. Cash, W.C. Clark, F. Alcock, N. Dickson, N. Eckley, J. Jäger, Salience, Credibility, Legitimacy and Boundaries: Linking Research, Assessment and Decision Making, SSRN Electron. J. (2003). doi:10.2139/ssrn.372280.

[117] S. Sarkki, J. Niemela, R. Tinch, S. van den Hove, A. Watt, J. Young, Balancing credibility, relevance and legitimacy: A critical assessment of trade-offs in science-policy interfaces, Sci. Public Policy. 41 (2014) 194–206. doi:10.1093/scipol/sct046.

[118] K. Vohland, M.C. Mlambo, L.D. Horta, B. Jonsson, A. Paulsch, S.I. Martinez, How to ensure a credible and efficient IPBES?, Environ. Sci. Policy. 14 (2011) 1188–1194. doi:10.1016/J.ENVSCI.2011.08.005.

[119] GESAMP, Sources, fate and effects of microplastics in the marine environment (Part 1), 2015. http://www.gesamp.org/publications/reports-and-studies-no-90 (accessed January 29, 2019).

[120] GESAMP, The magnitude and impacts of anthropogenic atmospheric nitrogen inputs to the ocean, 2018. http://www.gesamp.org/publications/the-magnitude-and-impacts-of-anthropogenic-atmospheric-nitrogen-inputs-to-the-ocean (accessed January 29, 2019).

[121] IPCC, Appendix A to the Principles Governing IPCC Work: Procedures for the preparation, review, acceptance, adoption, approval and publication of IPCC reports, 2013. https://archive.ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a-final.pdf (accessed January 29, 2019).

[122] IPCC, IPCC Procedures, (2019). https://www.ipcc.ch/documentation/procedures/ (accessed January 29, 2019).

[123] IPBES, Conflict of interest policy and implementation procedures, 2015. https://www.ipbes.net/system/tdf/downloads/Conflict_of_interest_policy.pdf?file=1&type=node&id=15252 (accessed January 29, 2019).

[124] UNCCD, Call for Independent Scientists to Join the Science-Policy Interface, 2017. https://www.unccd.int/sites/default/files/inline-files/SPI%20Call%20for%20Independent%20Scientists_FINAL_07112017.pdf (accessed January 29, 2019).

[125] IPCC, Authors: Special Report on Climate Change and Land (SRCCL), (2019). https://archive.ipcc.ch/report/authors/report.authors.php?q=34&p=&p (accessed January 29, 2019).

[126] M. Oubenal, M. Hrabanski, D. Pesche, IPBES, an inclusive institution? Challenging the integration of stakeholders in a science-policy interface, Ecol. Soc. 22 (2017). doi:10.5751/ES-08961-220111.

[127] IPBES, Land Degradation and Restoration, (2019). https://www.ipbes.net/group/land-degradation-restoration (accessed January 29, 2019).

[128] UNCCD, Work programme for the Science-Policy Interface (2018–2019), 2017. https://www.unccd.int/sites/default/files/sessions/documents/2017-07/ICCD_COP(13)_CST_7-1710500E.pdf (accessed January 29, 2019).

[129] B.H. MacDonald, R.E. Cordes, P.G. Wells, Grey literature in the life of GESAMP, an international marine scientific advisory body, Publ. Res. Q. 20 (2004) 25–41. doi:10.1007/BF02910858.

[130] GESAMP, The Atmospheric Input of Chemicals to the Ocean, 2012. http://www.gesamp.org/publications/the-atmospheric-input-of-chemicals-to-the-ocean (accessed January 29, 2019).

[131] GESAMP, GESAMP Composite List, 2018. http://www.imo.org/en/OurWork/Environment/PollutionPrevention/ChemicalPollution/Documents/GESAMP%20Composite%20List%202018%20web.pdf (accessed January 29, 2019).

[132] GESAMP, Deliverable 2(b): Regional/subregional assessments on biodiversity and ecosystem services, (2015). https://www.ipbes.net/deliverables/2b-regional-assessments (accessed January 29, 2019).

[133] UNCCD, Science-Policy Interface work programme for the biennium 2018-2019, 2018. https://knowledge.unccd.int/sites/default/files/inline-files/SPI_%20WP2018-2019.pdf (accessed January 29, 2019).

[134] UNCCD, Communications Strategy of the Science-Policy Interface, 2017. https://knowledge.unccd.int/sites/default/files/inline-files/SPI%20Communications%20Strategy_110117_0.pdf (accessed

January 29, 2019).

[135] UNCCD, Review of the Science-Policy Interface and its achievements, 2017. http://knowledge.unccd.int/sites/default/files/inline-files/ToR_SPI_revised-Apr2016.pdf (accessed January 29, 2019).

[136] GESAMP, Objectives, (2019). http://www.gesamp.org/about/objectives (accessed January 29, 2019).

[137] M. De Donà, Science-policy platforms in global environmental governance: the case of the UNCCD SPI, 2017. https://www.duo.uio.no/handle/10852/59967 (accessed January 6, 2019).

[138] I. Fazey, J. Fischer, D.B. Lindenmayer, Who does all the research in conservation biology?, Biodivers. Conserv. 14 (2005) 917–934. doi:10.1007/s10531-004-7849-9.

[139] K.G. Pennell, M. Thompson, J.W. Rice, L. Senier, P. Brown, E. Suuberg, Bridging Research and Environmental Regulatory Processes: The Role of Knowledge Brokers, Environ. Sci. Technol. 47 (2013) 11985–11992. doi:10.1021/es4025244.

[140] B.C.K. Choi, T. Pang, V. Lin, P. Puska, G. Sherman, M. Goddard, M.J. Ackland, P. Sainsbury, S. Stachenko, H. Morrison, C. Clottey, Can scientists and policy makers work together?, J. Epidemiol. Community Health. 59 (2005) 632–7. doi:10.1136/jech.2004.031765.

[141] IPCC, Future of the IPCC; Collated Comments from Governments, 2013. https://www.ipcc.ch/apps/eventmanager/documents/5/030920131000-INF_1_p37.pdf (accessed January 27, 2019).

[142] IISD Reporting Services, Summary of the Thirteenth Session of the Conference of the Parties to the UN Convention to Combat Desertification, Earth Negot. Bull. (2017). http://enb.iisd.org/vol04/enb04278e.html (accessed January 27, 2019).

