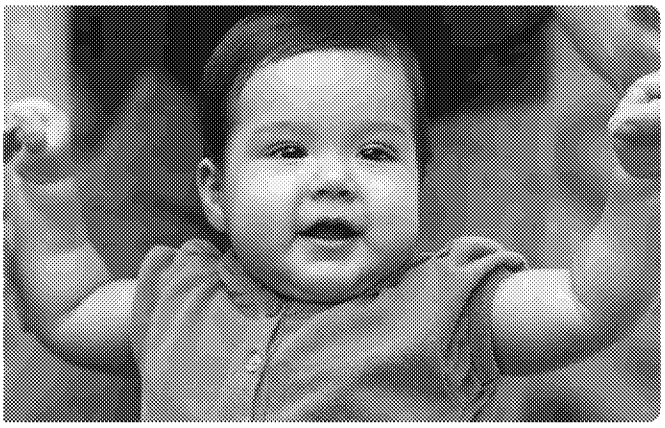
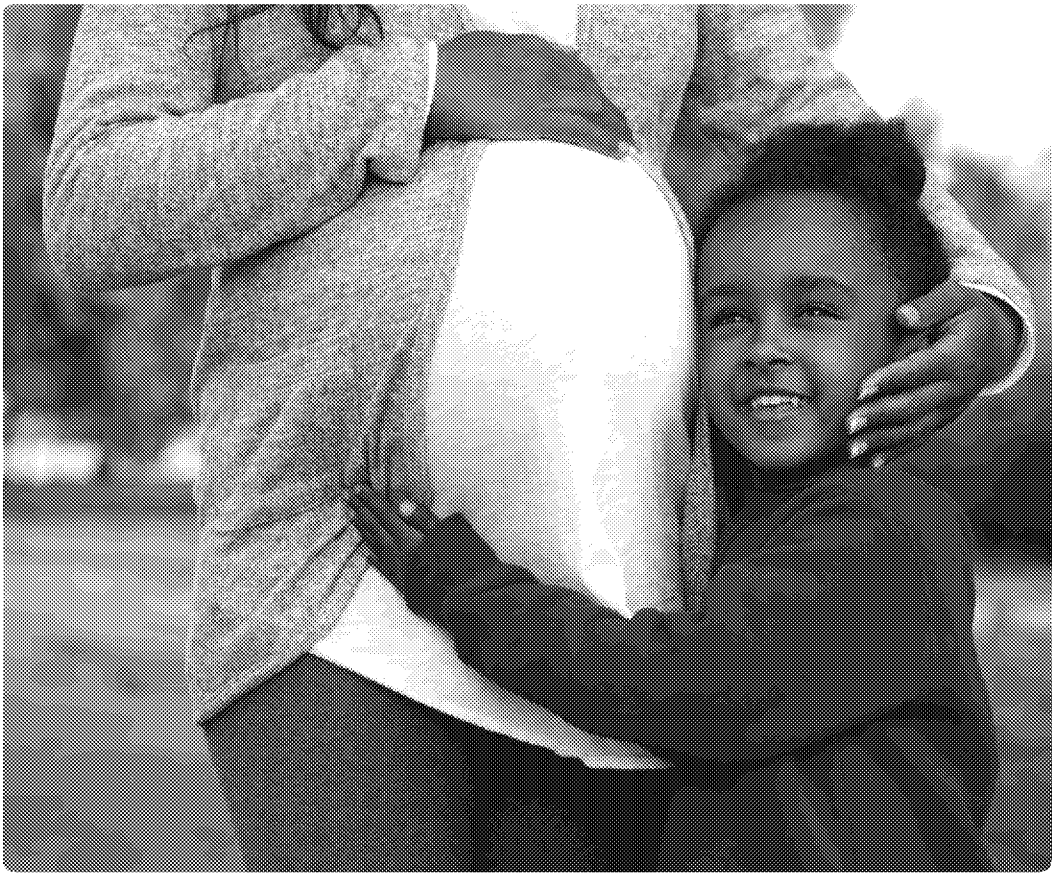
BEYOND 2020 PERSPECTIVES





January 2017

IPEN

a toxics-free future

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These Beyond 2020 Perspectives, as well as translated versions, are available online:

http://ipen.org/documents/ipen-beyond-2020-perspectives

IPEN is a leading global network of non-governmental organizations (NGOs) working in more than 100 developing countries and countries with economies in transition. IPEN works to establish and implement safe chemicals policies and practices to protect human health and the environment. It does this by building the capacity of its member organizations to implement on-the-ground activities, learn from each other's work, and work at the international level to set priorities and achieve new policies. Its mission is a toxics-free future for all.

IPEN has been engaged in the SAICM process since 2003, and its global network helped to develop the SAICM international policy framework. At its founding, in 1998, IPEN focused on advancing the development and implementation of the Stockholm Convention on persistent organic pollutants (POPs). Today, its mission also includes promoting safe chemicals management through the SAICM process (where it holds the public interest organization seat on the SAICM Bureau), halting the spread of toxic metals, and building a movement for a toxics-free future.

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BEYOND 2020: WHY SAICM IS IMPORTANT

IPEN AND PAN

January 2017

INTRODUCTION

The Strategic Approach to International Chemicals Management (SAICM) addresses significant health and environmental harms caused by chemical exposure and makes a global political commitment to reform how chemicals are produced and used in order to minimize those harms. Heads of State at the 2002 World Summit on Sustainable Development in Johannesburg called for the development of SAICM. While the agreement is not legally binding, its basic texts represent a consensus of Environment Ministers, Health Ministers and other delegates from more than one hundred governments who attended the first International Conference on Chemicals Management (ICCM1), held in Dubai, February 2006.

SAICM is the only global forum where the full range of known and newly discovered health and environmental concerns associated with the chemical life-cycle can be identified, assessed and addressed. SAICM catalyzes and enables multi-stakeholder, multi-sectoral efforts to achieve chemical safety and to minimize or eliminate all sources of toxic exposure. It provides opportunities for information-exchange, knowledge-sharing, support and encouragement to government officials with national responsibilities for chemicals management. While SAICM can be useful to chemicals managers from countries at all levels of development, it is of particular importance to those from developing and transition countries and especially, least developed countries (LDCs).

SAICM ADDRESSES SUBSTANCES AND OTHER ISSUES NOT COVERED BY THE CHEMICALS CONVENTIONS

SAICM's broad scope covers many chemical exposures that lie outside the framework of current chemicals conventions. Key features of SAICM's importance include its high level of political endorsement and the many ways it links chemical safety to: sustainable development; financing; regulatory infrastructure; enforcement; coherency in coordination across ministries and stakeholders; and key chemical safety principles including right to know, substitution, polluter pays and others. SAICM is an important driver for action on chemical safety and its links to sustainable development. In the absence of SAICM, no international framework would exist for addressing the majority of the world's most pressing, chemical safety concerns.

IMPORTANCE TO DEVELOPING AND TRANSITION COUNTRIES

SAICM was adopted in 2006 to supersede and replace the Intergovernmental Forum on Chemical Safety (IFCS); to facilitate better coordination and the greater engagement of the organizations making up the Inter-Organization Programme for the Sound Management of Chemicals (IOMC) in sound chemicals management initiatives; and to better promote multi-sectoral, multi-stakeholder engagement and partnerships. Since its adoption, SAICM has grown and matured and has proved to be a very useful international framework for promoting and advancing chemical safety objectives. While SAICM is important to all countries, it is of special value to the many low- and middle-income countries that still have very weak legal, regulatory, institutional and technical infrastructures and lack information and capacity for protecting their residents and environment from the harms associated with exposure to toxic chemicals and wastes. With the current, rapid expansion of chemical use and chemical production in the developing world, there is a growing need for a stronger, more capable SAICM that receives proper political priority and adequate resources.

The Stockholm Convention on Persistent Organic Pollutants—which was adopted prior to SAICM—and the Minamata Convention on Mercury—which was adopted after SAICM—both address specific toxic pollutants that can travel long distances on air or water currents, and accumulate in the environment and in living organisms. These pollutants cause harm to human health and the environment at locations distant from their original source. This is the reason given to justify establishing global, legally-binding, chemicals-control treaties. This is also what gives governments of high income countries a self-interested reason to provide political, technical and financial support to the Conventions.

SAICM, on the other hand, has a much wider scope: it addresses virtually all sources of toxic chemical exposure not covered by the Stockholm, Minamata, Montreal Protocol

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or other treaties. In many cases, the harms to human health and/or the environment caused by these other sources can be just as serious as harms caused by persistent organic pollutants, ozone depleting substances, and/or mercury. These sources of toxic chemical exposure frequently disproportionately affect people and environments in low- and middle-income countries. In many cases, however, the governments of adversely affected countries lack information about these sources of toxic exposure and also often lack information about the kinds of relevant policies and programs that can be put in place to adequately address them.

Consider just two examples of the many toxic chemical sources that are not comprehensively addressed by any of the existing chemicals and wastes conventions[1]: lead poisoning and pesticide exposure (please see Annex 1).

According to WHO, lead poisoning is an "entirely preventable disease".2 As high-income countries have increasingly adopted programs and policies aimed at minimizing childhood lead exposure, this has now predominantly become a disease of low-income regions. An estimated 90% of all children with elevated blood-lead levels now live in low-income regions.3 But since lead does not generally travel long distances in the environment, global chemicals conventions have not been of use in reducing and minimizing these exposures.

The relevant government agencies and industries in low-income countries have often lacked information about the extreme harms associated with childhood lead exposure and they have also lacked information about policies, programs and techniques that can be put in place to minimize or eliminate these harms. SAICM, however, has provided a venue for sharing information about these harms and for promoting international cooperation to address them. ICCM2 identified lead in paint as an emerging policy issue and stimulated the establishment of a global, multi-stakeholder partnership – the Global Alliance to Eliminate Lead Paint (GAELP) – which promotes lead paint elimination efforts at the country level, and which reports its progress to meetings of the ICCM.

The other example is health and environmental harms associated with pesticide exposure. Here too, the harm disproportionally impacts people and environments in low- and middle-income countries. In these countries, a much greater proportion of the populations engage in agriculture and/or live in rural areas where pesticides are intensively used than in high income countries. National pesticide control regulations in low- and middle-income countries are often completely lacking or weak, spotty, and inadequately monitored and enforced. Literacy is often lower; peasants, small farmers and landless agricultural workers often lack access to critical information and in many cases, highly hazardous pesticides that have been banned or severely restricted in high-income countries continue to be widely used.

Some pesticides that are persistent and/or bioaccumulative, and that transport long distances in the environment, have been banned by the Stockholm Convention. The Rotterdam Convention enables the provision of information to importers of some other hazardous pesticides and formulations. However, all other pesticides – many of them highly hazardous – are completely uncontrolled at the global level. According to WHO, available data are too limited to estimate the global health impacts of pesticides, however it is clear from the scientific literature that the effects of manufacturing, use, dispersal, and improper handling of pesticides are a significant global health problem. UNEP notes that the accumulated health costs of acute injury to small holder pesticide uses in sub-Saharan Africa will be approximately USD$97 billion by 2020.4 Currently, there is no cost estimate of the global health and environmental impacts of pesticides.

In response to these and other concerns, ICCM4 recognized that highly hazardous pesticides (HHPs) cause adverse human health and environmental effects in many countries, particularly in low-income and middle-income countries, and it welcomed a strategy to address the problem developed by FAO, UNEP and WHO. ICCM4 additionally encouraged stakeholders to undertake concerted efforts to implement this strategy at the local, national, regional and international levels, with emphasis on promoting agro-ecologically-based alternatives and strengthening national regulatory capacity to conduct risk assessment and risk management.[5]

This issue is not addressed in a comprehensive way in any international cooperative agreement. SAICM is the only framework within which governments, intergovernmental agencies and relevant stakeholders can cooperate to address this critically important issue.

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1 Basel, Rotterdam, Stockholm, and Minamata Conventions

2 World Health Organization, Childhood Lead Poisoning, 2010 page 8: http://www.who.int/ceh/publications/leadguidance.pdf

3 Ibid, page 32

4 UNEP (2013) Costs of Inaction on the Sound Management of Chemicals, Job Number: DTI/1551/GE

5 http://www.saicm.org/index.php?option=com_content&view=article&id=550&Itemid=767

SAICM CATALYZES AND ENABLES MULTI-STAKEHOLDER, MULTI-SECTORAL EFFORTS TO ADDRESS SOURCES OF TOXIC EXPOSURE

The Global Alliance to Eliminate Lead Paint and the decisions of ICCM4 on HHPs are just two examples of how SAICM stimulates and enables multi-stakeholder, multi-sectoral efforts to address sources of toxic exposure. ICCM decisions have also stimulated international activities aimed at addressing other toxic exposure sources, including: access to information about chemicals in products; toxic exposures related to the full lifecycle of electrical and electronic products; endocrine disrupting chemicals (EDCs); nanotechnology and nanomaterials; environmentally persistent pharmaceutical pollutants and others.

SAICM provides a framework that stimulates and enables government officials, public interest NGOs, community groups, UN agencies, the private sector, the health sector, trade unions, and other relevant actors to interact and collaborate with one another in support of sound chemicals management objectives. In the absence of the SAICM framework, such collaboration would often be difficult and would sometimes not even be feasible. In the context of SAICM, public interest NGOs and other stakeholders can align their own chemical safety initiatives with internationally approved policies and frameworks that their governments acknowledge and support.

If SAICM were to expire in 2020, these initiatives would come to an end and there would be little if any basis going forward to promote any other multi-stakeholder, multi-sectoral efforts to address sources of toxic exposure.

SAICM PROVIDES INFORMATION AND SUPPORT TO GOVERNMENT OFFICIALS WHO HAVE RESPONSIBILITIES FOR CHEMICALS MANAGEMENT

SAICM provides a framework for regional meetings that enable peer-to-peer discussions on issues related to sound chemicals management. SAICM helps national chemicals managers better understand the approaches that other countries use to control the many different chemical hazards they need to address. SAICM expands access to chemicals-related information, expertise, and policy guidance. SAICM helps elevate the standing of national chemicals management officials within their own ministries or agencies; and it helps stimulate inter-ministerial coordination and cooperation in support of chemical safety objectives.

OUTCOMES FOR WHY SAICM IS IMPORTANT

1. The multi-stakeholder and multi-sectoral design and practice of SAICM is preserved Beyond 2020.
2. SAICM's broad scope is preserved because, in its absence, no participatory international framework would exist for addressing the majority of the world's most pressing chemical safety concerns.
3. Current issues of concern and emerging policy issues are carried forward Beyond 2020 and further addressed.
4. The Beyond 2020 process results in continued, measurable progress toward reforming how chemicals are produced and used in order to prevent harm to human health and the environment.

ANNEX 1 TWO EXAMPLES OF ISSUES IMPORTANT TO DEVELOPING AND TRANSITION COUNTRIES THAT ARE NOT COMPREHENSIVELY ADDRESSED BY ANY OF THE EXISTING CHEMICALS AND WASTES CONVENTIONS

Lead and pesticide exposure are just two of many possible examples of sources of toxic exposure that the SAICM process seeks to address. In the absence of SAICM, no participatory international framework would exist for addressing the majority of the world's most pressing chemical safety concerns.

LEAD POISONING

The World Health Organization (WHO) considers lead poisoning to be one of the top ten diseases whose health burden among children is due to modifiable environmental factors.[6] Lead poisoning accounts for 0.6% of the total global burden of disease.[7] Sixteen percent of all children, worldwide, are estimated to have lead in their blood at levels greater than 10 micrograms of lead per deciliter. Of all children with elevated blood-lead levels, an estimated 90% live in low-income regions.[8] Scientists and public health officials agree that there is no safe level of lead exposure for children.[9]

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6 Prüss-Üstün A, and C. Corvalán C (2006) World Health Organization, Preventing Disease Through Healthy Environments: Towards an estimate of the environmental burden of disease, 2006, page 12: http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

7 World Health Organization, Childhood Lead Poisoning, 2010 page 11: http://www.who.int/ceh/publications/leadguidance.pdf

8 Ibid, page 32

9 https://www.cdc.gov/nceh/lead/

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In addition to its enormous human costs, exposure to lead also puts a great economic burden on societies. A recent study that investigated the economic impact of childhood lead exposure on national economies in low- and middle-income countries estimated the total cumulative cost burden to be $977 billion international dollars per year.[10] This amount is seven times greater than the combined total of all the development aid to low- and middle-income countries provided by major donor governments.11 According to WHO, lead poisoning is an "*entirely preventable disease*".[12]

PESTICIDE EXPOSURE

Global data and authoritative estimates of the harms to human health and the environment caused by pesticide exposure are much sparser than those associated with lead exposure. WHO scientists have indicated that the global burden of disease associated with chronic exposure to toxic pesticides is still unknown because it has not yet been possible to conduct estimates based on the different modes of action by which pesticides exert their toxic effects.[13] An older, but authoritative study estimated that there are possibly one million cases of serious unintentional pesticide poisonings each year, and an additional two million cases of people hospitalized for suicide attempts with pesticides. The author notes that this necessarily reflects only a fraction of the real problem and estimates that there could be as many as 25 million agricultural workers in the developing world suffering some from occupational pesticide poisoning each year, though most incidents are not recorded and most patients do not seek medical attention.[14] A more recent surveillance exercise in Central America indicated a 98% rate of underreporting of pesticide poisonings, with a regional estimate of 400,000 poisonings per year, 76% of the incidents being work related.[15] And still more recently, an FAO survey in Burkina Faso (2010), under the auspices of the Rotterdam Convention, showed that 82% of farmers have experienced symptoms of pesticide poisoning.[16]

UNEP notes that the accumulated health costs of acute injury to small holder pesticide uses in sub-Saharan Africa will be approximately USD$97 billion by 2020.[17] A conservative estimate of pesticide exposure impacts on small farmers in sub-Saharan Africa suggests that certain specific costs associated with pesticide poisoning—lost work days, outpatient medical treatment, and inpatient hospitalization– amounted in 2005 to USD$4.4 billion. These estimates do not include other costs such as the human suffering or the costs associated with lost livelihoods.[18] Nor do data and authoritative estimates quantify the harms to ecosystems associated with pesticide exposures. Once all the harms associated with pesticide exposure become better studied and quantified, they are likely to be as great, or greater, than the harms associated with lead exposure.

