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Options for effective governance of the Beyond-2020 Framework for sound management of chemicals and waste: Lessons learned from other regimes

1. The secretariat has the honor to provide, in the annex to the present note, submitted by the Center for Governance and Sustainability; '*Options for effective governance of the Beyond-2020 Framework for sound management of chemicals and waste: Lessons learned from other regimes*'.

2. The document is presented as received by the secretariat, without formal editing.

Annex

Options for effective governance of the Beyond-2020 Framework for sound management of chemicals and waste: Lessons learned from other regimes

Submitted by the Center for Governance and Sustainability

Options for effective governance of the Beyond-2020 Framework for sound management of chemicals and waste:

Lessons learned from other regimes

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Niko Urho, Center for Governance and Sustainability

University of Massachusetts Boston

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Preface

The Strategic Approach to International Chemicals Management (SAICM) was established in 2006 as an outcome of the World Summit on Sustainable Development. Since then, SAICM has catalyzed action to achieve sound management of chemicals throughout their life cycle by 2020, with a voluntary yet inclusive multi-sectoral and multi-stakeholder approach. In October 2015, the fourth session of the International Conference on Chemicals Management launched an intersessional process to prepare recommendations regarding the Strategic Approach and the sound management of chemicals and waste beyond 2020.

This process provides an important opportunity to revitalize global action to strengthen the sound management of chemicals and waste beyond 2020 and to support implementation of the 2030 Agenda for Sustainable Development, which addresses chemicals and waste through several goals and targets, including sustainable consumption and production, health, water, and cities and human settlements. Moreover, chemicals and waste relate implicitly to the goals on poverty, agriculture, oceans, decent work and climate change. Evidently, the sustainable development goals cannot be met until the sound management of chemicals and waste is achieved.

Putting in place governance structures and operational modalities for the Beyond 2020 Framework is not an easy task. It is even less so, with the projected rapid expansion of global chemical markets in societies already challenged with the unsound management of chemicals and wastes. However, trends can be reversed, and we can move towards a non-toxic environment by taking decisive action on governance reform in the design of the framework.

This report provides options for the effective governance of the sound management of chemicals and waste beyond 2020 by analyzing five selected elements for effective governance: objectives and milestones, national action plans, reporting, review, and scientific support. It draws from lessons learned about four international instruments that include a national action plan mechanism: the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the Paris Agreement, the Stockholm Convention on Persistent Organic Pollutants, and the High-Level Political Forum. The study builds on and complements the earlier initiative of the Nordic Council of Ministers as well as the options and models proposed in the 'Nordic Report' of 2017.

This report has been commissioned by the Ministry of the Environment of Finland to enrich the intersessional discussions and inform development of the Beyond-2020 Framework, by complementing official documents prepared by the SAICM Secretariat as well as documents provided by other SAICM stakeholders. The report has benefitted from input and discussions with various experts in the field, but the views expressed and conclusions drawn are the sole responsibility of the author.

Helsinki, March 2018

Abbreviations

AHTEG	Ad Hoc Technical Expert Group
BIP	Biodiversity Indicators Partnership
BR	Biennial Report
BURs	Biennial Update Reports
CBD	Convention on Biological Diversity
COP	Conference of Parties
CSD	Commission on Sustainable Development
CSO	Civil Society Organization
ECI	Environmental Conventions Index
EEAP	Environmental Effects Assessment Panel
EMG	UN Environmental Management Group
ERT	Expert Review Team
FAO	Food and Agriculture Organization of the United Nations
GBO	Global Biodiversity Outlook
GCO	Global Chemicals Outlook
GDP	Gross Domestic Product
GEF	Global Environment Facility
GGI	Greenhouse Gas Inventories
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
GHS	Global Harmonized System
GMP	Global Monitoring Programme
GPA	Global Plan of Action
GS	Global Stocktake
GSDR	Global Sustainable Development Report
GSDR	Global Sustainable Development Report
GWMO	Global Waste Management Outlook
HLPF	High-level Political Forum
IAEG-SDG	Inter-agency Expert Group on Sustainable Development Goals
ICCM	International Conference on Chemicals Management
IEG	International Environmental Governance
IFCS	Intergovernmental Forum on Chemical Safety
IGO	Intergovernmental Organization
ILO	International Labor Organization
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
JPOI	Johannesburg Plan of Implementation
LDCs	Least Developed Countries
MDGs	Millennium Development Goals
MEP	Multidisciplinary Expert Panel
MRV	Measurement, Reporting, and Verification
NAP	National Action Plan

NBSAP	National Biodiversity Strategy and Action Plan
NCM	Nordic Council of Ministers
NCs	National Communications
NDCs	Nationally Determined Contributions
NIPs	National Implementation Plans
NSDS	National Sustainable Development Strategy
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OEWG	Open-ended Working Group
OOG	Overall Orientation and Guidance
OPS	Overarching Policy Strategy
PA	Paris Agreement
POP-RC	Persistent Organic Pollutants Review Committee
POPs	Persistent Organic Pollutants
QSP	Quick Start Programme
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
SAICM	Strategic Approach to International Chemicals Management
SAP	Scientific Assessment Panel
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body on Scientific and Technological Advice
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SDGs	Sustainable Development Goals
SIDSs	Small Island Developing States
SMART	Specific, Measurable, Ambitious, Realistic, and Time-bound
SPM	Summary for Policy-Makers
SVHC	Substances of Very High Concern
TEAP	Technology and Economics Assessment Panel
TER	Technical Expert Review
UNDAF	United Nations Development Assistance Framework
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNHRC	United Nations Human Rights Council
UNITAR	United Nations Institute for Training and Research
UNSC	United Nations Statistical Commission
UPR	Universal Periodic Review
VNR	Voluntary National Review
VPR	Voluntary Peer Review
WHA	World Health Assembly
WHO	World Health Organization
WMO	World Meteorological Organization
WRI	World Resources Institute
WSSD	World Summit on Sustainable Development

Summary

The 2030 Agenda on Sustainable Development places chemicals and waste at the heart of sustainable development, with a commitment to leave no one behind. Many goals and targets of the 2030 agenda address sound management of chemicals and waste, particularly Targets 12.4 and 3.9. Together these targets reinforce the global goal agreed upon at the 2002 World Summit on Sustainable Development*:* 'to achieve, by 2020, that chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment.' Clearly, a fundamental transformation in the global production, use, disposal, and trade of chemicals and waste is necessary to achieve sustainable development.

Sound management of global chemicals and waste relies on many international instruments, both legally binding and voluntary in nature, that have emerged mainly in the twenty-first century. The Strategic Approach to International Chemicals Management (SAICM) was developed in 2006 to complement legally binding agreements as a voluntary approach to deliver the 2020 goal with 46 objectives and almost 300 actions. The multi-stakeholder and multi-sectoral character of SAICM has been welcomed due to its inclusive and voluntary approach to sound management of chemicals and waste. However, despite significant action taken during the past decade, the international community is not on track to meet the 2020 goal. In fact, pollution from the production and use of chemicals is believed to constitute one of the most urgent global challenges, threatening humanity and natural ecosystems across political, geographical and legal bounds. This can be partly attributed to a global governance failure that must be addressed as a matter of urgency in face of projections that show sharp future increases in the production of chemicals, in particular in countries and regions that lack adequate safety measures for chemicals and waste.

Against this backdrop, in October 2015, the Fourth International Conference on Chemicals Management (ICCM4) decided to initiate an intersessional process to prepare recommendations regarding the Strategic Approach and the Sound Management of Chemicals and Wastes Beyond 2020. Preparation for the Beyond-2020 Framework includes three intersessional meetings that will provide recommendations for consideration at the Fifth International Conference on Chemicals Management to be held in 2020. The first intersessional meeting, held 7-9 February 2017 in Brasilia, Brazil, resulted in a co-chairs' summary, which was subsequently developed into the 'Co-chairs´ overview paper' that identifies several governance areas in need of improvement. Prior to this, among others, the Nordic Council of Ministers published a report, exploring possible functions and governance options for the new framework entitled 'Global Chemicals and Waste Governance Beyond 2020' as a contribution to the intersessional process.

To inform the intersessional process, this report analyzes five selected features needed for effective governance that are addressed in the Co-chairs´ overview paper: objectives and milestones, national action plans, reporting, review, and scientific support. Most importantly, this report examines the feasibility of a national action plan approach for the global governance of chemicals and waste, which was proposed in the Nordic Report, since it received interest during the first intersessional meeting as a possible mechanism for enhancing sound management of chemicals and waste. To this end, this report focuses on lessons learned from four international instruments that have a national action plan mechanism: the Convention on Biological Diversity (CBD), the United Nations

Framework Convention on Climate Change (UNFCCC) and the Paris Agreement (PA), the Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention), and the 2030 Agenda on Sustainable Development and the High-Level Political Forum (HLPF), to inform the development of the Beyond-2020 Framework. The first three of these instruments are legally binding conventions, whereas the HLPF is a non-legally binding institutional mechanism for reviewing progress in implementation of the 2030 agenda. This report is exploratory in nature and does not represent an exhaustive analysis, but suggests how the Beyond-2020 Framework could benefit from lessons learned from other international instruments.

SAICM shows critical weaknesses in several governance features examined for this report, including the lack of measurable and time-bound objectives and milestones, a national action plan mechanism that lacks strategic focus, a weak reporting and review mechanism, and absence of a formal mechanism to provide scientific support. This is explained by the fact the SAICM was designed to work differently than conventional approaches by mobilizing support from other actors rather than actively participating in their delivery through internal structures. Consequently, the organizations in the Inter-Organization Programme for the Sound Management of Chemicals (IOMC) are expected to provide necessary international coordination of many of the actions, but with minimal resources and often without any additional funding, since they are accountable to their own governing bodies, not to ICCM. Similarly, governments are not bound by ICCM resolutions, making it challenging for countries to prioritize policy and obtain funding for related activities over competing activities linked with legally binding commitments. In essence, many of the implementation challenges are linked to the governance structure of SAICM and its interplay with other governance mechanisms. Nevertheless, SAICM´s unique ability to convene stakeholders from various sectors and catalyze action through the engagement of UN and other actors, as well as the creation of multi-stakeholder partnerships, should be the foundation for developing the future framework.

This report proposes a 'Cooperative Framework for Action on the Sound Management of Chemicals and Wastes' to address existing governance gaps of SAICM. The term 'Cooperative Framework' refers to the joint commitment of key sectors (environment, health, agriculture, labor, industry, development, finance, etc.) and relevant stakeholders, including major downstream industry sectors that use chemicals in their products. To this end, the model envisions a holistic and inclusive framework to catalyze action at the national level through a national action plan mechanism. The development of multi-stakeholder and multi-sectoral nation action plans need to be strategically prioritized and directly linked to the implementation of time-bound objectives and milestones. Existing work, including SAICM implementation plans and national chemical profiles, provide a valuable basis to take the next step and solidify a national action plan mechanism. They should be complemented and supported by successfully engaging the UN-level, sub-national, and non-state actors through the preparation of other stakeholder action plans. The preparation of national action plans other stakeholder plans should follow a bottom-up approach, allowing all stakeholders to determine priorities and actions and seeking to raise the level of ambition over time.

The report proposes the development of time-bound and measurable objectives and milestones, based on the Overall Orientation and Guidance (OOG) document and incorporating other critical elements, including emerging policy issues, to raise the level of aspiration endeavoring to help mainstream sound management of chemicals and waste in all sectors of society. The Strategic Plan

for Biodiversity 2011-2020, which includes five strategic objectives and twenty Aichi Biodiversity Targets, provides a valuable model for development of objectives and milestones that are SMART (specific, measurable, ambitious, realistic and time-bound) yet limited in number to maintain strategic focus and to ease their communication beyond conventional actors. To ensure broad sectoral ownership and the creation of a genuinely cooperative and synergistic framework, the entire chemicals and waste cluster, IOMC organizations and their memberships, and other stakeholders should be involved in the designing the objectives and milestones.

To ensure transparency and accountability of the Cooperative Framework, the model proposes introduction of voluntary reporting and review procedures. The development of measurable indicators will be essential to ensure proper follow-up of implementation; an expert working group could be established for their preparation and an international partnership created to ensure their diligent follow-up. The introduction of an iterative collective global stocktake is proposed to inform the revision of NAPs endeavoring to ensure progression over time. Based on global stocktaking reports, countries could redefine objectives and milestones contained in the Cooperative Framework over time. In this way, the Cooperative Framework would remain a 'living,' dynamic instrument for global cooperation. Details on the global stocktake could be agreed after 2020. The global stocktake could be coupled with individual stakeholder reviews that could be piloted by interested countries and other stakeholders. The development of the review procedures should focus on constructive criticism following a ‘naming-and-acclaiming’ approach in contrast to a ‘naming-and-shaming’ approach, to overcome the political reservations to engage in accountability dynamics.

The ICCM-5 should signal the need to enhance the science-policy interface at all levels to ensure evidence-based and responsive decision-making. This will help minimize the time lag between scientific recognition of new problems and action taken to prevent them. Options range from enhancing the linkage with existing science-policy processes, such as the Global Chemicals Outlook (GCO) and the Global Waste Management Outlook (GWMO), to more ambitious proposals including institutionalizing science within the structures of the future framework through a subsidiary scientific body or establishing an independent science-policy structure. One option includes the development of ad hoc technical expert groups with clearly defined objectives to provide scientific support and policy recommendations on specific topics. Ensuring legitimacy, salience, and credibility will be key to creating an effective science-policy interface. A process could be established to agree on details of the interface, with the goal of reaching agreement by 2025 at the latest. A gap analysis could be conducted to increase understanding of the existing landscape of science-policy interfaces, helping to identify missing functions and the most suitable form for their delivery.

These governance features hold the potential to strengthen sound management of chemicals and waste, yet they will undoubtedly have costs that need to be carefully weighed to find cost-efficient solutions. The cost of inaction needs to be taken into account when considering the design of the future regime. Providing sufficient financial support for developing countries will be key. Thus, a resource mobilization strategy will need to be developed to tap into all sources of financing, including domestic and international flows, building on UNEP´s integrated approach to financing sound management of chemicals and waste. Financial support will be needed in particular for enabling activities, building on the valuable work of the Quick Start Programme (QSP), the Special Programme and the support provided by the Global Environment Facility (GEF). At the same time,

NAPs will help tap into domestic resources and design economic instruments that can generate new streams of revenues. Also, it will be critical to internalize harms associated with hazardous chemicals and waste within relevant industries for mobilizing sufficient resources to implement the Beyond-2020 Framework. This could be achieved by first preparing a study to identify market-based instruments to internalize environmental externalities within relevant industries and then preparing a global cost internalization program for the Beyond-2020 Framework.

1. Introduction

1.1 Objective

This report examines possibilities for strengthening sound management of chemicals and waste by establishing a NAP mechanism and associated policy instruments needed for effective governance, aiming to inform the Intersessional Process of the Strategic Approach and Sound Management of Chemicals and Waste Beyond 2020.

1.2 Chemicals and waste in today´s world

There is widespread recognition that governance of chemicals and waste is not as effective as it could be and that the objective endorsed by the 2002 World Summit on Sustainable Development (WSSD) to achieve sound management of chemicals by 2020 might not be met. This has contributed to rising public concern and political interest in fighting pollution in many ways, including tackling risks related to hazardous chemicals and waste. This was highlighted in the third session of United Nations Environment Assembly (UNEA3) organized in December 2017 in Nairobi, Kenya, which adopted a ministerial declaration 'Towards a Pollution-Free Planet' that states, inter alia, that it is 'both inexcusable and preventable that tens of thousands of chemicals are used in everyday objects and applied in the field without proper testing, labelling or tracking.'[1] Increased political interest and public concern provide a rare window of opportunity to take decisive action to enhance global chemicals and waste governance beyond 2020.

The number of chemicals in active use has rapidly grown in recent decades, bringing various benefits that support important sustainability goals, including combating climate change, advancing public health protection from vector-borne diseases, ensuring food security, producing countless industrial and consumer goods, and providing clean water and sanitation. However, the proliferation of chemicals has also raised severe concerns about their effects on human health and the environment. To date, over 140 000 chemicals have been introduced to the global markets, and most of these lack thorough estimation of their impacts on human health and the environment (UNEP 2012). Lack of safety or toxicity information results from the absence of minimum standards for the amount and type of data to be provided before a chemical is introduced into the global market (Ditz & Tuncak 2014). Of 5 000 chemicals that are produced in the highest quantities, only half have undergone any testing for safety or toxicity and less than 20% have information on developmental or reproductive toxicity despite their almost universal prevalence (Landrigan et al. 2017).

Rigorous pre-market toxicity and safety testing of chemicals has become mandatory in only the past decade and in only a few high-income countries (Landrigan et al. 2017). This includes the EU's Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) legislation, which aims to 'ensure a high level of protection of human health and the environment, including the promotion of alternative methods for assessment of hazards of substances, as well as the free

[1] UNEA-3 Ministerial Declaration (para 2)

circulation of substances on the internal market while enhancing competitiveness and innovation.'[2] The regulation is based on the principle that manufacturers, importers, and downstream users must ensure that they manufacture, place on the market, or use substances that do not adversely affect human health or the environment. Its provisions are underpinned by the precautionary principle.

The problems resulting from unsound management of chemicals and waste are multifold and pertain to all areas of society (Box 1). At the same time, the international community faces many new challenges, including plastic pollution and associated hazardous chemicals, which lacks an effective framework for its control (Simon & Schulte 2017) despite that 8,3 billion tonnes of plastics have been produced since the 1950s (Geyer et al. 2017 and the volume is expected to grow fivefold by mid-century (Galloway 2015). Currently, 80% of plastics are landfilled or enter the environment (Geyer et al. 2017), thereby finding their way to water bodies directly affecting 700 species (Gall & Thomson 2015). Plastics constitute a possible risk for human health for several reasons. Firstly, they absorb traces of dangerous pollutants like PCBs, DDT, and PAH in water bodies, raising concerns about biological magnification (Rochman et al. 2013). Secondly, plastics break down to microplasctics and nanoplastics, which can penetrate cell membranes, raising concern of possible intracellular effects (Yong 2015), such as brain damage evidenced in fish (Mattsson et al. 2017). Lastly, continuous daily interaction with plastic items allows direct exposure to harmful chemicals in them (Galloway 2015).

BOX 1: Examples of existing challenges related to production and use of chemicals and waste

- **E-waste** is the fastest-growing part of the world´s waste stream, reaching 45 million metric tonnes in 2016, but only 20% is collected and recycled, whereas large quantities are managed informally by open burning or being placed in dumpsites. These processes pose a significant threat to human health and the environment (Baldé et al. 2017).
- **Lead** exposure, resulting mainly from lead paints, lead-glazed potteries, and informal lead-acid battery recycling sites, has serious health impact, estimated to reduce the world economy by a value of nearly one trillion US dollars per year (Attina & Trasande 2013).
- **Highly hazardous pesticides** have been linked to various human diseases, including cancer (Ki-Hyun et al. 2017), but they also negatively affect non-human species, such as bees by causing 'colony collapse disorders' (Woodcock et al. 2017), and birds by weakening their migratory abilities (Eng et al. 2017). Only 35% of developing countries have a regulatory regime for pesticides, and even then enforcement is problematic (UN 2017a).
- **Endocrine disrupting chemicals** (EDCs), which are found in everyday consumer products, interfere with hormone receptors, hormone synthesis, and hormone conversion and are shown as developmental and reproductive problems including infertility. Around 800 chemicals are known or suspected EDCs, and the majority lack proper testing for endocrine effects (UNEP &WHO 2012).
- **Nanomaterials** have been introduced to a wide spectrum of products without proper toxicological testing, even though they are unintentionally released to the environment during use and result in human exposure. Concern has been raised, inter alia, about widely used carbon nanotubes, which have been found to share similar characteristics as asbestos (UNEP & WHO 2017a).

[2] Regulation (EC) No 1907/2006 (Art. 1)

Long-range atmospheric and oceanic transportation of hazardous chemicals and waste makes their control a global challenge. Some hazardous chemicals bioaccumulate, or build up in the fatty tissue of organisms, thus further biomagnifying upwards through the food chain (Selin 2010). For example, traditional foods, such as marine mammals, that are contaminated with mercury have caused intellectual disabilities in children in the Arctic region, despite being situated far from all emissions sources of mercury (Jacobson et al. 2015). Improved analytical technologies continue to reveal the presence of new chemicals that were not expected to be present in the Arctic: a recent study found 17 new 'chemicals of emerging concern' that could be considered for global and/or regional regulation (AMAP 2017).

Chemicals play an important role in economic welfare, and their production has grown rapidly during the past half century; today chemicals constitute one of the largest manufacturing industries in the world. In the EU, chemicals companies employ 1.14 million people (CEFIC 2017). In 2016, world chemicals sales totalled 3.4 trillion USD (CEFIC 2017), which represents almost 5% of the global Gross Domestic Product (GDP). The largest share of sales derives from China (40%), followed by the EU (15%), and the US (14%) (CEFIC 2017). The production and use of chemicals is rapidly growing and shifting to the developing world, where safety standards are lower or non-existent (UNEP 2012). The Organisation for Economic Co-operation and Development (OECD) projects that the global chemical sales will grow about 3% per year until 2050 (OECD 2012).