[143] M. Akhtar-Schuster, F. Amiraslani, C.F.D. Morejon, R. Escadafal, E. Fulajtar, A. Grainger, K. Kellner, S.I. Khan, O.P. Pardo, U. Sauchanka, L.C. Stringer, F. Reda, R.J. Thomas, Designing a new science-policy communication mechanism for the UN Convention to Combat Desertification, Environ. Sci. Policy. 63 (2016) 122–131. doi:10.1016/j.envsci.2016.03.009.

[144] IPBES, About, (2019). https://www.ipbes.net/about (accessed January 28, 2019).

[145] UNCCD, UNCCD Scientific Conferences, (2019). https://knowledge.unccd.int/unccd-scientific-conferences (accessed January 29, 2019).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8. ANNEXES

Annex 1: Thought Starter prepared before the 1st Intersessional Meeting (SAICM/IP.1/4)

Information included in this annex has been taken directly without editing of content from:

> *SAICM, First meeting of the intersessional process considering the Strategic Approach and the sound management of chemicals and waste beyond 2020, (2017). http://www.saicm.org/Beyond2020/IntersessionalProcess/FirstIntersessional/tabid/5463/language/en-US/Default.aspx (accessed January 29, 2019).*

Desired outcome for the intersessional process:

- The role of science and its link to both policy and implementation are taken into consideration in the beyond 2020 discussions.

Key considerations:

- Considerable uncertainties about hazards and risks come with the ongoing development of new chemical substances and with the increasing use of chemicals in ever more products. The role of science in the Strategic Approach process is an important consideration, particularly in making science relevant and useful in policy and governance processes.

- Strengthening the link between science and policy may therefore be highly recommended in global chemicals governance.

- A new subsidiary body to a future International Conference on Chemicals Management addressing science-policy issues and functions could be established to fulfil a number of requirements.

- For a possible subsidiary body to be useful, precise terms of reference would be needed to ensure that all appropriate stakeholder groups are able to participate and that the full spectrum of scientific and public health disciplines related to chemical safety are actively engaged.

- Tasks could include: providing information on the state of knowledge on emerging and ongoing challenges; analysing options for dealing with the challenges; developing indicators for tracking progress on Strategic Approach implementation; and using a wide range of capacity building approaches, including education and training programmes, capacity building projects and others.

- Apart from spurring progress within the Strategic Approach, the subsidiary body undertaking science-policy functions could foster transdisciplinary academic cooperation, enable information exchange and learning across disciplines and regions, and generally enhance the visibility of these issues within academia.

Questions:

- Is there a need to strengthen the link between science and policy beyond 2020? If so, what science-policy functions could be enhanced beyond 2020? Can existing organizations perform these functions, or is there a need for a new body?

- What are possible advantages and disadvantages of a subsidiary body?

- What elements would be needed for a precise terms of reference including provisions to ensure balanced participation, avoid bias and undue influence, and the engagement of all relevant disciplines?

- Would the subsidiary body:

    - Be time- or task-limited?
    - Assess emerging and ongoing challenges and provide policy-relevant knowledge on the effects of these challenges?
    - Advise stakeholders on a possible prioritization, based on the estimated social and environmental costs and benefits?
    - Link to potential future Global Chemicals Outlook processes?
    - Report to the Conference?

- How would this work link to the activities of other international venues (support the Multilateral Environmental Agreements) as well as work of Inter-Organization Programme for the Sound Management of Chemicals (IOMC) organizations?

Annex 2: Comments by stakeholders during the 1st Intersessional Meeting

Information included in this annex has been taken directly without editing of content from:

> *SAICM, Report of the first meeting in the intersessional process to consider the Strategic Approach and the sound management of chemicals and waste beyond 2020, (2017). http://www.saicm.org/Portals/12/documents/meetings/IP1/K1707024.pdf (accessed January 29, 2019).*
>
> *IISD Reporting Services, First Meeting of the Intersessional Process for Considering SAICM and the Sound Management of Chemicals and Waste Beyond 2020: 7-9 February 2017, Earth Negotations Bull. 15 (2017). http://www.iisd.ca/chemical/SAICM/iccm5/ip1/ (accessed January 29, 2019).*

Felix Dodds, Tellus Institute, discussed the 21st century challenges for chemicals and waste in the context of the 2030 Agenda for Sustainable Development … He suggested learning from the SDGs partnerships process, including current work on "smart criteria" for multi-stakeholder partnerships, and considering a science-policy interface for chemicals and waste.

Morocco suggested post-2020 work consider linkages with the SDGs on air and water, the science-policy interface, and efforts to fill gaps in scientific knowledge and risk assessment.

Observing that not all chemicals and waste management issues can be solved by 2030, 2040 or even 2050, the **Russian Federation** suggested time limits for particular goals might be worthwhile, but not an overall SAICM time limit. He called for the future SAICM to have a stronger scientific basis, and, in that vein, proposed a science-policy interface similar to the Intergovernmental Panel on Climate Change (IPCC) or Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

Colombia said SAICM provides value added through its multi-sectoral and multi-stakeholder approach, bringing together all relevant actors. He urged keeping this approach while reinvigorating partnerships and closing the gap between science and policy.

UN Environment ... said handling new and emerging issues is an important part of SAICM because it keeps the instrument dynamic, responsive, relevant and alive, and should be preserved beyond 2020, but that EPIs need to be addressed in a scientifically robust manner, using the most up-to-date science. He said that while

UN Environment is open to discussing various options for a science-policy interface, he cautioned that form should follow function and said UN Environment is uncertain what issues the interface might address that are not already being tackled by UNEA, the GCO, the Global Waste Management Outlook, and the International Resource Panel.

Sweden, supported by **Norway**, suggested ... if a science-policy interface were adopted it should not preclude SAICM participants from nominating new areas of concern.

Germany ... said a science-policy interface might be useful if it did not duplicate existing work elsewhere.

Health Care Without Harm emphasized the science-policy interface should not delay implementation by focusing on uncertainty of the hazardous effects of chemical substances, and highlighted the need for precise terms of reference of a possible scientific subsidiary body and for addressing conflicts of interest of that body's members.

The **US** ... noted that resources required for a scientific body would be better spent on implementation.