As with lead, harms associated with pesticide exposure disproportionally impact low- and middle-income countries. A much greater proportion of the populations of these countries engage in agriculture and/or live in the rural areas where pesticides are intensively used compared to high income countries. National pesticide control regulations in low- and middle-income countries are often completely lacking or weak, spotty, and inadequately monitored and enforced, and the normal conditions of pesticide use often pose greater threats to farmer and ecosystem health.

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10 Attina TM, Trasande L (2013) Economic costs of childhood lead exposure in low- and middle-income countries, Environmental Health Perspectives 121: 1097-1102 http://ehp.niehs.nih.gov/1206424/

11 In 2013, governments participating in the Development Assistance Committee (DAC) of the Organization of Economic Development and Cooperation (OECD) provided a total of USD$134.8 billion in net official development assistance. See: OECD; Aid to developing countries rebounds in 2013 to reach an all-time high; *http://www.oecd.org/newsroom/aid-to-developing-countries-rebounds-in-2013-toreach-an-all-time-high.htm*

12 World Health Organization, Childhood Lead Poisoning, 2010 page 8: http://www.who.int/ceh/publications/leadguidance.pdf

13 Prüss-Ustün A, Vickers C, Haefliger P, Bertollini R (2011) Knowns and unknowns on burden of disease due to chemicals: a systematic review; Environmental Health 10:9 http://www.ehjournal.net/content/10/1/9

14 Jeyaratnam, J (1990) Acute pesticide poisoning: A major global health problem, World Health Stat Q43:139-44

15 Murray D, Wesseling C, Keifer M, Corriols M, Henao S (2002) Surveillance of pesticide-related illness in the developing world: putting the data to work. International Journal of Occupational Environmental Health 8(3):243-8.

16 http://www.pic.int/Implementation/SeverelyHazardousPesticideFormulations/SHPFKit/PesticidePoisoning/tabid/3117/language/en-US/Default.aspx

17 UNEP (2013) Costs of Inaction on the Sound Management of Chemicals, Job Number: DTI/1551/GE

18 UNEP (2012) Global Chemicals Outlook/ Towards Sound Management of Chemicals: Synthesis Report for Decision-Makers; *P 29*

BEYOND 2020: RAISING THE POLITICAL PRIORITY OF CHEMICAL SAFETY

IPEN

January 2017

INTRODUCTION

The Strategic Approach to International Chemicals Management (SAICM) addresses significant health and environmental harms caused by chemical exposure and makes a global political commitment to reform how chemicals are produced and used in order to minimize those harms. Heads of State at the 2002 World Summit on Sustainable Development in Johannesburg called for the development of SAICM. While the agreement is not legally binding, its basic texts represent a consensus of Environment Ministers, Health Ministers and other delegates from more than one hundred governments who attended the first International Conference on Chemicals Management (ICCM1), held in Dubai, February 2006.

Unfortunately, SAICM has a relatively low political priority in most countries. In addition, there also appears to be low to moderate visibility and commitment to sound chemicals management within UN agencies. A recent report by the United Nations Environmental Management Groups notes that, "While the priority of sound chemicals management as a topic appears relatively high on the agenda of many organizations, visibility of and commitment to it in the UN system is low to moderate."[19] In the absence of SAICM, no international framework would exist for addressing the majority of the world's most pressing chemical safety concerns. However, the SAICM secretariat appears to have a low visibility within the UN system, when it should be its chemical safety flagship.

Some ascribe SAICM's low political priority in countries to the fact that the agreement is not legally binding. Others note the lack of a tangible, adequate financial mechanism for implementation of the agreement. Another view considers that sound chemicals management needs better messaging to highlight its links to sustainable development. All of these characteristics make it difficult for SAICM to achieve a higher political priority; however, governments widely agree on the need to raise the political priority of chemical safety and that should also include SAICM and arrangements on chemical safety Beyond 2020.

GOVERNMENTS AGREE ON THE NEED TO RAISE THE POLITICAL PRIORITY OF CHEMICAL SAFETY

In 2012 at the Rio+20 summit, governments agreed on the need for, "heightened efforts to increase the political priority accorded to sound management of chemicals and waste."[20] In 2014, the first United Nations Environment Assembly (UNEA1), in its decision on chemicals and wastes, welcomed the report of the Executive Director entitled, "Strengthening the sound management of chemicals and wastes in the long term."[21] The report notes that, "There is a need to increase the political priority and commitment to the sound management of chemicals and wastes at the local, national, regional and global levels, recognizing that a number of processes present opportunities to draw attention to these important issues, including those relating to the sustainable development goals and the Strategic Approach to International Chemicals Management." [22]

As chemical use and production continues to expand, SAICM should be upgraded in importance to match the growing challenge of health, environmental, and economic injuries associated with the production and use of toxic chemicals and wastes. Because of its broad scope and relevance to chemical safety concerns not covered by other agreements, SAICM remains the only global forum where the problems of sound chemicals management can be comprehensively identified and addressed.

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[19] UN Environment Management Group (2015) United Nations and sound chemicals management: Coordinating delivery for Member States and sustainable development, https://sustainabledevelopment.un.org/content/documents/2334chemical_report.pdf

[20] United Nations (2012) Resolution adopted by the General Assembly on 27 July 2012: 66/288. The Future We Want, Para 223, A/RES/66/288 https://sustainabledevelopment.un.org/futurewewant.html

[21] UNEP (2014) Continued strengthening of the sound management of chemicals and waste in the long term, United Nations Environment Assembly, UNEP/EA.1/L.17

[22] UNEP (2014) Continued strengthening of the sound management of chemicals and waste in the long term, United Nations Environment Assembly, UNEP/EA.1/L.17

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SAICM OBJECTIVES AND RECOMMENDATIONS FOR IMPLEMENTATION

Chemicals management in countries is spread out among many ministries and institutions, making coherent management a serious challenge. The SAICM agreement clearly acknowledges, *"gaps, overlaps, and duplication in chemicals management activities and there is a need in many countries for enhanced coherence, consistency and cooperation..."*[23]

Governments have agreed within SAICM that chemical safety mechanisms should be multi-sectoral, comprehensive, effective, efficient, transparent, coherent and inclusive, and they should ensure accountability. SAICM also represents a global consensus that chemicals regulation should, *"promote and support meaningful and active participation by all sectors of civil society, particularly women, workers and indigenous communities, in regulatory and other decision-making processes that relate to chemical safety."*[24]

SAICM's Overarching Policy Strategy recommends each government designate a SAICM national focal point and establish an inter-ministerial or inter-institutional committee to represent relevant chemical safety areas.[25] The focal point should be a representative of this inter-ministerial committee. Relevant sectors of government may include, among others, ministries of Environment, Health, Agriculture, Labor, Industry and Development.

SAICM has an extensive list of national focal points and also a series of regional government focal points, and focal points for intergovernmental organizations and non-governmental organizations.[26] However, it is not clear how many countries have actually successfully established functional inter-ministerial committees, especially considering SAICM's low political priority.

[23] UNEP - WHO (2006) Overarching Policy Strategy, para 9, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475 http://www.saicm.org/index.php?option=com_content&view=category&layout=blog&id=143&Itemid=528

[24] UNEP - WHO (2006) Overarching Policy Strategy, para 16, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475 http://www.saicm.org/index.php?option=com_content&view=category&layout=blog&id=143&Itemid=528

[25] UNEP - WHO (2006) Overarching Policy Strategy, para 23, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[26] http://www.saicm.org/index.php?option=com_content&view=category&layout=blog&id=143&Itemid=528

CHEMICAL UNITS

One way to increase the political priority of SAICM and chemicals management within countries would be to formalize coordination of the inter-ministerial committee recommended in the SAICM agreement. One way to do this would be to utilize a pre-existing structure to assume this responsibility. The Montreal Protocol supported the development and operation of national ozone units in 147 countries, including a peer support system and regional networks. These units have been generally acknowledged to have played a key role in the successful implementation of the Protocol. These ozone units could be broadened and serve as focal points for implementation of SAICM, and the Basel, Rotterdam, Stockholm, and Minamata Conventions.

The idea of expanding the ozone units to serve as chemical units emerged during the consultative process on financing options for chemicals and wastes, launched by the UNEP Executive Director in 2009. It appeared again during discussions of the financing mechanism for the Minamata Convention, which concluded in 2012.

Ideally, the chemical units would locate chemical safety responsibilities in a single effectively-operated institutional arrangement. The updated chemical units could have a multi-disciplinary nature, including a role in coordination, regulation, financing /mainstreaming, compliance, needs assessment, reporting and others. The units should interface with all stakeholders as well as the regional centers established by the Basel and Stockholm Conventions. The efforts to establish synergies in the chemicals conventions have primarily focused on the secretariats. This proposal focuses on synergies at the national level.

DEVELOPMENT AGENCIES AND CHEMICAL SAFETY

In many ways SAICM has been ahead of its time in linking chemical safety and sustainable development. The first statement of SAICM's Dubai Declaration states, *"The sound management of chemicals is essential if we are to achieve sustainable development, including the eradication of poverty and disease,*

the improvement of human health and the environment and the elevation and maintenance of the standard of living in countries at all levels of development."[27] This ministerial-level recognition led to raised expectations that chemical

[27] UNEP - WHO (2006) Dubai Declaration, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

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safety would become a priority of development assistance and that international development assistance agencies would provide substantial funding for SAICM implementation. However, this has not yet occurred on a significant scale. Beyond 2020, development agencies should elevate the priority given to sound chemicals management and incorporate chemical safety into planning and assistance programs. This should be tracked with a clearing house mechanism that measures development aid for sound chemicals management.

OUTCOMES FOR RAISING THE POLITICAL PRIORITY OF CHEMICAL SAFETY

1. Creation of adequately-funded chemical safety coordination units. This might take the form of broadening the Montreal Protocol units to serve as coordinating multi-disciplinary national operations for implementation of SAICM, and the Basel, Rotterdam, Stockholm, and Minamata Conventions.
2. Development agencies increase the funding priority of chemical safety in development aid.
3. The SAICM secretariat tracks development aid for sound chemicals management with a clearing house mechanism.

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BEYOND 2020: CHEMICAL SAFETY AND AGENDA 2030

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INTRODUCTION

The Strategic Approach to International Chemicals Management (SAICM) addresses significant health and environmental harms caused by chemical exposure and makes a global political commitment to reform how chemicals are produced and used in order to minimize those harms. Heads of State at the 2002 World Summit on Sustainable Development in Johannesburg called for the development of SAICM. While the agreement is not legally binding, its basic texts represent a consensus of Environment Ministers, Health Ministers and other delegates from more than one hundred governments who attended the first International Conference on Chemicals Management (ICCM1), held in Dubai, February 2006.

Well before Agenda 2030 was adopted, a key feature of the 2006 SAICM high-level Dubai Declaration was the inherent relationship between chemical safety and sustainable development: The Declaration opens with the statement, "The sound management of chemicals is essential if we are to achieve sustainable development, including the eradication of poverty and disease, the improvement of human health and the environment and the elevation and maintenance of the standard of living in countries at all levels of development." [28]

In adopting SAICM, governments agreed that advancing chemical safety should be viewed as a necessary component of the sustainable development agenda. The diseases and behavior disorders caused by chemical exposures not only cause human suffering, they also retard economic productivity and impose costly additional burdens on a country's health and education systems. Shortfalls in a country's ability to manage chemicals become barriers that block economic development and poverty reduction initiatives.

In October 2015, governments adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs).[29] The Preamble notes a determination to take *"bold and transformative steps which are urgently needed to shift the world on to a sustainable and resilient path."* [30] The overall plan seeks to *"realize the human rights of all"*[31]; *"achieve gender equality and the empowerment of all women and girls"*; and *"ensure the lasting protection of the planet and its natural resources."* [32]

The 2030 Agenda for Sustainable Development reaffirms all the principles of the Rio Declaration on Environment and Development and it envisages, "*a world free of poverty, hunger, disease and want.*" [33] It reaffirms commitments regarding, *"the human right to safe drinking water and sanitation"; "improved hygiene"*; and a world, *"where food is sufficient, safe, affordable and nutritious."*[34]

Actions related to chemical safety and toxic chemicals are either referenced or implied in many, if not all of the SDGs. The Agenda also acknowledged that progress made toward achieving these goals should be measurable.

The International Conference on Chemicals Management, at its fourth session (ICCM4), welcomed the 2030 Agenda for Sustainable Development, and it noted that there is a, "*potential for the Strategic Approach multisectoral and multi-stakeholder platform to make a significant contribution to the implementation of that Agenda, in particular its goals and targets relating to chemicals and wastes.*"[35]

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[28] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[29] United Nations (2015) Transforming our world: The 2030 Agenda for Sustainable Development, UN General Assembly, A/RES/70/1 http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[30] United Nations (2015) Transforming our world: The 2030 Agenda for Sustainable Development, UN General Assembly, A/RES/70/1 http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[31] For more information on the human rights dimensions of chemical safety, please see the IPEN paper, "Beyond 2020: Human rights and chemical safety."

[32] United Nations (2015) Transforming our world: The 2030 Agenda for Sustainable Development, UN General Assembly, A/RES/70/1 http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[33] United Nations (2015) Transforming our world: The 2030 Agenda for Sustainable Development, UN General Assembly, A/RES/70/1 http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[34] United Nations (2015) Transforming our world: The 2030 Agenda for Sustainable Development, UN General Assembly, A/RES/70/1 http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[35] UNEP (2015) IV/1: Implementation towards the achievement of the 2020 goal, Report of the International Conference on Chemicals Management on the work of its fourth session, SAICM/ICCM.4/15

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Furthermore, ICCM4 decided that the SAICM Beyond 2020 process should, *"develop recommendations regarding measurable objectives in support of the 2030 Agenda for Sustainable Development."* [36] These recommendations should be concrete and provide clear connections to minimizing harms associated with chemicals and wastes.

SUSTAINABLE DEVELOPMENT GOAL 2: END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE

Targets under SDG2 include:

2.3: *"double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land..."*

2.4: ensure *"sustainable food production systems and implement resilient agricultural practices"*

2.5: *"maintain the genetic diversity of seeds, cultivated plants..."*

The Dubai Declaration notes that one of the key reasons for taking concerted action on chemical safety concerns is the *"dependency on pesticides in agriculture."*[37] In 2015, ICCM4 adopted Resolution IV/3 establishing highly hazardous pesticides (HHPs) as a SAICM Issue of Global Concern.[38] Delegates recognized, *"that highly hazardous pesticides cause adverse human health and environmental effects in many countries, particularly in low-income and middle-income countries"* and agreed to take concerted efforts to implement a strategy developed by FAO, UN Environment, and WHO. Delegates further indicated that this should be done, *"with emphasis on promoting agroecologically based alternatives."*

SAICM Beyond 2020 can contribute to Agenda 2030 by developing a global plan of action to implement this FAO, UN Environment, WHO strategy with the aim of increasing the agricultural productivity and incomes of small-scale food producers while at the same time achieving significant measurable reductions in human and environmental exposures to HHPs through implementation of agroecology. The use of agroecology was emphasized by the by the UN Special Rapporteur on the Right to Food, de Schutter, in his 2010 report to the Human Rights Council[39] which outlined the significance of agroecological practices to offer a more sustained and equitable strategy than reliance on genetically engineered crops and agrochemical inputs and in providing higher incomes and improved livelihoods for the poorest, particularly small scale farmers in developing countries.

The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) was a global consultative process with the participation of hundreds of experts from all UN regions (more than 100 countries) in an intergovernmental process co-sponsored by FAO, GEF, UNDP, UN Environment, UNESCO, the World Bank and WHO. IAASTD addressed issues of sustainable development and agriculture via focus on this question: *"How can we reduce hunger and poverty, improve rural livelihoods, and facilitate equitable, environmentally, socially and economically sustainable development through the generation, access to, and use of agricultural knowledge, science and technology?"*[40]

IAASTD noted that the business as usual agricultural model is to, *"continuously innovate, reduce farm gate prices and externalize costs"* and concludes that, *"Business as usual is no longer an option."* [41] An important shift is to recognize farmers and their communities as *"producers and managers of ecosystems."* This internalizes costs and enhances sustainability while maintaining productivity.