Against this backdrop, environmental pollution caused by poorly managed chemicals and waste is one of the greatest causes of illness and deaths (UNEP et al. 2015). The World Health Organization (WHO) estimates that 1.3 million lives were lost in 2012 due to exposures to selected chemicals, such as lead and pesticides. However, data is only available for a few chemical exposures, whereas people are exposed to many more chemicals in their daily lives (WHO 2016).

Children and other vulnerable groups are often most severely affected. This is true particularly for an array of widely used chemicals and pesticides with neurotoxic characteristics, which have permanently injured the brains of millions of children worldwide (Grandjean & Landrigan 2014). Given the growing number of neurotoxic chemicals on the markets, many that have yet to be identified, researchers refer to a 'global pandemic of developmental neurotoxicity' that is silently eroding the intelligence of children (Grandjean & Landrigan 2014).

The links between chemicals management and waste management are strong. Outdated or used hazardous chemicals often become waste products and are designated for disposal. In addition, hazardous chemicals exist in various articles, including large ships, industrial apparatus and medical equipment. Chemicals in such articles are released into the environment during recycling and disposal (Selin 2010).

1.3 The Beyond-2020 process in the context of global chemicals and waste management

In response to the growing threats posed by the introduction of new chemicals to consumer markets, regimes have been created to protect human health and the environment from adverse effects of toxic chemicals and waste. Currently, global chemicals and waste management includes a number

of international instruments developed mainly in the last thirty years. This includes four global legally binding treaties:

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989) aims to protect human health and the environment against the adverse effects of hazardous waste by regulating their transboundary movement and disposal;
- The Stockholm Convention on Persistent Organic Pollutants (2001) aims to protect human health and the environment from persistent organic pollutants by regulating their production, use, trade, and disposal;
- The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in the International Trade (1998) aims to protect human health and the environment from harmful chemicals by regulating their international trade using a PIC scheme;
- The Minamata Convention on Mercury (2013) aims to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds by regulating their production, use, trade, emissions, and releases.

Other important global legally binding instruments include:

- The World Health Organization's International Health Regulations (2005), which require countries to be prepared for and able to respond to chemical incidents;
- The International Labour Organization's conventions related to worker safety and specific chemicals, types of chemicals or exposures;
- The International Maritime Organization's conventions related to marine pollution;
- The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and their Destruction (1992).

In addition, other legally binding regional conventions for sound management of chemicals and waste have been adopted, including the Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1991); the Waigani Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement of Hazardous Wastes within the South Pacific Region (1995); and conventions and legally binding instruments of the United Nations Economic Commission for Europe, including the Protocol on Persistent Organic Pollutants of the Convention on Long-Range Transboundary Air Pollution (1998).

Also, membership in OECD involves adherence to a suite of legal instruments, some of which relate to sound chemicals management, including the OECD Mutual Acceptance of Data.
This legal backdrop is supported and complemented by the programmatic work of each of the IOMC organizations as well as a number of voluntary initiatives, such as:

- The International Code of Conduct on Pesticide Management of the Food and Agriculture Organization of the United Nations (FAO), which establishes voluntary standards of conduct for all public and private entities engaged with the management of pesticides;
- The Globally Harmonized System of Classification and Labeling of Chemicals (GHS), which provides standards for classification of chemicals based on their hazards, including labels and safety data sheets.

These legally binding conventions and voluntary initiatives have an important role to play, but their limited scope leaves many hazardous substances beyond control at the international level. In 2002, discussions on chemicals management at the WSSD launched negotiations that led, in 2006, to the adoption of the Strategic Approach to International Chemicals Management (SAICM). SAICM was designed as a broader framework for global cooperation in the sound management of chemicals and waste, intended to complement the existing international intiatives. Although voluntary in nature, SAICM addresses issues that fall beyond the legally binding conventions, with the objective of achieving sound management of chemicals throughout their life cycle by 2020, as agreed in the WSSD. The 2030 Agenda on Sustainable Development provides renewed political commitment to sound management of chemicals and waste, as reflected throughout the SDGs. Annex 1 shows the SDGs and associated indicators that have the strongest links to chemicals and waste. Indeed, the 2030 agenda, particularly targets 3.9 and 12.4, reinforces the earlier global goal agreed upon at the 2002 WSSD. Furthermore, UNEA resolution 1/5 outlines a long-term vision. Table 1 lists existing the goals and provides clarification of their different nuances.

Table 1. Existing goals for enhancing sound management of chemicals and waste

Goal	Clarification
SAICM Overarching Policy Strategy (para 13) '…to achieve the sound management of chemicals throughout their life-cycle so that, by 2020, chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment.'	• Objective is to 'minimize significant adverse effects' instead of 'eliminate' • What constitutes 'significant adverse effects' remains undefined so the extent is open for interpretation
2030 agenda (SDG 12.4) 'By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.'	• The goal includes 'all wastes' • Asks for significant reduction of release and minimization of adverse effects (without the qualifier 'significant') • Covers 'environmentally sound management' and 'releases to air, water and soil' excluding occupational exposure or consumer product safety
UNEA Resolution 1/5 (Annex 1, para 5) 'To achieve the sound management of chemicals throughout their life cycle and of hazardous wastes in ways that lead to the prevention or minimization of significant adverse effects on human health and the environment, as an essential contribution to the three dimensions of sustainable development.'	• The goal includes 'hazardous wastes' • Incorporates the concept of 'prevention' of adverse effects

The main policy instruments of SAICM are listed in Box 2. SAICM was designed with a minimalist governance structure so it could have a catalytic role engaging stakeholders across all sectors. To this end, the International Conference on Chemicals Management (ICCM) functions as the governing body, which meets at intervals decided in the SAICM's Overarching Policy Strategy (2009, 2012, 2015, 2020), supported by a small secretariat that functions under the overall administrative responsibility of the United Nations Environment Programme (UNEP). In 2009, ICCM-2 established an Open-Ended Working Group (OEWG) as a subsidiary body to the

Conference, which convenes between conferences to prepare resolutions for ICCM. To date, ICCM has convened four times, with two OEWGs between them. The Bureau consists of five governmental representatives representing all UN regions and is supported by the attendance of four NGO representatives and the chair of the IOMC, which was established in 1995 as an international coordinating group to promote sound chemicals management worldwide.

BOX 2: Main policy instruments of SAICM

- The Dubai Declaration, which provides high-level political support;
- The Overarching Policy Strategy (OPS), which outlines five key thematic objectives, including risk reduction, knowledge and information, governance, capacity building and technical cooperation, and illegal international traffic in chemicals.
- The Global Plan of Action (GPA), which lists 273 activities and associated indicators.
- The Overarching Orientation and Guidance, which (OOG) that lists eleven basic elements for achieving the 2020 goal.
- Six emerging policy issues: lead in paint, chemicals in products, hazardous substances within electrical and electronic products, nanotechnologies and manufactured nanomaterials, endocrine-disrupting chemicals, and environmentally persistent pharmaceutical pollutants.
- Two issues of concern: perfluorinated chemicals and highly hazardous chemicals.

ICCM has the mandate to review progress against the 2020 target. In 2015, at its fourth session, ICCM initiated in Resolution IV/4 an intersessional process to prepare recommendations regarding the Strategic Approach and the sound management of chemicals and waste beyond 2020. The resolution outlines a meeting schedule for the intersessional process leading to the 2020 conference, where the new framework for sound management of chemicals and waste is envisaged to be adopted. The intersessional process includes three meetings. The first intersessional meeting was held 7-9 February 2017 in Brasilia, Brazil. The meeting attracted high interest, bringing together 400 participants from governments, intergovernmental organizations, and NGOs. The meeting produced a co-chairs´ summary, which set out their views of the contributions of the attendees to the first meeting. The second meeting of the intersessional process is set for 13-15 March 2018 in Stockholm, Sweden.

Prior to the first intersessional meeting, the Nordic Council of Ministers (NCM) published a 'Nordic report' to explore possible functions and forms for the new framework entitled 'Global Chemicals and Waste Governance Beyond 2020' that was discussed in a subsequent Nordic Seminar organized in 16-17 January 2017 in Helsinki, Finland (Honkonen & Khan 2017a, Honkonen & Khan 2017b). This report makes an in-depth analysis of possibilities for the elaboration of a national action plan approach for the global governance of chemicals proposed in the Nordic Report (Honkonen & Khan 2017a) and other important areas. Since this report complements the Nordic Report, it does not discuss in-depth many important functions included therein, such as financing and stakeholder participation. This report has benefitted from comments received from various experts and feed-back received from an informal workshop held 19 January 2018, in Stockholm, Sweden that focused on identification of objectives and milestones for the Beyond-2020 Framework, where the preliminary results of the report were presented and discussed.

1.4 Scope and structure of the study

This report analyzes selected elements found in the co-chairs´ summary and subsequent overview paper to fulfil information gaps and provide guidance for their operationalization as a possible way forward in the elaboration of the Beyond-2020 Framework. The elements were chosen for this report based on the perception that effective global governance should include the following features:

- Time-bound objectives and milestones to raise aspirations
- National Action Plans for internalization
- Reporting to induce transparency
- Review and monitoring to enhance accountability
- Scientific support to increase adaptiveness and responsiveness

This report specifically examines these five governance features, but also touches upon other important areas such as financing that are needed for effective governance. The chosen areas are closely linked and should be considered as a whole.

Figure 1 illustrates the relationship between the different elements examined. Time-bound objectives and milestones form the foundation, since they provide aspiration and guide work under all other areas. NAPs are intended to internalize objectives and milestones into national planning processes and mobilize stakeholders for broad-based implementation. Reporting is needed to take stock of national actions taken to achieve the objectives and milestones. Review and monitoring of performance against the objectives and milestones are needed to assess if implementation is progressing and if they need revision. Scientific support is needed to enhance evidence-based decision-making to ensure that the regime responds in a timely manner to new scientific knowledge and is reflected in the objectives and milestones. Annex 2 shows how the Co-chairs´ overview paper and scenario note address all these areas, anticipating detailed discussions most prominently on objectives and milestones in the second meeting of the intersessional process.

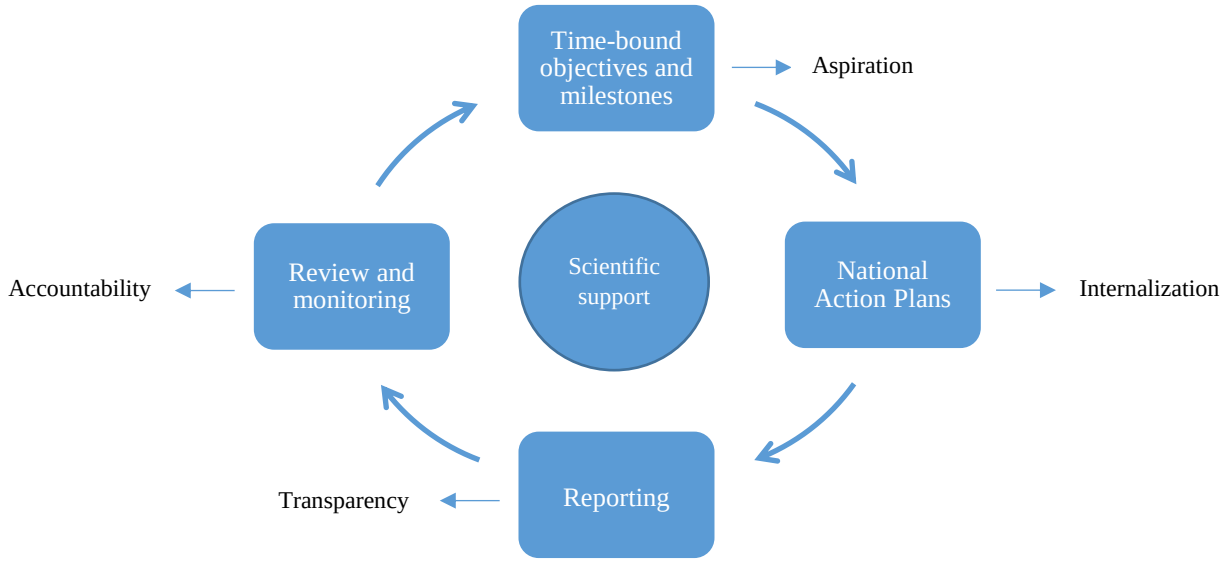

Figure 1. The relationship between the five governance features analyzed in this report.

To understand how these governance features can be operationalized in the Beyond-2020 Framework, four international regimes have been chosen for closer examination. These include:

- Convention on Biological Diversity
- United Nations Framework Convention on Climate Change and the Paris Agreement
- Stockholm Convention on Persistent Organic Pollutants
- The 2030 Agenda on Sustainable Development and the High-level Political Forum

These regimes have been chosen for a reference point for various reasons. Most importantly, all the regimes have a NAP mechanism that constitutes the basis for this study. Furthermore, the CBD and UNFCCC constitute overarching approaches for dealing with broad environmental challenges that are comparable with the scope of sound management of chemicals and waste. The High-level Political Forum forms an interesting reference point due to the voluntary nature of the 2030 agenda that it oversees. The Stockholm Convention covers specifically hazardous chemicals and can therefore provide useful information for the Beyond-2020 Framework. Many other instruments, such as the Montreal Protocol on Substances that Deplete the Ozone Layer, would provide valuable information and have been referenced in Section 3 of this report, but have not been analyzed in detail.

The analysis includes both legally binding and voluntary regimes, since the five government features can be voluntary or legally binding. The analysis aims to show the added value of different governance elements and their interlinkages to help tailor necessary adjustment on a scale considered suitable for the Beyond-2020 Framework.

Section 2 of this report analyzes the four regimes. Section 3 analyzes possibilities for operationalizing the different elements for effective governance in the Beyond-2020 Framework. Section 4 proposes the development of a holistic and inclusive Cooperative Framework for Action on the Sound Management of Chemicals and Wastes to catalyze action at the national level and successfully engage UN-system, sub-national, and non-state actors. Lastly, Section 5 provides conclusions.

The report aims to complement official documents prepared by the SAICM secretariat, in particular the Proposal for Objectives in Support for the 2030 Agenda on Sustainable Development (SAICM/IP.2/8), Financing the Sound Management of Chemicals and Waste beyond 2020' (SAICM/IP.2/9) and Review of Existing Governance Models of Potential Relevance to the Sound Management of Chemicals and Waste, including Science-Policy Interfaces (SAICM/IP.2/10).

1.5 Definitions

Time-bound objectives and milestones
Internationally agreed time-bound goals and targets adopted by governing bodies of international instruments to enhance global sustainability.

National Action Plans
Plans and strategies adopted by governments aimed at enhancing national implementation of a given international instrument.

Reporting
Standardized information disclosed by individual states about the national implementation process. When rules permit, reporting can be carried out also by stakeholders.

Review
Evaluation of performance by a third party or secretariat either individually (country-specific) or collectively (on a regional or global scale).

Monitoring
Measurement of progress against national, regional and/or global indicators.

Science-policy interface
Interaction between scientists and policy-makers to enhance evidence-based decision-making.

2. Governance elements in selected international regimes

This section analyzes how five functions for effective governance (time-bound objectives, national action plans, reporting, review and science-policy interface) have been carried out in four selected international regimes. This section is intended to provide insight into the design of possible similar features in the Beyond-2020 Framework.

2.1 Convention on Biological Diversity

Time-bound objectives

The overall objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising out of the utilization of genetic resources (Art. 1). In 2010, the Conference of Parties (COP) of the CBD adopted the Strategic Plan for Biodiversity 2011-2020 with a vision of 'Living in harmony with nature,' where 'By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.' The Strategic Plan includes a mission to 'halt the loss of biodiversity by 2020' and lists twenty Aichi Biodiversity Targets, grouped under five strategic goals, to be achieved by 2015 or 2020. One of the most symbolic targets is Target 11, which calls for increasing the surface of protected land areas to 17% by 2020. The twenty targets are listed in Annex 3. The adoption of the Strategic Plan and the targets were noted with appreciation by the General Assembly.[3]

The adoption of the Strategic Plan constitutes the culmination of 2010's International Year of Biodiversity, which included numerous international meetings. Altogether, twenty informal workshops and two global workshops were held to prepare the Strategic Plan. Most importantly, a High-level Meeting on Biodiversity in the General Assembly held 22 September 2010 in New York convened heads of state to provide political guidance to the CBD COP-10. The President's Summary of the High-level Meeting attaches great significance to the successful adoption of the Strategic Plan and specifies that it should contain ambitious, measurable, and time-bound targets for 2020 (UN 2010). Prior to this, a high-level retreat was held for the secretariats of the biodiversity-related conventions on 1 September 2010 in Geneva, Switzerland, which helped to develop a broader approach to the implementation of the biodiversity-related Multilateral Environmental Agreements (MEA), instead of linking the Strategic Plan only to the CBD.

The Strategic Plan will be implemented primarily through national and sub-national activities, with supporting action at the regional and global levels. The governing bodies of the other biodiversity-related MEAs have endorsed the Strategic Plan, and the UN Environmental Management Group (EMG) has identified measures for effective implementation of the Strategic Plan across the UN System. Most significantly, many of the Aichi Biodiversity Targets have been translated into the SDGs.

[3] A/RES/65/161 (para 4)

The architects of the Aichi Biodiversity Targets worked to formulate SMART (specific, measurable, ambitious, realistic, and time-bound) targets, since the preceding 2010 Biodiversity Target ('to achieve by 2010 a significant reduction of the current rate of biodiversity') was considered ambiguous and difficult to quantify, and thus impaired accountability and led to weak implementation (Maxwell et al. 2015). The Aichi Biodiversity Targets constitute an improvement, since they address the state of biodiversity and also focus on pressures on biodiversity, underlying drivers, policy responses, and integration of biodiversity issues across sectors (Butchart et al. 2016). Main elements of the Strategic Plan are shown in Box 3.

BOX 3: Main elements of the Strategic Plan for Biodiversity 2011-2020

Vision

'Living in harmony with nature' where 'By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.'

Mission

'take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet´s variety of life, and contributing to human well-being, and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach.'

Strategic Goals and Aichi Biodiversity Targets (keywords)

Strategic Goal A: Address underlying causes

1) Increase awareness
2) Integrate into national planning processes
3) Remove harmful subsidies
4) Promote sustainable consumption and production patterns

Strategic Goal B: Reduce direct pressures

5) Habitat loss
6) Unsustainable use
7) Unsustainable use
8) Pollution
9) Invasive alien species
10) Climate change

Strategic Goal C: Enhance biodiversity status

11) Prevent extinction of species
12) Protect ecosystems
13) Maintain diversity of genetic resources

Strategic Goal D: Ensure delivery of benefits

14) Provide ecosystem services
15) Ensure ecosystem resilience
16) Ensure access to benefits of genetic resources

Strategic Goal E: Enhance implementation

17) Ensure delivery of NBSAPs
18) Respect traditional knowledge
19) Solidify the science base
20) Secure financing

However, despite the sincere attempt to create SMART targets, only 30% of the targets include quantifiable elements, meaning that there is no clear quantitative threshold to be met for the target to be achieved (Butchart et al. 2016). Lack of quantifiable targets reduces measurability of progress. Table 2 lists the quantifiable elements found in the Aichi Biodiversity Targets. Other issues hindering the achievement of the targets could include complexity and lack of clarity in wording (Butchart et al. 2016).

Table 2. Quantifiable elements with clear binary or numeric thresholds in the Aichi Biodiversity Targets

Threshold	Quantifiable elements
Numeric	• Habitat loss is 'at least halved' (Target 5) • Conservation of 'at least 17% of terrestrial and inland water and 10% of coastal and marine areas' (Target 11) • 'restoration of at least 15% of degraded ecosystems' (Target 15)
Binary	• 'the extinction of known threatened species has been prevented' (Target 12) • 'the Nagoya Protocol… is in force' (Target 16) • each Party has 'commenced implementing …a national biodiversity strategy and action plan' (Target 17)

The fourth edition of the *Global Biodiversity Outlook* (GBO), which is directly linked to and reviews implementation of the Aichi Biodiversity Targets, shows significant progress towards meeting some components of the majority of targets, but in most cases progress will not be sufficient to meet the targets set for 2020 (Sec. of the Convention on Biological Diversity 2014). This may be partly due to time lags between taking positive actions and discernable positive outcomes (Sec. of the Convention on Biological Diversity 2014). Based on a recent survey that analyzed National Biodiversity Strategies and Action Plans (NBSAPs) and national reports submitted to the CBD, only 5% of countries are expected to meet their goals set for 2020 commitments (WWF et al. 2016). Countries are progressing better on targets that are procedural in nature, such as Target 16 on ratification of the Nagoya Protocol, and Target 17 on updating the NBSAPs commitments (WWF et al. 2016). The iconic Target 11 concerning work on protected areas is also progressing well – perhaps due to the long history of work in this area (WWF et al. 2016), whereas progress on Target 20 (resource mobilization) is very weak, with over 85% of countries not meeting their commitments (WWF et al. 2016).