Germany suggested a review mechanism, to be discussed with the science-policy interface.

The African Group emphasized the lack of resources for scientific work in the countries of the region and called for developing a transparent mechanism for the nomination and selection of emerging issues that allows accountability, including accountability at the highest political level.

Flasbarth said the chemicals industry is a driver for the transformation to a decarbonized economy and underlined: the importance of public knowledge on chemical products; the need to substitute hazardous substances; the importance of non- chemical technological solutions; and the need for a science- policy interface on chemicals.

Norway suggested developing guidelines for sustainable chemicals production using a lifecycle approach and enabling product recycling. She did not support an additional scientific panel for chemicals and waste under a post-2020 platform.

Brazil stressed focusing on scientific capacity building and cautioned about diverting resources from implementation.

Annex 3: Comments submitted by stakeholders after the 1st Intersessional Meeting

Information included in this annex has been taken directly without editing of content from:

> *SAICM, Stakeholders' inputs to the Intersessional Process on SAICM and the sound management of chemicals and waste beyond 2020, (2017). http://www.saicm.org/Beyond2020/IntersessionalProcess/Stakeholdersinputs/tabid/6098/language/en-US/Default.aspx (accessed January 29, 2019).*

0) Inputs in the Co-chair summary and agreed by Cameroon, Germany, ICCA, Suez Canal University, Togo, the US, and WHO

- Explore how to strengthen the link between science, public health and policy in global chemicals and waste governance.
- Recognize the existing mechanisms for provision of science advice on chemicals and waste by intergovernmental and international bodies such UNEP, WHO and the chemicals and wastes conventions secretariats.
- Consider the social interface and the full range of scientific and public health disciplines.
- Explore approaches on the use of science to inform policy-making and action, including existing mechanisms in other clusters such as climate change and biodiversity.
- There were also comments regarding the need to focus on scientific capacity-building and caution about diverting resources from implementation.

1) The Secretariat of the Basel, Rotterdam and Stockholm Conventions

In the chemicals and wastes cluster, specifically under the BRS conventions, a number of processes and activities are taking place on enhancing the science to action interface.

At the 2017 COPs, Parties adopted similar decisions on science to action, among others, calling for the revision of a roadmap for further engaging Parties and other stakeholders in informed dialogue for enhanced science-based action in the implementation of the conventions at the regional and national levels, taking into account the roles of the scientific bodies of the conventions.

The draft roadmap considered at the 2017 COPs already provides some initial actions

that countries and stakeholders may implement at the regional and national levels towards enhancing this interface, for instance:

- Build national and regional capacity on how to use scientific information in decision-making and to involve stakeholders in science-based decision-making
- Build networks and partnerships for enhanced science-based action
- Address challenges faced by developing countries and countries with economies in transition in science based decision-making
- Enhance collaboration between Secretariat and other entities on information sharing and outreach on scientific aspects of the BRS conventions

2) Canada

Rather than creating a new body, we may wish to recognize strengths/abilities of existing science-based mechanisms in informing policy making (UNEP, WHO, MEAs including technical subsidiary bodies, OECD, UNEA, and ad hoc processes on specific issues, i.e. marine litter). These bodies could be mobilized to investigate new issues and provide advice.

This would require new collaborative efforts between or among these scientific bodies but would also bring efficiencies and better results.

3) EU and its Member States

Improving the interface between science and policy is vital in technically complex fields such as SMCW. At the multilateral level, it is important to continue to preserve the impartiality of the work of existing scientific bodies. In addition, overarching assessments could be relevant for state of the art knowledge and advice on issues of concern, and for the broader inclusion of academic perspectives from developing countries and emerging economies.

At the national level, technical and scientific advice should also be sound, unbiased, legitimate and based on evidence, including the work carried out by existing bodies at the multilateral level. The guidelines prepared by the OECD are a good example, which Governments may follow at the national level. It is also essential to maintain socio-economic considerations separate from scientific and technical advice provided to policy and decision-makers.

4) Germany

Strengthen the science-policy interface to bring sustainable chemical innovations to achieve the SDG's faster to the markets and to implementation.

5) Greenpeace

We have particular interest in the science-policy interface mentioned in the co-chairs' summary report. From our perspective, it will be necessary but not sufficient only to strengthen the existing scientific bodies currently advising different aspects of global chemical and waste sound management work. Just as the somewhat fragmented existing chemical and waste instruments will require an overarching framework to ensure co-ordination and to fill the gaps, so the existing relevant scientific bodies, which normally sit ONLY under, or work ONLY for, one of these existing instruments, would also benefit substantially from consolidation. We see a huge potential for greater collaboration, streamlining, or even merging of separate working groups and/or task-forces under one overarching scientific panel/body, in order to enhance the breadth and depth of strategic guidance, improve coherence and synergy, avoid duplication of work, and increase efficiency and credibility of policy decision-making on global chemical and waste work. There could also be significant financial benefits from such consolidation.

An overarching panel might also enable more timely and consistent responses within potential action areas under SAICM and beyond 2020, e.g. EPIs. We fear that the current lack of a stable, strong and credible overarching scientific body under SAICM, may well have contributed in part to the relatively slow progress on such issues. Furthermore, such a global overarching scientific body could provide the critical mass necessary in order to encourage engagement of the wider scientific community with relevant expertise on chemical and waste issues, which has not so far been mobilized as effectively as it could. By analogy, many scientists & civil society organisations around the world have been mobilized by the critical mass of the IPCC within the field of climate science. We hope the document in Annex 1 which was originally prepared for UKCSF could serve as a contribution to this broad issue.

The importance of scientific information in sound chemical management has been emphasized in the Overarching Policy Strategy (OPS) of SAICM, on risk reduction, knowledge and information, as well as capacity building and technical cooperation. The role of science in SAICM and beyond-2020 agenda-setting is perhaps of most relevance in relation to issues of concern, the nominations of which, along with any subsequently adopted resolutions, must be based on sound science, showing the link between chemical exposures and effects on human health and the environment1.