Key IAASTD recommendations relevant to the Beyond 2020 process and its contributions to Agenda 2030 include:

- Reduce agrochemical inputs (particularly pesticides and synthetic fertilizers)
- Use energy, water and land more efficiently (not only as in precision agriculture, but also as in agroecology)

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36 UNEP (2015) IV/1: Implementation towards the achievement of the 2020 goal, Report of the International Conference on Chemicals Management on the work of its fourth session, SAICM/ICCM.4/15

37 UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

38 UNEP (2015) IV/3 Highly hazardous Pesticides, Report of the International Conference on Chemicals Management on the work of its fourth session, SAICM/ICCM.4/15

39 De Schutter O (2010) Report submitted the Special Rapporteur on the Right To Food, Human Rights Council, 16th session, A/HRC/16/49

40 UNDP, FAO, UNEP, UNESCO, World Bank, WHO, GEF (2009) Synthesis Report, International Assessment of Agricultural Knowledge, Science and Technology for Development, ISBN 978-1-59726-550-8 http://www.unep.org/dewa/agassessment/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Synthesis%20Report%20(English).pdf

41 UNDP, FAO, UNEP, UNESCO, World Bank, WHO, GEF (2009) Synthesis Report, International Assessment of Agricultural Knowledge, Science and Technology for Development, ISBN 978-1-59726-550-8 http://www.unep.org/dewa/agassessment/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Synthesis%20Report%20(English).pdf

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- Use agroecological management approaches
- Internalize the environmental cost of unsustainable practices and avoid those that promote the wasteful use of inputs (pesticides and fertilizers)
- Regulate environmentally damaging practices and develop capacities for institutional changes that ensure monitoring and evaluation of compliance mechanisms
- Adjust intellectual property rights (IPR) and related frameworks to allow farmers to manage their seeds and germplasm resources as they wish

Consideration might be given to additional SAICM Beyond 2020 initiatives associated with SDG2 as proposed in SAICM Global Plan of Action activities 23 – 42, 46, 50-53, 65, 68, 89, 92, 93, 97, 114-117, 120, 132, 158 – 160, 202, and 228, along with measurable objectives described below.

SUSTAINABLE DEVELOPMENT GOAL 3: ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES

Targets under SDG3 include:

3.4: *"reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being"*

3.9: *"substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination."*

The SAICM Dubai Declaration expresses, *"concern about the long-term effects of chemicals on both human health and the environment"* and recognizes the need to protect vulnerable groups including, *"children and the unborn child from chemical exposures that impair their future lives."*[42]

The SAICM Overarching Policy Strategy notes that, *"Risk reduction (including preventing, reducing, remediating, minimizing and eliminating risks) is a key need in pursuing the sound management of chemicals throughout their entire life cycle including, where appropriate, products and articles containing chemicals."*[43] The Overarching Policy Strategy recognizes that, *"Risk reduction measures need to be improved to prevent the adverse effects of chemicals on the health of children, pregnant women, fertile populations, the elderly, the poor, workers and other vulnerable groups and susceptible environments."*[44] Finally, the Overarching Policy Strategy emphasizes the need to *"give priority consideration to the application of preventive measures such as pollution prevention."*[45]

All SAICM's Emerging Policy Issues and its Issues of Concern are highly relevant to addressing SDG3, including: lead in paint, chemicals in products, hazardous chemicals in the lifecycle of electrical and electronic products, nanotechnologies and manufactured nanomaterials, endocrine disrupting chemicals, environmentally persistent pharmaceutical pollutants and highly hazardous pesticides.

In the past, most of SAICM's initiatives on Emerging Policy Issues and Issues of Concern have focused primarily on defining an issue and raising awareness about it. The major exception has been on the issue of lead in paint. On this issue, SAICM fostered an active, global, multi-stakeholder partnership – the Global Alliance to Eliminate Lead Paint – which is successfully encouraging companies to stop manufacturing and selling lead paints and encouraging governments to enact regulatory controls and providing tools to stakeholders to achieve actual change on the ground. Substantial measurable reductions in the manufacture and sales of lead paints have already been achieved and more can be anticipated. These primary prevention achievements translate easily into measurable reductions in lead exposures of future generations, and these in turn, translate into reduced incidents of mental impairments, cardiovascular disease and other non-communicable diseases.

Beyond 2020, SAICM should seek to develop and implement plans of action addressing other Emerging Policy Issues and Issues of Concern that can also achieve measurable risk-reduction results aimed at reducing premature mortality from non-communicable diseases; at promoting mental health and well-being[46]; and/or at reducing the number of deaths and illnesses from hazardous chemicals and pollution.

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42 UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

43 UNEP - WHO (2006) Overarching Policy Strategy para 7, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

44 UNEP - WHO (2006) Overarching Policy Strategy para 7c, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

45 UNEP - WHO (2006) Overarching Policy Strategy para 14f, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

46 Exposure to lead, mercury, endocrine disrupting chemicals and other neurotoxic substances significantly impair mental health

In addition to SAICM's present list of Emerging Policy Issues and Issues of Concern, consideration might be given to other risk-reduction initiatives from SAICM's Global Plan of Action such as: 4, 5, 6, 7 – 10, 11 – 21, 35, 57 – 67, 72, 74 – 79, 87, 138 – 153, 221, 237, 245 – 246, 255, and 260, along with measurable objectives described below.

SUSTAINABLE DEVELOPMENT GOAL 4: ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL

Targets under SDG4 include:

4.3: *"ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university."*

The SAICM Overarching Policy Strategy notes the need implement measures to strengthen knowledge and information including, *"improved education, training and awareness-raising activities aimed at those who may be exposed to toxic substances at any stage in the life cycle of chemicals..."*[47] The Global Plan of Action has items specifically relating education to promote sustainability (83), improve communication (110), children's chemical safety (150), GHS (154), occupational health and safety (155), and safety of waste handlers and recyclers (161).

SUSTAINABLE DEVELOPMENT GOAL 5: ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS

Targets under SDG5 include:

5.1: *"End all forms of discrimination against all women and girls everywhere"*

5.5: *"Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life."*

5a: *"Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws."*

5c: *"Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels."*

Rio Principle 20 states, *"Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development."*[48] In 2006, this principle was fully embedded in the SAICM documents that demonstrate the intimate links between chemical safety and sustainable development.

The SAICM Dubai Declaration commits governments to, *"work towards effective and efficient governance of chemicals management by means of transparency, public participation and accountability involving all sectors of society, in particular striving for the equal participation of women in chemicals management."*[49]

SAICM's Overarching Policy Strategy notes that, *"in many countries some stakeholders, particularly women and indigenous communities, still do not participate in all aspects of decision-making related to the sound management of chemicals, a situation which needs to be addressed"* and it indicates the importance of public participation in decision- making, *"featuring in particular a strengthened role for women."*[50] The SAICM Overarching Policy Strategy also states that risk reduction measures need to be improved, *"to prevent the adverse effects of chemicals on the health of children, pregnant women, fertile populations, the elderly, the poor, workers and other vulnerable groups and susceptible environments."*[51] Finally, one of the SAICM Overarching Policy Strategy objectives is, *"To ensure equal participation of women in decision-making on chemicals policy and management."*[52]

The Stockholm Convention preamble also addresses this linkage. It notes, *"health concerns, especially in developing countries, resulting from local exposure to persistent*

[47] UNEP - WHO (2006) Strategic Approach to International Chemicals Management, para 10 http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[48] United Nations Conference on Environment and Development (1992) Rio Declaration on environment and development, http://www.unep.org/documents.multilingual/default.asp?documentid=78&articleid=1163

[49] UNEP - WHO (2006) Dubai Declaration, para 18, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[50] UNEP - WHO (2006) Overarching Policy Strategy, para 2, 9, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[51] UNEP - WHO (2006) Overarching Policy Strategy, para 7, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[52] UNEP - WHO (2006) Overarching Policy Strategy, para 16, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

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organic pollutants, in particular impacts upon women and, through them, upon future generations."[53] The treaty obligates governments to, *"consult their national stakeholders, including women's groups and groups involved in the health of children, in order to facilitate the development, implementation and updating of their implementation plans."*[54] The Stockholm Convention instructs Parties, with their capabilities to promote and facilitate, *"Development and implementation, especially for women, children and the least educated, of educational and public awareness programmes on persistent organic pollutants, as well as on their health and environmental effects and on their alternatives."*[55]

For more information on women and chemical safety, please see the IPEN paper, "Beyond 2020: Women and chemical safety."

SUSTAINABLE DEVELOPMENT GOAL 6: ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

Targets under SDG6 include:

6.3: *"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."*

The Dubai Declaration states, *"Progress in chemicals management has not, however, been sufficient globally and the environment worldwide continues to suffer from air, water and land contamination, impairing the health and welfare of millions."*[56]

In the SAICM Overarching Policy Strategy, three of the Risk Reduction objectives clearly relate to SDG6:

- *To give priority consideration to the application of preventive measures such as pollution prevention;*
- *To reduce the generation of hazardous waste, both in quantity and toxicity, and to ensure the environmentally sound management of hazardous waste, including its storage, treatment and disposal;*
- *To promote the environmentally sound recovery and recycling of hazardous materials and waste;*

At ICCM4, environmentally persistent pharmaceutical pollutants – an issue that relates primarily to water pollution – was adopted as a SAICM Emerging Policy Issue. In addition, in the SAICM Global Plan of Action, activity 203 is about evaluating pollutant releases to air, land, and water.

More generally, reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials is a centrally important aspect of the sound management of chemicals and wastes. It is also of central importance to the minimization of significant adverse impacts on the environment and human health associated with exposures to hazardous chemicals and wastes. SAICM Beyond 2020 can therefore further develop future SAICM initiatives and plans of action associated with SDG7.

SUSTAINABLE DEVELOPMENT GOAL 8: PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL

Targets under SDG8 include:

8.8: *"Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment."*

Workers are a key stakeholder in the Strategic Approach, as noted in the Overarching Policy Strategy and as indicated by trade union representation in the SAICM Bureau.

The SAICM Dubai Declaration notes that one of the reasons to take concerted action on toxic chemicals is, *"exposure of workers to harmful chemicals and concern about the long-term effects of chemicals on both human health and the environment."*[57]

Workers have an especially important need – often denied them – to have full access to information about the chemicals they use and about the hazards those chemicals pose. The SAICM Dubai Declaration states, "We stress the responsibility of industry to make available to stakeholders such data and information on health and environmental ef-

[53] Stockholm Convention preamble, http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

[54] Stockholm Convention Article 7, http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

[55] Stockholm Convention Article 10, http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

[56] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[57] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

fects of chemicals as are needed safely to use chemicals and the products made from them".[58]

The SAICM Overarching Policy Strategy takes up several topics related to establishing safe and secure working environments. A SAICM Overarching Policy Strategy Risk Reduction objective is, "To minimize the risks to human health, including that of workers, and to the environment throughout the lifecycle of chemicals." [59]

A SAICM Overarching Policy Strategy Governance objective is, "To promote and support meaningful and active participation by all sectors of civil society, particularly women, workers and indigenous communities, in regulatory and other decision-making processes that relate to chemical safety." [60]

The SAICM Overarching Policy Strategy also addresses access to information and, in fact, contains an entire section on Knowledge and Information Objectives. This includes, as an objective, to ensure, for all stakeholders, "That information on chemicals throughout their life cycle, including, where appropriate, chemicals in products, is available, accessible, user friendly, adequate and appropriate to the needs of all stakeholders. Appropriate types of information include their effects on human health and the environment, their intrinsic properties, their potential uses, their protective measures and regulation."

SAICM Overarching Policy Strategy Principles and Approaches state that in implementing the Strategic Approach, governments and other stakeholders should be guided by, inter alia, "ILO Convention No. 170 concerning safety in the use of chemicals at work."

The Executive Summary also states that under SAICM's risk reduction objective, work areas aimed at protecting human health and the environment would include the development of action plans to address priority concerns in relation to groups with specific vulnerabilities, including workers: "Occupational health and safety for workers would be promoted through measures such as the establishment of national inspection systems and implementation of adequate occupational health and safety standards to minimize workplace hazards from chemicals." [61]

The Executive Summary also states that central to the Strategic Approach's governance objectives would be measures to review national legislation in order to ratify and implement existing international agreements dealing with chemicals and hazardous wastes such as [inter alia] ... "the International Labour Organization conventions on the protection of workers." [62]

Under SAICM's Global Plan of Action:

Item 20 notes the need to, "protect workers from chemicals causing asbestosis, other asbestos related diseases and occupational cancers, those chemicals included in the Rotterdam Convention because of their occupational risks and other hazardous chemicals based on their occupational health risks." [63]

Item 147 stresses, "the importance of worker's right to know in all sectors (formal and informal), i.e., that the information provided to workers should be sufficient for them to protect their safety and health as well as the environment."[64]

SAICM Beyond 2020 can do much more than has been done in the past to promote initiatives aimed at ensuring safe and secure working environments for all workers. In some cases, these might be the promotion of workplace-focused activities on subjects that have already been identified as Emerging Policy Issues and Issues of Concern such as: highly hazardous pesticides; hazardous substances in electronics (aimed at preventing toxic exposures to workers both at the point of production and also during end-of-life waste management and recovery); nanotechnologies and nanomaterials; and chemicals in products.

SUSTAINABLE DEVELOPMENT GOAL 9: BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION

Targets under SDG9 include:

9.4: *"greater adoption of clean and environmentally sound technologies and industrial processes."*

The SAICM Dubai Declaration notes the need to develop, *"safer alternative products and processes, including*

[58] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[59] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[60] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[61] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[62] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[63] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[64] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

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non-chemical alternatives." [65] In its statement of needs, the SAICM agreement notes the need to develop, *"safer alternatives, including alternatives to chemicals of concern, and affordable sustainable technologies should be accelerated"* and that, *"Developing countries and countries with economies in transition need better access to affordable, safer technologies and alternatives, which will also assist in reducing illegal traffic in hazardous chemicals."*[66] The Statement of Needs also notes the need to strengthen capacities in developing and transition countries and to promote, *"adequate transfer of cleaner and safer technology to those countries."* [67] SAICM's Overarching Policy Strategy includes the need to promote *"cleaner production, informed substitution of chemicals of concern and non-chemical alternatives"* and undertake research to develop, *"safer chemicals and cleaner technologies and non-chemical alternatives and technologies."* [68] The Global Plan of Action has a series of items that are directed at cleaner production (43 – 46), and other relevant activities are identified in 57, 59, 70, and 78.

For more information on this topic and relevant SAICM issues, please see the IPEN paper, "Beyond 2020: Green chemistry and sustainable chemistry."

SUSTAINABLE DEVELOPMENT GOAL 11: MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

Targets under SDG11 include:

11.6: *"reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management."*

The SAICM Dubai Declaration notes that, *"Progress in chemicals management has not, however, been sufficient globally and the environment worldwide continues to suffer from air, water and land contamination, impairing the health and welfare of millions."*[69] Key risk reduction activities in SAICM are, *"pollution prevention, risk reduction, and risk elimination."*[70] SAICM risk reduction objectives also include reducing, *"the generation of hazardous waste, both in quantity and toxicity, and to ensure the environmentally sound management of hazardous waste, including its storage, treatment and disposal."*[71] Global Plan of Action items relevant to waste management, including zero waste, are outlined in items 68-73, 118, 121, 161-162, 169, 171-172, 187, 234, 258-262, and 272-273.

Note that zero waste is the approach most consistent with fulfillment of sustainable waste management objectives because it addresses sustainable resource management. Zero waste is defined as, *"a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health."*[72]

Key sources of air pollution in cities include transportation; power generation (including waste to energy); incineration, gasification, pyrolysis and co-incineration in cement kilns; industrial operations; and home heating using biomass or coal. In the SAICM framework, the priority approach for addressing these and other sources should be pollution prevention.

In addressing the issue of transport-related air pollution in cities, clean public transportation should be promoted. Insofar as private internal combustion vehicles remain in use, attention should be given to promoting cleaner fuels including electric, natural gas and hybrid vehicles – and eventually, hydrogen-fueled vehicles. An important topic for consideration is the sulfur content of diesel fuel. High sulfur fuels release sulfur oxides which act as precursors to the formation of PM2.5 and other particles that are released during diesel combustion. It is common for diesel

[65] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[66] UNEP - WHO (2006) Statement of needs, para 7 Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[67] UNEP - WHO (2006) Statement of needs, para 10 Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[68] UNEP - WHO (2006) Overarching policy strategy, para 14, 15 Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[69] UNEP - WHO (2006) Dubai Declaration, para 5, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[70] UNEP - WHO (2006) Overarching Policy Strategy para 14, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[71] UNEP - WHO (2006) Overarching Policy Strategy para 14, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[72] http://zwia.org/standards/zw-definition/

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fuels sold in developing countries to contain high levels of sulfur, which increases their contribution to air pollution.[73] A recent report reveals that international petrochemical companies exploit weak regulatory standards and sell diesel fuel in Africa that have as much as 378 times more sulfur than is permitted in Europe.[74] These fuels may also contain levels of benzene and PAHs that violate European standards.[75] Regulatory measures can also limit the amount of sulfur and toxic chemicals contained in petrol and can in other ways mandate cleaner-burning fuels. Another matter of concern to public health is the continuing use of lead in aviation fuel, contributing to airborne lead contamination that may adversely affect communities in the vicinity of airfields.