The Strategic Plan was adopted with the understanding that effective mobilization of resources are needed for the timely implementation of the Aichi Biodiversity Targets. To this end, in 2010, a resource mobilization strategy was adopted in conjunction with the Strategic Plan.[4] The strategy highlights the need to increase funding from all sources, including official development assistance (ODA); domestic budgets at all levels; private sector; NGOs, foundations, and academia; international financial institutions; UN organizations, funds and programmes; non-ODA public funding; South-South cooperation initiatives; and technical cooperation. In addition, the convention has developed a Global Platform on Business and Biodiversity to support a business engagement that has resulted to the launch of a Global Partnership for Business and Biodiversity. By the request of the COP, the secretariat is developing in cooperation with the Global Partnership a 'Business Case and Framework for Involving Business in Achieving the Targets'[5] to explain the Aichi Biodiversity Targets and to provide guidelines for recommended actions that can be taken by businesses to help achieve them.

Currently, the Strategic Plan and the Aichi Biodiversity Targets are reviewed and the preparations for the Post-2020 Biodiversity Framework have started. In December 2016, CBD COP-13

[4] UNEP/CBD/COP/X/3
[5] UNEP/CBD/COP/XII/10 (para 3d)

requested the secretariat and the bureau to prepare a proposal for a comprehensive and participatory preparatory process and timetable for the Strategic Plan in the post-2020 era.[6]

National Action Plans

Article 6 of the CBD obliges countries to develop national strategies, plans, or programmes for the conservation and sustainable use of biological diversity to reflect the measures set out in the convention. The strategy should be mainstreamed into the planning and activities of all sectors that have an impact on biodiversity. To this end, the NBSAPs constitute the principal implementation tool for the CBD.

The CBD provides guidance to elaboration of NBSAPs through decisions IX/8 and X/2. The guidelines encourage, inter alia, gender mainstreaming; mobilization of financial resources; enhancing synergies with poverty eradication; mainstreaming of biodiversity into other national strategies, development cooperation and national accounting; and improving the science-policy interface. The NBSAP preparation is intended to follow a multi-sectoral and multi-stakeholder approach and the guidelines encourage participation of stakeholders form all major groups, as well as, of indigenous people and local communities. The guidelines also highlight significance of regional networks and promoting local action. Parties are encouraged to establish national coordination mechanisms, including indicators for monitoring progress. The guidelines are regularly updated by the COP.

In 2010, in conjunction with the adoption of the Strategic Plan 2011-2020, parties were asked to develop and start implementing an updated NBSAP by 2015 to translate the Aichi Biodiversity Targets into action. Parties were encouraged to incorporate national and regional targets in NBSAPs by using the targets as a flexible reference.[7] While the flexibility to develop national and regional targets has helped parties take into account national priorities and capacities, it has led to the use of different targets among countries and thus weakens comparability.

To date, 189 of 196 (96%) of the parties have developed a NBSAP. The CBD has not specified the periodicity of NBSAPs, but they can be divided in two categories: pre-2010 and post-2010. A total of 137 parties have developed post-2010 NBSAPs that takes into consideration the Aichi Biodiversity Targets. NBSAPs have contributed to better understanding of biodiversity, considerably extended the coverage of protected areas, enhanced protection of endangered species and, in many cases, filled legal gaps in implementation (Pisupati & Prip 2015).

Main challenges of NBSAPs (Pisupati & Prip 2015) include:

- Lack of cross-sectoral coordination mechanisms
- Lack of influence beyond the main national agency responsible for biodiversity
- Poor correlation between NBSAPs and poverty alleviation
- Overly ambitious and prescriptive objectives and actions
- Lack of mechanisms for monitoring and review
- Lack strategies for communication and for financing

[6] UNEP/CBD/COP/XIII/1 (para 34)
[7] UNEP/CBD/COP/X/2 (para 3)

A significant feature of the Strategic Plan 2011-2020 is that it was designed as a broader framework so it would be relevant to all the biodiversity-related MEAs. To this end, the Strategic Plan was intended to help align the activities of the other biodiversity MEAs in the NBSAPs to achieve a coherent approach to implementation. Two other biodiversity MEAs (CITES and CMS) have developed guidance on how to use NBSAPs as an implementing tool. Aligning activities of smaller biodiversity-related conventions in NBSAPs has helped these conventions tap into funding from GEF that was previously inaccessible, since all except CBD lack a financial mechanism. Before this, for example, CITES had never benefited from the GEF, even indirectly through the CBD window (Tadanori 2008). However, few NBSAPs have explicitly incorporated measures to implement other biodiversity MEAs than the CBD (Pisupati & Prip 2015).

GEF support for NBSAPs falls under enabling activities. The average financial support for preparing a pre-2010 NBSAP was around 200 000 USD (GEF 1998). GEF-5 (2010-2014) provided support to update NBSAPs in 137 countries (94% of all eligible countries) without significant changes in the level of support (CBD 2014). GEF-6 (2014-2018) did not allocate funding for updating NBSAPs (GEF 2014)

Reporting

Article 26 of the CBD states that the objective of national reporting is to provide information on measures taken for the implementation of the convention and the effectiveness of these measures. The reporting interval is approximately every four years. Parties are obliged to report periodically; to date, five reporting rounds have been carried out. The sixth national reports are due at the end of 2018. The CBD encourages broad multi-stakeholder participation in reporting.[8] Unlike most other conventions, CBD asks for mainly open-ended questions in their reports. While this might have some merits in understanding better national concerns and circumstances, it does not allow efficient comparison of data between countries or enable to see long-term trends. The average reporting level is high (on average 75%), but in the latest reporting round, countries submitted a record 190 reports (97%). GEF provides support to assist developing countries in reporting under enabling activities. During the last reporting period, 102 countries (70% of GEF-eligible parties) received such support (CBD 2012).

Review and monitoring

The secretariat is mandated to uptake collective review of progress through two separate procedures. First, the periodic Global Biodiversity Outlook (GBO) report aims to provide parties with an overview of progress in implementing the convention drawing form NBSAPs, national reports and other sources of information. The fifth edition of the GBO is intended to inform COP-15 (to be held in 2020). Second, in 2014 COP-12 launched a process to review progress specifically focusing on the implementation of the Strategic Plan at each of its meetings until 2020, drawing from national reports and other information, including scientific assessments.

[8] UNEP/CBD/COP/XIII/27 (para 7)

The development of a voluntary peer-review (VPR) process for individual country reviews has been discussed in the CBD since 2008. In 2014, COP-12 started to develop a VPR process to create greater transparency and accountability, as well as to provide opportunities for peer learning for parties directly involved. The secretariat was requested to develop a methodology, and an informal working group was established to support the work. A draft methodology was tested in two countries (India and Ethiopia) and resulted in a revised methodology (Sec. of the Convention on Biological Diversity 2016). It was discovered that sufficient time is needed for review teams to understand the system and processes in the target country, and to identify interviewees, allowing experts to familiarize themselves with the country's governance system (Morgera 2017). The revised methodology outlines that individual reviews are expected to consist of a desk study (primarily based on the last National Report and the NBSAP); an in-country visit (where governmental institutions and stakeholders can be contacted by the review team); a report by the review team (which is to be sent to the reviewed party in order to annex a response); and an evaluation and progress report by the secretariat (comprising an evaluation of all country reviews undertaken, and a synthesis report on the VPR process) (Ulloa et al. 2018). In 2016, COP-13 took note of this progress and requested to continue testing the development of the methodology.[9] Since then, VPRs have been carried out in India, Montenegro, Uganda, and Sri Lanka. The VPRs are funded by voluntary contributions from Japan, Switzerland, and Norway.

Rapid development of online databases, indicators, and indicator partnerships have improved the ability to quantify progress towards the Aichi Biodiversity Targets (Pimm et al. 2014). The Biodiversity Indicators Partnership (BIP) consists of 59 partners that support the delivery of indicators to measure progress towards the targets. There are currently 42 BIP indicators that provide information for the targets. However, an analysis of BIP indicators reveals that several targets lack indicators (2, 3, and 15) and several other targets (1, 13, and 16-20) have significant gaps (McOwen et al. 2016).

Scientific support

The CBD has a Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) that provides the COP with timely advice relating to implementation. Its functions include providing assessments of the status of biological diversity; providing assessments of the types of measures taken in accordance with the provisions of the CBD; and responding to questions that the COP may put to the body. The secretariat is responsible for the preparation of official documents to SBSTTA meetings; the strongest mechanism on which the secretariat can draw is the Ad Hoc Technical Expert Group (AHTEG) (Koetz et al. 2008). AHTEG assessments are mandated by the COP and are prepared by a maximum of 15 experts nominated by parties and a limited number of experts from appropriate organizations. The meetings of SBSTTA are open to all parties and are attended by about 500 participants (Koetz et al. 2008). However, the role of SBSTTA as a science-policy interface has been questioned, as it has developed into what many refer to as 'mini-COP' – a body with strong political features negotiating draft decisions in preparation of the COPs (Koetz et al. 2008). In 2009, a Nordic report exploring possibilities to enhance synergies among biodiversity-related MEAs concluded that an independent science-policy platform is required to provide the CBD and other biodiversity-related MEAs with timely and scientifically credible advice for

[9] UNEP/CBD/COP/XIII/25 (para2)

achieving more coherent and effective decision-making (Urho 2009). Similarly, a gap analysis prepared by UNEP for facilitating discussions on improving the science-policy interface on biodiversity concluded that there is 'a lack of regular processes providing periodic, timely and policy-relevant information covering the full range of biodiversity and ecosystem service issues to the broader development community' (UNEP 2009).

Against this backdrop, governments felt the urge for a new mechanism to provide a stronger voice for evidence-based knowledge and to synthesize scattered data from different sources. In 2008, this led to negotiations for the creation of an independent science-policy interface to provide governments with authoritative and scientifically credible information to stem biodiversity loss. Following a series of meetings, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem services (IPBES) was established in 2012. The Intergovernmental Panel on Climate Change (IPCC) was used as a model, in particular its intergovernmental feature, since it was considered pivotal to ensure sufficient buy-in from governments to the assessment reports. However, IPBES utilizes not only scientific knowledge but also traditional and local knowledge that makes it different from IPCC. IPBES produces thematic reports on topics of particular interest (e.g., pollinators and invasive alien species), as well as provides global overviews of biodiversity and ecosystem services, with its first global assessment to be released in 2019. IPBES convenes regularly plenary meetings bringing together all member states and other states and observers. The work is supported between sessions by a bureau of ten members and a multidisciplinary expert panel (MEP) of 25 members. Over the years, IPBES has evolved to a robust mechanism compromising of 127 governmental members with a secretariat in Bonn, Germany with approximately 40 staff members. One thousand scientists from all over the world currently contribute to the work of IPBES on a voluntary basis.

2.2 United Nations Framework Convention on Climate Change and the Paris Agreement

Time-bound objectives

The objective of the UNFCCC is stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system (Art. 2). This level was defined in 2009 in Copenhagen and in 2010 in Cancún, where governments agreed on an aspirational goal of limiting global temperature increases below 2°C above pre-industrial levels. In 2015, governments adopted the Paris Agreement, which goes even further with a two-headed global long-term goal that urges 'holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.' This goal is the backbone of the Paris Agreement, since it provides a measurable goal that is based on science. However, the Paris Agreement does not establish a clear emissions reduction target or even specify when global emissions should peak or equal net zero.

National Action Plans

In 2013, COP-19 invited parties to develop individual national climate action plans (so-called 'Intended Nationally Determined Contributions,' or INDCs) to mitigate climate change.[10] For many countries this was the first time they formulated a comprehensive vision for addressing climate change (Bodle et al. 2016). Almost all countries formulated their INDCs before the adoption of the Paris Agreement at COP-21 in December 2015. Article 4 of the Paris Agreement cements the preparation of NAPs by obliging parties to 'prepare, communicate and maintain' successive nationally determined contributions (NDCs). The Paris Decision, accompanying the Paris Agreement, 'invites' parties to submit their first NDCs at the latest by ratification.[11] INDCs can also qualify for NDCs.

The NDC sets out domestic efforts to combat climate change, including a mitigation goal, corresponding to the party's national contribution to global mitigation efforts (Desgain & Sharma 2016). At the national level, NDCs will be implemented through individual policies and measures, which countries are now in the process of designing (Desgain & Sharma 2016). All these policies and measures will undergo a measurement and reporting process nationally (Desgain & Sharma 2016).

The Paris Agreement obliges each party to regularly present an NDC and make it public but does not prescribe specific mitigation actions or which emission levels should be achieved by when (Bodle et al. 2016). To this end, the Paris Agreement gives parties flexibility in developing NDCs that has made it easy for countries to join in the convention and to develop NDCs (Bodle et al. 2016). To date, 164 countries have submitted their first NDC. However, the lack of standards for the content of the NDCs makes it difficult to understand their potential impact on emissions, and to compare them between parties (Bodle et al. 2016). Nevertheless, NDCs provide a tool to estimate if parties are on the track to meet the 2 °C goal and, thereby, provide feed-back to adjust collective action accordingly.

Important elements of NDCs include the need to reflect the 'highest possible ambition' and 'progression' over time. This means that parties are committed to raising the level of ambition over time. However, there is no guidance on how the concept of progression could be applied to the wide range of very different NDCs (Bodle et al. 2016).

The NDCs have to be renewed every five years and the first implementation cycle (or accounting period) covers the period 2021-2025. The NDCs need to be submitted five years ahead of the start of an implementation cycle. For example, NDCs for 2026-2030 needs to be submitted in 2020. However, at any time, parties can adjust their existing nationally determined contribution with a view to enhancing its level of ambition

In response to the request from COP-19, GEF provided support for INDC development in 46 countries, on average with 245 000 USD per country. Also the UNFCCC secretariat has an important role in supporting NDCs. The secretariat make NDCs available in a public registry and

[10] UNFCCC/CP.19/1 (para 2b)
[11] UNFCCC/CP.21/1 (para 22)

prepares a synthesis report of submitted NDCs. The secretariat also provides support to the elaboration of NDCs in developing countries. In total, 4.4 million Euros has been budgeted from supplementary funding sources to secretariat support for NDC preparation in 2018-2019.

Reporting

Article 13 of the Paris Agreement lays down the 'transparency framework' and its two functional pillars: reporting and review. The aim of the transparency framework is to ‘build mutual trust and confidence and to promote effective implementation’ through the generation of real-time information that will dissipate fears of free-riding and competitive disadvantage (Tabau 2016). The 'transparency framework' builds on the Measurement, Reporting, and Verification (MRV) scheme put in place by the Cancun Agreements (Tabau 2016). The transparency framework will apply to all countries but provides ‘built-in flexibility’ to accommodate varying national capacities.

Under the Paris Agreement, parties are instructed to report on:

- national inventories of anthropogenic emissions;
- information necessary to track progress made in implementing and achieving NDCs;
- information related to climate change impacts and adaptation;
- information on support provided and mobilized and to be provided;
- information on support received and needed.

Under the UNFCCC two main modes exist for reporting following a common format (UNFCCC 2000) and requesting information that is mostly open-ended. These include:

- National communications (NCs) for all countries every four years, with information on activities undertaken to reach the objectives of the convention;
- Biennial reports (BRs) for developed countries and biennial update reports (BURs) for developing countries to cover, inter alia, greenhouse gas emissions and trends;

The secretariat prepares regularly synthesis reports of information provided in NCs and BRs/BURs. The average national reporting rate under the convention is 44%. Nevertheless, all developed countries and 61% of developing countries have submitted the sixth NC that was due 1 January 2014. GEF provides support to developing countries´ reporting under enabling activities: 500 000 USD for NCs and 352 000 USD for BRs. GEF-5 (2010-2014) provided support to more than a hundred countries in preparing their NCs and first BURs with 95 million USD.

Review and monitoring

Since 2010, the UNFCCC has included a robust review mechanism under the compulsory MRV system with some differences between developed countries and developing countries. NCs and BRs from developed countries and BURs from developing countries are reviewed individually. Specific sessions are held in conjunction with the Subsidiary Body for Implementation (SBI) for in-depth discussions of country reviews. Normally, these sessions include an oral presentation by the party summarizing progress and answering questions, with the participation of all parties.

Article 13 of the Paris Agreement establishes a technical expert review (TER) that broadens the scope of the review process to track progress made in implementing and achieving NDCs and applies the reviews process to all countries, with more discretion for least developed countries (LDCs) and small island developing states (SIDS). The review is intended to provide useful information to individual parties through identification of areas in need of improvement.

The individual review process under the UNFCCC relies on three sources: desk reviews, where experts review the information at their office; centralized reviews, where experts meet together to review the information of various countries; and in-country reviews, where experts visit the country under review and engage with policymakers and other relevant national stakeholders (Dagnet et al. 2017). In-county reviews are the most labor-intensive but provide full dedication to the country and create the greatest capacity-building benefit (Dagnet et al. 2017). Currently, the review process depends on volunteer experts (Dagnet et al. 2017). It is estimated that almost 800 experts will be needed to cover review obligations under the Paris Agreement (Dagnet et al. 2017).

Individual reviews are coordinated by the secretariat and conducted by international expert review teams (ERTs). The reviews are conducted following review guidelines (Dec. 13/CP.20) and result in country-specific review reports that are publicly available at the UNFCCC website. MRV technical review teams are appointed by the government of the country under review. As a consequence, the independent character of experts' reviews in the climate regime has been questioned (Huggins 2015; Dannenmaier 2012), as well as the aim of the review process to increase public pressure and states' accountability in the UNFCCC (Duyck 2015).

One of the new mechanisms aiming to keep the Paris Agreement dynamic and progressive is the global stocktake, which aims to assess collective efforts of parties every five years. To provide a comprehensive outlook, it will be based not only on the information of national contributions but also on other sources, including the reports of IPCC and subsidiary bodies (Tabau 2016). The details of the global stocktake are under negotiations, but it is expected to consist of a technical phase that includes an analysis of existing data and a political phase that endeavors to increase ambition to the required level. The technical phase will aim to assess current status of actions in relation to the long-term goals and thereby identify the implementation deficit and actions required to fulfill it. The output of the technical phase will inform and serve as basis for the political phase. The political phase will consist of political dialogue, possibly in form of a ministerial segment, to raise political awareness and increase collective pressure. The outcome of the global stocktake is intended primarily to inform the preparation of NDCs. Therefore, the first global stocktake has been scheduled for 2023, to allow for inclusion of the results in the preparation of their next round of NDCs in 2025 (Bodle et al. 2016).

In accordance with Articles 4 and 12 of the convention, parties are required to submit national greenhouse gas inventories (GGIs) to the secretariat. GGIs provide a comprehensive accounting of total greenhouse gas emissions from both sources and sinks. The IPCC has produced and revised guidelines for national greenhouse inventories since 1994.

Scientific support

The UNFCCC's Subsidiary Body on Scientific and Technological Advice (SBSTA) provides timely advice to the COP on scientific and technical matters related to the convention. The SBSTA carries out methodological work under the UNFCCC, the Kyoto Protocol, and the Paris Agreement. The interaction between the IPCC and SBSTA is interesting, but the IPCC is recognized by the UNFCCC as its primary source of scientific information, since it is considered an independent and prominent source (Warrilow 2017).

The IPCC was established in 1988 under the auspices of the World Meteorological Organization (WMO) and UNEP. The mandate of the IPCC is to 'assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation' (IPCC 2013). IPCC merely synthesizes existing research and does not carry out its own research or monitor climate-related data. To date, IPCC has published five global assessment reports (1990, 1995, 2001, 2007, and 2013/2014), as well as numerous other reports that have given scientific input to strengthen the climate regime. Its first assessment report played an important role in the establishment of the UNFCCC at the 1992 Earth Summit (Skodvin & Alfsen 2010). The second report provided key input to the negotiations that led to the adoption of the Kyoto Protocol. The fifth report informed the climate negotiations resulting in the Paris Agreement. The IPCC has, over the years, been firmly established as an independent assessment mechanism serving the SBSTA and the COP of the UNFCCC.

The sixth assessment report is expected to be published in 2022 in time for the global stocktake foreseen under the Paris Agreement. The key design feature of IPCC is its intergovernmental nature, which allows governments to achieve political and scientific consensus by approving a summary of the politically relevant conclusions of the main assessment reports (Box 4). Another strength of the IPCC lies in its three working groups, which are supported by hundreds of scientists with proven track records, drawn from many disciplines and many countries (Warrilow 2017). In 2007, the IPCC was awarded the Nobel Peace Prize.

BOX 4: How is politico-scientific consensus achieved in the IPCC?

A defining feature of IPCC is that the Summary for Policymakers (SPM) of the main reports are 'approved' – not merely 'accepted' – which fosters governmental ownership while retaining scientific credibility (Dubash et al. 2014). 'Approval' of SPMs signifies that the material has been subject to detailed, line by line discussion and agreement (IPCC 1999). The first draft SPM is written by scientists summarizing the content of the assessment report. It is sent to governments for comments, which are reflected in the second draft prepared by the scientists. The second draft is then reviewed during a four-day plenary session comprising government delegations and observer organizations. Each review session is chaired by a leading scientist and includes a panel of other scientists. The draft SPM is displayed on a giant screen, and each sentence is discussed at length by the delegates and revised accordingly. All revisions are made under the full control of the chair and panel, thus ensuring that the SPM remains consistent with the scientific content of the full assessment report. Cases of high political sensitivity and failure to reach consensus are notable exceptions (Mach et al. 2016). The plenary session results in the approval of the SPM in consensus by the participating governments.