Abundant experience has been gained under other international mechanisms to demonstrate the importance and value of a credible and transparent scientific panel or advisory group in guiding timely and informed decision-making through provision of scientific expertise and advice , e.g. IPCC (Intergovernmental Panel on Climate Change) for UN Framework Convention on Climate Change, POPRC (POPs Review Committee) of the Stockholm Convention, CRC (the Chemical Review Committee) under the Rotterdam Convention, the Scientific Groups of the London Convention/

London Protocol on the Prevention of Marine Pollution by Dumping of Wastes and Other Mater, and GESAMP (Join Group of Experts on the Scientific Aspects of Marine Environmental Protection) for different UN systems.

Although precise models and mandates vary among those science panels, the core principles are similar in each case, including an ability for such bodies to work independently of vested interests to provide high-quality scientific advice and reports on both established and emerging issues of relevance to those instruments, drawing upon other expertise as required. In the case of chemicals management, such an interface could, for example, consider evidence relating to substances and groups of substances under regulation or of emerging concern in a transparent way, and could suggest concrete and focused action if mandated, with a credibility and, therefore, authority of which is internationally accepted. This model was preferred in the "Chemicals and Waste Governance Beyond 2020" report by Nordic Council of Ministers, which was presented to the Brazil meeting.

In the same report, it was suggested that ways should be sought to utilize more effectively the existing scientific panels that focus on chemicals and waste, in order to avoid duplication and extra costs.

Taking all of these into consideration, IPCP could serve as a strong candidate or, at least, an established and credible starting point to fill this gap, which has also been mentioned in the Nordic Council report.

6) IPEN

The actual proposal is not certain, though some have suggested formation of a body to address scientific issues. It is not clear what tangible problem this proposal is trying to address. In many instances, acting on existing scientific evidence is a stronger need than collecting additional information (e.g. the listing of the paraquat formulation and chrysotile asbestos is still pending under the Rotterdam convention despite very clear data and recommendations from the CRC). All the emerging policy issues and issues of concern that have been proposed and worked on during SAICM so far, have been solidly justified and no extra scientific body would have altered or improved decision-making on them. Considering the serious resource challenges facing chemical safety implementation, a funded scientific body would be a low priority compared to many other pressing concerns. If such a body were to be considered, then very precise terms of reference would be needed to ensure that all appropriate stakeholder groups are able to fully participate and that the full spectrum of scientific and public health disciplines related to chemical safety are actively engaged. In addition, strict measures to prevent conflict of interest and bias would need to be instituted to protect scientific integrity in policy decisions.

7) USA

We agree with the below point that it is important to recognize and cooperate with existing entities and mechanisms for provision of scientific advice on chemicals and waste, but we do not believe there is a need for a new mechanism. Also, the Overarching Policy Strategy includes several activities related to science and technical exchanges. It would be useful to include more of those concepts here.

8) WHO

Recognize that the link between science and policy is not always direct since there are other considerations, drivers and facts - besides scientific facts - that need to be taken into account and addressed in policy decisions, especially at the global scale.

9) IPCP

It should be recognized that academic scientists in the field of chemicals and waste have much to offer to the SMCW, but in comparison to other stakeholders such as non-governmental organizations and industry are much less organized and coordinated with respect to policy-related work. Thus, in contrast to the fields of climate change and biodiversity, only a small number of academic scientists have been individually called in by some ministries and agencies, whereas the majority of academic scientists are neither participating nor represented in the current science-policy discussion of chemicals and waste. As a consequence, the academic community has a rather limited voice in the current science-policy interface in the field of chemicals and waste. Accordingly, a future, strengthened science-policy interface should leverage existing associations of academic scientists, engage scientists globally, and facilitate a harmonized contribution of the academic community, similarly to the Intergovernmental Panel on Climate Change and Working Groups under the Convention on Long-Range Transboundary Air Pollution.

It should be recognized that a strong science-policy interface should facilitate bidirectional communication, and thus, promote the co-production of science and policy in the field of chemicals and waste, including perspectives from developing and developed countries: scientific evidence from exploratory research can grow stronger if the policy context defines a need for additional research, and, similarly, a weak policy context can become stronger if confirmatory scientific evidence is produced. The future, strengthened science-policy interface should therefore have at least the following functions:

a. to monitor and evaluate the progress of science, identify new and

emerging issues, and inform decision-makers about those issues;

b. to monitor and evaluate progress on methods for monitoring and reporting in support of policy initiatives; and

c. to monitor and evaluate progress of policy, identify fields where gaps in the relevant science exist and are critical, and inform scientists about these gaps.

The future, strengthened science-policy interface with the engagement and involvement of the academic community may be established both on the national/regional and international levels in the following ways:

a. On the national level, one route of more actively including academic scientists could be through continuous, broad outreach by national agencies and ministries. This could be similar to the current practices, but may also be enhanced through regular dialogue between agencies/ministries and the academic community in individual countries.

b. On the international level, governments may wish to provide financial support for the coordination and facilitation of the academic community to be present at international meetings and conferences to provide scientific and technical inputs as well as for scientists to understand the existing research needs and better organize future research activities within the academic community to fill these gaps.

The future, strengthened science-policy interface should be neutral (i.e., without financial conflict of interest), independent, transparent and science/facts-oriented.

10) The NGO Forum for Health

The fundamental challenge is to bring to bear clear evidence from scientific research and to give scientific findings a clear pathway to the decision-making table at multilateral and global levels, and ultimately at national level.

Annex 4: Survey sent to relevant stakeholders to collect data during the development of the gap analysis report

General

1. Name of science-policy interface body (SPI body):

2. Your contact details (name, affiliation, email):

Organisation and governance structures

3. How is the SPI body organized? Is the SPI body a subsidiary or independent body?

4. Who are the members of the SPI body?

5. How are the members/experts selected and appointed and according to which criteria?

6. Are rules and procedures in place to identify and minimize conflicts of interest amongst members of the SPI body?

   ☐ Yes
   ☐ No

7. If yes, could you please specify what they are (or point out to us where we may find such information)?

8. Which procedures or rules are in place to ensure academic credibility and independence?

9. Is the SPI body open to observers?

   ☐ Yes, to all stakeholders
   ☐ Yes, to invited stakeholders
   ☐ No
   ☐ Other:

10. What is the budget of the SPI body (incl. in-kind contributions)? How is the SPI body financed? How is transparency in the financing process ensured?