Efforts to control mercury releases from coal-fired power plants under the Minamata Convention provide co-benefits and reductions in other forms of air pollution. Shifting to combustion-free energy sources such as solar and wind is not only consistent with the Minamata Convention and the Framework Convention on Climate Change, but would also implement many elements of SAICM's Overarching Policy Strategy, including the promotion of *"cleaner production, informed substitution of chemicals of concern and non-chemical alternatives"* and undertaking research to develop, *"safer chemicals and cleaner technologies and non-chemical alternatives and technologies."* Many Global Plan of Action items are directed at industry responsibility to adopt more sustainable practices, including 11 – 23, 26, 30, 40, 43 – 46, 57, 59, 70, and 78.

Chemicals in products (including lead, mercury, many plastics and others) are examples of commonly burned materials in incinerators and for energy production that contribute to urban air pollution. The toxicity of chemicals used to manufacture many plastic products and packaging undermines the goal of recycling and has the potential to poison the circular economy. Furthermore, using plastic waste for energy, refuse-derived fuel or co-incineration in cement kilns and other industrial burners contributes to the toxicity of our environment and human health on a global scale. The global human health and environmental impacts of this problem are acutely and disproportionately felt in the Asia Pacific region, making a compelling and urgent argument for toxics elimination in plastic production and a ban on plastic waste burning technologies. SAICM has a key role in promoting safer chemicals policy through toxics reduction, elimination and substitution to avoid and ultimately eliminate the adverse toxic impacts embedded throughout the whole life cycle of plastic products and packaging from raw materials extraction, use and final disposal.

SUSTAINABLE DEVELOPMENT GOAL 12: ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

Targets under SDG12 include:

12.3: *"By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses."*

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

12.5: *"substantially reduce waste generation through prevention, reduction, recycling and reuse."*

12.6: *"Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle."*

12.7: *"Promote public procurement practices that are sustainable, in accordance with national policies and priorities."*

SDG12.4 is a paraphrase of the SAICM objective. In addition, SAICM's Overarching Policy Strategy highlights the need to, *"reduce the generation of hazardous waste, both in quantity and toxicity, and to ensure the environmentally sound management of hazardous waste, including its storage, treatment and disposal."*[76] SAICM also seeks to prevent illegal traffic of wastes. The SAICM Global Plan of Action has activities addressing waste prevention and minimization, waste reduction at source, and zero waste resource management. Many Global Plan of Action items

[73] UNEP (2005) Opening the door to cleaner vehicles in developing and transition countries: The role of lower sulphur fuels, Report of the Sulphur Working Group of the Partnership for Clean Fuels and Vehicles

[74] Public Eye (2016) Dirty Diesel: How Swiss traders flooded Africa with toxic fuels, https://www.publiceye.ch/fileadmin/files/documents/Rohstoffe/DirtyDiesel/PublicEye2016_DirtyDiesel_A-Public-Eye-Investigation.pdf

[75] Public Eye (2016) Dirty Diesel: How Swiss traders flooded Africa with toxic fuels, https://www.publiceye.ch/fileadmin/files/documents/Rohstoffe/DirtyDiesel/PublicEye2016_DirtyDiesel_A-Public-Eye-Investigation.pdf

[76] UNEP - WHO (2006) Overarching Policy Strategy para 14h, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

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are directed at wastes, including: 68 – 73, 118, 121 – 122, 161 – 161, 169, 171 – 172, 186 – 187, 234, 258 – 271, and 272 – 273.

Industry adoption of sustainable practices runs throughout the SAICM agreement. In its statement of needs, the SAICM agreement notes the need to develop, *"safer alternatives, including alternatives to chemicals of concern, and affordable sustainable technologies should be accelerated"* and that, *"Developing countries and countries with economies in transition need better access to affordable, safer technologies and alternatives, which will also assist in reducing illegal traffic in hazardous chemicals."*[77] SAICM's Overarching Policy Strategy includes the need to promote, *"cleaner production, informed substitution of chemicals of concern and non-chemical alternatives"* and undertake research to develop, *"safer chemicals and cleaner technologies and non-chemical alternatives and technologies."* [78] The SAICM Global Plan of Action calls for, *"Promoting alternatives in order to reduce and phase out highly toxic pesticides."* The Global Plan of Action items directed at industry's responsibility to adopt more sustainable practices include 11 – 23, 26, 30, 40, 43 – 46, 57, 59, 70, and 78.

The SAICM Global Plan of Action #26 also identifies the need to prioritize procurement of, *"least hazardous pest control measures and use best practices to avoid excessive or inappropriate supplies of chemicals."* An international workshop on hazardous chemicals in the lifecycle of electrical and electronic products mandated by ICCM also included the need for, *"green electrical and electronic product procurement initiatives"* and government procurement policies that that promote *"cleaner"* electrical and electronic equipment, *"being purchased and used whenever possible."*[79]

For further information on topics relevant to SAICM and this SDG please see IPEN papers, "Beyond 2020: Why SAICM is important" and "Beyond 2020: Raising the political priority of chemical safety."

SUSTAINABLE DEVELOPMENT GOAL 13: TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

Targets under SDG13 include:

13.1: *"Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries."*

In 2009, the Stockholm Convention's Global Monitoring Plan recognized the importance of climatic effects on POPs. The 4th Conference of the Parties of the Stockholm Convention subsequently mandated a study of the issue. In 2011, UNEP and the Arctic Monitoring and Assessment Programme (one of the Arctic Council's working groups) released a study of climate change and POPs. The report notes that climate change can increase both primary and secondary emissions of POPs and that the resulting increased exposure would, *"increase the risks related to their harmful effects."*[80] The report makes recommendations that are relevant to SAICM efforts, including cleanup of contaminated sites, improved waste management, and controls on e-waste export and dumping.

Sustainable agriculture also has clear links to climate change actions that are relevant to SAICM. Work on climate-resilient agriculture recommends integrated practices that include agroforestry and minimizing, *"the need for external inputs (e.g. energy, chemical fertilizers and pesticides)."*[81] The International Panel of Experts on Sustainable Food Systems (IPES-Food) also documents the need for a shift to agroecological systems, noting that, *"60% of the food consumed around the world comes from small-holder agriculture in developing countries where crop diversity is key for the resilience of farming systems."*[82]

SUSTAINABLE DEVELOPMENT GOAL 14: CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

Target under SDG14 includes:

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77 UNEP - WHO (2006) Statement of needs, para 7 Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

78 UNEP - WHO (2006) Overarching policy strategy, para 14, 15 Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

79 UNEP (2012) Report of the International workshop on hazardous substances within the life-cycle of electrical and electronic products, held in Vienna, from 29 to 31 March 2011, SAICM/ICCM.3/INF/24

80 UNEP/AMAP, 2011. Climate Change and POPs: Predicting the Impacts. Report of the UNEP/AMAP Expert Group. Secretariat of the Stockholm Convention, Geneva. 62 pp http://www.amap.no/documents/doc/climate-change-and-pops-predicting-the-impacts/753

81 http://www.fao.org/climate-smart-agriculture/knowledge/practices/integrated/en/

82 IPES-Food (2016) From uniformity to diversity: A paradigm shift from industrial agriculture to diversified agroecological systems. International Panel of Experts on Sustainable Food Systems http://www.ipes-food.org/images/Reports/UniformityToDiversity_FullReport.pdf

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."*

The SAICM Overarching Policy Strategy includes, *"pollution prevention, risk reduction, and risk elimination"* in its objectives, including by giving, *"priority consideration to the application of preventive measures such as pollution prevention."*[83] The Global Plan of Action includes government activities to address pollution prevention (Items 46 and 73) and marine ecosystem management (Item 120). One key aspect of marine pollution addressed by the Minamata Convention and SAICM is mercury pollution. The SAICM Global Plan of action includes reduction of risks posed to human health and the environment from mercury (Items 57 – 60). The Minamata Convention recognizes, *"that mercury is a chemical of global concern owing to its long-range atmospheric transport, its persistence in the environment once anthropogenically introduced, its ability to bioaccumulate in ecosystems and its significant negative effects on human health and the environment."*[84] The Convention, recognizes, *"the substantial lessons of Minamata Disease, in particular the serious health and environmental effects resulting from the mercury pollution, and the need to ensure proper management of mercury and the prevention of such events in the future."* [85]

Fresh fish may contain disturbingly high levels of mercury, POPs, and other harmful substances. In the Pacific Small Island Developing States (SIDS), it is common for the ocean's natural resources to be harvested by distant nation fishing vessels (which sometimes benefit from state-subsidized fuel) under bilateral agreements. Such bilateral agreements often permit unsustainable fishing practices (such as purse-seining) that are not permitted in the home country. Because of the high price obtained for fresh fish on the international market, increasing amounts are exported to developed countries (for example EU, Japan, US) while SIDs and coastal populations subsist largely on canned fish because it is more affordable. The irony is that the populations in developed countries that are responsible for industrial pollution (including mercury emissions from coal-fired power plants) may be exposing themselves to mercury and other pollutants transferred by long-range transport to the global oceans by consumption of imported fish.

Deep sea mining is also raising concerns about damage to the marine environment. Harvesting polymetallic nodules will not only result in a potentially damaging plume, but also, wastewater produced by "de-watering" can adversely impact marine ecosystems. Countries avoid surveillance by the International Seabed Authority by seeking bilateral agreements with Pacific Island governments. Damage to ecosystems should be part of the true cost estimation for this activity.

Plastics are another key type of marine pollution. UN Environment has identified plastic marine pollution (and particularly microplastics) as a major global environmental threat.[86] The Asia Pacific region has been identified as a major region leaking plastic waste into our ocean, with estimates suggesting that there will be more plastic in our oceans than fish by 2050.[87] Plastics in the marine environment, particularly microplastics, concentrate toxic pesticides and other industrial chemicals at much higher levels than in surrounding waters. Microplastics are readily ingested by marine organisms and therefore also pose a hazard to human health because they could be a significant route of exposure to endocrine-disrupting and carcinogenic chemicals.[88] SAICM has a key role in promoting safer chemicals policy through toxics reduction, elimination and substitution to avoid and ultimately eliminate the adverse toxic impacts embedded throughout the whole life cycle of plastic products and packaging from raw materials extraction, use and final disposal. The toxicity of chemicals used to manufacture many plastic products and packaging undermines the goal of recycling and has the potential to poison the circular economy. Furthermore, using plastic waste for energy, RDF or co-incineration in cement kilns and other industrial burners contributes to the toxicity of our environment and human health on a global scale. The global human health and environmental impacts of this problem are acutely and disproportionately felt in the Asia Pacific region, making a compelling and urgent argument for toxics elimination in plastic production and a ban on plastic waste burning technologies.

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[83] UNEP - WHO (2006) Overarching policy strategy, para 14, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[84] Minamata Convention http://mercuryconvention.org/Convention/tabid/3426/Default.aspx

[85] Minamata Convention http://mercuryconvention.org/Convention/tabid/3426/Default.aspx

[86] UNEP (2016) Marine Plastic Debris and microplastics. Global lessons and research to inspire action and guide policy change. http://www.unep.org/about/sgb/Portals/50153/UNEA/Marine%20Plastic%20Debris%20and%20Microplastic%20Technical%20Report%20Advance%20Copy.pdf

[87] Ellen MacArthur Foundation (2016) The New Plastics Economy: Rethinking the New Plastics Economy.

[88] https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics

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SUSTAINABLE DEVELOPMENT GOAL 15: PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

Targets under SDG15 include:

15.1: *"By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements."*

15.2: *"By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally."*

15.3: *"By 2030, combat desertification, restore degraded land and soil..."*

15.5: *"Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species."*

15.9: *"By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts."*

This SDG is relevant to harms to human health and the environment posed by contaminated sites and overall chemicals and wastes pollution on land – a significant issue in many countries. Ocean ecosystems are also profoundly impacted by land-based activities that result in pollution. For Pacific SIDS and many other developing countries, poor waste management has resulted in historical dumping of imported goods that contain toxic components (including e-waste) that have become hazardous wastes when discarded. Because of their porous geology, the resulting leachate from old dumps is a significant issue for SIDS because they leach into the waterways and into the surrounding lagoons and oceans. Persistent toxic substances in these leachates are taken up by the marine life, which provides ready food for subsistence fishermen. Ecosystem sampling is required so that policymakers and decision-makers can confidently formulate policies for the benefit of their populations, and to take actions to reduce exposure to toxics by implementing sustainable management of both solid wastes and sanitation.

One of the SAICM Global Plan of Action priority areas is, *"Promoting the remediation of contaminated sites,"* and GPA items 47, 48, and 243 concern identification and remediation of contaminated sites to reduce potential harms to the public and the environment. Both the Stockholm and Minamata Conventions require governments to endeavor to develop appropriate strategies for identifying contaminated sites and insure their management is performed in a manner protective of human health and the environment.

The forestry components of this SDG are also relevant to SAICM. FAO has noted the importance of agroforestry systems and the importance of managing soil nutrients to reduce fertilizer use.[89] FAO also notes the role of agroforestry in, *"providing shelter to natural enemies and making use of crops and trees' complementary pest resistance mechanisms, agroforestry reduces the need for pesticides."* [90]

SUSTAINABLE DEVELOPMENT GOAL 16: PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS

Targets under SDG16 include:

16.7: *"Ensure responsive, inclusive, participatory and representative decision-making at all levels."*

16.10: *"Ensure public access to information..."*

A key objective of the SAICM Overarching Policy Strategy is the involvement of all stakeholders at the local, regional, and global levels, *"and public participation in decision-making, featuring in particular a strengthened role for women."*[91] The agreement notes that *"knowledge, information, and public awareness are basic needs for decision-making for the sound management of chemicals..."*[92] The SAICM agreement notes the need to improve participatory decision-making, noting, *"That in many countries some stakeholders, particularly women and indigenous communities, still do not participate in all aspects of decision-making related to the sound management*

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89 http://www.fao.org/forestry/agroforestry/89999/en/

90 http://www.fao.org/forestry/agroforestry/89999/en/

91 UNEP - WHO (2006) Overarching Policy Strategy para 2, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

92 UNEP - WHO (2006) Overarching Policy Strategy para 8, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

of chemicals, a situation which needs to be addressed" [93] A key SAICM Governance objective is, *"To promote and support meaningful and active participation by all sectors of civil society, particularly women, workers and indigenous communities, in regulatory and other decision-making processes that relate to chemical safety"* and, *"To ensure equal participation of women in decision-making on chemicals policy and management."* [94]

The Stockholm Convention underlines the importance of manufacturers to, *"take responsibility for reducing adverse effects caused by their products and for providing information to users, Governments, and the public on the hazardous properties of those chemicals."*[95] Article 9 of the treaty states that, *"For the purposes of this Convention, information on health and safety of humans and the environment shall not be regarded as confidential."*[96] The Stockholm Convention obligates Parties, within their capabilities, to promote and facilitate, *"Provision to the public of all available information on persistent organic*

pollutants" and, *"Development and implementation, especially for women, children and the least educated, of educational and public awareness programmes on persistent organic pollutants, as well as on their health and environmental effects and on their alternatives."*[97] The Minamata Convention clearly states that, *"For the purposes of this Convention, information on the health and safety of humans and the environment shall not be regarded as confidential."*[98] The SAICM Dubai Declaration notes the, *"responsibility of industry to make available to stakeholders such data and information on health and environmental effects of chemicals"* and commits to, *"facilitate public access to appropriate information and knowledge on chemicals throughout their life cycle, including the risks that they pose to human health and the environment."* [99] SAICIM reinforces the chemical safety principle that, *"information on chemicals relating to the health and safety of humans and the environment should not be regarded as confidential."*[100] SAICM's statement of needs notes that, *"There is often limited or no information on many chemicals currently in use and often limited or no access to information that already exists"* and states that, *"Knowledge, information and public awareness are basic needs for decision-making for the sound management of chemicals, including products and articles containing chemicals."*[101]

SUSTAINABLE DEVELOPMENT GOAL 17. STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT

Targets under SDG17 include:

17.2: *"Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries."*

17.3: *"Mobilize additional financial resources for developing countries from multiple sources."*

Financial considerations are a key part of ensuring that developing and transition countries can meet their obligations under chemicals agreements – and this connects financial resources directly to fulfillment of the relevant SDGs. The SAICM Overarching Policy Strategy that was adopted in 2006 acknowledged that access to considerable financial and other resources will be needed to achieve the sound management of chemicals.[102] However, these funds never materialized on a scale commensurate with the need.