2.3 Stockholm Convention on Persistent Organic Pollutants

Time-bound objectives

The objective of the Stockholm Convention is to protect human health and the environment from persistent organic pollutants (Art 1). The Convention includes a time-bound quantitative objective to ‘‘to detect a 50% decrease within a time period of 10 years’ of persistent organic pollutants (POPs) present in the environment, stated in the Global Monitoring Programme (GMP) guidance document (UNEP 2015). However, GMP guidelines are technical and do not have the political endorsement required to make the goal aspirational to the international community. Nevertheless, it is important to understand that commitments under the Convention do not aim for achievement by a distant target date, but rather necessitate action within a relatively immediate time frame (Kohler & Ashton 2010).

National action plans

Article 7 of the conventions obliges parties to develop and periodically update National Implementation Plans (NIPs) for the implementation of the obligations under the convention. The NIP must be submitted within two years of the date on which the convention enters into force. The preparation of the NIP requires national consultation with relevant stakeholders, including women´s groups and groups involved in the health of children. The convention also specifies that Party must endeavor to implement NIPs into sustainable development strategies. To date, 91% of parties have submitted NIPs covering the twelve initial POPs (Sec. of the Stockholm Convention 2017a).

Guidance for NIP preparation has been prepared and regularly updated by the secretariat in cooperation with other relevant stakeholders. Essentially, the NIP should provide information about all the measures taken with regards to POPs, such as legislative and policy measures, preparation of action plans and setting up monitoring schemes related to the occurrence and releases of POPs, and efforts to reduce their environmental concentrations. NIPs are intended to be ‘living documents’ to be periodically updated as the convention evolves and new substances are listed in the annexes. However, since 2011, only around one quarter of NIPs have been updated to reflect the inclusion of new substances of the recent COPs (Sec. of the Stockholm Convention 2017a).

GEF is the financial mechanism for the Stockholm Convention. In the initial years of the Convention, 80% of the activities supported by GEF were directed to NIPs (Kohler & Ashton 2010). Prior to 2010, GEF funded the preparation of initial NIPs in 138 countries with grant funding of 68 million USD (GEF 2017). After 2010, only 10% of activities supported by GEF have been allocated to updating NIPs, to which end NIPs have been updated in 61 countries with 11.5 million USD of grant funding (GEF 2017). This means that GEF has succeeded in making a shift in the development of NIPs to their implementation. Their costs also have come down from 0.5 million USD (initial NIPs) to 0.19 million USD (updated NIPs). Experience has shown that the development of a NIP requires three to four years (UNEP 2010).

Challenges encountered in the development of NIPs are listed below:

- Due to lack of initial clear guidance, preparations were challenging and resulted in variation between countries (Sec. of the Stockholm Convention 2017b).

- Quality varies between countries, and they do not typically cover all sectors or the relevant time frame (Sec. of the Stockholm Convention 2017b).
- Many developing countries have failed to set an adequate baseline, and the distinction between baseline and incremental costs has proven problematic (Sec. of the Stockholm Convention 2017b).
- NIPs have been treated as standalone endeavors lacking political engagement and not creating public awareness (UNEP 2010).
- Lack of mainstreaming POPs management into national planning processes, for example through the provision of national budget resources, is low (Kohler & Ashton 2010).
- The use of external consultants has hindered the originally envisioned capacity building effect, especially in LDCs (Kohler & Ashton 2010).

Reporting

Article 15 of the Convention obliges parties to report on measures taken to implement the Convention and on the effectiveness of such measures in meeting the objectives of the Convention. Reporting includes measures adopted to implement the convention and their effectiveness, as well statistical data on the production, import, and export of the listed chemicals. The reporting frequency is every four years and, to date three reporting cycles have been carried out (2002-2006, 2006-2010, and 2010-2014). The reporting template is focused mainly on multi-choice questions, allowing for comparison between countries. The average reporting rate is only 44%, one of the lowest among MEAs. The reporting level dropped from the second cycle (56%) to the third (49%). This could be due to many factors, including difficulties in accessing the online reporting tool (Sec. of the Stockholm Convention 2017a). In addition, the absence of a feed-back mechanism in the form of a synthesis report from the secretariat can discourage reporting (Honkonen & Khan 2017b). The recent effectiveness evaluation report highlights the lack of a compliance mechanism under the Stockholm Convention, is hindering the process of providing advice and assistance to countries facing problems with reporting (Sec. of the Stockholm Convention 2017a).

Review and monitoring

The convention includes a periodical effectiveness evaluation, outlined in Article 16, which aims to assess how the convention has succeeded in achieving its objective and identifies ways to improve effectiveness. The evaluation draws from many sources, including national reports, monitoring information, NIPs, and non-compliance information. To date, the effectiveness evaluation has produced two reports (2009 and 2017). The second report relied on a framework that was adopted in COP-6 in 2013 and carried out by a committee of fourteen members (ten parties and four other experts) confirmed by the COP. The second effectiveness evaluation showed that the convention is succeeding in reducing levels of POPs in humans and the environment, but limited data available from national reports and NIPs was a key challenge.

Article 16.2 sets the basis for a monitoring mechanism for chemicals listed under the convention and forms a central component of the effectiveness evaluation. The Global Monitoring Plan (GMP) monitors the presence of POPs as well as their regional or global environmental transport. Samples are collected, analyzed, statistically treated, and reported in a uniform manner using the ‘living’

GMP guidelines document. Implementation of the GMP is facilitated by a global coordination group consisting of fifteen members, supported by five regional organization groups with altogether thirty members. To date, two global monitoring reports have been produced: the first (2009) provided information on the baseline concentrations of the twelve legacy POPs in air and human martices, whereas, the second report (2017) provided the first indications of changes in concentrations of legacy POPs, as well as baseline information on the newly listed POPs. Over the years, a comparable dataset of twenty-three chemicals of concern has been generated (Magulova & Priceputu 2016).

Scientific support

The Convention has a subsidiary scientific body, the Persistent Organic Pollutants Review Committee (POP-RC), to review chemicals to be restricted. The committee consists of thirty-one government-designated experts in chemicals assessment or management. The COP confirms the appointment of experts nominated by parties on the basis of equitable geographical distribution, taking into account gender and the need for a balance between different types of expertise. Each member serves for four years from the date of appointment, and for no more than two consecutive terms.

2.4 High-Level Political Forum

Time-bound objectives

At the 2012 Rio+20 Conference, governments agreed to establish sustainable development goals that are 'action-oriented, concise and easy to communicate.'[12] The goals were developed through a transparent intergovernmental process that was open to all stakeholders. An Open-ended Working Group (OWG) was established in 2013 and finally in July 2014, after thirteen sessions, the OWG put forward a proposal compromising of 17 goals and 169 targets. In September 2015, the UN Sustainable Development Summit adopted the 2030 Agenda on Sustainable Development.

The 2030 agenda includes a declaration that outlines a vision and includes other subsections, including shared principles and commitments. Most importantly, the agenda includes a central commitment to 'leave no one behind' that is repeated throughout the agenda, signaling its inclusive and universal nature that everyone should benefit equally. The slogan has become an inherent part of the 2030 agenda. The term originates from a report of the Secretary-General´s High-Level Panel on Eminent Persons on the Post-2015 Development Agenda, which outlines five transformative shifts starting with 'Leave no one behind' (UN 2015).

Paragraph 75 of the 2030 agenda specifies that the goals and targets need to be followed up and reviewed using a set of global indicators. A global indicator framework with 231 indicators was developed by the Inter Agency and Expert Group on SDG Indicators, then agreed by the UN Statistical Commission in March 2016 and, finally adopted in July 2017 by the General Assembly.[13]

[12] A/RES/66/288 (para 247)
[13] A/RES/71/313

The SDGs build on the Millennium Development Goals (MDGs), which had only 18 targets and 48 indicators, significantly broadening the scope and extending them from developing countries to all countries and the entire global community. SDGs are not legally binding, but national governments have committed to achieving the goals and the 2030 agenda at the highest political level. Situated in international law, the SDGs are a set of norms at the softest end of the 'hard-to-soft' continuum (Persson at al. 2016).

National action plans

The 2030 agenda states that 'cohesive nationally owned sustainable development strategies, supported by integrated national financing frameworks, will be at the heart of our efforts.'[14] Furthermore, paragraph 78 encourages governments to develop ambitious national responses to the overall implementation of the 2020 agenda, building on existing planning instruments such as national development and sustainable development strategies. However, specific guidance for elaboration on sustainable development strategies is not given, so they play an ambiguous role in the 2030 agenda.

The failure to outline a NAP mechanism in detail may have resulted from mixed past experiences. Indeed, a NAP mechanism dates back to the Earth Summit in 1992, which called for the development of National Sustainable Development Strategies (NSDSs).[15] They were considered important to internalize sustainable development to national planning processes (Persson et al. 2016). In 1997, at the 'Rio+5 Conference,' a goal was set for all countries to formulate NSDSs by 2002.[16] However, in 2002, only 85 countries had developed NSDSs, and they varied in scope and quality (Report of the Secretary-General 2002). By 2009, 106 countries had formulated NSDSs (UNGA 2010). Relatively weak interest in NSDSs might be explained by the fact that the Commission on Sustainable Development (CSD) never dedicated time for their systematic review (Report of the Secretary-General 2013).

Reporting

Paragraph 79 of the 2030 agenda encourages countries to 'conduct regular and inclusive reviews of progress at the national and sub-national levels which are country-led and country-driven.' The voluntary national reviews (VNRs) form the backbone of the 2030 agenda, as it aims to take stock of the national mechanisms, policies, and measures in place, facilitate sharing of experiences and strengthen policies and institutions of governments and mobilize multi-stakeholder support for the implementation of the 2030 agenda. The VNRs are intended to serve as a basis for the regular reviews by the HLPF. In practice, each country participating in preparation of VNRs presents a concise written report and makes a brief oral presentation during the HLPF. Countries are encouraged to report at least twice by 2030. In 2016, 22 countries conducted VNRs and, in 2017, the number rose to 43. In 2018, 51 countries have volunteered to submit VNRs.

[14] A/RES/71/313 (para 63)
[15] Agenda 21 (chapter 8)
[16] A/RES/S-19/2 (para 24)

The Secretary-General has prepared voluntary common reporting guidelines to help countries frame their VNRs. The reporting guidelines aim to introduce comparability among countries to make the discussion of good practices and the tracking of global trends more effective. Nevertheless, it is up to each country to decide the scope and format of its VNR. This creates many problems in terms of accountability. It is unclear whether the VNRs should reflect the globally adopted goals and targets or nationally defined ones or, if both, what the balance should be (Persson et al. 2016). In 2017, a third of VNRs addressed all SGDs (UN 2017b). Similarly, each country can decide whether to use national or global indicators to assess progress, which weakens comparability between countries. Furthermore, VNRs have limited potential to institutionalize sustainable development, since as a reporting tool they are retrospective in nature and do not provide room for prospective policy planning. Nevertheless, it can be argued that in the implementation of the 2030 agenda countries are primarily accountable to their own citizens and parliaments, rather than to the UN. Also, since the prevailing circumstances and starting levels vary greatly between countries, it is often more useful to compare performance across time within rather than between countries.

Review and monitoring

The 2030 agenda relies on three principal mechanisms for collective periodic review. First, an annual progress report on the Sustainable Development Goals is prepared by the Secretary-General in cooperation with the UN system that is based on the global indicator framework and data produced by national statistical systems and information collected at the regional level. Second, the quadrennial Global Sustainable Development Report (GSDR) aims to strengthen the science-policy interface and provide evidence-based information to support decision-making. Last, thematic reviews of progress also take place at the HLPF.

The development of a monitoring scheme has been outsourced to the United Nations Statistical Commission (UNSC). An inter-agency Expert Group on Sustainable Development Goal (IAEG-SDG), consisting of 28 representatives mainly from national statistical offices, was appointed to the development of a set of indicators. The global indicator framework was adopted by UNGA in July 2017.[17] The indicators are to be refined annually and reviewed comprehensively in 2020 and 2025. Official statistics and data from national statistical systems constitute the basis for the framework. A large number of UN bodies and other organizations are collaborating to support data collection and provide necessary capacity support. In addition, countries are encouraged to complement global indicators with regional and national indicators. A Global SDG Indicators Database has been developed to provide open access to country-specific information.[18] The Secretary-General´s annual progress report is based on the global indicator framework.

Scientific support

The Rio+20 Outcome Document, in paragraph 88 k), calls for strengthening ‘the science-policy interface through review of documentation, bringing together dispersed information and assessments, including in the form of a global sustainable development report.’ The modalities of the Global Sustainable Development Report (GSDR) report were agreed in July 2016 as part of the

[17] A/RES/71/313
[18] https://unstats.un.org/sdgs/indicators/database/

HLPF ministerial declaration. Essentially, the GSDR aims to provide scientific guidance to further the implementation of the 2030 agenda, including address new and emerging issues and highlight emerging trends and actions. The preparation of the report is steered by group of fifteen scientists who represent a variety of backgrounds, scientific disciplines, and institutions, ensuring geographical and gender balance. The group is appointed for each GSDR report by the Secretary-General. The group is supported by a task team co-chaired by six UN bodies that coordinate inputs from the UN system, the private sector, civil society, and academia. The report is published every four years, when the HLFP meets under the General Assembly.

2.5 Summary of main features

A set of time-bound objectives have been adopted in the CBD and HLPF. National Action Plans are common in all the examined instruments. Reporting is a common feature in all instruments, but vary greatly in format from entirely open-ended to fully structured. Review is most advanced in the UNFCCC/PA, which relies on both collective and individual review. The science-policy interface consists of both subsidiary and independent bodies, with two instruments (CBD, UNFCCC/PA) enjoying benefits of both. Table 3 summarizes main features of selected international instruments. SAICM has been included in the table as a reference point.

Table 3. Main features of five functions needed for effective governance in selected regimes.

	CBD	**UNFCCC/PA**	**Stockholm Convention**	**HLPF**	**SAICM**
Time-bound objectives	Strategic Plan with a vision, 5 Strategic goals and 20 Aichi Biodiversity Targets	Two-headed temperature limit (not time-bound)	General objective (not time-bound)	2030 agenda with vision, 17 SDGs and 169 targets	Overarching Policy Strategy (OPS) with an overall objective for 2020 and 46 objectives
National Action Plans	National Biodiversity Strategies and Action Plans (NBSAPs): Aichi Biodiversity Targets to be used as a flexible reference; Activities of other biodiversity MEAs can be included	Nationally Determined Contribution (NDCs): Should be 'progressive' and reflect 'highest possible ambition'; Should include a goal	National Implementation Plans (NIPs): To be updated after listing of new chemicals	National Sustainable Development Strategies (NSDSs): Not specified by HLPF, but relies on NSDSs originating from Agenda 21	Integrated national programmes; National profiles; SAICM implementation plans
Reporting	Format: mainly open-ended questions Interval: every four years	1) National communications (NCs) 2) Biennial Reports (BRs) and Biennial Update Reports (BURs) Format: mainly open-ended questions; Interval: every 2 (BUs/BURs) and 4 years (NCs)	Format: mainly multiple-choice questions; Interval: every four years	Voluntary National Reviews (VNRs) Format: mainly open-ended; Interval: at least twice between 2015-2030	Format: mainly multiple-choice questions; Interval: every three years
Review	Collective: Global Biodiversity Outlook (GBO) led by the secretariat every four years; Individual: Voluntary peer-review mechanism (VPR)	Collective: Global stocktake (GS) every five years; Individual: Compulsory measurement, reporting and verification (MRV) system; Technical expert review system	Collective: Effectiveness Evaluations led by parties and other experts every eight years	Collective: Global Sustainable Development Report (GSDR) every four years; SG`s annual progress report	Collective: Secretariat´s progress report based on 20 indicators every three years
Monitoring	Biodiversity Indicators Partnership (BIP) consisting of 59 partners with 42 indicators	Greenhouse gas inventories (GGI)	Global Monitoring Plan (GMP) facilitated by 30 members	IAEG on SDGs with 231 indicators providing basis for SG´s annual progress report	n/a
Scientific support	Subsidiary body: SBSTTA; Independent body: IPBES providing thematic, global and regional assessments	Subsidiary body: SBSTA; Independent body: IPCC providing thematic and global assessments	Subsidiary body: POP-RC 31 members (government-designated experts) providing recommendations for listing chemicals	Scientific panel for GSDR with 15 members (government-designated experts) supported by an UN inter-agency taskforce	Process for taking up emerging issues established; Emerging issues taken up by IOMC organizations and expert working groups are often established

3. Overview of governance elements

The section elaborates how the governance elements could be incorporated in the Beyond-2020 Framework. Each subsection is divided into a brief overview of the current situation in SAICM, lessons learned from other instruments applicable to the new framework and recommendations for next steps.

3.1 Time-bound objectives

Current situation in SAICM

The overall objective of SAICM is 'to achieve the sound management of chemicals throughout their life cycle so that, by 2020, chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment.' The overall objective derives from paragraph 23 of the Johannesburg Plan of Implementation (JPOI) and is reiterated in paragraph 13 of SAICM´s Overarching Policy Strategy (OPS). The OPS has five thematic focus areas with 46 objectives. The OPS is complemented by the Global Plan of Action (GPA) with 273 activities and associated indicators. The numerous objectives and specific actions display the overwhelming scope of the challenges but result in lack of strategic focus, diverting attention from critical priorities and hindering efficient follow-up of progress.

The overall objective may fall short of delivering, since it is heavily qualified: the objective is to 'minimize significant adverse effects' instead of to 'eliminate,' and what constitutes 'significant adverse effect' remains undefined (Ditz & Tuncak 2014). Furthermore, its operationalization has been weakened by lack of strategic priority-setting evidenced by numerous objectives, activities, and indicators that all lack measurability.

To provide strategic focus to SAICM, ICCM4 adopted, in 2015, the Overall Orientation and Guidance (OOG) document, which outlines in 11 basic elements what is critical at the national and regional levels to the attainment of sound chemicals and waste management. Furthermore, ICCM4 decided that the intersessional process should consider the need to develop recommendations regarding measurable objectives in support of the 2030 agenda.[19] The first meeting of the intersessional process held in February 2017 in Brasilia, Brazil, asked for the development of a proposal on 'objectives in support of the 2030 agenda and related milestones, with the objectives to be aspirational in nature, limited in number and centered on the 11 elements of the Overall Orientation and Guidance,' which has been produced and made available (Doc. SAICM/IP.2/8) to support the deliberations of the second meeting of the Intersessional process (SAICM 2018a). A rare window of opportunity to design a set of measurable objectives and milestones for the Beyond-2020 Framework.

[19] SAICM/ICCM/IV/4 (para 10)

Lessons learned from other instruments

The Aichi Biodiversity Targets and the SDGs consist of a set of non-legally binding goals and targets that are aspirational in nature, aiming to mobilize a broad group of stakeholders for their implementation. Arguably, the 'softness' and the low level of obligation associated with the SDGs and Aichi Biodiversity Targets make it possible to design ambitious and forward-looking goals that facilitate broad participation. In other words, when no legally binding obligations are at stake, states and other stakeholders may be willing to adopt an agenda that is more ambitious in scope and vision (Pogge & Sengupta 2015). The non-legally binding nature of such goals and targets provides an exemplary model for the development of time-bound objectives and milestones for the Beyond-2020 Framework.

The Strategic Plan for Biodiversity 2011-2020 and the 2030 agenda both include punchlines— in the vision ('living in harmony with nature') of the former and in the declaration ('leave no one behind') of the latter. Arguably, the slogans have brand value, since they provide easily memorable conceptual commitment aiming to influence people and provoke action. In this sense, they both constitute strong ideological commitments that aim to inspire everyone to become drivers of change. Similarly, the sound management of chemicals and waste could benefit from an aspirational commitment that would, ideally, be embedded in the vision of the Beyond 2020 Framework.' An informal workshop was held on 19 January 2018 in Stockholm, Sweden, that discussed possibilities for a vision, objectives, and milestones for sound management of chemicals and waste. Possible keywords for the visions presented and discussed included the following six suggestions: non-toxic environment, pollution-free planet, no harm from chemicals, no harm to humans or biodiversity from chemicals, chemicals safety, and detoxified future (SAICM 2018b).

With regards to goal-setting, the development of the Beyond-2020 Framework is currently in the same situation as the biodiversity cluster was a decade ago, when the 2010 Biodiversity Target ('to achieve by 2010 a significant reduction of the current rate of biodiversity') turned out to be ambiguous and difficult to quantify. This resulted in lack of accountability and, ultimately, weak implementation. These notions triggered the development of the Aichi Biodiversity Targets, which were intended to be SMART (specific, measurable, ambitious, realistic, and time-bound) and intended to tackle biodiversity loss at different levels (state of biodiversity, underlying drivers, policy responses, and integration across sectors). However, despite sincere effort to make SMART targets, the Aichi Biodiversity Targets largely remain without quantifiable (numeric or binary) features and contain ambiguities and complexities. The Biodiversity Indicators Partnership (BIP) has developed 42 indicators to increase measurability of the Aichi Biodiversity Targets.