Terms of reference (mandate and scope)

11. What is the geographical scale covered by the SPI body, and please specify region(s) in “Other...”, if applicable:

    ☐ Global
    ☐ Regional
    ☐ National
    ☐ Local
    ☐ Others:

12. Which chemicals or groups of chemicals are covered by the SPI body?

13. Are chemical management issues (e.g. chemical information exchange along the value chain) covered by the SPI body, in addition to chemicals or groups of chemicals? If yes, could you please provide one or two examples in “Other...”

    ☐ Yes
    ☐ No
    ☐ Other

14. Which stage(s) of the following chemical lifecycle are covered by the SPI body?

    ☐ Production and packaging
    ☐ Transport and storage
    ☐ Trade
    ☐ Use
    ☐ Reuse, recycling and recovery
    ☐ Disposal
    ☐ Other:

15. Which aspects are covered by the SPI body?

    ☐ Environmental aspects
    ☐ Human health-related aspects
    ☐ Both of the above
    ☐ Other:

16. What are the mandates of the SPI body?

17. How is the work program of the SPI body decided? E.g. by whom?

18. How would you categorize the work of the SPI body?

	NO OR LOW	MODERATE	HIGH
Relevance of the SPI body to International Chemicals Management	☐	☐	☐
Degree of specialization of the SPI body in the field of chemicals management	☐	☐	☐

19. Could you please provide more details regarding the work areas of the SPI body? If your answer is “yes” or “other”, please specify below.

	YES	NO	OTHER
Does the SPI body provide scientific assessment of new issues and/or policy measures upon request?	☐	☐	☐
Does the SPI body provide scientific support in monitoring and evaluation of the progress of implementation and/or the effectiveness of relevant measures?	☐	☐	☐
Does the SPI body identify issues of concern and inform policy-makers?	☐	☐	☐
Does the SPI body facilitate science-policy dialogue (e.g. development of joint strategies)?	☐	☐	☐
Does the SPI body actively synthesize and disseminate scientific information in certain fields?	☐	☐	☐
Does the SPI body work on capacity building?	☐	☐	☐
Does the SPI body inform relevant scientists about policy development?	☐	☐	☐
Does the SPI body coordinate scientific inputs for policy calls?	☐	☐	☐
Does the SPI body have other work areas?	☐	☐	☐

20. Examples of scientific assessment of new issues and/or policy measures upon request

21. Examples of scientific support in monitoring and evaluation of the progress of implementation and/or the effectiveness of relevant measures

22. Examples of identification of issues of concern

23. Examples of facilitation of science-policy dialogue

24. Examples of active synthesis and dissemination of scientific information in certain fields?

25. Examples of capacity-building

26. Examples of activities to inform scientists about policy developments

27. Examples of activities to coordinate scientific inputs for policy calls

28. Examples of other work areas

Outputs

29. What are the SPI body's outputs (e.g. assessments, technical guidelines, recommendations, etc.)?

30. Is there a transparent review process of the SPI body's outputs? If yes, how does it work?

31. Who has ownership of the outputs of the SPI body (e.g. SPI body, governments)?

Network

32. Is there communication and coordination with other SPI bodies? If yes, with which ones?

33. Does the SPI body actively expand its network? Does it reach out to universities?

Developing countries and countries with economies in transition

34. Are processes or rules in place to ensure that the circumstances and needs of developing countries and countries with economies in transition are taken into account? If yes, which?

Annex 5: Additional information pertaining to the interface bodies considered in the gap analysis presented in this report

1. Outputs

OUTPUT	TYPE OF OUTPUT	SPI BODY
SCIENTIFIC / TECHNICAL OUTPUT	Assessments (e.g. scientific and technical assessments, screening assessments)	Basel OEWG, POPRC, SAP, EMEP, CLRTAP WG Effects, AMAP, OECD EHS, UNITAR, IRP, FAO/WHO JECFA, FAO/WHO JMPR
	Reviews of scientific information (e.g. Thematic Review papers – GCO)	Basel OEWG, EMEP, CLRTAP WG Effects, GCO, IRP, IPCP, FAO/WHO JECFA, FAO/WHO JMPR, GESAMP
	Technical guidelines (e.g. monitoring guidelines, standards for the testing of chemicals)	Basel OEWG, EMEP, CLRTAP WG Effects, AMAP, PEN, OECD EHS, GEF STAP, FAO/WHO JECFA, FAO/WHO JMPR, FAO/WHO JMPM, GESAMP
	Scientific/technical guidance documents and manuals, advice	Basel OEWG, SCE GHS, GMP, WHO CRAN, GEF STAP, IRP, IPCP, Protocol on PRTRs, FAO/WHO JECFA, FAO/WHO JMPR, FAO/WHO JMPM, GESAMP
	Reports (e.g. on the status of implementation of protocols, systems, etc.)	GCO, SCE GHS, UNEP EDC AG, WHO CRAN, GEF STAP, Protocol on PRTRs, FAO/WHO JECFA, FAO/WHO JMPR, GESAMP
	Tools, databases, inventories	WHO CRAN, UNITAR, IRP, Protocol on PRTRs, FAO/WHO JECFA, FAO/WHO JMPR, GESAMP
	Summaries for policy-makers, guidance documents for policy-makers	CRC, AMAP, GCO, IRP, Protocol on PRTRs, GESAMP
LEGAL INSTRUMENTS	Legal instruments (recommendations to the COP, rationales, decisions, draft resolutions)	CRC, SCE GHS, OECD EHS, FAO/WHO JECFA

OUTPUT	TYPE OF OUTPUT	SPI BODY
OUTPUT CONCERNING FUNCTIONING OF THE SPI BODY	Meeting and workshop reports, reviews on activities, workplans	Basel OEWG, CRC, POPRC, EMEP, CLRTAP WG Effects, SCE GHS, GEF STAP, IRP, IPCP, Protocol on PRTRs, FAO/WHO JECFA, FAO/WHO JMPR, FAO/WHO JMPM, GESAMP
OUTREACH	Outreach products, awareness raising materials	SAP, AMAP, GMP, UNEP EDC AG, IRP, Protocol on PRTRs
OTHER	Other	SCE GHS: Guidance material to assist organizations involved in capacity-building GMP: Strategy planning, demonstration projects, information gathering and exchange UNITAR: Management plans IPCP: Statements, e.g. Zürich Statement on Future Actions on Per- and Polyfluoroalkyl Substances (PFASs) FAO/WHO JECFA: Monographs

- There is a marked preponderance of scientific/technical output, especially in the form of assessments and technical guidelines. Some of these are destined for scientists (e.g. technical guidelines, tools, databases), whereas others are destined for policy-makers. That output is predominantly scientific/technical in nature reflects the fact that the science to policy function is the most important function amongst the SPI bodies. Few SPI bodies publish outreach or awareness raising materials, or recommendations, decisions, draft resolutions or other legal instruments.