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93 UNEP - WHO (2006) Overarching Policy Strategy para 9, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

94 UNEP - WHO (2006) Overarching Policy Strategy para 16, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

95 Stockholm Convention preamble, http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

96 Stockholm Convention Article 9 para 5, http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

97 Stockholm Convention Article 10 http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

98 Minamata Convention, Article 17, http://mercuryconvention.org/Convention/tabid/3426/Default.aspx

99 UNEP - WHO (2006) Dubai Declaration para 20, 21, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

100 UNEP - WHO (2006) Dubai Declaration para 22, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

101 UNEP - WHO (2006) Statement of Needs, para 6, 8, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

102 UNEP, Strategic Approach to International Chemicals Management: SAICM texts and resolutions of the International Conference on Chemicals Management, 2006, p21: http://www.saicm.org/images/saicm_documents/saicm%20texts/SAICM_publication_ENG.pdf

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Substantial new and additional funds will be required for full and robust implementation of SAICM and relevant SDGs in the world's developing and transition countries. The measures to be implemented must be sustained on a continuing basis. Therefore, revenue flows to support national chemicals management programs and infrastructures must also be long-term and sustainable. A realistic approach to mobilizing resources on the scale needed for robust SAICM implementation must be developed.

UN Environment developed an integrated approach to financing sound management of chemicals and wastes that includes some elements that could be developed further. However, this has not yet provided a large influx of financial support for SAICM implementation. Donor government delegates at SAICM preparatory meetings raised expectations that international development assistance agencies would provide substantial funding for SAICM implementation. This has not yet occurred on a significant scale and needs to be further pursued.

Industry involvement is vaguely defined in the integrated approach but several aspects are noted, including fines, cost recovery measures, and tax rebates as incentives. One objective is to shift government costs of chemicals management to producers and importers that benefit from these services provided by the government. Three key aspects noted in the integrated approach are command and control, economic instruments (such as cost recovery), and voluntary agreements. Overall, the key to securing sustainable funding for chemical safety is the internalization of costs within relevant producer industries. This is because the money needed to assure that chemicals are safely managed is, ultimately, the responsibility of chemical producing industries.

For further information on topics relevant to SAICM and this SDG please see the IPEN paper, "Beyond 2020: Financing chemical safety."

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BEYOND 2020: FINANCING CHEMICAL SAFETY

IPEN

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INTRODUCTION

The Strategic Approach to International Chemicals Management (SAICM) addresses significant health and environmental harms caused by chemical exposure and makes a global political commitment to reform how chemicals are produced and used in order to minimize those harms. Heads of State at the 2002 World Summit on Sustainable Development in Johannesburg called for the development of SAICM. While the agreement is not legally binding, its basic texts represent a consensus of Environment Ministers, Health Ministers and other delegates from more than one hundred governments who attended the first International Conference on Chemicals Management (ICCM1), held in Dubai, February 2006.

The SAICM Overarching Policy Strategy that was adopted in 2006 acknowledged that access to considerable financial and other resources will be needed to achieve the sound management of chemicals.[103] However, these funds never materialized on a scale commensurate with the need.

Substantial new and additional funds for the implementation of SAICM will be needed for a sincere global effort to achieve SAICM's goals and relevant SDGs, in particular in the world's developing and transition countries. The ultimate objective is to ensure that the costs of sound chemicals management are internalized by producing industries but this will require substantial efforts to reform legal and governance mechanisms and the measures to be implemented must be sustained on a continuing basis. Revenue flows to support national chemicals management programs and infrastructures must also be long-term and sustainable. A realistic approach to mobilizing sustainable and predictable resources on the scale needed for robust SAICM implementation must be developed.

[103] UNEP (2006) Strategic Approach to International Chemicals Management: SAICM texts and resolutions of the International Conference on Chemicals Management, p21: http://www.saicm.org/images/saicm_documents/saicm%20texts/SAICM_publication_ENG.pdf

FUNDING FOR SAICM IMPLEMENTATION IS LACKING

Overall, SAICM funding has not been adequate or predictable:

- Donor government delegates at SAICM preparatory meetings raised expectations that international development assistance agencies would provide substantial funding for SAICM implementation. This has not yet occurred on a significant scale and needs to be further pursued.
- Though a modest and limited SAICM Quick-Start funding program was established and successful, the program was time-limited and focused on enabling activities. No substantial and sustainable program for mobilizing the necessary implementation resources followed.
- Some funds for SAICM implementation were included in the portfolio of the Global Environment Facility during its fifth and sixth replenishments.[104] This is welcome. However, the amount allocated was very small compared to the need.[105]
- UNEP developed an integrated approach to financing sound management of chemicals and wastes that includes some elements that could be developed further. However, this has not yet provided a large influx of financial support for SAICM implementation.
- A Special Programme to support institutional strengthening at the national level has been established. This too is welcome, but it is limited in scope and time and specifically diverges from SAICM's multi-stakeholder approach by being open solely to government stakeholders.

THE INTEGRATED APPROACH

In 2013, the UNEP Governing Council approved an integrated approach to address the financing of chemicals management.[106] The integrated approach includes three components: mainstreaming chemical safety into development planning, industry involvement, and dedicated external financing.

[104] $4.43 billion USD for the GEF-6 period, of which $554 million USD is programmed under the chemicals and waste focal area (12.5%); $1.35 billion USD for climate (28%); and $1.2 billion for biodiversity (29%).

[105] Breakdown is as follows: POPs $375 million USD; Mercury $141 million USD; SAICM $13 million USD; and ODS $25 million USD; GEF6 Programming Directions; https://www.thegef.org/gef/replenishment_docs/1043/40

[106] UNEP (2013) VIII. Consultative process on financing options for chemicals and wastes, Proceedings of the governing council/global ministerial environment forum at its first universal session, UNEP/GC.27/17

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Mainstreaming

The mainstreaming component is designed to integrate sound chemicals management into national budgets, sector and development plans for agriculture, health, environment, water, transport, industry, trade, energy, mining, and other sectors. Ultimately, the goal is to articulate chemicals and waste management priorities in country assistance plans and strategies. Ideally, this would allow national and international financing to be directed into sound chemicals management.

Industry involvement

This is vaguely defined in the integrated approach but several aspects are noted, including fines, cost recovery measures, and tax rebates as incentives. One objective is to shift government costs of chemicals management to producers and importers that benefit from these services provided by the government. Three key aspects noted in the integrated approach are command and control, economic instruments (such as cost recovery), and voluntary agreements.

Dedicated external financing

The integrated approach lists three components of dedicated external financing: institutional strengthening, Global Environment Facility (GEF) funding under the integrated chemicals and wastes focal area, and the Special Program Fund for Chemicals and Wastes. An additional source of funding should be international development assistance agencies.

Institutional strengthening means strengthening or establishing institutional structures to address chemical safety implementation. The Integrated Approach notes that this could include funding of chemical units.

The GEF funding refers to the widened scope of the integrated chemicals and wastes focal area. However, external financing of the chemicals agenda through GEF financing is underfunded. In GEF6, chemicals and wastes only represent 12.5% of the portfolio.[107] A total of $554 million USD is programmed under the chemicals and waste focal area, with allocations as follows: POPs $375 million USD; Mercury $141 million USD; SAICM $13 million USD; and Ozone Depleting Susbstances $25 million USD.[108] The increase in funding over GEF5 is primarily earmarked for mercury. SAICM, which has the broadest mandate, has the smallest allocation.

The Special Programme Fund was not clearly outlined in the Integrated Approach, but has since evolved.[109] The Programme is time-limited and only applicable to activities that fall outside the GEF's mandate. Unlike the GEF, the Special Programme only funds government initiatives.

Donor government development assistance agencies should be funding sound chemicals management and SAICM in particular, due to inherent links between sound chemicals management and sustainable development. As noted by UNEP, *"the economic development assistance agenda has not necessarily kept pace with these changes in the global distribution of chemical-intensive activities. Chemicals management is usually not included either in development assistance packages, or in recipient countries' aid requests. Consultations by UNEP with donor countries reveal a pattern of treating chemical management problems on a case-by-case basis, rather than integrating them into broader environment and development agenda. Factors contributing to this pattern include a lack of awareness of the risks posed by poorly-managed chemicals and waste, and lack of coordination among national institutions regulating chemical use and disposal."*[110]

EXAMPLES OF THE CHEMICAL INDUSTRY'S EXTERNALIZED COSTS

The harms associated with hazardous chemicals represent costs that are externalized by the industry onto the public and the environment. As noted by UNEP, *"The vast majority of human health costs linked to chemicals production, consumption and disposal are not borne by chemicals producers, or shared down the value-chain. Uncompensated harms to human health and the environment are market failures that need correction."*[111] The magnitude of the costs externalized by the chemical industry is enormous. Conservative estimates of some of these externalized costs include:

- USD$90 billion for health-related pesticide costs in Sub-Saharan Africa from 2005 – 2020. As a means of comparison, the entire 2009 Overseas Development Assistance to the health sector in Africa was US$4.8

[107] $4.43 billion USD for the GEF-6 period, of which $554 million USD is programmed under the chemicals and waste focal area (12.5%); $1.35 billion USD for climate (28%); and $1.2 billion for biodiversity (29%).

[108] GEF6 Programming Directions; https://www.thegef.org/gef/replenishment_docs/1043/40

[109] http://www.unep.org/chemicalsandwaste/SpecialProgramme

[110] UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

[111] UNEP (20122013) Global Chemicals Outlook: – *Towards the sound management of chemicals, p 118, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE*

billion – a fraction of the health-related costs due to pesticides alone.[112]

- €157 billion as a median annual health cost for diseases associated with endocrine disrupting chemicals in the European Union. The diseases include IQ loss and associated intellectual disability, autism, attention-deficit hyperactivity disorder, childhood obesity, adult obesity, adult diabetes, cryptorchidism, male infertility, and mortality associated with reduced testosterone. The authors noted that this estimate was conservative as it represented only those EDCs with the highest probability of causation and a broader analysis would have produced greater estimates of burden of disease and accompanying costs.[113]
- USD$236 billion annual costs for pollution associated with the production and use of volatile organic compounds. This is an underestimate as it excludes damage to most natural resources as well as water pollution and land use change and waste in non-OECD countries.[114]
- USD$977 billion annual costs related to childhood lead exposure in low- and middle-income countries. This figure represents 1.20% of global GDP in 2011. The authors note that the largest burden of lead exposure is now borne by low- and middle-income countries.[115]

None of these figures reflect the full magnitude of human suffering or damage to ecosystems.

INTERNALIZATION OF COSTS

The amount of new and additional funds that developing and transition country governments will need if they are to successfully establish and operate effective chemical safety policies, consistent with achieving the SAICM goal, is on a scale substantially beyond what donor governments have so far been willing and able to provide. New sources of funding are therefore needed to enable governments of developing and transition countries to protect their public's health and environment from injuries associated with exposures to toxic chemicals and wastes.

The key to securing sustainable funding for chemical safety is the internalization of costs within relevant producer industries. The starting point for the SAICM is the recognition that adverse effects ("damage") associated with the production and use of chemicals presently exists and need to be addressed. Chemicals-producing industries—merely by producing chemicals—create the fundamental conditions that lead to such damage. Therefore, a practical approach would be to designate chemicals-producing industries as the "polluter," based on the argument that this is the most economically and administratively efficient choice, as outlined by the EU in a 2002 OECD report.[116]

The costs of government management of chemicals and wastes are externalities

When chemicals are produced, or used in a country, it is an obligation of the government to ensure that the public's health and the environment are not harmed as a result of chemical exposure or chemical accidents. The costs governments incur in fulfilling this obligation are economic externalities that arise as a result of economic decisions by industry to manufacture and to use chemicals. According to the Polluter Pays Principle,[117] and according to sound economic policy, such external costs should not be borne by the general taxpayer, by the general national treasury, or by any other third party. Rather, appropriate economic instruments should be developed that effectively internalize such costs within the relevant industries in ways that do not distort international trade and investment. As noted above, *"The vast majority of human health costs linked to chemicals production, consumption and disposal are not borne by chemicals producers, or shared down the value-chain. Uncompensated harms to human health and the environment are market failures that need correction."*[118]

Many countries start out with significant legacy issues. They are burdened with obsolete stocks of chemicals and pesticides; contaminated soils, sediments and sites; and other costly legacies for which no responsible party with sufficient remedial capabilities or attachable assets has or can be identified. The protection of public health and the

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[112] UNEP (20122013) Global Chemicals Outlook: – *Towards the sound management of chemicals, p 99, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE*

[113] Trasande L, Zoeller RT, Hass U, Kortenkamp A, Grandjean P, Myers JP, DiGangi J, Bellanger M, Hauser R, Legler J, Skakkebaek NE, Heindel JJ (2015) *Estimating Burden and Disease Costs of Exposure to Endocrine-Disrupting Chemicals in the European Union*, J ClinEndocrinolMetab 100: 1245 – 1255 doi: 10.1210/jc.2014-4324

[114] UNEP (2013) Costs of inaction on the sound management of chemicals; p 11, Job numbe DTI/1551/G

[115] Attina TM, Trasande L (2013) *Economic costs of childhood lead exposure in low- and middle-income countries, Environ Health Perspect 121: 1097-1102 doi:* 10.1289/ehp.1206424

[116] OECD (2002) The polluter-pays principle as it relates to international trade, Joint Working Party on Trade and Environment, JT00137174 http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=com/env/td(2001)44/final

[117] See Rio Declaration on Environment and Development, Principle 16, adopted by the 1992 United Nations Conference on Environment and Development, http://www.unep.org/Documents/Default.asp?DocumentID=78&ArticleID=1163

[118] UNEP (2012) *Global Chemicals Outlook: Towards the sound management of chemicals, p 118, ISBN 978-92-807-3320-4*

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environment must encompass a plan under which these legacy issues are satisfactorily addressed.

Governments require substantial chemicals management capabilities and infrastructure in order to effectively implement, promote, and enforce sound chemicals management laws, policies and regulations. Additionally, governments need enhanced capability so that they can effectively promote clean technology transfer, cleaner production, safe and sustainable agricultural practices, safer substitutes (including non-chemical ones) to replace production and use of hazardous chemicals and materials, and other similar reforms. With these government capabilities appropriately in place, harm can be prevented and future toxic legacies can be avoided. In their absence, especially in many developing and transition countries, there is a high likelihood of continuing practices that poison children, workers and farmers, pollute communities, and disrupt ecosystems through chemical exposures and chemical accidents, further hindering development processes of those countries who need it the most.

A small levy on the chemical industry would produce appropriate levels of funding

Chemicals-producing industries acknowledge that they bear responsibility for costs associated with their normal operations: procedures for operational safety, product stewardship, development of safer alternatives and so on. Downstream-user industries assume (or should assume) similar costs. However, purely voluntary measures have not been and will not be sufficient to achieve SAICM's goals.

The global chemical industry has an annual turn-over of approximately USD $4.1 trillion per year (trillion = thousand billion).[119] If, for example, a global cost recovery scheme recovers USD $4.1 billion annually,[120] the total burden on the chemical producing industry would come to 0.1% of the industry's annual turnover – one cent (USD $.01) for each ten dollars (USD $10.00) in sales.

This cost is so small relative to the total turnover of the chemical industry that it should not be reflected in the price of products to the end-user. The aggregate costs of daily fluxes in the price of petroleum and other raw materials are huge compared to the amount a producer might need to pay annually in this kind of a cost-recovery scheme.

On the other hand, USD $4.1 billion per year is considerably more than what donor governments would likely make available in grant aid for chemicals management efforts. It is also considerably more than governments of developing and transition countries can mobilize under present conditions.

Global approach to cost internalization

A global approach to cost internalization has several advantages. Given the transnational nature of the chemicals industry and its markets, purely national approaches to cost-recovery could be difficult, even for large, highly industrialized countries. Most developing and transition countries would find the burden of establishing a unique national approach overwhelming. A purely national approach could also lead to economic retaliation and/or distortions in international trade and investment.

Besides contributing to efficiency and consistency, a global approach may provide other benefits. Some substantial costs to governments for sound chemicals management are associated with chemicals that are not produced in the country and not directly imported. Instead, the chemical may be present in imported products and released to the environment when the product is used and/or after it has become a waste. Such chemicals may be of substantial volume, and measures to assure they do not harm health and the environment may be costly. However, a purely national cost recovery system would likely be unable to recover these costs.

Finally, some Least Developed Countries (LDCs) may have great needs, but national cost-recovery could not be reasonably expected to generate sufficient revenues. For these and other reasons, a global approach would be preferred.

Overall, the key to securing sustainable funding for chemical safety is the internalization of costs within relevant producer industries. This is because the money needed to assure that chemicals are safely managed is, ultimately, the responsibility of chemical producing industries, in line with Rio Principle 16.

OUTCOMES FOR FINANCING CHEMICAL SAFETY

1. ICCM designs and implements a specific SAICM implementation financial mechanism with sufficient, predictable funds that can be accessed by all relevant SAICM stakeholders.
2. ICCM supplements the Special Programme to enable access by all relevant SAICM stakeholders.