As said, SAICM´s 2020 objective for achieving sound management of chemicals and waste suffers from similar problems as the former 2010 Biodiversity Target with vague formulation and lack of detailed quantification. Arguably, a major advantage of designing truly SMART targets is that they are intended to hold signatories accountable by determining whether targets have been met (Maxwell et al. 2015), so it provides a good model for development of objectives and milestones for the Beyond-2020 Framework. Nevertheless, experiences from the Aichi Biodiversity Targets show that any future policy commitments concerning targets should include the adoption of a smaller number of more focused headline targets (alongside subsidiary targets) that are specific, quantified,

simple, succinct, and unambiguous (Butchart et al. 2016). Lessons learned from Aichi Biodiversity targets are shown in Box 5.

BOX 5: Lessons learned from wording in the Aichi Biodiversity Targets

- **Avoid ambiguity**
  Refrain from the use of imprecise terms (e.g., 'substantially,' 'significantly,' 'effective,' 'as appropriate,' 'where feasible,' 'take steps to achieve') and poorly defined operational terms;
- **Maximize measurability**
  Set clear binary or numeric thresholds to be met in order for the target to be achieved; and
- **Seek simplicity**
  Avoid complexity and redundancy (e.g., 'at all levels,' 'consistent with national legislation') by reducing the number of elements or components in each target.

Source: Butchart et al. 2016

A particular challenge will be to find the right level of ambition. That is, set the level of ambition too low, and the target becomes inconsequential and ineffective in addressing the problem the instrument is designed for. Set the level too high, and risk inability to implement it. Both pathways carry risks for instruments credibility (Hagerman & Pelai 2016). Evidently, the Aichi Biodiversity Targets were created with a high level of ambition, considering that only 5% of countries are on track to meet them (WWF et al. 2016). Nevertheless, they have provided strategic focus to move forward and helped to assess progress.

The Aichi Biodiversity Targets have provided a valuable showcase for enhancing synergies among biodiversity-related MEAs, thereby contributing to a more coherent international environmental governance (IEG) system. That is, they were designed as a framework for the entire biodiversity cluster, as well as for the broader UN system and other stakeholders. Similarly, objectives and milestones for the Beyond-2020 Framework could create an umbrella to enhance sound chemicals and waste management of all relevant entities ranging from the chemicals and waste cluster to the private sector, as demonstrated in Figure 2. In particular, the objectives and milestones could function as glue to solidify the chemicals and waste cluster by creating a joint approach to implementation of programmatic activities.

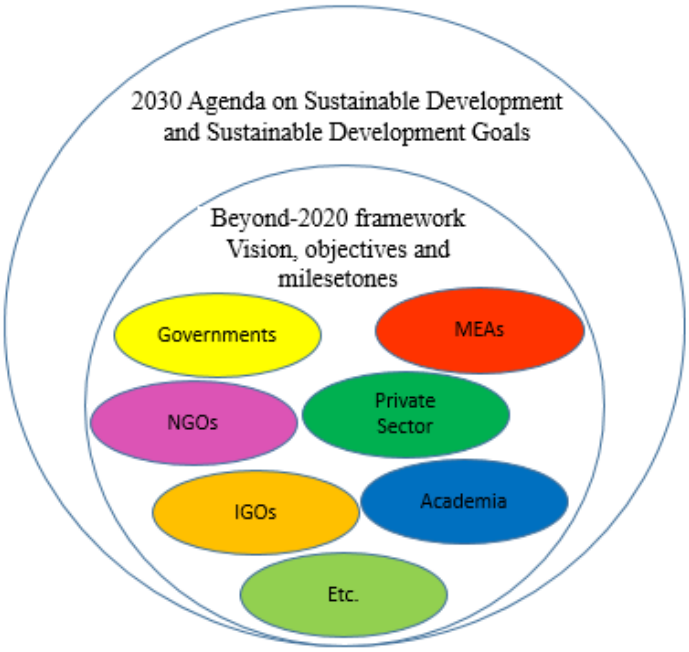

Figure 2. The vision, objectives and milestones should be designed to operationalize the SDGs of the 2030 agenda with relevance for chemicals and waste. The objectives and milestones could provide an overarching framework for action to governments, MEAs, IGOs, NGOs, academia, as well as private sector and other relevant stakeholders.

The Paris Agreement was able to agree on a two-headed temperature limit founded on science and that captured the attention of the general public. However, the Paris Agreement did not establish a clear emission reduction target or even specify when global emissions should peak or equal net zero. Although not part of this analysis, one reason for the success of the Montreal Protocol in reducing the use and release of ozone-depleting substances is that the parties agreed to precise targets for phasing out the chemicals (Ditz & Tuncak 2014). Similarly, under the Beyond-2020 Framework, several technically oriented binary and/or quantitative milestones could be agreed for phasing out hazardous chemicals in specific cases, such as lead in paint or highly hazardous pesticides. Alternatively, one milestone could include the commitment to develop plans of action for all existing and emerging SAICM policy issues by a certain year.

Ultimately, large-scale transformation will only happen if businesses systematically internalize sound management of chemicals and waste into strategy-building, in line with the polluter pays principle. The UNFCCC has achieved unforeseen business engagement that has driven new innovations, forging partnerships, creating jobs, and increasing financial flows. The CBD is following closely behind and has developed a resource mobilization strategy and launched a global business and biodiversity partnership to provoke business interest. Given the economic power of the chemicals industry, the size of international trade in chemicals, and the strong trade and market dimensions of chemicals management, the Beyond-2020 Framework should help businesses to adapt their business models to meet the objectives and milestones and support national implementation.

Recommendations for the Beyond-2020 Framework

- In the run-up to the ICCM5 Conference, the development of a vision, objectives and milestones for sound management of chemicals and waste should receive extensive technical consideration, but also high-level engagement across all relevant sectors with the aim to fulfill the commitments in the 2030 agenda on Sustainable Development concerning sound management of chemicals and waste.
- The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets provide a useful model, due to their aspirational and communicative nature, for developing a long-term vision and measurable time-bound objectives and milestones for sound management of chemicals and waste, with the aim to guide national implementation and ensure broad ownership of the UN system and beyond. The vision should include a general commitment with carefully chosen aspirational keywords that help to brand and communicate the objectives and milestones. The Overall Orientation and Guidance document provides a holistic and strategic framework that could be translated into a focused set of measurable objectives and milestones for sound management of chemicals and waste. Also, specific objective and milestones could be developed for other needs, including addressing emerging policy issues and enhancing global governance, with the aim of ensuring strategic focus by limiting the number of objectives to 2-5 and milestones to 15-20. See Box 6 for examples of possible measurable and time-bound objectives and milestones.
- To ensure broad sectoral ownership and a genuinely cooperative and synergistic framework for sound management of chemicals and waste, the entire chemicals and waste cluster, IOMC organizations and their memberships, and other stakeholders should be involved in the design of the objectives and milestones. The objectives and milestones should be mapped to indicate their primary custodians to ensure that all relevant stakeholders and sectors are engaged, including industry players along the value chain and the academic community.
- A resources mobilization strategy should be developed to secure resources from all relevant stakeholders, building on the UNEP's integrated approach to financing.
- The measurable objectives and milestones should be designed to be SMART (specific, measurable, ambitious, realistic, and time-bound) as well as avoiding ambiguity, maximizing measurability and seeking simplicity, to ensure that they resonate with a broad audience and serve to track progress.

BOX 6: Examples of possibilities for developing measurable and time-bound objectives and milestones for sound management of chemicals and waste

Objective 1: Enhance domestic efforts for sound management of chemicals and waste, in line with the overall orientation and guidance (OOG)

- By 2030, each country has developed legal frameworks that address the life-cycle of chemicals and waste, including have functional enforcement and compliance mechanism in place;
- By 2035, each country has established a system and are able to collect, with support of industries and other stakeholders, health and safety data and information on chemicals and waste throughout the life-cycle, and are making it publicly available;
- By 2040, each country has included sound management of chemicals and waste in national health, labor, social, environment and economic budgeting processes and development plans.

Objective 2: Minimize production and use of and exposure to hazardous chemicals and waste, including address emerging policy issues

- By 2030, global action plans have been developed for emerging policy issues with the aim to:
  - By 2030, launch risk management action plans for 50% of identified EDCs
  - By 2030, phase out lead in paint
  - By 2040, achieve environmentally sound disposal and management of E-waste
- By 2050, chemicals of global concern have been phased out;
- By 2030, harmonize hazard classifications according to the Global Harmonized System (GHS) for x number of chemicals generated.

Objective 3: Develop global governance of hazardous chemicals and waste

- By 2025, a dynamic science-policy interface for sound management of chemicals and waste has been developed and is operational;
- By 2025, a mechanism to assess collective progress through a global stocktake has been developed with the view to carry out the first global stocktake in 2028;
- By 2030, criteria to identify new global chemicals of concern, using a grouping of chemicals approach, have been prepared and adopted;
- By 2040, a monitoring system has been developed and is monitoring the occurrence and effects of x number of toxic chemicals in the environment and in humans.

Objective 4: Enhance stakeholder participation and sectoral engagement to provoke a system-wide transformation in chemical and wastes management

- By 2025, each country has developed, adopted and commenced the implementation of National Action Plans and all relevant stakeholders have prepared their own plans to enhance sound management of chemicals and waste, covering all key sectors, including environment, health, agriculture, labor, industry, development, finance etc.;
- By 2030, each country has formed a national multi-stakeholder and multi-sectoral platform for the follow-up of the objective and milestones for sound management of chemical and waste;
- By 2030, a global cost internalization program for sound management of chemicals and waste has been prepared endeavoring to increase private sector engagement and financing;
- By 2035, each country has required science-policy mechanisms in place to promote evidence-based decision-making and policy formulation for sound management of chemicals and waste.

Objective 5: Enhance chemically sound circular economy policies and promote application of sustainable and green chemistry

- By 2030, define principles and guidelines for sustainable chemistry for major downstream and retail industry sectors and launch a global campaign to promote their wide-spread use;
- By 2035, prepare and adopt global standards for enhancing traceability of chemicals of global concern throughout their life-cycle.

3.2 National Action Plans Mechanism

Current situation in SAICM

The Overarching Policy Strategy (OPS) and Global Plan of Action (GPA) include three key concepts that outline elements for national action plan mechanism, but they are not guided by measurable and time-bound objectives and milestones. These include integrated national programmes, national profiles, and SAICM implementation plans. These are explained in detail below with conclusions in the end.

Integrated National Programmes

Paragraph 16b of the OPS outlines the objective to 'promote the sound management of chemicals within each relevant sector and integrated programmes for sound chemicals management across all sectors.' The GPA includes a work area for 'Implementation of integrated national programmes for the sound management of chemicals at the national level in a flexible manner.' As specified in activity 166 of the GPA, the following activities are suggested for Integrated National Programmes:

- Develop comprehensive national profiles.
- Formalize inter-ministerial and multi-stakeholder coordinating mechanisms on chemicals management issues, including coordination of national government and multi-stakeholder positions in international meetings.
- Develop national chemical safety policies outlining strategic goals and milestones towards reaching the Johannesburg Summit 2020 goal.
- Develop national chemicals safety information exchange systems.
- Develop national strategies to mobilize national and external resources and to raise the importance placed on chemicals management within national sustainable development frameworks.
- Develop policies of systematic stakeholder involvement, bringing synergies from related initiatives on chemicals management.

The specific indicator for activity 166 is as follows: 'All countries have developed integrated national programmes for the sound management of chemicals.' A five-year timeframe (2006-2010) has been given to achieve this.

SAICM Implementation Plans

Paragraph 22 of the OPS states that 'Implementation of the Strategic Approach could begin with an enabling phase to build necessary capacity, as appropriate, to develop, with relevant stakeholder participation, a national Strategic Approach implementation plan, taking into consideration, as appropriate, existing elements such as legislation, national profiles, action plans, stakeholder initiatives and gaps, priorities, needs and circumstances.' In 2006, the first sessions of ICCM encouraged 'governments to focus their initial implementation work on those activities that will facilitate a prompt start in efforts to achieve the Johannesburg Plan of Implementation 2020 goal and the objectives set forth in the Strategic Approach, such as by continuing to facilitate existing

international chemicals management priorities and considering additional efforts that are needed to develop a national Strategic Approach implementation plan.'[20]

Guidance for the development of SAICM implementation plans was developed in 2009 by the SAICM Secretariat and the United Nations Institute for Training and Research (UNITAR) in collaboration with the IOMC (SAICM 2009a). The guidance document outlines four phases for preparation on the action plans:

1) Establishment of a coordinating mechanism and organizational considerations
2) Assessment of national infrastructure and capacity
3) Development of a SAICM implementation plan
4) Implementation of a SAICM implementation plan

The Quick Start Programme (QSP) was established in 2006 with a voluntary time-limited trust fund to assist implementation of SAICM in developing countries, including '… development and strengthening of national chemicals management institutions, plans, programmes and activities to implement the Strategic Approach.'[21] An impact evaluation of the QSP showed that national strategies or plans for sound management of chemicals have been produced in many projects under various titles, such as, National Implementation Plans, National Chemical Management Policies, roadmaps for GHS implementation, Libreville Declaration, implementation strategies, integration of sound chemical management into national development plans, and development of national chemicals safety plans (Nurick & Touni 2015). A case study from Guyana (Box 7) provides insight into a SAICM implementation plan.

BOX 7: SAICM Implementation Plan for Guyana

The SAICM implementation Plan for Guyana (2012-2015) aims to strengthen national policies, programmes, networks and other mechanism to ensure sound management of chemicals. The plan is based on a multi-sectoral approach, involving all institutions, organizations and disciplines that take part in chemicals management in Guyana. It identifies seven priority areas of work deriving from the GPA, including risk assessment, research and laboratory capacities, waste management, education and awareness raising, stakeholder participation, preventing illegal trafficking and emergency planning. The plan builds on valuable worked done by the proceeding QSP project 'Developing an Integrated National Programme for the Sound Management of Chemicals and SAICM Implementation in Guyana' that was carried out by UNITAR with support of 80 000 USD that enabled to, inter alia, establish an inter-ministerial committee, prepare a national chemicals profile to take stock of existing national efforts and to prepare a national capacity assessment to identify priority work areas. In other words, the implementation plan constitutes of a logical continuum of prior work that had helped to establish necessary institutional capacities to deliver an action-oriented plan.

Source: Government of Guyana 2011.

Chemical Profiles

GPA activity 166 specifies that Integrated National Programmes for the sound management of chemicals should include, inter alia, the development of comprehensive national profiles. Other GPA activities are to specify the role of national profiles, including activity 165, which encourages

[20] SAICM/ICCM/I/1 (para 2)
[21] SAICM/ICCM/I/4 (Appendix 1, para 3b)

putting in place sectoral and multi-stakeholder mechanisms to develop national profiles and priority actions; activity 207, which calls for assistance and training for the development of national profiles; and activity 211, concerning the need to promote programs to develop chemicals management instruments (including national profiles).

The national profiles derive from the Intergovernmental Forum on Chemical Safety (IFCS), the predecessor of SAICM. In 1994, the first meeting of IFCS recognized national profiles as a priority action to implement Chapter 19 of Agenda 21 and recommended that 'National Profiles to indicate the current capabilities and capacities for management of chemicals and the specific needs for improvements should be elaborated as soon as possible and no later than 1997.'[22] In 1997, the final report of the second meeting of IFCS encouraged 'countries to prepare and continuously update national profiles, using the UNITAR/IOMC guidance document.'[23] In 2000, the third meeting of the IFCS adopted a declaration with the following commitment: 'By 2002: Most countries, through a multi-stakeholder process, will have developed a National Profile on chemicals management.'[24]

In 2001, the seventeenth Council Meeting of GEF, acting in the capacity of the interim financial mechanism for the Stockholm Convention, recommended the development or updating of a National Profile for SAICM in conjunction with developing NIPs for the Stockholm Convention[25]. In addition, the guidelines suggests 'Countries which have not prepared a National Profile are encouraged to do so (using UNITAR/IOMC guidance).' To date, 30 countries have received support from GEF for preparation of a National Profile as part of the development of NIPs under the Stockholm Convention. Over 55 countries have also received support for preparing or updating national profiles under the Quick Start Programme.

The UNITAR/IOMC guidelines for the development of national profiles were developed in 1996 and revised in 2012. The guidelines clarify the primary objective of national profiles, which is to develop an official national reference document providing a clear picture of the national legal, institutional, administrative, and technical infrastructure for national chemicals management. They can also assist in the identification of infrastructure-related strengths, weaknesses, and gaps, as well as identifying priority needs for national action and external technical assistance. Last, they can provide a nationally recognized information base against which progress in meeting specific national or international targets may be judged. Over 120 countries have prepared national profiles following the UNITAR/IOMC National Profile Guidance Document. The vast majority of national profiles have been developed in the 1990s or 2000s. An online registry has been created to access them.[26]

Conclusions

SAICM includes duplicative features for development of national action plans that include three concepts, including integrated national programmes, national profiles, and SAICM implementation plans. They have been implemented in developing countries since the mid-90s, starting with

[22] IPCS/IFCS/94.8Res.2
[23] IFCS/FORUM-II/97.25w (para 76 A)
[24] IFCS/FORUM III/23W
[25] GEF/C.17/4
[26] http://cwm.unitar.org/national-profiles/nphomepage/np3_region.aspx

national profiles that focus on taking stock of existing efforts and then evolving to a more programmatic level with the creation of SAICM implementation plans. However, no comprehensive analysis has been made of the preparation of integrated national programmes, national profiles, and SAICM implementation plans. Arguably, the lack of a strategically prioritized NAP mechanism has resulted in an ad hoc and sporadic approach to development of NAPs with different names and approaches, making it challenging to assess collective progress. Nevertheless, existing work provides a solid basis to formalize the NAP mechanism as key instrument for delivering the proposed time-bound objectives and milestones by giving it more strategic focus.

Lessons learned from other instruments

The analysis shows that a NAP mechanism is commonly used to enhance implementation in international frameworks that have broad scope, such as the CBD, UNFCCC/PA and HLPF, but is also prevalent in regimes with a narrow scope, like the Stockholm Convention. The study also shows that a NAP mechanism is not limited to legally binding regimes, but is also deployed by voluntary frameworks, including the 2030 agenda. The NAP mechanism, across all analyzed instruments, encourages stakeholder engagement and mainstreaming into broader development planning and, thereby, constitutes a central pillar for internalization of their objectives. In other words, it provides a unique bottom-up mechanism by deploying a wide range of national stakeholders across sectors to identify policies and carry out actions, in accordance with national priorities and capabilities.

The NAP mechanism facilitates prospective policy planning and stakeholder engagement and, thereby, anchors the international framework at the national level. Most importantly, NAPs provide an operational tool for the measurable objectives and milestones that are fundamental to provide real effect. Evidently, the lack of a requirement for a formal NAP mechanism in the 2030 agenda is a challenge for the operationalization of SDGs at the national level. It is worthwhile to note that Agenda 21 included a process to develop National Sustainable Development Strategies (NSDSs) with the aim to internalize sustainable development to national planning processes. Initially, NSDSs received interest from many countries but lost impetus over time, since they lacked a uniform indicator framework and were never properly followed up.

NAPs provide an important tool for the mobilization of resources from national budgets, as specifically outlined in NBSAPs under the CBD and NIPs under the Stockholm Convention, since their preparation is expected to bring together stakeholders from all sectors of government and beyond. Nevertheless, it is expected that financial support is needed for the development of NAPs in developing countries. The preparation of NAPs under the Beyond-2020 Framework would be likely to follow the bottom-up approach model of NBSAPs or NDCs. NBSAPs have been supported by GEF on average by 200 000 USD per country, although this has often included support also for reporting. GEF provided support for INDCs under the UNFCCC to 46 countries with an average of 245 000 USD per country.

The NDCs constitute a powerful tool and was key for reaching agreement on the Paris Agreement. They are simple documents, often only few pages long, and contain the commitment that countries are willing to put on the table to achieve the 2°C degree goal. Most importantly, collectively they inform parties of progress in achieving the 2°C degree goal and, thereby, help to inform whether the

ambition level needs to be scaled up and to what extent. Whereas, in the biodiversity regime, the challenge with NBSAPs is that it is impossible to create an aggregate to determine if parties are on the path to meet the mission to halt biodiversity loss by 2020. It can be argued that due to the complexity of biodiversity loss it is very difficult to identify a single benchmark or 'tipping point' against which to assess progress like the 2°C degree goal for the Paris Agreement. Similarly, sound management of chemicals and waste can be regarded as a more complex challenge, considering the number of chemicals on the markets, so it can be next to impossible to identify a single benchmark for assessing progress.

All in all, despite their slight differences, the NBSAPs and NDCs constitute a useful model for the Beyond-2020 Framework, due to their bottom-up nature. Hence, the challenges in chemicals and waste management differ greatly between countries requiring flexibility to address national circumstances. In this context, the NDCs are particularly relevant, due to their open nature in respect of how to achieve the necessary reductions and what parties promise to do. This is in the spirit of the Paris Agreement that does not prescribe specific mitigation actions or which emission levels should be achieved by when, nor is there an obligation to fulfil the NDC (Bodle at al 2016). Nevertheless, each Party is obliged to present on 5-year intervals an NDC and to make it public and subjects them all regularly to individual review and collective stock take. A unique feature of NDCs is the commitment to regularly scale up action and reflect highest possible ambition that certainly should be the starting point of any NAP mechanism, including under the Beyond-2020 Framework.