2. Review process for outputs

All of the SPI bodies for which information is available state that they have a review process for their outputs. The review processes are more or less well defined and more or less complex. They range from simpler processes or rules, such as:

- An “open process on development of outputs, before, during and after OEWG” (Basel OEWG)
- Comments from CRC-internal reviewers on task group reports and decision guidance documents (CRC)

- Internal national review and independent peer review (AMAP)
- Peer review similar to a typical scientific publication review process (GEF STAP)

to more complex processes and rules, such as:

- Multiple rounds of reviews with hundreds of international experts and a physical meeting to discuss reviews (SAP, Scientific Assessment of Ozone Depletion)
- Several rounds of comments on draft outputs solicited from Parties and observers, and draft outputs placed on website for public viewing and comments. A document listing all comments and how they were handled is also put on the website. A contact group open to all observers is set up to review and revise the outputs based on comments (POPRC)

3. Ownership of results

WHO HAS OWNERSHIP OF RESULTS?	EXAMPLES
THE SPI BODY ITSELF	CRC, POPRC, AMAP/Arctic Council, IPCP, UNITAR
THE HOST ORGANIZATION	GEF STAP (host organization: GEF Partnership), WHO CRAN (WHO), IRP (UNEP), SCE GHS (UN), AMAP (Arctic Council), FAO/WHO JECFA (FAO and or WHO), GESAMP (8 sponsoring agencies)
THE MEMBER COUNTRIES OF THE SPI BODY	OECD EHS
THE PARTNERS WHO GENERATE THE OUTPUT	UNEP's programs (GMP, PEN, DDT Alliance, UNEP EDC AG) – but if activity funded by UNEP, then UNEP shares ownership of the output. UNITAR also shares ownership of output with its partners.
VARIOUS OR OTHER STAKEHOLDERS	AMAP: Scientists retain rights to intellectual property etc. AMAP encourages scientists to make use of work performed in AMAP assessments in e.g. preparation of publications for the scientific literature. AMAP data and graphical and other products are generally accessible and available for use, especially e.g. educational use, including data accessible online from AMAP thematic data centers.
	Basel OEWG: Parties and other stakeholders (e.g. subsidiary bodies established under the Convention that report to the OEWG, observers) own the results, as appropriate.

4. Organizational structure

SPI BODY	FORM OF SPI BODY	ORGANIZATIONAL ELEMENTS
Under MEAs		
BASEL OEWG	Subsidiary body	Bureau composed of 2 co-chairs, 2 vice-chairs, 1 rapporteur
CRC	Subsidiary body	Bureau composed of 1 chair, 4 vice-chairs
POPRC	Subsidiary body	1 chair (elected by COP), 1 vice-chair (elected by Committee)
SAP	Subsidiary body	Scientific Steering Committee (co-chairs and 4 other prominent scientists), Coordinating Lead Authors, Lead authors, Assessment Coordinator
EMEP	Subsidiary body[I]	Coordination of EMEP's operation by 5 programme centers and 4 task forces, which report annually to the EMEP Steering Body. Steering Body reports to the Executive Body of the Convention.
CLRTAP WG EFFECTS	Subsidiary body	Bureau composed of 1 chair and 5 vice-chairs. 6 International Cooperative Programmes and a Task Force on Health
PROTOCOL ON PRTRS	n/a because not a distinct SPI body[II]	
SCE GHS	Subsidiary body	1 Chairperson and 1 vice-chairperson. Correspondence groups (informal groups)
Associated with MEAs		
GMP	Partnership	GMP's governing body: Partnership Advisory Group (PAG), which consists of the leads of all 8 partnership areas, nominees from the area leads, UN Environment, and other participants invited by the Secretariat.
PEN	Network	Coordinated by the Secretariat of the PEN, which is hosted by UN Environment Chemicals and Health Branch. PEN is comprised of an Advisory Committee and PEN members.

SPI BODY	FORM OF SPI BODY	ORGANIZATIONAL ELEMENTS
DDT ALLIANCE	Alliance	Alliance consists of a Steering Committee (15 members, and a Coordinator), 5 Thematic Groups and an Assembly.
Not directly associated with MEAs		
UNEP EDC AG	Advisory group	Established by UNEP, representatives nominated through members of the SAICM bureau and representatives from major groups and stakeholders.
GCO	n/a because not technically an SPI body, but a process	
OECD EHS	n/a because not a distinct SPI body[ll]	
WHO CRAN	Network	A Network Coordinating Group is convened by WHO. Secretariat and planning support provided by WHO Department of Public Health, Environmental and Social Determinants of Health.
WHO IPCS	Joint programme	Joint programme of WHO, ILO and UNEP. WHO is the Executing Agency of the IPCS. Organizational structure is composed of the Central Unit (CU) (WHO Programme for the Promotion of Chemical Safety acts as CU), the Intersecretariat Coordinating Committee, the Programme Advisory Committee, Task Groups and Working Groups.
FAO/WHO JECFA	Independent expert committee	WHO and FAO Joint Secretaries are responsible for providing secretariat support, organizing meetings, etc., and a WHO JECFA Secretariat and a FAO JECFA Secretariat each invite experts with expertise in their respective fields.
FAO/WHO JMPR	Independent expert ad hoc body	The JMPR comprises the WHO Core Assessment Group and the FAO Panel of Experts on Pesticide Residues in Food and the Environment. There are a Joint FAO/WHO Secretariat of the Meeting, a WHO JMPR Secretariat and a FAO JMPR Secretariat.
FAO/WHO JMPM	Joint programme	JMPM consists of members from the FAO Panel of Experts on Pesticide Management and the WHO Panel of Experts on Vector Biology and Control. Both are statutory bodies of their respective Organizations. There is a FAO/WHO Joint Secretariat of the JMPM.