[119] United Nations Environment Programme (2012) Global Chemicals Outlook

[120] See http://www.oecdwash.org/DATA/DOCS/env_outlook_chem_industry.pdf

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3. Donor government development assistance agencies substantially increase visibility and financial support for chemical safety by 2022, particularly because SAICM links sound chemicals management to sustainable development and will develop measurable objectives in support of Agenda 2030.
4. A SAICM clearing house mechanism publicly tracks development aid for sound chemicals management by 2022.
5. UN Environment executes a study by 2023 on how to implement marketbased instruments to internalize within relevant industries the cost to governments of implementing robust programs for sound chemicals management, with an appropriate share of the funds generated directed to assist chemical safety activities in developing countries and countries with economies in transition. The study should include input and review by governmental and stakeholder experts and give serious consideration to common global or regional approaches or instruments that avoid distortions in international trade and investment, consistent with Rio Principle 16.
6. The SAICM Secretariat uses the UN Environment cost internalization report and other relevant materials to provide legal and policy training on global and regional cost internalization approaches back to back with SAICM regional meetings, which include the participation of appropriate government staff from countries responsible for developing and executing these types of laws.
7. UN Environment uses the cost internalization report and other relevant materials to initiate a multi-stakeholder process to develop a global cost internalization program within the SAICM process, finalized by 2028.

12 PROGRAM INITIATIVES WITH MEASURABLE OBJECTIVES TO CONTRIBUTE TO ACHIEVING AGENDA 2030[121]

Beyond 2020 objectives should be clearly measurable with adequate quantitative and qualitative indicators that facilitate a running assessment of the SAICM successes and challenges. Each initiative below will produce meaningful real world outcomes as highlighted in their clearly measurable objectives. These objectives should be used to develop meaningful indicators and plans of action.

1. Lead in paint

Relevant SDG(s): 3, 16

The Global Alliance to Eliminate Lead Paint is successfully encouraging companies to stop manufacturing and selling lead paints, encouraging governments to enact regulatory controls, and providing tools to stakeholders to achieve actual change on the ground. Substantial measurable reductions in the manufacture and sales of lead paints have already been achieved and more can be anticipated. These primary prevention achievements translate easily into measurable reductions in lead exposures of future generations, and these in turn, translate into reduced incidents of mental impairments, cardiovascular disease and other non-communicable diseases.

Key measurable objectives

1. By 2020, analytical data on lead in paint from 80 developing and transition countries is publicly available as a contribution to enable all countries to: 1) Establish effective legally-binding regulatory controls by 2022 on lead decorative paints and lead paints for other applications most likely to contribute to children's lead exposure; and 2) Establish effective, legally-binding regulatory controls by 2027 prohibiting the use of lead in paint, varnishes, stains, enamels, glazes, primers or other coatings.
2. By 2025, publicly available monitoring of lead content of paint on the market shows that no new decorative paint or paints for other applications most likely to contribute to childhood lead exposure are being sold.
3. By 2027, strategies and guidance on safe management of legacy lead paint have been developed and made publicly available.
4. By 2030, publicly available monitoring shows that no varnishes, lacquers, stains, enamels, glazes, primers or coatings that are being produced, sold, exported, imported or used for any purpose contain lead.

2. Highly hazardous pesticides

Relevant SDG(s): 2, 3, 8

The Dubai Declaration notes that one of the key reasons for taking concerted action on chemical safety concerns is the *"dependency on pesticides in agriculture."*[122] In 2015, the ICCM4 adopted Resolution IV/3 establishing Highly

[121] For a more comprehensive list of objectives outlining chemical safety contributions to achieving relevant Sustainable Development Goals, please see Annex 1.

[122] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

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Hazardous Pesticides (HHPs) as a SAICM Issue of Global Concern.[123] Delegates recognized, *"that highly hazardous pesticides cause adverse human health and environmental effects in many countries, particularly in low-income and middle-income countries"* and agreed to take concerted efforts to implement a strategy developed by FAO, UNEP, and WHO. Delegates further indicated that this should be done, *"with emphasis on promoting agroecologically based alternatives."* FAO and WHO have developed technical criteria to define HHPs and the Pesticide Action Network International has also contributed additional criteria to define them.[124] SAICM Beyond 2020 can contribute to Agenda 2030 by developing a plan of action to implement this FAO, UNEP, WHO strategy with the aim of increasing the agricultural productivity and incomes of small-scale food producers while at the same time achieving significant measurable reductions in human and environmental exposures to HHPs through implementation of agroecology.

Key measurable objectives:

1. Identify and make publicly available, environmental and health information on 50 pesticides that should be classified as highly hazardous under the conditions of their ordinary use in 75 developing and transition countries by 2025; 150 countries by 2030.
2. Provide guidance on safer alternatives to HHPs with priority to non-chemical alternatives and ecosystem approaches to sustainable food and fiber production to 50 countries by 2025; 150 countries by 2030.
3. Phase out the manufacture, import, sale and use of 20 highly hazardous pesticides in 50 countries by 2025;150 countries by 2030.
4. By 2030, provide assistance to 1,000,000 farmers in 100 countries to enable them to discontinue the use of highly hazardous pesticides while maintaining their agricultural livelihood.

3. Chemicals in products

Relevant SDG(s): 3, 8, 16

The SAICM Dubai Declaration states, *"We stress the responsibility of industry to make available to stakeholders such data and information on health and environmental effects of chemicals as are needed safely to use chemicals and the products made from them"* [125] An objective of the SAICM Overarching Policy Strategy is, *"That information on chemicals throughout their life cycle, including, where appropriate, chemicals in products, is available, accessible, user friendly, adequate and appropriate to the needs of all stakeholders. Appropriate types of information include their effects on human health and the environment, their intrinsic properties, their potential uses, their protective measures and regulation."*[126] SAICM Beyond 2020 should advance information about chemicals in products through private sector implementation of the agreed chemicals in products programme, monitoring, and by addressing the issue at its source with comprehensive information about chemicals in commerce. Note that a number of lists of chemicals of concern could be useful for further efforts on this topic, including the Substitute It Now (SIN) list[127] and lists and monitoring results performed by the Danish Consumer Council,[128] among others.

Key measurable objectives:

1. Monitor 50 chemicals of concern129 in consumer products in 75 countries with publicly available results completed by 2025.
2. By 2030, private sector implements the SAICM chemicals in products programme in 150 countries.
3. Private sector publicly provides comprehensive information on adverse effects for all chemicals in commerce by 2030, including mutagenicity, carcinogenicity and adverse effects on the reproductive, developmental, endocrine, immune and nervous systems.

4. Hazardous substances within the lifecycle of electrical and electronic products

Relevant SDG(s): 3, 8, 12

This SAICM emerging policy issue covers design, production and use, and end of life aspects of hazardous chemicals in electrical and electronic products. The issue has focused primarily on electronic waste so far and SAICM

[123] UNEP (2015) IV/3 Highly hazardous Pesticides, Report of the International Conference on Chemicals Management on the work of its fourth session, SAICM/ICCM.4/15

[124] See PAN International list of HHPs, December 2016, in http://pan-international.org/resources/

[125] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[126] UNEP - WHO (2006) Overarching Policy Strategy para 7, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[127] http://chemsec.org/business-tool/sin-list/

[128] http://kemi.taenk.dk/english

[129] Groups of chemicals that might be prioritized include persistent, bioaccumulative and toxic substances (PTS); very persistent and very bioaccumulative substances; chemicals that are carcinogens or mutagens or that adversely affect, inter alia, the reproductive, endocrine, immune or nervous systems; persistent organic pollutants (POPs), mercury and other chemicals of global concern; chemicals produced or used in high volumes; chemicals subject to wide dispersive uses; and other chemicals of concern at the national level. SAICM Overarching Policy Strategy para 9.

Beyond 2020 should turn its attention to the design and production parts of the lifecycle. Few SAICM issues are as pertinent to the public as this one and more attention and work should be conducted to advance recommendations made by the international workshop mandated by ICCM on hazardous substances within the life cycle of electrical and electronic products, hosted by UNIDO and held in Vienna on 29–31 March 2011.

Key measurable objectives:

1. By 2025, assess implementation of the 2011 Vienna recommendations on hazardous substances within the lifecycle of electrical and electronic products in 20 countries designing and/or producing electrical and electronic equipment.
2. By 2025, develop and publicly disseminate a list of chemicals of concern to human health and the environment used in electronics production and products.
3. By 2030, 50 countries enact meaningful right to know regulations for workers producing electrical and electronic equipment, including sub-contractors.

5. Endocrine disrupting chemicals (EDCs)

Relevant SDG(s): 3, 16

EDCs are a global and ubiquitous problem. Exposure occurs at home, in the office, on the farm, in the air we breathe, the food we eat, and the water we drink. Despite this widespread exposure, information about EDCs is lacking and difficult to access in developing and transition countries. Regulators cannot identify which substances are EDCs, their presence in media, food, products, etc. is unknown, and in many countries these substances are unregulated. The UNEP / WHO State of the Science report on EDCs outlines the current scientific information and effects on human health and recommends improved testing and reduced exposure.[130]

Key measurable objectives:

1. By 2020, UN Environment assembles a list(s) of endocrine disrupting chemicals (EDCs) and potential EDCs and sources of exposure from the UNEP/WHO State of the Science report and other sources and makes it publicly available on its website.
2. By 2025, conduct monitoring studies of EDCs in 4 – 6 developing and transition countries in four UN regions for a total of 16 – 24 countries.
3. By 2030, monitoring and research results are translated into EDC control actions in 5 developed countries and 3 developing and transition countries in 4 UN regions for a total of 17 countries.

6. Nanotechnologies and manufactured nanomaterials

Relevant SDG(s): 3, 16

Among other items, nanomaterials are present in food, cosmetics, household appliances, computers, mobile phones, pharmaceuticals, textiles, ceramics, construction materials, sports equipment, and military weapons, although no publicly available inventory of nanomaterials in products exists.[131] There are many uncertainties about the potential harms of nanomaterials, but policies have been primarily focused on accelerating their use with very limited consideration of toxicity or precautionary approaches.[132] [133] [134] SAICM Beyond 2020 should address the information issue by working to establish a global inventory of nanomaterials. The safety of nanotechnologies and nanomaterials should be considered in synergy with worker safety issues in SAICM, and include health surveillance of workers in the nanotechnology industry.

Key measurable objectives:

1. By 2025, establish a living, publicly available global inventory of nanomaterials on the market.
2. Conduct biomonitoring and health surveillance of workers handling nanomaterials in 15 countries by 2025; 50 countries by 2030.
3. By 2030, the private sector publicly provides comprehensive and verifiable information on adverse effects for all nanomaterials in commerce, including muta-

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[130] UNEP, WHO (2013) State of the science of endocrine disrupting chemicals, ISBN: 978-92-807-3274-0 (UNEP) and 978 92 4 150503 1 (WHO) (NLM classification: WK 102)

[131] Foladori G, Invernizzi N, Bejarano F (2012). Social and Environmental Implications of Nanotechnology Development in Latin America and the Caribbean. ReLANS / IPEN/ CMS-UCSB http://ipen.org/documents/social-and-environmental-implications-nanotechnology-development-latin-america-and

[132] Senjen R, Foladori G, Azoulay D (2013). Social and Environmental Implications of Nanotechnology Development in the Asia Pacific Region. NTN (National Toxics Network Australia) / ReLANS (Latin American Nanotechnology and Society Network) / IPEN http://ipen.org/sites/default/files/documents/Social%20and%20Enviro%20Implications%20of%20Nano%20Development%20in%20Asia-Pacific.pdf

[133] Musee N, Foladori G, Azoulay D (2012). Social and Environmental Implications of Nanotechnology Development in Africa http://ipen.org/documents/social-and-environmental-implications-nanotechnology-development-africa

[134] Foladori G, Invernizzi N, Bejarano F (2012). Social and Environmental Implications of Nanotechnology Development in Latin America and the Caribbean. ReLANS / IPEN/ CMS-UCSB http://ipen.org/documents/social-and-environmental-implications-nanotechnology-development-latin-america-and

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genicity, carcinogenicity and adverse effects on the reproductive, developmental, endocrine, immune and nervous systems.

4. By 2030, support the development of adequate governance and/or regulatory frameworks in 5 countries in 5 UN regions for a total of 25 countries.

7. Environmentally persistent pharmaceutical pollutants (EPPP)

Relevant SDG(s): 3, 7

At ICCM4, environmentally persistent pharmaceutical pollutants – an issue that relates primarily to water pollution – was adopted as a SAICM Emerging Policy Issue. In addition, in the SAICM Global Plan of Action, activity 203 is about evaluating pollutant releases to air, land, and water. More generally, reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials is a centrally important aspect of the sound management of chemicals and wastes. It is also of central importance to the minimization of significant adverse impacts on the environment and human health associated with exposures to hazardous chemicals and wastes. SAICM Beyond 2020 can therefore further develop future SAICM initiatives and plans of action associated with SDG7.

Key measurable objectives:

1. By 2022, develop a global roadmap on how pharmaceuticals can be produced, used and disposed of in a sustainable way, with an emphasis on the quality/rational use of medicines (human and veterinary), preventing microbial resistance and reducing and eliminating pharmaceutical pollution downstream of production facilities.
2. By 2025, establish an inventory of available techniques in waste water treatment/water treatment plants for destroying pharmaceutical pollutants, applicable in all countries.
3. By 2025, establish regular monitoring and public reporting of water sources in 50 countries, including potable water, surface and ground water sources, sewage treatment effluents and sewage sludge for the presence of EPPPs and their bioactive transformation products.
4. By 2025, governments and the private sector apply extended producer responsibility so that the pharmaceutical industry is accountable for all pharmaceutical waste throughout the life cycle of their products.
5. By 2030, achieve clean production and zero discharge of pharmaceuticals into the environment.

8. Zero waste

Relevant SDG(s): 11, 12, 13

SDG11 calls on countries to address municipal and other waste management to make cities sustainable. Zero waste is the approach most consistent with fulfillment of sustainable waste management objectives because it addresses sustainable resource management. SAICM risk reduction objectives include reducing, *"the generation of hazardous waste, both in quantity and toxicity, and to ensure the environmentally sound management of hazardous waste, including its storage, treatment and disposal."*[135] Global Plan of action items relevant to waste management including zero waste are outlined in items 68-73, 118, 121, 161-162, 169, 171-172, 187, 234, 258-262, and 272-273.

Key measurable objectives:

1. By 2025, all major cities containing more than 1 million inhabitants conduct a waste audit to find out the amount and type of waste being produced, imported, and exported.
2. By 2030, implement segregation of waste at source for reuse, recycling and composting in all major cities.
3. By 2030, the private sector makes products that are non-toxic; durable; reusable; easy to dismantle, repair and rebuild; minimally and appropriately packaged; recyclable and/or compostable at the end of life and publicly reports progress periodically.
4. By 2030, facilitate circular economy/cradle to cradle systems without toxic chemical recycling in 100 countries in 5 UN regions.

9. Workplace right to know

Relevant SDG(s): 3, 8, 16

The SAICM Dubai Declaration notes that one of the reasons to take concerted action on toxic chemicals is, *"exposure of workers to harmful chemicals and concern about the long-term effects of chemicals on both human health and the environment."* [136] Workers have an especially important need – often denied them – to have full access to information about the chemicals they use and about the hazards those chemicals pose. The SAICM Dubai Decla-

[135] UNEP - WHO (2006) Overarching Policy Strategy para 14, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[136] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

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ration states, "*We stress the responsibility of industry to make available to stakeholders such data and information on health and environmental effects of chemicals as are needed safely to use chemicals and the products made from them.*" [137] SAICM Beyond 2020 can do much more than has been done in the past to promote initiatives aimed at promoting safe and secure working environments for all workers. In some cases, these might be the promotion of workplace-focused activities that are related to already-identified Emerging Policy Issues and Issues of Global Concern such as: highly hazardous pesticides; hazardous substances in electronics (aimed at preventing toxic exposures to workers both at the point of production and also during end-of-life waste management and recovery); and chemicals in products.

Key measurable objectives:

1. By 2030, ILO Convention 170 ratified and implemented in all countries.
2. By 2030, establish and enforce occupational health and safety regulations that provide meaningful right to know to workers, prioritize prevention, establish exposure limits protective of the most vulnerable populations, and provide equal protection in the workplace and the community in 150 countries.
3. WHO initiates a hazard surveillance program in 75 countries by 2025 to identify agricultural settings where there are particular pesticide exposures and health hazards to workers; 150 countries by 2030.
4. Conduct biomonitoring and health surveillance of workers handling endocrine disrupting chemicals and nanomaterials in 50 countries by 2025; 100 countries by 2030.
5. By 2025, the private sector completes an inventory of hazardous chemicals used in manufacturing processes as a baseline for subsequent reduction and publicly reports their chemical footprint periodically.