The relevance of non-state actors in mitigating sustainability challenges has increased rapidly during the past decades, and their role was discussed in the run-up to the Paris Agreement. A working paper from the World Resources Institute (WRI) suggested allowing competent international and non-governmental organizations, as well as subnational authorities to submit input to the 5-year intervals for the sake of 'procedural equity' (Oberthür et al. 2015). Multi-stakeholder participation is in the heart of SAICM and is expected to continue so in the Beyond-2020 Framework. A good model for enhancing sectoral engagement is provided by the WHO Chemicals Road Map that was approved in July 2017 to increase health sector engagement towards the 2020 goal and beyond (WHO 2017). See Box 8 for more information on the WHO Chemicals Roadmap.

BOX 8: WHO Chemicals Road Map

In May 2017, the 70th World Health Assembly approved the WHO Chemicals Road Map to enhance health sector engagement in the strategic approach to international chemicals management towards the 2020 goal and beyond. The road map identifies actions where the health sector has either a lead or important supporting role to play, recognizing the need for multi-sectoral and multi-stakeholder cooperation. These actions are organized into four areas: risk reduction; knowledge and evidence; institutional capacity; and, leadership and coordination. The road map outlines responsibilities for both Member States and the WHO Secretariat. This means that Member States and other stakeholders are encouraged to define their own implementation plans for the road map. The road map will be updated according to the outcome of the intersessional process to prepare recommendations regarding the Strategic Approach and the sound management of chemicals and waste beyond 2020.

Source: WHO 2017.

The development of a NAP mechanism usually follows steps starting from identifying stakeholders and taking stock of existing information. The expectation is that the process ends in the adoption of the action plan at the highest level helping to ensure political commitment and sufficient resources. Figure 3 aims to capture main phases needed for NAP development and implementation at the national level.

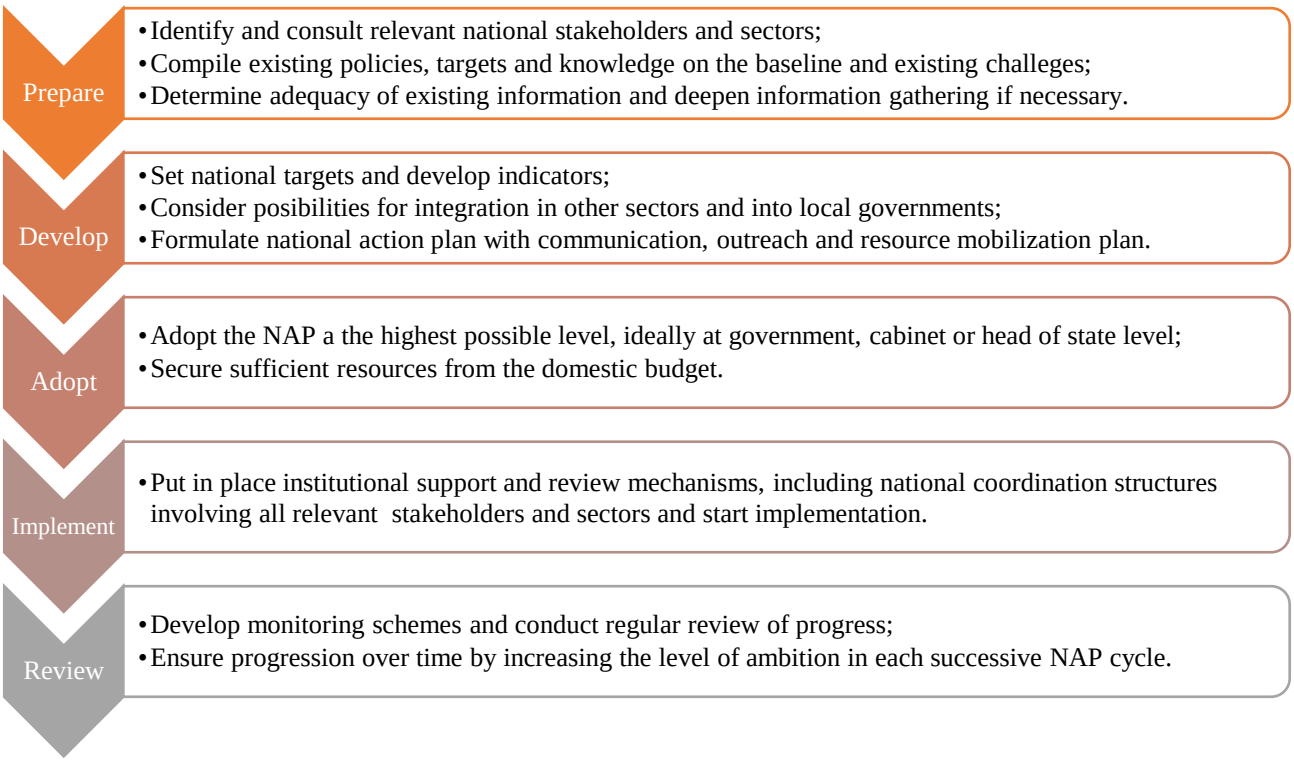

Figure 3. The NAP cycle includes distinct phases starting from preparation of the plan to review of progress.

Recommendations for the Beyond-2020 framework

The internalization of the objectives and milestones across all sectors of society will be key for the success of the framework. To this end, this report proposes strategic action plans consisting of NAPs and other stakeholder plans to encourage governments and other stakeholders to undertake robust policy-planning measures to meet the objectives and milestones:

- NAPs need to be strategically prioritized and directly linked to the implementation of the global objectives and milestones. NAPs should be developed by governments, in cooperation with relevant stakeholders and sectors, using the objectives and milestones as a flexible reference, based on national priorities, circumstances and capabilities. NAPs should be accompanied with national multi-stakeholder and multi-sectoral platforms to oversee work to enhance sound management of chemicals and waste. Guidelines should be prepared to guide the development of NAPs to ensure consistency and comparability between countries in assessing progress. The periodic updating of NAPs could take place every 5 or 10 years depending on the level of ambition, coupled with an endeavor to progressively scale up activities in each successive round. Existing work, including integrated national

programmes, SAICM implementation plans and national profiles, should be strategically evaluated, to understand lessons learned for the development of a NAP mechanism for the implementation of the objectives and milestones in the Beyond-2020 Framework.

- In line with the multi-sectoral and multi-stakeholder character of SAICM, other relevant stakeholders, including individual organizations from industry or civil society, should be encouraged to develop stakeholder plans, which outline concrete activities for their stakeholders towards the implementation of the objectives and milestones. This would more clearly define roles and responsibilities, including areas of shared responsibility and possible collaboration, as well as foster broader ownership and catalyze action in the UN-system and among all relevant stakeholders, including major downstream industry sectors that use chemicals in their products. This should be complemented with multi-stakeholder partnerships and joint strategic policy development to ensure collaboration across different constituencies.

3.3 Reporting

Current situation in SAICM

In 2009, ICCM2 adopted modalities for reporting under SAICM that consists of 20 indicators to review progress towards the 2020 goal. Reporting is carried out approximately every three years and, to date, two reporting rounds have been completed. In addition, the GPA includes 273 activities with associated indicators, but these activities are commonly not reported and followed-up. The indicators were adopted with the understanding that additional indicators need to be developed to assess the effectiveness of the efforts undertaken, such as levels of chemicals in environmental and human media, but no such indicators have been developed to date (SAICM 2009b).

A critical weakness of the main indicator framework and many of the indicators included in the GPA is that they measure more the existence of certain mechanisms at the national level, instead of their actual implementation and enforcement (Senuagwa and Persson 2014). All the 20 main indicators begin with 'The number of…' which provides quantifiable information but fails to accurately reflect actual progress and gaps in implementation (IPEN 2015). The latest progress report shows that LDCs and other low-income countries were reporting fewer activities overall compared to the first reporting period, whereas, lower middle-income and higher-income categories were reporting more activities. However, this does not provide an accurate picture of progress of trends, as reporting on activities does not translate directly to progress, demonstrating clearly the problems linked to the current reporting format. There is a growing awareness that current indicators are ineffective in assessing progress and as a result several initiatives have been set up to tackle the problem (Senuagwa and Persson 2014).

In 2015, the IOMC proposed the introduction of a set of indicators that would help relevant IOMC organizations to track progress in 10 areas by analyzing data from verifiable sources and for which global data are available (SAICM 2015). The proposed set of indicators developed by the IOMC is

applicable for eight out of eleven basic elements of the Overall Orientation and Guidelines document. The indicators are in use, and are published on the IOMC website. The data will be provided by IOMC to the SAICM secretariat to supplement the progress report.

Lessons learned from other instruments

Analyzing and processing the information contained in national reports is essential to determine if countries have established the institutional, technical and regulatory frameworks that will, consequently, contribute to the solution of environmental problems. To this end, reporting has emerged as a critical feature in international environmental instruments. All the four analyzed instruments have developed detailed reporting procedures with the UNFCCC having the most extensive reporting procedures. Online reporting tools are frequently used for submitting national reports under all instruments.

The interval for reporting varies largely between the different instruments. The Stockholm Convention and the CBD have a reporting interval of 4 years, whereas, reporting under the UNFCCC is every four years for national communications (NCs) and every two years for biennial reports (BRs) or biennial update reports (BURs). The voluntary national reviews (VNRs) under the HLPF follows a less strict reporting schedule and countries are required to report at least twice during 2015-2030. However, some countries (including Finland) have decided to follow a stricter reporting schedule and provide VNR reports every four years to honor the four-year cycle of the HLPF. In general, the reporting schedule is linked to the meeting schedule of the given instrument, but a four-year reporting cycle seems to be the most common, as it usually encompasses the period between three governing body meetings.

The reporting formats place varying emphasis to open-ended questions vis-à-vis multiple-choice questions between the instruments. The reporting under the CBD consists largely of open-ended questions, thus, resulting in a descriptive analysis of progress, which significantly weakens comparability between countries and across time. This also affects the follow-up of the Aichi Biodiversity Targets, since there are no standards or methodology for countries to report on. Whereas, the reporting under the Stockholm Convention is focused on multiple-choice questions that provides information of trends over time and between countries. The VNRs of the 2030 agenda constitute the most open reporting format, since only general guidelines have been prepared to support consistency and comparability of reporting that provides countries great freedom with respect to what to report. In this sense, the VNRs form a self-assessment tool rather than a mechanism to measure overall progress, as information cannot properly be drawn together from the national reports to see trends over time. Nevertheless, a unique feature of VNRs is that the role of the civil society, private sector and other stakeholders in the reporting is emphasized. To this end, many governments have included stakeholders' views and actions in their VNRs – both in written reports and in oral presentations at the HLPF.

The average reporting rate varies across the instruments ranging from 44% (Stockholm Convention and UNFCCC) to 75% (CBD). However, all the three conventions have seen major improvements in reporting rates in the course of time, in particular the latest reporting rates for CBD (97%) and UNFCCC (70%) have been considerably high. It is worth noticing that the latest reporting rate for developed countries is significantly higher than for developing countries. For example, 100% of

developed countries have submitted the sixth national communication of the UNFCCC and 80% the third national report of the Stockholm Convention. To this end, reporting seems to be a challenge explicitly to developing countries. The GEF supports reporting in developing countries for UNFCCC (500 000 USD for national communications and 352 000 USD for biennial update reports) and CBD (NBSAPs development and national reporting jointly normally for 220 000 USD). However, reporting in the Stockholm Convention is not supported by GEF funding, since enabling funding is only confined to NIP preparation. This could at least partly explain the lower level of reporting for the Stockholm Convention.

Reporting under HLPF is not directly comparable with reporting under MEAs. The open-ended nature of the VNRs and the lack of a common reporting cycle creates an entirely different reporting ambience characterized with creativity, in comparison to regular and more structural reporting under the MEAs. However, the limited number of national reports that are published and discussed every year in the HLPF creates more pressure among countries to succeed in reporting. Arguably, the fact that the VNRs are introduced and discussed among other member states and observers encourages to put more effort to reporting. However, the open-ended structure can also result in the provision of selective information to portray a more positive picture of progress than what is reality. To this end, open-ended reporting should be coupled with peer-review to ensure that it resembles a realistic picture of progress both in terms of achievements and implementation gaps.

Reasons for complying with national reporting obligations under various international environmental instruments is still to a large extent unclear, as it has received relatively little academic interest. The first comprehensive assessment of national reporting among selected MEAs has been carried out by the Center for Governance and Sustainability of the University of Massachusetts Boston and resulted in the development of the Environmental Conventions Index (ECI). The assessment has identified some factors that affect the reporting rate. To this end, there is much to learn, in particular, from the Ramsar Convention on Wetlands that has an average reporting rate of 86% that is one of the highest among MEAs despite the complexity of its reporting format in terms of the number of questions. The high reporting rate is explained by the Ramsar Secretariat´s support and active engagement, working through a network of regional focal points, which has proven to be indispensable for helping countries to report on time. Also, reporting has been encouraged by the Secretary-General´s report on progress that synthesizes information from national reports, thus, showing parties that reporting matters. In other words, countries are encouraged to report if they understand that information contained in their national reports will be used to assess overall progress.

<u>Recommendations for the Beyond-2020 framework</u>

- An indicator framework needs to be developed to support the effective review of the objectives and milestones under the Beyond-2020 Framework. To this end, a specific expert working group could be created for the formulation of indicators and a multi-stakeholder partnership, consisting of IOMC organizations and other stakeholders, could be established for their follow-up.
- National reporting needs to be developed by formulating indicators in such a way that they provide information on how established mechanisms or institutional strategies are used (instead of measuring merely their existence at the national level). The reporting format

needs to be simple and rely mainly on quantitative information to help measure progress over time and across regions. In addition, specific indicators could be developed to assess the effectiveness of the measures (e.g., levels of chemicals in environmental and human media).

- All relevant indicators for chemicals and waste found in the 2030 agenda for Sustainable Development (in particular regarding SDGs 3.9, 6.3, 12.4, 12.5 and 14.1) should be incorporated with the indicator framework for the Beyond-2020 Framework. This will help align the objectives and milestones with the follow-up of the 2030 Agenda on Sustainable Development.

3.4 Review and monitoring

Current situation in SAICM

SAICM does not have a review mechanism to assess individual reports, although it would provide countries with useful feedback on progress. Instead, the SAICM secretariat compiles a collective global progress report every three years based on the twenty indicators from the submitted stakeholder reports that provides data on regional differences. The SAICM Secretariat prepares a progress report from reports submitted by stakeholders. The first progress report covered the period 2009-2010 and the second progress report the period 2011-2013. The first reporting round received 108 responses from 78 governments, 11 IGOs, and 19 NGOs, whereas the second reporting round received 85 responses from 68 governments, 5 IGOs, and 12 NGOs. The average reporting rate by governments has been 40% - the same level with conventions in the chemicals and waste cluster.

ICCM4 asked the secretariat to develop a third progress report including achievements, strengths, and weaknesses for 2014–2016 and an analysis of the twenty indicators of progress for consideration by the third meeting of the Open-ended Working Group (OEWG3). ICCM4 also directed the OEWG3 to consider the need for a report for the period 2017–2019 for consideration by ICCM5.

Lessons learned from other instruments

Review represents an opportunity to provide transparency of state behavior, but also a mechanism for mutual learning about successful policies and possibilities for development, thereby enhancing trust, cooperation, and stewardship (Ulloa et al. 2018). This analysis shows that review mechanisms are not constrained to legally binding instruments but are also common practice in voluntary frameworks. In fact, review has proven to be an indispensable feature of governance frameworks and thus is becoming common practice in multilateral processes.

Review mechanisms take various forms and should be always designed with a clear understanding of what needs to be reviewed, as well as who should be responsible for carrying out the reviews and for what purposes. Introducing a review process can entail increased costs to a regime but is often based on voluntary participation of experts, helping to keep costs at minimum. Review mechanisms can be grouped in two main categories: individual reviews (country-specific) and collective reviews (with regional or global scope).

Individual reviews

The UNFCCC has most advanced individual review mechanism through the compulsory measurement, reporting, and verification (MRV) system, since it is based on reviews of national reports that results in country-specific review reports that are discussed by all parties in dedicated sessions. Furthermore, the MRV is complemented by the technical expert review (TER) system outlined in the Paris Agreement, which extends the scope of reviews to include NDCs.

The CBD has recently made progress towards the development of a voluntary peer review (VPR) mechanism that is now in a pilot phase. Unlike the MRV it is voluntary in nature, but that does not de facto represent a weakness, since it plays the same function as MRV and allows for learning and capacity building over time. The VPR also differs from MRV in that the former is carried out by peers (CBD focal points and other experts directly involved in the conventions) and the latter by external technical experts (Ulloa et al. 2018). To this end, VPRs function not only for evaluation but also for peer learning.

A weakness of the individual review processes under the UNFCCC and CBD is that neither provides a role for civil society organizations (CSOs), since the review is undertaken solely by government-appointed representatives. Though not discussed in this report, the universal periodic review (UPR) of the United Nations Human Rights Council (UNHRC) is of interest, as it appears to have a more comprehensive review process through giving a formal role to CSOs in the review of states' performance (Ulloa et al. 2018).

Collective reviews

The Paris Agreement includes a new innovative feature – a global stocktake every five years to assess collective progress drawing from national reviews and other sources of information to inform the development of NDCs to ensure progression over time. The global stocktake has two phases planned, starting with extensive analysis drawing from various sources of information to determine to what degree action corresponds with the goals. Following this will be a political phase consisting of ministerial-level discussions. The global stocktake is still under development, so it is impossible to assess its effectiveness, but it has inspired discussions for the development of collective review in other international instruments.

The Stockholm Convention includes a unique effectiveness evaluation that provides a feasible model for considering how to carry out collective review. This evaluation has been carried out by a committee consisting of parties and other experts every eight years and has provided valuable information to cost-effectively assess performance. The Global Biodiversity Outlook, prepared by the CBD secretariat, provides another feasible option, since it is directly linked to the follow-up on the Aichi Biodiversity Targets. Both models draw information from reporting, national action plans and other sources (including monitoring data), but differ in that the Stockholm Convention´s effectiveness evaluation is run mainly by parties and the Global Biodiversity Outlook by the secretariat.

The review of the 2030 Agenda on Sustainable Development represents perhaps the most independent form of review; its Global Sustainable Development Report is carried out by a committee of fifteen scientists and supported by an UN inter-agency taskforce. The GSDR in its current from has not yet produced its first report, making it difficult to evaluate its performance.

In conclusion, the development of a possible individual review mechanism should be based on provision of feedback and mutual learning – as opposed to a stricter assessment of individual country performance or a 'naming-and-shaming' approach. In other words, the development of a possible review mechanism should be focused on constructive criticism following a 'naming-and-acclaiming' approach. This could help states to overcome the political reservations to engage in accountability dynamics.

Recommendations for the Beyond-2020 framework

A review mechanism provides the opportunity for constructive learning and is important for effective governance by strengthening accountability and enhancing implementation, thus, it constitutes a highly beneficial element for the Beyond-2020 Framework. In line with examples from other governance frameworks, the review mechanism could consist of two basic elements: collective progress reviews (A) complemented by individual stakeholder reviews (B).

A: Collective progress reviews

1) *Secretariat´s collective progress report*
   At minimum, the secretariat´s collective progress report, which synthesizes the reporting data from stakeholder reports, should continue to regularly inform stakeholders of its progress. This report could be supplemented with information harvested from other sources (e.g., BRSM, ILO and International Health Regulation) that are easily available to fill possible data gaps and solidify the analysis.

2) *Collective global stocktake*
   More ambitiously, a collective global stocktake of the implementation of National Action Plans and other stakeholder plans, and other data by an independent review body or the secretariat could provide constructive feedback into international decision-making. Based on global stocktaking reports, stakeholders could redefine objectives and milestones contained in the Beyond-2020 Framework over time. In this way, the framework would remain a 'living,' dynamic instrument for global cooperation. It should draw from various sources including national reports, NAPs and the clearing-house mechanism. The global stocktake could take many forms, based on models such as:
   - the two-phased approach of the Paris Agreement, consisting first of a technical analysis of the sufficiency of existing efforts and then a political phase to provoke shared political understanding;
   - the Stockholm Convention, which has undertaken periodic effectiveness evaluations to determine how well it has done in achieving its objectives, led by a small committee representing both appointed parties and other experts;

- the Global Sustainable Development Report (GSDR) of the HLPF, which is led by an UN inter-agency taskforce, supplemented by a small number of appointed scientific experts;
- the Global Biodiversity Outlook, which gives the secretariat responsibility for review. This model could build on UNEP´s Global Chemicals Outlook by designating it as formal follow-up mechanism for the Beyond-2020 Framework.

The secretariat's progress report and the global stocktake are not mutually exclusive approaches. For example, they could be adjusted so that the secretariat´s progress report would be prepared more frequently (every 3-4 years), whereas, the global stocktake would provide a more comprehensive analysis more sparsely (every 5-10 years). The intervals of the collective reviews would naturally depend on the interval of the governing body that is to be determined. For instance, a two-year interval of the governing body could mean that the secretariat´s progress report is prepared every four years and the global stocktake every eight years. Nevertheless, the global stocktake should be timed primarily to inform updating of the objectives and milestones and the revision of national action plans.