SPI BODY	FORM OF SPI BODY	ORGANIZATIONAL ELEMENTS
UNITAR	n/a because not a distinct SPI body[II]	
GEF STAP	Independent body	GEF STAP is a corporate body of the GEF.
IRP	Partnership	The partnership consists of a Panel, a Steering Committee and a Secretariat.
GESAMP	Advisory body	GESAMP is managed through an Executive Committee consisting of a representative of each Sponsoring Organization and the Chairperson and two Vice-Chairpersons of GESAMP. Working Groups are set up to carry out substantive work.
IPCP	Network	The 3 organs of the IPCP are: General Assembly, Board and Auditors.
AMAP	Working group	AMAP is a working group of the Arctic Council and has a Secretariat.

I. The Steering Body to EMEP is a subsidiary body to the Executive Body, the supreme governing body to the Convention.

II. These "SPI bodies" are not distinct SPI bodies that have their own organizational structures. Rather, they are (intergovernmental) bodies that conduct relevant activities at the chemicals and waste science-policy interface; these activities are integrated in the activities/functioning of the broader organization. The organization structures of these bodies are therefore not included here. The SPI work relating to the Protocol on PRTRs is carried out by UNECE.

- The SPI bodies are predominantly organized either as subsidiary bodies (all of the SPI bodies under MEAs are subsidiary bodies) or as collaborative mechanisms such as networks, partnerships, alliances or joint programs.

- Other forms that SPI bodies take are independent bodies/committees, advisory groups/bodies and working groups.

5. Membership

SPI BODY	WHO ARE THE MEMBERS?
Under MEAs	
BASEL OEWG	Representatives of all interested Parties
CRC	31 experts in chemicals management, nominated by governments and appointed by the COP.
POPRC	31 members. Members of the Committee are government-designated experts in chemical assessment or management from Parties.
SAP	Selected experts who are qualified in the field of atmospheric science and internationally recognized as such.
EMEP	Each Party participating in the session shall be represented by a delegation consisting of a head of delegation and other representatives and advisers from national environment agencies or national research institutes.
CLRTAP WG EFFECTS	Each Party participating in the session shall be represented by a delegation consisting of a head of delegation and other representatives and advisers from national environment agencies or national research institutes.
PROTOCOL ON PRTRS	n/a, as not a distinct SPI body
SCE GHS	79 participants: Governments (there are member states and non-member states of the body) and UN funds and programs (UNEP) and specialized agencies (ILO, IMO, WHO), UN related organizations (UNITAR), IGO (OECD), NGOs (consultative with ECOSOC and others)
Associated with MEAs	
GMP	180 partners comprised of governments, NGOs, businesses and industry associations, and academia.
PEN	About 450 members: governments, IGOs, donors, PCB holders, NGOs, industry, experts/academia and business sectors relevant to PCB.

SPI BODY	WHO ARE THE MEMBERS?
DDT ALLIANCE	Membership is open. All stakeholders including organizations and individuals engaged within the scope of developing and deploying alternatives to DDT for disease vector control are invited to take part. Professional experts who are committed to the development and deployment of alternatives to DDT may join as Individual members.
Associated with MEAs	
UNEP EDC AG	14 members, 10 representatives from governments, as well as representatives from major groups and stakeholders (including IGOs, NGOs, academia and industry).
GCO	Steering Committee composed of representatives from governments, IGOs, academia, civil society and private sector, selected so as to ensure regional and gender balance as much as possible. Approximately 30 experts. Also external executing partners.
OECD EHS	36 member countries
WHO CRAN	The Network welcomes contributions from the following entities undertaking work towards its overall objective: Government and public health institutions, IGOs, professional societies, WHO Collaborating Centres, NGOs in official relations with WHO and any other entity with expertise concerning chemical risk assessment.
WHO IPCS	No current information was found – in the 1990s, 32 member states and national institutions were committed to the Programme through MoU.
FAO/WHO JECFA	Experts with chemical and toxicological expertise, as well as other expertise considered essential given the items on the agenda of specific meetings.
FAO/WHO JMPR	Experts who attend as independent internationally-recognized specialists who act in a personal capacity and not as representatives of national governments.
FAO/WHO JMPM	Members drawn from the FAO Panel of Experts on Pesticide Management and the WHO Panel of Experts on Vector Biology and Control.
UNITAR	Not a distinct SPI body but within UNITAR as a whole, worldwide recognized senior experts provide international expertise to countries and organizations, to advance their approaches to management of chemicals, supported by a team of project officers based within UNITAR's offices.

SPI BODY	WHO ARE THE MEMBERS?
GEF STAP	Panel Members, who are internationally recognized experts in the GEF's key areas of work. One Panel Member is responsible for the Chemical and Waste focal area of the GEF. The Panel Members are supported by a global network of experts and institutions.
IRP	Open to all parties.
GESAMP	17 experts drawn from a wide range of relevant disciplines, who act in an independent and individual capacity.
IPCP	The IPCP network is open to academic scientists from all over the world to become members.
AMAP	The eight Arctic countries: Canada, Kingdom of Denmark, Finland, Iceland, Norway, Russian Federation, Sweden, United States; 6 Permanent Participants (representatives of Arctic Indigenous Peoples organizations: Aleut International Association, Arctic Athabaskan Council, Gwitch'in Council International, Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North, Sami Council).

6. Conflict of interest

6.1. Are procedures or rules in place to minimize conflicts of interest amongst members?

ARE PROCEDURES OR RULES IN PLACE TO MINIMIZE CONFLICTS OF INTEREST AMONGST MEMBERS?	SPI BODIES
Yes	CRC, POPRC, EMEP, CLRTAP WG Effects, WHO CRAN, GEF STAP, IRP, IPCP, FAO/WHO JECFA, GESAMP
No	GMP, PEN, DDT Alliance, UNEP EDC AG, AMAP, OECD EHS