10. Agroecology

Relevant SDG(s): 2, 3, 4, 5, 6, 8, 12, 13

In 2009, the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) concluded that it is necessary to shift from current farming practices to sustainable agriculture systems capable of providing both significant productivity increases and enhanced ecosystem services. It noted that sustainable development can be promoted through reduced agrochemical inputs and by the use of agroecological management approaches. FAO promotes a paradigm of sustainable crop production intensification (SCPI) that conserves and enhances natural resources, and develops a healthy agroecosystem as the first line of defense against crop pests. It is based on an ecosystem approach: inputs of land, water, seed and fertilizer compliment natural processes that support plant growth, pollination, natural predation for pest control, and soil biota that enhance plant access to nutrients. It draws on nature's contribution to crop growth, and applies appropriate external inputs as needed. Additionally, FAO has sponsored international and regional symposiums on agroecology with the participation of hundreds of experts and rural grassroots organizations.[138] At the Conference of the Parties to the Stockholm Convention in May 2013, Parties agreed unanimously to give priority to ecosystem-based approaches to pest control to replace the insecticide endosulfan, which is listed under the Convention for global phase out.[139] Finally, in 2015, the ICCM4 adopted Resolution IV/3 establishing Highly Hazardous Pesticides (HHPs) as a SAICM Issue of Global Concern.[140] Delegates recognized, *"that highly hazardous pesticides cause adverse human health and environmental effects in many countries, particularly in low-income and middle-income countries"* and agreed to take concerted efforts to implement a strategy developed by FAO, UNEP, and WHO. Delegates further indicated that this should be done, "*with emphasis on promoting agroecologically based alternatives.*" SAICM Beyond 2020 can contribute to Agenda 2030 by developing an initiative focused on agroecology. This initiative would synergize with the issue of concern focused on highly hazardous pesticides but would broaden the issue in keeping with SDG2 and other relevant SDGs.

Key measurable objectives:

1. Adopt policies and instruments in 75 countries by 2025 that implement agroecological strategies and practices that reduce synthetic inputs, such as pesticides and fertilizers, and are based on biodiversity and integrated soil nutrition and thus increase agricultural productivity in a sustainable way, strengthen adaption to climate change and mitigate greenhouse gases; 150 countries by 2030.

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[137] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[138] See http://www.fao.org/agriculture/crops/thematic-sitemap/theme/spi/en/

[139] Report of the Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants on the work of its sixth meeting. SC-6/8: Work programme on endosulfan, point 2. P46. http://chm.pops.int/Conventio n/Conference of the Parties(COP)/ReportsandDecisions/tabid/208 /De fault.aspx

[140] UNEP (2015) IV/3 Highly hazardous Pesticides, Report of the International Conference on Chemicals Management on the work of its fourth session, SAICM/ICCM.4/15

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2. Increase local markets by 50% in 75 countries by 2025 so that the increase in agricultural production and productivity will translate into higher incomes;150 countries by 2030.
3. Implement policies and their instruments to achieve access to education, land, agricultural extension, and credit equitably between women and men, respecting community cultures and practices in 75 countries by 2025; 150 by 2030.

11. Plastics

Relevant SDG(s): 11, 12, 14

UN Environment has identified plastic marine pollution and particularly microplastics as a major global environmental threat.[141] The Asia Pacific region has been identified as a major region of leakage for plastic waste into our ocean with estimates suggesting that there will be more plastic in our oceans than fish by 2050.[142] SAICM has a key role in promoting safer chemicals policy through toxics reduction, elimination and substitution to avoid and ultimately eliminate the adverse toxic impacts embedded throughout the whole life cycle of plastic products and packaging from raw materials extraction, use and final disposal.

Key measurable objectives:

1. By 2023, plastics audits in municipal and industrial wastes conducted and results publicly released in 50 countries.
2. By 2025, ban multi-layered, single use plastic packaging and products, particularly sachets, in 150 countries.
3. Private sector funds recycling infrastructure in 75 countries by 2025, 150 countries by 2030.
4. By 2022, initiate a monitoring program for chemicals in microplastics in the world's oceans as an effectiveness evaluation measure for SAICM and the chemical conventions.

12. Women and chemical safety

Relevant SDG(s): 2, 3, 4, 5, 6, 8, 9, 11, 12, 13, 14, 15, 16, 17

Despite the fact that women make up roughly half the population and chemical exposures are widespread, the gender aspects of chemical safety have been largely ignored.[143] Rio Principle 20 states, *"Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development."*[144] The SAICM ministerial Dubai Declaration commits governments to, "*work towards effective and efficient governance of chemicals management by means of transparency, public participation and accountability involving all sectors of society, in particular striving for the equal participation of women in chemicals management.*"[145] Risk reduction measures need to be improved, "*to prevent the adverse effects of chemicals on the health of children, pregnant women, fertile populations, the elderly, the poor, workers and other vulnerable groups and susceptible environments.*"[146] SAICM Beyond 2020 should address aspects of the relationship between women and chemical safety in each of its emerging policy issues and issues of concern. These might include lack of data, disparity in environmental assessments and impacts, occupational exposures, and decision-making.

Key measurable objectives:

1. Make "women and chemical safety" an Issue of Concern.
2. Address the relationship between women and chemical safety in all SAICM Emerging Policy Issues and Issues of Concern.
3. Include women and chemical safety components as an integrated component in all IOMC and national projects.

ANNEX 1: CHEMICAL SAFETY CONTRIBUTIONS TO ACHIEVING RELEVANT SUSTAINABLE DEVELOPMENT GOALS

SAICM contribution to SDG2: *"End hunger, achieve food security and improved nutrition and promote sustainable agriculture"*; including 2.3: *"double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land…"*; 2.4: ensure *"sustainable food*

[141] UNEP (2016) Marine Plastic Debris and microplastics. Global lessons and research to inspire action and guide policy change. http://www.unep.org/about/sgb/Portals/50153/UNEA/Marine%20Plastic%20Debris%20and%20Microplastic%20Technical%20Report%20Advance%20Copy.pdf

[142] Ellen MacArthur Foundation (2016) The New Plastics Economy: Rethinking the New Plastics Economy. https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics

[143] For more information on this topic, please see the IPEN paper, Beyond 2020: Women and chemical safety

[144] United Nations Conference on Environment and Development (1992) Rio Declaration on environment and development, http://www.unep.org/documents.multilingual/default.asp?documentid=78&articleid=1163

[145] UNEP - WHO (2006) Dubai Declaration, para 18, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[146] UNEP - WHO (2006) Overarching Policy Strategy, para 7, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

production systems and implement resilient agricultural practices"; and 2.5: *"maintain the genetic diversity of seeds, cultivated plants..."*

SAICM 2.1 Fully implement agroecological strategies and practices

1. Adopt policies and instruments in 75 countries by 2025 that implement agroecological strategies and practices that reduce synthetic inputs such as fertilizers and pesticides and are based on biodiversity and integrated soil nutrition and thus increase agricultural productivity in a sustainable way, strengthen adaption to climate change, and mitigate greenhouse gases; 150 countries by 2030.
2. Increase local markets by 50% in 75 countries by 2025 so that the increase in agricultural production and productivity will translate into higher incomes, in particular for small holders;150 countries by 2030.
3. Adopt concrete policy measures for secure legal access to land in 75 countries by 2025; 150 countries by 2030.

SAICM 2.2 Phase-out highly hazardous pesticides

1. Raise awareness about the harms of highly hazardous pesticides (HHPs) and the availability of safer alternatives in 150 countries by 2025.
2. Provide guidance on safer alternatives to HHPs with priority to non-chemical alternatives and ecosystem approaches to sustainable food and fiber production to 50 countries by 2025; 150 countries by 2030.
3. Identify and make publicly available, health and environmental hazard information on 80 pesticides that should be classified as highly hazardous under the conditions of their ordinary use in 75 developing and transition countries by 2025; 150 countries by 2030.
4. Phase out the manufacture, import, sale and use of 20 highly hazardous pesticides in 50 countries by 2025;150 countries by 2030.
5. Provide guidance and promote assistance to identify and reduce exposure to highly hazardous pesticides including near areas of cultivation, particularly around schools, hospitals, and urban areas in 150 countries by 2030.
6. Provide assistance to 1,000,000 farmers in 100 countries to enable them to replace the use of highly hazardous pesticides with agroecological alternatives while maintaining their agricultural livelihood by 2030.

SAICM contributions to SDG3: *"Ensure healthy lives and promote well-being for all at all ages"* including 3.4: *"reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being"*; and 3.9: *"substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination."*

SAICM 3.1 Establish chemical control laws and ratify the chemicals conventions

1. Ratify the Basel, Minamata, Rotterdam, and Stockholm Conventions and ILO conventions 155, 170, 174, and 184 in all countries by 2030 and prepare national plans for their implementation.
2. Establish and enforce basic chemical control laws grounded in the precautionary principle and that incorporate pollution prevention measures in 150 countries by 2030.
3. Establish and implement cost recovery instruments to recover chemical management costs from industries producing/importing/using chemicals in 150 countries by 2030.
4. The SAICM Secretariat uses the UN Environment cost internalization report (See IPEN paper, "Beyond 2020: Financing chemical safety") and other relevant materials to provide legal and policy training on global and regional cost internalization approaches back-to-back with SAICM regional meetings, which shall include the participation of appropriate government staff from countries responsible for developing and executing these types of laws.
5. Ratify the Basel Ban Amendment by 2020.
6. By 2020, analytical data on lead in paint from 80 developing and transition countries is publicly available as a contribution to enable all countries to: 1) Establish effective legally-binding regulatory controls by 2022 on lead decorative paints and lead paints for other applications most likely to contribute to children's lead exposure; and 2) Establish effective legally-binding regulatory controls by 2027 prohibiting the use of lead in paint, varnishes, stains, enamels, glazes, primers or other coatings.
7. By 2030 publicly available monitoring shows that no varnishes, lacquers, stains, enamels, glazes, primers or coatings produced, sold, exported, imported or used for any purpose contain lead.
8. Establish and enforce occupational health and safety regulations that provide meaningful right to know to workers, prioritize prevention, establish exposure limits protective of the most vulnerable populations, and provide equal protection in the workplace and the community in 150 countries by 2030.
9. Adopt policy instruments in 75 countries by 2025 that prohibit carcinogenic, neurodevelopmental toxicants, and endocrine-disrupting chemicals from products, including personal care and cleaning products, food

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contact materials, and toys/childcare products, in favor of safe substitutes; 150 countries by 2030.

10. Adopt policy instruments to reduce, substitute, and eliminate hazardous substances in electrical and electronic products in 75 countries by 2025; 150 countries by 2030.
11. Conduct biomonitoring and health surveillance of workers handling nanomaterials in 15 countries by 2025; 50 countries by 2030.
12. Eliminate exposure to neuro-toxicants in all countries by 2030.

SAICM 3.2 Reduce and eliminate pesticide poisoning

1. Initiate a hazard surveillance program to identify agricultural settings where there are particular pesticide exposures and health hazards to workers.
2. Update pesticide poisoning data for the African, Asia-Pacific, Central and Eastern Europe, and Latin America and the Caribbean regions by 2022.
3. Achieve 80% reduction in pesticide poisonings globally by 2030.
4. Reduce the number of pesticide-related suicides by 50% by 2025; 100% by 2030.
5. Establish effective poison control centers in the 55% of the WHO Member States that do not have them and ensure adequate coverage in existing centers by 2030.

SAICM 3.3 Establish safe work that prevents and eliminates chemical exposure

1. Establish policies, instruments and actions to ensure that agricultural workers are not exposed to hazardous pesticides in 75 countries by 2025; 150 countries by 2030.
2. Prohibit all forms of asbestos globally by 2025.
3. Establish and enforce occupational health and safety regulations that provide meaningful right to know to workers, prioritize prevention, establish exposure limits protective of the most vulnerable populations, and provide equal protection in the workplace and the community in 150 countries by 2030.
4. Adopt policy instruments to reduce, substitute, and eliminate hazardous substances in electrical and electronic products in 25 countries by 2025; 50 countries by 2030.
5. Conduct biomonitoring and health surveillance of workers handling nanomaterials in 15 countries by 2025; 50 countries by 2030.

SAICM contributions to SDG4: *"Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"*; including 4.3: *"ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university."*

SAICM 4.1 Fully educate the public on chemical safety

1. Implement public education programs in all countries by 2030 based on the needs of their members, their community know-how and the specific potentialities of each territory, to promote gender equity and develop culturally and environmentally sustainable agricultural practices and techniques appropriate to the community.
2. Implement public education programs in all countries by 2030 to improve knowledge of toxic chemicals and sustainable practices such as agroecology.
3. Implement public awareness, education and training programs on POPs (including their health and environmental effects and alternatives) in all countries by 2030, especially for woman, children and the least educated.
4. Implement public education programs on identifying and protecting populations at risk of mercury exposure with the participation of public health and other involved sectors in all countries by 2030.
5. Implement public education programs on the health and environmental effects of mercury, alternatives, results of monitoring, epidemiological information, and information on the reduction or elimination of production, use, trade, emissions and releases in all countries by 2030.
6. Implement public education programs on the need for recycling, including electrical and electronic products, in all countries by 2030.

SAICM 4.2 Fully educate workers to prevent exposure to toxic substances, wastes, and materials

1. Implement educational programs for waste handlers and recyclers on preventing exposure to toxic chemicals in all countries by 2030.
2. The private sector implements educational programs on preventing occupational exposure to mercury or mercury compounds in all countries by 2030.
3. The private sector funds educational programs performed by independent training centers for agricultural and industrial workers that are sufficient to protect safety and health in all countries by 2030.

SAICM contributions to SDG5: *"Achieve gender equality and empower all women and girls"*; including 5.1: *"End all forms of discrimination against all women and girls everywhere"*; 5.5: *"Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life."*; 5a: *"Undertake reforms to give women equal rights*

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to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws."; and 5c: *"Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels."*

SAICM 5.1 Achieve gender equality in agriculture

1. Implement policies and their instruments to achieve access to education, land, agricultural extension, and credit equitably between women and men, respecting community cultures and practices in 75 countries by 2025; 150 by 2030.

SAICM 5.2 Make the relationship between women and chemical safety a high-level issue of concern

1. ICCM establishes a multi-stakeholder women and chemicals working group by 2020 to develop recommendations for actions on women and chemical safety that are included in workplans guiding SAICM emerging policy issues and issues of concern.
2. Female Ministers of Environment, Health, and Agriculture, in collaboration with relevant stakeholders, develop a report for SAICM on women and chemical safety for release in 2022 that includes case studies and concerns from all UN regions.
3. Female Ministers of Environment, Health, and Agriculture make a ministerial declaration on women and chemical safety in 2022 that springs from the findings and recommendations of their report and is consistent with the needs and strategies outlined in the SAICM agreement.

SAICM 5.3 Address the relationship between women and chemical safety as an integrated component in all IOMC and national projects

1. Develop gender guidelines for sound chemicals, waste management, and agriculture in all IOMC and national projects by 2024. Existing gender guidelines could serve as the baseline, but currently do not address specific aspects of chemicals and wastes and the differences of their implications in women and men, and thus need to be expounded upon.
2. Donors and IOMC organizations require gender assessments, collection of sex-disaggregated data, and gender trainings for involved staff and project participants for all chemicals, waste and agriculture projects by 2020.
3. Donors and IOMC organizations develop quantitative and qualitative gender indicators for both policy and projects on chemicals and waste by 2020 to better understand gender implications related to chemicals and waste topics, which will further lead to improved conditions for women and men equally, and empower them to play an active role as agents of change.
4. Donors and IOMC organizations require a section about gender-related activities and outcomes of the project in all chemicals, wastes, and agriculture projects by 2020.
5. Donors and IOMC organizations make all gender-disaggregated data retrieved in all projects publicly available beginning in 2022, to increase the protection of human health and to stimulate further scientific research.

SAICM contributions to SDG6: *"Ensure availability and sustainable management of water and sanitation for all"*; including 6.3: *"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."* (see SAICM 12.2 for waste measures)

SAICM 6.1 Reduce and eliminate water pollution

1. Monitor all major rivers and waterways for existing and emerging substances of concern[147] in 75 countries by 2025; 150 countries by 2030.
2. Set controls to protect freshwater sources, including drinking water, from pesticide contamination in 75 countries by 2025; 150 countries by 2030.
3. Establish and implement cost recovery instruments to recover cleanup costs from polluting industries in 150 countries by 2030.
4. Clean up all major rivers and waterways in 150 countries by 2030.
5. Implement and enforce pollution prevention in 150 countries by 2030.

SAICM 6.2 Sustainably manage water used in agriculture

1. Implement policies and their instruments to assist agricultural producers to implement strategies and practices to collect rainwater "in situ", and enable its management, distribution and use, reducing evaporation and surface

[147] Groups of chemicals that might be prioritized include persistent, bioaccumulative and toxic substances (PTS); very persistent and very bioaccumulative substances; chemicals that are carcinogens or mutagens or that adversely affect, inter alia, the reproductive, endocrine, immune or nervous systems; persistent organic pollutants (POPs), mercury and other chemicals of global concern; chemicals produced or used in high volumes; chemicals subject to wide dispersive uses; and other chemicals of concern at the national level. SAICM Overarching Policy Strategy para 9.

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loss in 75 countries by 2025; 150 countries by 2030.