B: Individual stakeholder reviews

Individual stakeholder reviews could be launched on an exploratory basis, including two elements: voluntary national reviews and other voluntary stakeholder reviews.

Voluntary national reviews

- Voluntary independent expert reviews (following the model of the UNFCCC) would enable governments to appoint independent expert review teams to conduct country reviews, but input could also be welcomed from other stakeholders to ensure procedural equity.
- VPRs (following the model of the CBD) would provide interested governments the chance to review country performance as peers (rather than through the appointment independent expert review teams).

Other voluntary stakeholder reviews

- Voluntary national reviews could be complemented by reviews of other stakeholders, either individually or by sector.

The development of individual stakeholder reviews could start by developing a draft methodology for voluntary national reviews and other voluntary stakeholder reviews and then asking interested countries and other stakeholders to pilot it. This would provide valuable information about possible adoption of the voluntary review process and, if adopted, enable interested countries to sign up for review.

3.5 Mechanism for scientific support

Current situation in SAICM

One of the functions of SAICM, as set out in paragraph 24k of the Overarching Policy Strategy, is to promote information exchange and scientific cooperation. Science is particularly important to the implementation of the Strategic Approach with respect to risk reduction, knowledge and information, and capacity-building and technical cooperation (SAICM 2009c).

SAICM includes an important feature that aims to bring emerging challenges based on scientific evidence to the attention of governments and other stakeholders: a mechanism allowing individual stakeholders to bring proposals for addressing new emerging policy issues for the consideration of the sessions of the ICCM, as outlined in paragraph 24j of the OPS. The modalities for considering emerging policy issues are set out in the annex to ICCM resolution II/4. It states that emerging policy issues need to be submitted 18 months before the conference session. Proponents need to provide information why an issue is considered an emerging policy issue based on current level of scientific information on significant adverse effects on human health and/or the environment. The emerging policy issues are usually taken up by the IOMC organizations (without any additional funding being provided). For some emerging policy issues, a working group was established that included technical experts from governments and other stakeholders to develop a work plan on the issue. To date, ICCM has recognized six emerging policy issues and two issues of concern.

To date, the experience in addressing the five emerging policy issues in SAICM has demonstrated that they tend to be most successful when resources are made available and when activities are mapped to the needs set out by stakeholders. Arguably, the EPI nomination process has had some success in raising awareness of emerging issues, but it lacks proper monitoring, and accountability of follow-up actions is weak.

While the ICCM has not directly engaged in the preparation of scientific assessments, several IOMC organizations have supported SAICM priorities by preparing scientific assessments on an ad hoc basis. Arguably most important is UNEP´s Global Chemicals Outlook (Box 9). In 2012, UNEP and WHO produced a report on the state of endocrine-disrupting chemicals (UNEP & WHO 2012). Other examples include reports from OECD on nanomaterials; from FAO on highly hazardous pesticides; from UNEP on lead, mercury and cadmium; and from WHO on public health impacts of chemicals.

BOX 9: Global Chemicals Outlook

In 2012, the first edition of the Global Chemicals Outlook (GCO) was published, providing a comprehensive assessment of the trends and changes affecting the production and use of chemicals, their health and environmental effects, economic implications, and policy options throughout their life cycle. The report was prepared to give policy advice aimed at meeting the 2020 goal and focused particularly on the economic aspects of chemicals management and the challenges and opportunities facing developing countries. The first GCO report was compiled by UNEP. It did not significantly influence decision-making under SAICM. While published in advance of ICCM3 in 2012, the meeting´s resolutions made no reference to the report. ICCM4 refers twice to the GCO in Res. IV/4 concerning the intersessional process, nothing that the GCO shows an increase in chemical production and use worldwide continuing beyond 2020. In a separate paragraph, ICCM 4 requested the independent evaluation of SAICM to use GCO as one source of information

In 2013, UNEP´s Governing Council welcomed the GCO report and its Synthesis Report for Decision Makers and requested UNEP to continue to work on the GCO, particularly in areas where data were found to be lacking or inadequate, with a view to developing a tool for assessing progress towards the achievement of the sound management of chemicals and hazardous waste, including the 2020 goal (decision 27/11). In 2016, UNEA provided additional guidance for the updating of the GCO and requested, inter alia, to address SAICM emerging policy issues and other issues where evidence indicates a risk to human health and the environment, develop options for the implementation of relevant SDGs, and to complete the report by the end of 2018 (Res. 2/7). The second edition of the GCO will address key management topics considered relevant for chemicals and waste management beyond 2020, which were developed using a back-casting approach.

Despite having a stakeholder-driven process to address new challenges on an evidential basis, SAICM does not rely on a permanent internal or external mechanism for exchange of views between the scientific community and policy-makers. In other words, SAICM lacks a subsidiary scientific body and is not serviced by any independent scientific body to facilitate joint construction of knowledge with the aim of enriching decision-making. In practice this means that there is no mechanism to provide early warning for emerging policy issues or follow up. More broadly, scientific support in the day-to-day business of SAICM relies largely on IOMC organizations, with limited if any additional funding to carry out tasks allotted to them. The GCO exhibits promise as a comprehensive new approach to assessing progress towards the 2020 goal.

To this end, decision-making is not supported by timely scientific data that can result in a significant time lag between the scientific recognition of new problems and action taken to deal with them. In fact, an analysis of major pollution areas shows a considerable time lag between the emergence and availability of scientific knowledge on pollution issues and policy action: lead, DDT, PCBs and asbestos are some of the toxic chemicals for which governments have responded extremely slowly to scientific evidence of their detrimental impacts on human health and the environment (UNEP 2017b). Deferred action induces higher costs, since it is far more cost-effective to invest in prevention of emerging environmental problems than to attempt to manage them once they have escalated into serious global threats (UNEP 2017b).

In summary, the challenge is not lack of science, but lack of a science-policy nexus to induce dialogue between the scientific community and policy-makers. The added value of a science-policy interface is to keep decision-makers informed with timely and policy-relevant information that will enable then to build a responsive and dynamic regime. This should take place at both global and

national levels, though this study focuses on the global level. The premise is that actions taken globally will need to be reflected at the national level.

Lessons learned from other instruments

The role of science in global governance has changed since the 1980s toward greater institutionalization of scientific input into global policy fora, often through globally organized assessments or scientific bodies (Gupta et al. 2012). Following this trend, all the analyzed regimes have institutionalized scientific input into their governance frameworks. Scientific bodies can be categorized broadly into two groups: 1) internal/subsidiary bodies that have formalized their relationship to the scientific community within their own structures, and 2) external bodies that are independent in their scientific analysis but service one or several normative regime. These are not mutually exclusive approaches, and regimes can benefit from both. These entities have been developed to meet various needs and therefore vary greatly in scope and structure; there is no 'one-type-fits-all' solution to the question which is the most effective science-policy interface (Koetz et al. 2008). Salience, credibility, and legitimacy have been identified as key qualities for achieving scientific authority (Mitchell et al. 2006) (Box 10).

BOX 10: Key qualities for achieving scientific authority in science-based initiatives

- **Salience** (directly relevant to the needs of users) derives from: 1) the comprehensive and integrated nature of their products**,** 2) the independent nature of scientific advice, and 3) the application of a solution-oriented approach.
- **Credibility** (based on authoritative and convincing information and analysis) derives from 1) the application of peer review, 2) the credentials of individual members, and 3) the number of scientific entities involved**.**
- **Legitimacy** (enjoys endorsement of the main target audience) derives from 1) representation of various scientific fields and consideration of geographical and gender balance; 2) formal recognition by the UN system; and 3) participation of non-academic actors.

Source: van de Hel and Biermann 2017.

Subsidiary scientific bodies constitute the main form of scientific support in the examined instruments. In general, their design ranges from loose ad hoc arrangements with few formalized instructions and irregular meeting schedules to standing committees with detailed rules for participation and work procedures that meet at set intervals (Mitchell et al. 2006). All the analyzed international instruments have formalized their relationship to the scientific community within their own structures. The Global Sustainable Development Report (GSDR) is designed to service the follow-up and review function of the HLPF through an innovative hybrid model consisting of 15 scientists appointed by the UN Secretary-General assisted by a UN inter-agency task force. The Persistent Organic Pollutants Review Committee (POP-RC) constitutes a committee of 31 COP-appointed scientific experts mandated to specifically help identify chemicals for listing under the Stockholm Convention. The subsidiary scientific and technical bodies of the CBD (SBSTTA) and UNFCCC (SBSTA) work through open-ended meetings with high participation from both scientists and governmental experts, but these meetings are often characterized by strong political features focusing on negotiating draft decisions in preparation for subsequent meetings of the COPs (Koetz et al. 2008).

It is worthwhile noting that the CBD SBSTTA relies on ad hoc technical expert assessments authored by small groups of scientists on topics outlined by the COPs. This provides a useful model applicable for chemicals and waste. Although not covered in this report, UNEP´s Global Mercury Assessment provides a valuable example of a thematic approach to assessments: it has been able to strengthen the scientific basis of sources, releases, and emissions of mercury and thus significantly contributed to the development of the Minamata Convention on Mercury (UNEP 2002, UNEP 2008, and UNEP 2013).

Independent scientific bodies form a special category in science-policy interfaces. The CBD and UNFCCC/PA are supported by external intergovernmental science-policy interfaces (IPBES and IPCC) that respond to enquiries for scientific or technical information from various COPs. Arguably, the independent nature of these bodies brings authority and scientific credibility that can help to solidify the regimes over time. IPBES and IPCC have many functional similarities. Most importantly, they include procedures to ensure a politico-scientific consensus, providing a strong basis for negotiations in respective regimes that they service. In this regard, a report's Summary for Policy-Makers constitutes a key feature, because it is approved line-by-line by governments. A guiding principle is that reports should be policy relevant but not policy prescriptive. Both mechanisms produce a variety of products, including periodic global assessments reports featuring status and trends, reports on specific thematic issues, and technical reports such as methodological guidelines. Both mechanisms operate with an annual budget of approximately 5 million USD, but actual authorship is largely carried out by scientists on a voluntary basis.

While not part of the analysis, the Montreal Protocol through its three subsidiary assessment panels provides an interesting reference point. The Scientific Assessment Panel (SAP), Environmental Effects Assessment Panel (EEAP), and Technology and Economics Assessment Panel (TEAP). The three panels carry out a periodic assessment at least every four years and the key findings of the panels are synthesized into a short report. The SAP consists of scientific steering committee with eight members (including four co-chairs) and hundreds of scientists that assess the status of the ozone layer and bring emerging scientific issues of importance to the attention of the meetings of the parties. Through independent technical and scientific information, these panels have helped the parties reach informed decisions to successfully phase out ozone-depleting substances and help the ozone layer recover (UNEP 2017).

Against this backdrop, the Beyond-2020 Framework could significantly benefit from a science-policy interface. Key considerations for the development of a scientific body include: 1) identification of key functions, 2) determining if membership is open-ended or restricted, and 3) deciding if it is independent or subsidiary in relation to the framework. The development of a scientific body should include careful consideration to ensure salience, credibility, and legitimacy of its work. In this context, the procedure for nominating scientists is very important, as are the processes for ensuring technical adequacy, such as peer review. Combining natural scientists with economists, political scientists, and social scientists is important (UNEP 2017c).

Recommendations for the Beyond-2020 Framework

Considering the magnitude of problems linked to toxic chemicals and waste, their potential risks to human health and the environment, and the imminent emergence of new threats, clearly the science-

policy interface needs to be considered as part of the overall governance of the Beyond-2020 Framework. Possible gaps in evidence or in the productive exchange of information through a science-policy interface often means that desired outcomes are unlikely to be achieved. The preparation of a gap study of existing science-policy interfaces in the sphere of chemicals and waste management would provide useful information helping to identify possible missing functions and solutions to address them. To this end, political commitment for developing a science-policy interface should be signaled in ICCM5, but details could be agreed through a separate process, with a goal to reach agreement of the interface by 2025.

The following options represent a growing level of ambition to enhance the science-policy interface. The options are not mutually exclusive.

1) **Enhancing links with existing science-policy interfaces**
   - Existing scientific processes and platforms already dealing with chemicals and waste could be given a more formal status to function as a science-policy interface for the Beyond-2020 Framework. This could include, inter alia, the Global Chemicals Outlook and the Global Waste Management Outlook.
   - Existing scientific processes and platforms that operate in areas that have links to chemicals and waste, but do not cover them directly, could be used more efficiently to address chemicals and waste in their assessments. This could include, for instance, UNEP´s International Resources Panel (IRP) that has already up taken work on metals, and the Intergovernmental science-policy platform on Biodiversity and Ecosystem Services (IPBES).

2) **Institutionalizing scientific input in the Beyond-2020 Framework**
   - Ad hoc expert groups could be established to prepare focused thematic reports at the request of the governing body to inform its subsequent sessions. This would provide the possibility to review emerging policy issues or address other issues of interest to stakeholders on a case-by-case basis. The number of issues to be reviewed in each session of the governing body could be limited to just a few, to allow for focused discussions.
   - A small subsidiary scientific advisory body could be established to help enhance interaction between the scientific community and policy makers and thus to achieve more timely and evidence-based decision-making. Its functions could include bringing emerging scientific issues to attention of stakeholders and/or reviewing progress towards achieving objectives and milestones. Functions could also include responding to requests for information on specific technical or scientific topics, such as preparation of guidelines or development and revision of indicators. Its structure could resemble the Montreal Protocol´s Scientific Assessment Panel.

3) **Strengthening the science-policy interface through an external body**
   - An independent scientific advisory body, with a fixed number of ‘permanent members’ and a roster of experts who could be called upon for specific purposes, could increase scientific credibility and provide independent support for stocktaking. This body could

be supported by an UN inter-agency task force to facilitate networking with civil society and the private sector.

- An independent intergovernmental science-policy interface with open-ended participation could be established to ensure the production of authoritative and scientifically credible reports, following procedures to achieve politico-scientific consensus, following the examples of IPBES and IPCC.

4. What could the new framework look like?

This report has shown that SAICM has critical weaknesses in several examined governance features. These include lack of time-bound and measurable objectives and milestones; a NAP mechanism that lacks strategic focus; a weak reporting and review mechanism; and absence of a formal mechanism to provide scientific support. This section presents a coherent governance model for Beyond-2020 Framework that aims to specifically address these shortcomings by incorporating useful governance features from the analyzed international regimes to improve legitimacy, accountability, institutionalization, responsiveness, and aspiration.

4.1 Cooperative framework for action

A Cooperative Framework for Action on Sound Management of Chemicals and Waste is proposed here to address institutional gaps by creating a governance structure that specifically encourages active, results-based implementation, includes a follow-up mechanism to assess implementation, and provides an effective interface for constructive dialogue with the scientific community to enable governments to make informed decisions. One strength of SAICM is its capability to convene stakeholders and catalyze action, which has been accepted as the starting point for the Cooperative Framework, thus the framework is intended to create a joint commitment of key sectors (environment, health, agriculture, labor, industry, development, finance etc.) and relevant stakeholders, including major downstream industry sectors that use chemicals in their products. Hence, this proposal provides a model for a governance framework that will focus on national implementation, provide for continuous progress review through collective- and self-assessment, and involves pathways for the readjustment of objectives and actions. The proposed governance mechanism is contemporary and forward-looking in its inclusivity, self-learning, and iterative in design.

The development of a new framework requires careful consideration, and all components need to be carefully weighed against each other to find a balanced outcome. Arguably, measurable objectives and milestones form the heart of the new framework, since they provide aspirational guidance for implementation and are inherently linked to other governance features providing them more meaningfulness. Most importantly, NAPs provide for prospective policy-planning to identify actions and engage stakeholders and, ultimately, institutionalize the implementation of the framework at the national level. Furthermore, reporting is need for retrospective self-evaluation allowing to help measure progress over time. To this end, NAPs and reporting form key supportive components that go hand-in-hand with measurable objectives and milestones, which need to be agreed as a matter of priority to fully operationalize the framework (Figure 4).

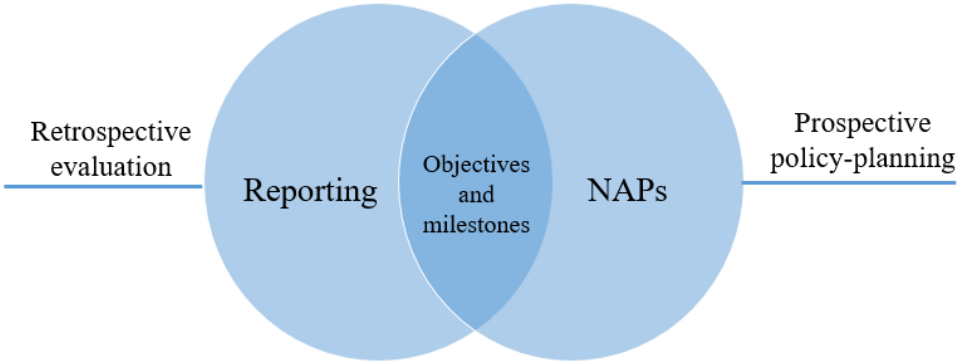

Figure 4. The measurable objectives and milestones form the foundation of the framework, but require both prospective and retrospective tools to ensure their effective operationalization and follow-up.

The model for the proposed framework is illustrated in Figure 5 in its full form, drawing on governance features from other international regimes. Any of the elements can be adjusted or remodeled as necessary to suit the needs and interests of stakeholders. In line with existing procedures of SAICM, the Cooperative Framework could consist of a governing body that convenes governments and stakeholders to take decisions and a secretariat that provides support for organization of meetings and production of documents. The vision, objectives, and milestones would guide the development of National Action Plans by governments, in cooperation with relevant national stakeholders. NAPs could be complemented by other stakeholder plans by UN bodies and other relevant global and regional actors. The action plans could be updated every ten years (or every five years if needed) with the endeavor to scale up activities in each round. Reporting would be carried out regularly to assess progress. Interested countries could be encouraged to take part in voluntary national reviews, focusing on reviewing NAPs and national reports. Reviews could be conducted to assess other stakeholder plans. In addition, a collective global stocktake could be carried out every five to ten years to assess overall progress to inform both the updating of national action plans to ensure progression over time and the revision of objectives and milestones in 2030.

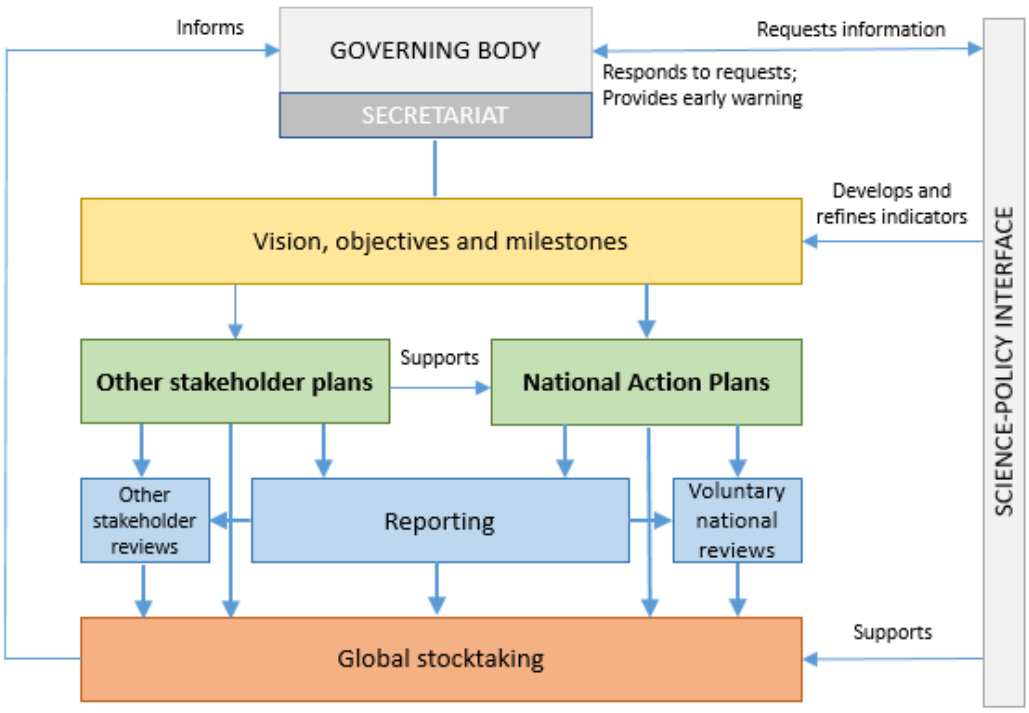

Figure 5. Collection of all analyzed governance features for the cooperative framework showing their mutual interlinkages.

Science should hold a strong place in any given governance structure and is particularly relevant for sound chemicals and wastes management. A global science-policy interface should first and foremost respond to the informational needs of governments and other stakeholders. Such an interface could include, inter alia, an early warning and horizon scanning function, responding to specific requests for scientific and technical information, supporting development and revision of indicators of progress, and providing support to the global stocktake.