6.2. Procedures or rules utilized to minimize conflict of interest

TYPE OF PROCEDURE OR RULE	SPI BODIES	DETAILS
CODE OF CONDUCT/ TERMS OF REFERENCE	CRC, POPRC	Clear rules include: no gifts, or benefits from persons, groups or organizations with dealings with the CRC, no preferential treatment.
	WHO CRAN	Rules in Terms of Reference include "Such entities [wishing to become Network Participants] shall be free from concerns which are primarily of a commercial or profit-making nature. Donations must not be subject to any perceived or real conflicts of interest and must comply with the applicable WHO rules".
	GEF STAP	The GEF STAP is governed by conflict of interest policies applicable to the GEF and UNEP.
	IRP	Rules outline a separation of roles and responsibilities between scientists and government representatives.
DECLARATION OF INTERESTS	CRC, POPRC, IPCP, FAO/ WHO JECFA, FAO/WHO JMPM, WHO IPCS	Rules state that activities, including business or financial interest, must be disclosed through a declaration of interests form (relating to real, apparent or potential conflicts of interest due to personal or professional involvement with commercial entities).
	WHO CRAN	Network Participants or those expressing interest in becoming Network Participants shall complete a standardized questionnaire, which seeks information concerning the status of the entity and the nature of the contribution it will make towards the Network.
	UNITAR	Various policies are in place at UNITAR to prevent conflicts of interest, including a Policy on Financial Disclosure, Declaration of Interest, and Impartiality Statements.
RULES REGARDING CREDENTIALS	EMEP, CLRTAP WG Effects	Rules state that credentials of all representatives (of Parties) shall be submitted to the secretariat. Where new protocols or amendments to the Convention or to one of its protocols other than amendments to the annex to the EMEP Protocol are to be adopted, the credentials shall be issued either by the Head of State or Government or by the Minister of Foreign Affairs or, in the case of a regional economic integration organization, by the competent authority of that organization. Pending a decision on their credentials, delegates may participate provisionally in the meeting but not vote.

TYPE OF PROCEDURE OR RULE	SPI BODIES	DETAILS
COMPLIANCE WITH RULES AND PROCEDURES	CRC, POPRC	Governments have primary responsibility in ensuring compliance (which may go beyond laws of a country). During mandate of experts, if situation of conflict of interest arises, Secretariat can discuss with the expert, government, bureau and or COP, with the possibility to temporarily suspend the expert from some or all activities of the CRC. COP decides at next session on the matter.
	WHO CRAN	WHO shall be solely responsible for reviewing the questionnaires completed by Network Participants and for all decisions relating to acceptance of Network Participants.
	IPCP	Members can be excluded from the network if they seriously violate its by-laws, incl. regarding conflicts of interest.
NO EXPLICIT RULES	AMAP	Rules as such do not exist; however, experts are expected to comply with general principles of scientific integrity and respect for their peers. In the event of a conflict of interest, expert group leads and/or the AMAP WG would become involved, if necessary, to find a resolution.
	SCE GHS	No apparent explicit rules regarding conflicts of interest.
	GESAMP	A template for new GESAMP working groups (published 2018) states that it is necessary for each agency, in consultation with the working group Chairperson, to identify potential conflicts of interest, and devise suitable steps to address this, if required. However, there are no further details on how to achieve this.

6.3. Procedures or rules to ensure academic credibility and independence

TYPE OF PROCEDURE	SPI BODIES	EXAMPLES
PEER REVIEW OF OUTPUTS	Basel OEWG, CRC, POPRC, SAP, AMAP, OECD EHS, GEF STAP, IRP	See point 2 ('Review process for outputs').
EXTERNAL MECHANISM	GMP	Partners are responsible for ensuring their own work's academic credibility.
INTERNAL MECHANISM	GMP, PEN, DDT Alliance, UNEP EDC AG	Internal bodies, such as the advisory committee (PEN), the Steering Committee (DDT Alliance) or members of the SPI body (UNEP EDC AG), are responsible for ensuring academic credibility and independence.
REGULATIONS, CODES AND POLICIES	JECFA, JMPR, JMPM, CRAN, IPCS	WHO policies include Code of conduct for responsible research, Code of ethics and professional conduct, Regulations for expert advisory panels and committees, Regulations for study and scientific groups, collaborating institutions, and other mechanisms of collaboration, Publishing policies and clearance procedures for publications, Handbook for guideline development.
	UNITAR	UNITAR policies include the Integrity and Ethics Oversight policy and the Anti-Fraud and Anti-Corruption Policy, as well as UN system-wide ethics policies.
PRACTICES TO AVOID LOBBYING	POPRC	Common practice during plenary meetings that observers only invited to speak after all members who wish to do so have taken the floor and to restrict the discussion leading up to a decision of the Committee only to members. Observers have been invited to limit themselves to providing relevant technical formation, to abstain from arguing for one or the other of the options before the Committee or to interact with members of the Committee during plenary meetings. Proposals from observers have not been addressed by the Committee unless supported by a member of the Committee.
RULES IN CASE A MEETING'S OBJECTIVITY IS DISPUTED	CRC, POPRC	Where the objectivity of a particular meeting has been called into question, the Conference of the Parties shall define the conditions for the disclosure of all relevant information.

7. Observers

NAME OF SPI BODY	IS THE SPI BODY OPEN TO OBSERVERS?			
	Yes, to all stakeholders	Yes, to invited stakeholders	No	Other
Under MEAs				
Basel OEWG	●			
CRC		●		
POPRC		●		
SAP			●	
EMEP		●		
CLRTAP WG Effects		●		
Protocol on PRTRs	●			
SCE GHS		●		
Associated with MEAs				
GMP	●			
PEN	●			
DDT Alliance	●			
Not directly associated with MEAs				
UNEP EDC AG	●			
GCO	●			
OECD EHS		●		
WHO CRAN		●		
WHO IPCS		●		
FAO/WHO JECFA			●	

	IS THE SPI BODY OPEN TO OBSERVERS?			
NAME OF SPI BODY	Yes, to all stakeholders	Yes, to invited stakeholders	No	Other
FAO/WHO JMPR			●	
FAO/WHO JMPM		●		
UNITAR		●		
GEF STAP	●			
IRP		●		
GESAMP		●		
IPCP	●			
AMAP [I]				●

I. All observers to the Arctic Council are observers to AMAP; for specific work tasks other organizations may be invited to participate in AMAP activities at the discretion of the AMAP Working Group Heads of Delegation of AMAP members and the Working Group Chair.

- Nearly all SPI bodies are open to observers. About half are open to all stakeholders, and half only to invited stakeholders. Only SAP of the Montreal Protocol, FAO/WHO JECFA and FAO/WHO JMPR are not open to observers.