4.2 The first decade of the Cooperative Framework 2020-2030

Careful institutional design will help to craft a framework that is coherent and supports effective decision-making. Figure 5 illustrates how the meetings of the governing body, the reporting schedule, secretariat´s collective progress report and the global stocktake could be adjusted coherently. First, it important to align the reporting schedule with meetings of the governing body so that reporting takes place in years between the meetings of the governing body. This will give the secretariat time to synthesize the information and give the governing body a progress report.

Countries could be asked to submit their first NAPs before 2025 to allow enough time for organizing coordination at the national level, securing sufficient funding, and recruiting participants. The periodicity of NAPs could be every 5 or 10 years depending on the level of ambition. The global stocktake could take place in 2029 to ensure sufficiency of information on implementation. The first global stocktake could not only inform the meeting of the governing body in 2030, but also the HLPF, to assess progress in achieving the SDGs and to provide necessary information for revising the sustainable development agenda after the 2030 meeting.

Consideration also needs to be given to harmonizing the meetings of the governing body with the meetings of the COPs of the BRS and Minamata Conventions, as well as sessions of the UNEA and the World Health Assembly (WHA). In this context, special consideration needs to be given to creating a fruitful interaction of the governing body with the WHA and UNEA.

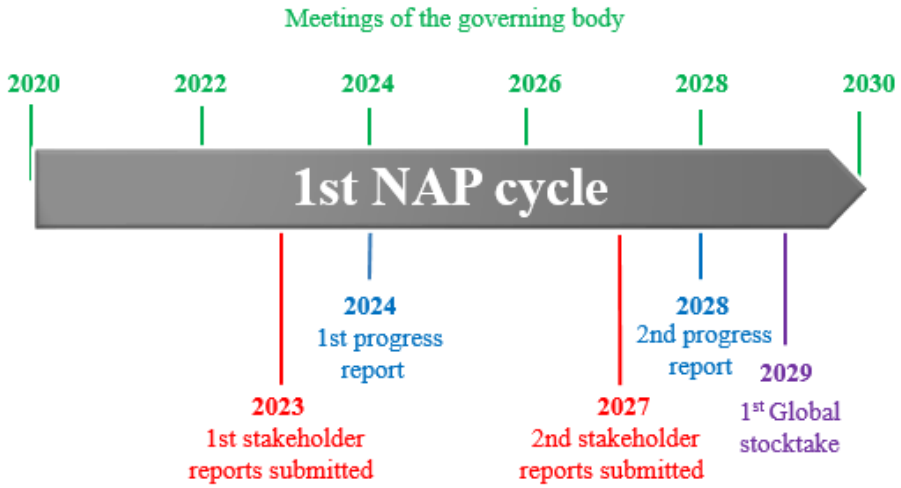

Figure 5. The timeline provides an example of how the proposed reporting schedule, the meetings of the governing body, the NAP cycle, the secretariat´s progress reports and the global stocktake could be co-adjusted coherently. The global stocktake should inform in a timely manner the meetings in 2030 of the governing body and HLPF that will assess and revise the 2030 Agenda on Sustainable Development. Although the NAP cycle is shown as taking ten years, meetings of the governing body should occur every two years to ensure regularity, continuity, and ownership of stakeholders.

4.3 Financial considerations

The formulation of a new framework for sound management of chemicals and waste needs to give due consideration to financial resources. This includes looking into both funding the effective operation of the secretariat and deploying adequate financial resources to support developing countries. The cost of inaction should also be included.

The secretariat plays an important role in convening stakeholders regularly, providing necessary support for governments, and producing requested meeting documents. To date, SAICM has received voluntary contributions from 18 entities, including 15 countries, the European commission, UNEP, and ICCA. Consequently, SAICM operates with an annual budget of 1.3 million USD to fund six secretariat staff members. The proposed new governance features could entail an increase in the budget, so that the secretariat would be allocated a support function for NAP development (if not externalized to specialized bodies). In addition, the possible creation of a subsidiary scientific body would bring costs through the preparation of requested scientific documents and organization of meetings. To this end, it will be fundamental to broaden current level of funding of SAICM by attracting new donors.

The delivery of time-bound objectives and milestones will, undoubtedly, require additional resources from both domestic and international sources. NAP development will play an important role in helping to better deploy domestic resources and to design policies and financial incentives to attract new revenues. UNEP´s integrated approach to financing for the sound management of chemicals and waste forms a crucial instrument to boost national action, since it consists of three mutually reinforcing components: mainstreaming, industry involvement, and external financing. Furthermore, the development of a resource mobilization strategy will be necessary to mobilize sufficient action from all sources, including the private sector, NGOs, foundations, academia, international financial institutions, UN organizations, funds and programmes, non-ODA public funding, South-South cooperation initiatives, and technical cooperation. IGOs have an important role to play, and system-wide contribution to support sound management of chemicals and waste should be broadened and deepened by continuing to fully mobilize the IOMC organizations.

Official development assistance (ODA) forms an important stream of funding for activities in developing countries. Box 11 shows existing instruments financed with ODA funding that are in place to support SAICM activities. The delivery of enabling activities (NAP development and reporting) needs to be secured following the example of CBD, UNFCCC, and the Stockholm Convention. UNEP´s Special Programme provides an ideal mechanism for supporting the Beyond-2020 Framework, due to its overarching nature that is compatible with the broad scope of the envisioned objectives and milestones. In addition, increased support from GEF could be expected by enhancing linkages to health, water, and sustainable production and consumption to reach the SDGs, or by addressing core issues through 'impact programmes' (UNEP 2018). The preparation for GEF-7 (2018-2022) includes proposals for such impact programmes, with two having clear links to chemicals and waste: the Food Systems, Land Use, and Restoration Impact Programme, and the Sustainable Cities Impact Programme.

Private sector financing forms an underutilized stream of financing. The internalization by relevant industries of harms associated with hazardous chemicals and waste will be critical for mobilizing sufficient resources to implement the Beyond-2020 Framework. In other words, appropriate economic incentives need to be identified and utilized so that the full cost of negative externalities is borne by the producer, not by taxpayers. Internalizing costs externalized by industry to the public and environment is even more important, considering that the global turnover of the chemicals industry represents 5% of the global GDP. IPEN has proposed developing a global approach to cost internalization by applying a marginal levy of only 0,1% on the chemicals industry, which would yield over 4 billion USD annually (IPEN 2017). The internalization of costs could be initiated step-by-step, starting with a study of market-based instruments to internalize costs within relevant industries, aiming to be completed by 2023. Initially, the report could be used to provide legal and policy training on global and regional cost internalization and, then to develop a global cost internalization program to be finalized by 2028.

4.4 Summary of recommendations

Table 4 summarizes the main recommendations of Sections 3 and 4 as well as provides an indicative timetable, and possible actors.

Table 4. Summary of main recommendations with indication of a timeline and actors for their execution

Feature	Recommendation	Timeline	Actors
Objectives and milestones	Adopt measurable and time-bound objectives and milestones based on the OOG document, and incorporate other critical elements, such as emerging policy issues and global governance of sound management of chemicals and waste.	2020	All stakeholders
National Action Plans	Launch a NAP mechanism to encourage governments to enhance the implementation of the time-bound objectives and milestones.	2020	Governments, relevant national stakeholders
	Evaluate SAICM implementation plans and associated instruments to inform the development of a strategic national action plan mechanism for the Beyond-2020 Framework.	2020	Secretariat
	Launch a process to develop plans to encourage other stakeholders to implement objectives and milestones.	2020	IOMC; subnational and non-state actors
	Prepare guidelines for the preparation of NAPs and other stakeholder plans to ensure consistency and comparability among governments and other stakeholders.	2020-2021	Secretariat; IOMC
	Initiate the first round of NAPs and other stakeholder plans endeavoring that plans have developed and commenced their implementation by 2025.	2020-2030	Governments; IOMC; Subnational and non-state actors
Reporting	Develop an indicator framework for the objectives and milestones, incorporating relevant indicators of the 2030 Agenda.	2020-2022	All stakeholders (expert working group)
	Establish a multi-stakeholder partnership to follow up the indicator framework for the objectives and milestones.	2020-2030	IOMC; NGOs; academia
Review	Initiate a collective global stocktake in ICCM5 to provide constructive feedback on implementation and establish an expert working group to agree on details.	2020-2025	All stakeholders
	Carry out the first global stocktake to inform the revision of NAPs and other stakeholder plans in the post-2030 era and to help the HLPF assess the achievement of SDGs relevant to chemicals and waste.	2028-2029	Secretariat / scientific community / IOMC /
	Initiate the preparation of voluntary stakeholder reviews in ICCM5 by requesting the development and piloting of a draft methodology.	2024-2026	All stakeholders (expert working group)
Science-policy interface	Signal political commitment for developing a science-policy interface for sound management of chemicals and waste in ICCM5, with the goal of reaching agreement by 2025.	2020-2025	All stakeholders
	Prepare a gap analysis to increase understanding of the existing landscape of science-policy interfaces for chemicals and waste, thus helping to identify possible missing functions and the most effective form for their delivery.	2020-2022	Secretariat; UNEP
Other	Prepare a resource mobilization strategy to help tap into all resources, including domestic flows and private sector financing.	2020-2022	Secretariat; IOMC
	Prepare a study to identify market-based instruments to internalize environmental externalities within relevant industries.	2019-2023	Secretariat IOMC
	Prepare a global cost internalization program for the Beyond-2020 Framework.	2023-2028	All stakeholders

5. Conclusions

The international community is more than ever at a critical juncture to protect the planet and its citizens from 'gross chemical contamination, with grave damage to human health, genetic structures and reproductive outcomes, and the environment,' which was recognized in Chapter 19 of Agenda 21 a quarter century ago. Given the rapidly increasing levels of chemicals in production and the continuous introduction of new substances to the markets, regulation and legislation at the national level need to keep pace and proactively respond to future trends. This will require efficient global governance of chemicals and waste that supports the creation of strong institutional arrangements at the national level. Despite significant action taken to date, global chemicals and waste governance is still in its infancy and is not equipped to safeguard human health and the environment from adverse effects of chemicals and waste—and is even less so in light of future prospects showing rapid expansion of global chemicals markets. To this end, decisions for governance reform cannot be deferred to the future but need to be taken now in the design of the Beyond-2020 Framework.

Against this backdrop, this report has fleshed out several important governance features that deserve attention in future negotiations leading to the adoption of the Beyond 2020 Framework. First and foremost, the future regime needs to build on the strengths of SAICM, including strong stakeholder participation and active engagement of the UN system. To this end, this report has proposed the development of a Cooperative Framework for Sound management of Chemicals and Wastes to step up stakeholder participation and sectoral engagement through vital governance features.

The creation of time-bound objectives and milestones form the heart of the proposed framework, since it anchors all the other governance features within its remit. Properly designed, and associated with suitable indicators, the objectives and milestones can inspire governments and stakeholders to navigate step-by-step toward a common vision and goals. The objectives and milestones should be anchored to the implementation of the 2030 Agenda on Sustainable Development, in particular targets 3.9 and 12.4. The Overall Orientation and Guidance document provides an important basis for the development of objectives and milestones to stimulate action at the national level, but it should also address emerging policy issues and other critical global objectives in a balanced manner, while maintaining strategic focus through a limited set of goals. The objectives and milestones should resonate with other important areas within the environment sphere (biodiversity and climate change) and beyond (health, agriculture, labor, industry, development, finance, etc.), helping to mainstream sound chemicals and waste management into national planning processes, including United Nations Development Assistance Frameworks (UNDAFs).

The NAP mechanism is a common feature in international instruments that operate in the field of sustainable development. Due to their bottom-up nature, the NDCs and NBSAPs of the climate and biodiversity clusters provide a model particularly well suited to the Beyond-2020 Framework because its broader framework is comparable with the scopes of the CBD and UNFCCC. A NAP mechanism should be designed to be simple, encouraging stakeholders to put their commitments forward and start implementation, coupled with an intention to progressively scale up the ambition level. An inherent weakness of existing SAICM implementation plans and national profiles is that they are not tracked at the international level. Nevertheless, work already done in form of national profiles and SAICM implementation plans, including through enabling activities supported by the QSP programme and GEF, provides a logical continuum to adopt of a more strategic NAP

mechanism directly linked to implementation of globally agreed objectives and milestones and periodically reviewed to ensure progression over time.

Providing timely scientific and empirical information in an accessible manner to policymakers is critical for achieving progress. The lack of a science-policy interface in SAICM is a particularly disturbing feature in the broader landscape of international environmental instruments that has seen the phenomenal institutionalization of science within governance frameworks mainly since the 1990s making it a prevalent feature of any credible regime - whether voluntary or legally binding - that seeks to make decisions affecting future generations based on scientific evidence. A credible and relevant science-policy interface also has the potential to inform the public opinion on dangers related to hazardous chemicals and waste and, thereby, activate ordinary citizens and CSOs as strong agents for change, as has happened for climate change with the release of influential IPCC reports. However, integrating a scientific and technical culture into decision-making processes and governance structures is not an easy process and should be based on careful assessment of options through a gap analysis. At minimum, action should be taken to forge stronger links with existing science-policy interfaces, in particular the Global Chemicals Outlook and Global Waste Management Outlook, which could assess progress in reaching the objectives and milestones and provide other necessary data to show the status and trends in global chemicals and waste management. More ambitiously, decisive action could be taken to institutionalize scientific input to the Beyond-2020 Framework or even create an independent scientific body with authority to catalyze profound societal change, following the example of the biodiversity and climate clusters, to ensure that the pollution of the planet and its citizens does not remain unaddressed and that a non-toxic environment can be ultimately reached.

Reporting and review are imperative to track progress and elicit constructive feedback, thus helping to adjust future action. A specific expert working group could be created for the formulation of indicators, and a multi-stakeholder partnership, consisting of IOMC organizations and other stakeholders, could be established for their follow-up. A collective progress report should be carried out by the secretariat based on submitted stakeholder reports and supplemented by information from other sources. More ambitiously, a collective global stocktake could be established to provide timely feedback to update NAPs and other stakeholder plans and to revise the objectives and milestones. Different options for a collective global stocktake mechanism could be assessed to identify the most suitable model for the Beyond-2020 Framework. Collective review could be coupled with individual stakeholder reviews to be piloted by a few interested countries and other stakeholders that would provide them valuable learning opportunities, as well as produce outputs to feed into the global stocktake.

Financing from both domestic resources and international flows will likely remain a challenge as long as the framework remains non-legally binding, since countries will have difficulties prioritizing actions and channeling financing over competing concern linked with legally-binding commitments. However, the new framework will need to properly address financing to become truly effective. One of the underlying challenges is that environmental and social costs of chemicals management have not been internalized globally through market or regulatory instruments. This could be tackled by developing a global cost internalization program.

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Annex 1. Sustainable Development Goals and associated indicators with direct links to sound management of chemicals and waste

SDGs	Indicators
3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	**3.9.1** Mortality rate attributed to household and ambient air pollution.
	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)
	3.9.3 Mortality rate attributed to unintentional poisoning
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	**6.3.1** Proportion of wastewater safely treated
	6.3.2 Proportion of bodies of water with good ambient water quality
12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	**2.4.1** Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement
	12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	**12.5.1** National recycling rate, tons of material recycled
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	**4.1.1** Index of coastal eutrophication and floating plastic debris density

Annex 2. Reference to the five areas required for effective governance in the 'Co-chairs´overview paper' and the 'Scenario note' prepared for the second meeting of the Intersessional Process on the Strategic Approach and Sound Management of Chemicals and Waste.

	Co-chairs´ overview paper	**Scenario note**
Objectives and milestones	In line with paragraph 10 of resolution IV/4, and in consultation with relevant stakeholders, the secretariat has been requested to develop a proposal for objectives in support of the 2030 Agenda and related milestones, with the vision to be aspirational in nature, objectives limited in number and achievable and measurable milestones centred on the 11 elements of the Overall Orientation and Guidance and the paper to be developed through an intersessional working group open to all stakeholders. This document is available to stakeholders and will be a helpful starting point. Regardless of the form of the future approach, measurable objectives will be needed. It is important to provide a practical program of work that is measurable, to make and track progress toward achieving the vision, noting that not all countries and stakeholders are starting at the same level. The Aichi targets for biodiversity were referenced as a potential model approach. The international governance of the biodiversity cluster, similar to the chemicals and waste cluster, includes autonomous legally binding multilateral environmental agreements as well as voluntary approaches. Biodiversity, as chemicals and waste management, requires action in many sectors of government (environment, agriculture, industrial development etc.), by different key actors, and at various levels of governance (i.e. international, regional, national, sub-national and local). The approach taken in the biodiversity cluster through the Aichi targets has been accepted by a wide range of governments and stakeholders as a means of addressing a complex policy issue through global and national action. It also has proven to be an effective way to measure progress in achieving the overall vision of biological diversity conservation. Early progress in establishing objectives and milestones and in identifying specific stakeholders will help clarify the needs and priorities for the beyond 2020 context, and may serve to guide the development of implementation and governance arrangements moving forward.	10. At this second meeting, emphasis will be placed on developing the overall vision and policy principles, as well as measurable objectives and milestones, for consideration by the third meeting of the Open-ended Working Group. 21. The SAICM secretariat has been requested to develop a proposal for objectives in support of the 2030 Agenda and related milestones. This document is a starting point for stakeholders to consider. 22. Stakeholders may wish to review the proposed objectives and milestones and consider if those objectives would support a programme of work beyond 2020 that will deliver the overall vision that will be developed by the present meeting.
NAPs	National action plans were noted as a possible tool for addressing the sound management of chemicals and waste, focusing in particular on building in-country capacity to address the 11 basic elements, issues of concern and fostering multisectoral and multi-stakeholder engagement. National action plans should build on any existing efforts under Strategic Approach, the multilateral environmental	28. Regions may also wish to reflect on the advantages and disadvantages of developing national action plans and regional action plans as a method to support the implementation of the sound management of chemicals and waste. The merit of "mentoring" programmes should be considered to support developing

	agreements and other voluntary efforts such as the WHO "Road map to enhance health sector engagement in the strategic approach to international chemicals management towards the 2020 goal and beyond".	countries in establishing and implementing national actions.
Reporting	Once more detailed and measurable actions and indicators are agreed, it will be important to reflect upon an effective and appropriate approach to reviewing implementation and advancement of the sound management of chemicals and waste beyond 2020. It would be desirable to start considering how to ensure appropriate review and follow-up, including in the context of the 2030 Agenda and without creating additional mechanisms or reporting obligations. In principle, the information and reporting mechanisms already existing under the various relevant organizations and instruments, as well as implementation of the 2030 Agenda, should be used to gather the necessary information.	23. Stakeholders may also wish to reflect upon an effective process for undertaking reviews and performance measurement. In doing so, stakeholders may wish to consider: i. Whether a review mechanism should be established, that could involve voluntary national and stakeholder reporting and the sharing of best practices? ii. How reporting could be coordinated with efforts under relevant international agreements in order to support the overall sound management of chemicals and waste and to contribute towards the achievement of the 2030 Agenda?
Review and monitoring	If appropriate, voluntary peer review processes, focusing on the objectives and milestones could be considered. While this would be subject to further discussion, these would be open to non-governmental stakeholders and provide an opportunity for information exchange and learning. Furthermore, any review process should be linked to national action plans, if such an approach is agreed upon in moving forward.	
Scientific support	The need to explore opportunities to strengthen the link between science, public health, socio-economic information and policy in chemicals and waste governance has also been identified, with particular emphasis on decision-making at the national level and, at the multilateral level, without interfering with the tasks of existing mechanisms for the provision of reliable, scientifically valid and evidence-based advice on chemicals and waste management by intergovernmental and international bodies such UNEP, WHO, OECD and the chemicals and wastes conventions. The secretariat was requested to develop an information document on the science-policy interfaces in other clusters such as climate change, biodiversity and other relevant areas for the second meeting of the intersessional process. In addition, the WHO, UNEP, and chemicals and wastes secretariats are planning a paper on the science-policy interface on chemicals. In considering options in this area, stakeholders should consider both the functions and the value-added of any new mechanism or body.	34. In addition, stakeholders may wish to reflect upon the following: ii. How can issues of concern be defined? What criteria should be used? How can issues of concern be linked to measurable objectives and milestones?

Annex 3. Aichi Biodiversity Targets in the Strategic Plan for Biodiversity 2011-2020.

Strategic Goals	Aichi Biodiversity Targets
Strategic Goal A Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	**Target 1** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. **Target 2** By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems. **Target 3** By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions. **Target 4** By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.
Strategic Goal B Reduce the direct pressures on biodiversity and promote sustainable use	**Target 5** By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced. **Target 6** By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits. **Target 7** By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity. **Target 8** By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity. **Target 9** By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment. **Target 10** By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.
Strategic Goal C To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	**Target 11** By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

	Target 12 By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained. **Target 13** By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.
Strategic Goal D Enhance the benefits to all from biodiversity and ecosystem services	**Target 14** By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable. **Target 15** By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification. **Target 16** By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.
Strategic Goal E Enhance implementation through participatory planning, knowledge management and capacity building	**Target 17** By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan. **Target 18** By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels. **Target 19** By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied. **Target 20** By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.