SAICM contributions to SDG8: *"Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all"*; including 8.8: *"Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment."*

SAICM 8.1 Establish safe work that prevents and eliminates chemical exposure

1. Establish policies, instruments and actions to ensure that agricultural workers are not exposed to hazardous pesticides in 75 countries by 2025; 150 countries by 2030.
2. WHO initiates a hazard surveillance program in 75 countries by 2025 to identify agricultural settings where there are particular pesticide exposures and health hazards to workers; 150 countries by 2030.
3. Prohibit all forms of asbestos globally.
4. Establish and enforce occupational health and safety regulations that provide meaningful right to known to workers, prioritize prevention, establish exposure limits protective of the most vulnerable populations, especially pregnant women, and provide equal protection in the workplace and the community in 150 countries by 2030.
5. 50 countries enact meaningful right to know regulations for workers producing electronics, including subcontractors, by 2030.
6. Adopt policy instruments to reduce, substitute, and eliminate hazardous substances in electrical and electronic products in 25 countries by 2025; 50 countries by 2030.
7. Conduct biomonitoring and health surveillance of workers handling nanomaterials in 15 countries by 2025; 50 countries by 2030.
8. Identify and implement biomonitoring and health surveillance of workers, with priority given to industries using large numbers of chemical substances such as electronics, textiles, and others; 15 countries by 2025; 50 countries by 2030.

SAICM contributions to SDG9: *"Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"*; including 9.4: *"greater adoption of clean and environmentally sound technologies and industrial processes."*

SAICM 9.1 Implement clean production

1. The private sector completes an inventory of hazardous chemicals used in manufacturing processes as a baseline for subsequent reduction by 2030 and publicly reports their chemical footprint periodically.
2. The private sector eliminates or reduces the use of hazardous chemicals in design and manufacturing by 70% by 2030 and publicly reports progress periodically.
3. The private sector makes products that are non-toxic; durable; reusable; easy to dismantle, repair and rebuild; minimally and appropriately packaged; recyclable and/or compostable at the end of life by 2030 and publicly reports progress periodically.
4. Free electronics take-back programs are part of extended producer responsibility measures in 150 countries by 2030.

SAICM 9.2 Advance hazard reduction in chemical design

1. UN Environment produces a report by 2022 focused on practical steps for hazard reduction in chemical design and use with a special emphasis on developing and transition countries.
2. ILO conducts capacity building workshops at SAICM regional meetings on how hazard reduction with inherently safer chemistry can reduce chemical accidents and insure worker health and safety.
3. The private sector implements benchmarking tools to assure hazard reduction and avoidance in the design of new chemicals and assessment of current products and reports on progress at each ICCM.

SAICM contribution to SDG11: *"Make cities and human settlements inclusive, safe, resilient and sustainable"* including 11.6: *"reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management."*

SAICM 11.1 Reduce and eliminate air pollution

1. Private sector reduces sulfur in fuel to less than 10 ppm in all countries by 2025.
2. Private sector reduces manganese in fuel to less than 2 ppm in all countries by 2025.
3. Private sector develops a plan for elimination of metals and benzene in fuel by 2025; implemented worldwide by 2030.
4. Publicly available daily, real-time PM2.5 monitoring is conducted in all major cities by 2025.
5. Pollution prevention regulations addressing industrial sources implemented and enforced in 75 countries by 2025, 150 countries by 2030.

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6. Eliminate government subsidies for waste to energy incinerators and cement kilns by 2022 in 75 countries, 150 countries by 2025.
7. Implement sustainable zero waste city strategies to address the adverse air quality impacts of open burning of waste in 75 countries by 2025; 150 countries by 2030.

SAICM 11.2 Implement zero waste strategies

1. The private sector makes products that are non-toxic; durable; reusable; easy to dismantle, repair and rebuild; minimally and appropriately packaged; recyclable and/or compostable at the end of life by 2030 and publicly reports progress periodically.
2. All major cities conduct a waste audit to find out the amount and type of waste being produced, imported, and exported by 2025.
3. Implement segregation of waste at source for reuse, recycling and composting in all major cities by 2030.
4. Uphold the rights and livelihoods of waste pickers and waste workers to collect and manage waste, and support local reuse and recycling centers that allow residents and companies to separate and deliver reusable and recyclable items and hazardous waste are established in all major cities by 2030.
5. Zero waste procurement practices including non-toxic zero waste products; reusable shipping containers; reduced packaging; recycled and compostable products; remanufactured equipment; and leased, rented, or shared equipment adopted in 150 countries and all major manufacturers by 2030.
6. Free electronics take-back programs are part of extended producer responsibility measures in 150 countries by 2030.
7. Ban multi-layered, single use plastic packaging and products, particularly sachets, in 150 countries by 2025.
8. Complete shift to non-combustion methods for residual waste treatment in 75 countries by 2030.
9. UN Environment conducts training for government regulators in all UN regions by 2023 on economic instruments useful for achieving sustainable zero waste practices including revenue generating instruments (e.g. pay as you throw, green taxes), revenue providing instruments (e.g. tax credits, funds), and non-revenue instruments (e.g. liability, public procurement, extended producer responsibility).
10. Support to local communities, their municipalities and not for profit sectors to implement Zero Waste City models in 75 countries by 2025; 150 countries by 2030.
11. Facilitate circular economy/cradle to cradle systems without toxic chemical recycling in 100 countries in 5 UN regions by 2030.

SAICM contributions to SDG12: *"Ensure sustainable consumption and production patterns"*; including 12.3: *"By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses"*; 12.4: *"By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frame works, and significantly reduce their release"*; 12.5: *"substantially reduce waste generation through prevention, reduction, recycling and reuse."*; 12.6: *"Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle."*; 12.7: *"Promote public procurement practices that are sustainable, in accordance with national policies and priorities."*

SAICM 12.1 Halve global food waste and encourage local food production

1. Adopt policies and instruments in 75 countries by 2025 that implement agroecological strategies and practices as the basis of agriculture; 150 countries by 2030.
2. Adopt policies and instruments in 75 countries by 2025 that promote responsible food consumption within a circular matrix of production and consumption that reduces the extraction and consumption of renewable and non-renewable natural resources; 150 countries by 2030.
3. Promote actions to plan sustainable uses of natural assets and favoring local food consumption in 75 countries by 2025; 150 countries by 2030.
4. Adopt policies and promote food production at the local level, facilitating consumer access through the purchase of state institutions, favoring small-scale industrialization and composting at the community level in 75 countries by 2025; 150 countries by 2030.

SAICM 12.2 Implement zero waste strategies

1. The private sector makes products that are non-toxic; durable; reusable; easy to dismantle, repair and rebuild; minimally and appropriately packaged; recyclable and/or compostable at the end of life by 2030 and publicly reports progress periodically.
2. All major cities conduct a waste audit to find out the amount and type of waste being produced, imported, and exported by 2025.
3. Implement segregation of waste at source for reuse, recycling and composting in all major cities by 2030.
4. Uphold the rights and livelihoods of waste pickers and waste workers to collect and manage waste, and support local reuse and recycling centers (that allow

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residents and companies to separate and deliver reusable and recyclable items and hazardous waste) are established in all major cities by 2030.

5. Zero waste procurement practices including non-toxic zero waste products; reusable shipping containers; reduced packaging; recycled and compost products; remanufactured equipment; and leased, rented, or shared equipment adopted in150 countries and all major manufacturers by 2030.
6. Free electronics take-back programs are part of extended producer responsibility measures in 150 countries by 2030.
7. Ban multi-layered, single use plastic packaging and products, particularly sachets, in 150 countries by 2025.
8. Complete shift to non-combustion methods for residual waste treatment in 75 countries by 2030.
9. UN Environment conducts training for government regulators in all UN regions by 2023 on economic instruments useful for achieving sustainable zero waste practices, including revenue generating instruments (e.g. pay as you throw, green taxes), revenue providing instruments (e.g. tax credits, funds), and non-revenue instruments (e.g. liability, public procurement, extended producer responsibility).
10. Support to local communities, their municipalities and not for profit sectors to implement Zero Waste City models in 75 countries by 2025; 150 countries by 2030.
11. Facilitate circular economy/cradle to cradle systems without toxic chemical recycling in 100 countries in 5 UN regions by 2030

SAICM 12.3 Implement clean production

1. The private sector completes an inventory of hazardous chemicals used in manufacturing processes as a baseline for subsequent reduction by 2030 and publicly reports their chemical footprint periodically.
2. The private sector eliminates or reduces use of hazardous chemicals in design and manufacturing by 70% by 2030 and publicly reports progress periodically.
3. The private sector makes products that are non-toxic; durable; reusable; easy to dismantle, repair and rebuild; minimally and appropriately packaged; recyclable and/or compostable at the end of life by 2030 and publicly reports progress periodically.
4. Free electronics take-back programs are part of extended producer responsibility measures in 150 countries by 2030.

SAICM 12.4 Favor safer materials and alternatives in public procurement

1. Green electrical and electronic product procurement initiatives favor products without harmful materials or chemicals in 150 countries by 2030.
2. Zero waste procurement practices including zero waste products; reusable shipping containers; reduced packaging; recycled and compostable products; remanufactured equipment; and leased, rented, or shared equipment adopted in150 countries and all major manufacturers by 2030.

SAICM 12.5 Develop and implement a stronger, more capable SAICM that receives proper political priority and adequate resources

1. The multi-stakeholder and multi-sectoral design and practice of SAICM is preserved Beyond 2020.
2. SAICM's broad scope is preserved because in its absence no participatory international framework would exist for addressing the majority of the world's most pressing chemical safety concerns.
3. Current issues of concern and emerging policy issues are carried forward Beyond 2020.
4. The Montreal Protocol units are broadened to funded chemical units that serve as coordinating multidisciplinary national operations for implementation of SAICM, and the Basel, Rotterdam, Stockholm, and Minamata Conventions.
5. ICCM designs and implements a specific SAICM implementation financial mechanism with sufficient, predictable funds that includes broader access as the Special Programme diverges from SAICM's multistakeholder approach by excluding financing for public interest civil society organizations.
6. Donor government development assistance agencies increase visibility and financial support for chemical safety by 2022, particularly because SAICM links sound chemicals management to sustainable development and will develop measurable objectives in support of Agenda 2030.
7. A SAICM clearing house mechanism publicly tracks development aid for sound chemicals management by 2022.
8. UN Environment executes a study by 2023 on how to implement marketbased instruments to internalize, within relevant industries, the cost to governments of implementing robust programs for sound chemicals management, with an appropriate share of the funds generated directed to assist chemical safety activities in developing countries and countries with economies in transition. The study should include input and review by governmental and stakeholder experts and give

serious consideration to common global or regional approaches or instruments that avoid distortions in international trade and investment, consistent with Rio Principle 16.

9. The SAICM Secretariat uses the UN Environment cost internalization report and other relevant materials to provide legal and policy training on global and regional cost internalization approaches back to back with SAICM regional meetings, which include the participation of appropriate government staff from countries responsible for developing and executing these types of laws.
10. UN Environment uses the cost internalization report and other relevant materials to initiate a multi-stakeholder process to develop a global cost internalization program within the SAICM process, finalized by 2028.

SAICM contributions to SDG13: *"Take urgent action to combat climate change and its impacts."*; including 13.1: *"Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries."*

SAICM 13.1 Fully implement agroecological strategies

1. Establish policies and implement practices to promote agroecological production to improve the resilience and adaptive capacity of agriculture to climate change hazards and natural disasters in 75 countries by 2025; 150 countries by 2030.
2. Implement policies and instruments to establish agroforestry systems in 75 countries by 2025, with a view to the sustainable use of trees and the ecosystems they support, taking into account the ecosystemic effect of forests on air, water, food and weather; 150 countries by 2030.
3. Implement policies for the sustainable use of forests and soils in 75 countries by 2025 through the establishment of agroecological practices that promote biodiversity, soil nutrition and the transfer of agricultural machinery appropriate to natural, economic, cultural conditions; 150 countries by 2030.

SAICM 13.2 Implement pollution prevention and eliminate polluting subsidies

1. Pollution prevention regulations addressing industrial sources implemented and enforced in 75 countries by 2025, 150 countries by 2030.
2. Eliminate government subsidies for waste to energy incinerators and cement kilns by 2022 in 75 countries, 150 countries by 2025.
3. Implement sustainable zero waste city strategies to address the adverse air quality impacts of open burning of waste in 75 countries by 2025; 150 countries by 2030.

SAICM contributions to SDG14: *"Conserve and sustainably use the oceans, seas and marine resources for sustainable development"*; including 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."*

SAICM 14.1 Reduce and eliminate plastic pollution

1. Private sector stops production and use of single-use plastics by 2025 in 150 countries.
2. Private sector implements free take-back of plastic containers and packaging in 75 countries by 2025, 150 countries by 2030.
3. Private sector funds recycling infrastructure in 75 countries by 2025, 150 countries by 2030.
4. Governments ban multi-layered, single use plastic packaging and products, particularly sachets, in 150 countries by 2025.
5. Governments ban the following plastic items in 150 countries by 2030: food wrappers, containers, straws, stirrers, shopping bags, utensils, cups, personal care products containing or packaged in plastic, take-out containers, and cigarette lighters.

SAICM contributions to SDG15: *"Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss"*; including 15.1: *"By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements."*; 15.2: *"By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally."*; 15.3: *"By 2030, combat desertification, restore degraded land and soil..."*; 15.5: *"Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species."*; and 15.9: *"By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts."*

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SAICM 15.1 Identify contaminated sites and prioritize them for cleanup

1. Identify and inventory sites contaminated by toxic chemicals including obsolete pesticides, mercury, and others in 75 countries by 2025; 150 countries by 2030.
2. Safely remove and store obsolete pesticides in 75 countries by 2025; 150 countries by 2030.
3. Characterize and prioritize mercury-contaminated sites followed by remediation in 75 countries by 2030.

SAICM 15.2 Stop illegal traffic

1. Governments classify illegal trade of obsolete pesticides as organized crime by 2025.
2. All governments end illegal traffic of obsolete pesticides and other toxic substances by 2030.

SAICM 15.3 Implement agroecology in forests

1. Implement policies and instruments to establish agroforestry systems in 75 countries by 2025, with a view to the sustainable use of trees and the ecosystems they support, taking into account the ecosystemic effect of forests on air, water, food and weather; 150 countries by 2030.
2. Implement policies for the sustainable use of forests and soils in 75 countries by 2025 through the establishment of agroecological practices that promote biodiversity, soil nutrition and the transfer of agricultural machinery appropriate to natural, economic, cultural conditions; 150 countries by 2030.
3. Adopt policies and instruments in 75 countries by 2025 that implement agroecological strategies and practices as the basis of agriculture; 150 countries by 2030.

SAICM contributions to SDG16: *"Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels;"* including 16.7: *"Ensure responsive, inclusive, participatory and representative decision-making at all levels."*; 16.10: *"Ensure public access to information..."*

SAICM 16.1 Provide publicly available information on the adverse effects of all chemicals in commerce

1. Private sector publicly provides comprehensive and verifiable information on adverse effects for all chemicals in commerce by 2030, including mutagenicity, carcinogenicity and adverse effects on the reproductive, developmental, endocrine, immune and nervous systems.
2. UN Environment assembles a list(s) of endocrine disrupting chemicals (EDCs) and potential EDCs and sources of exposure from the UNEP/WHO State of the Science report and other sources and makes it publicly available on its website by 2020.
3. Private sector implements the SAICM chemicals in products programme in 150 countries by 2030.
4. A global inventory of nanomaterials in commerce and products containing them is publicly available by 2025.
5. By 2020, analytical data on lead in paint from 80 developing and transition countries is publicly available as a contribution to enable all countries to: 1) Establish effective legally-binding regulatory controls by 2022 on lead decorative paints and lead paints for other applications most likely to contribute to children's lead exposure; and 2) Establish effective legally-binding regulatory controls by 2027 prohibiting the use of lead in paint, varnishes, stains, enamels, glazes, primers or other coatings.
6. Private sector, governments, and FAO provide health and environmental hazard information on 80 pesticides that should be classified as highly hazardous under the conditions of their ordinary use in developing and transition countries and make it publicly available by 2025.
7. UN Environment develops and publicly disseminates a list of chemicals of concern to human health and the environment used in electronics production and products by 2025.
8. 80 countries identify gaps in existing legislation and develop regulations to address information disclosure on chemicals in products by 2030.
9. 50 countries enact meaningful right to know regulations for workers producing electronics and in other industries using large amounts of chemicals such as the textile industry (including sub-contractors) by 2025; 100 by 2030.
10. UN Environment establishes a living, publicly available global inventory of nanomaterials on the market by 2025.
11. Pollutant release and transfer registers (PRTR) with publicly accessible data are established in 150 countries by 2030.

SAICM 16.2 Implement meaningful participation of civil society in decision-making

1. Mechanisms are implemented in 150 countries by 2030 to insure meaningful participation of civil society

in decisions on sound chemicals management at the national level in all countries, particularly for women, workers, and Indigenous Peoples.

2. Public interest civil society representatives participate in national implementation committees of SAICM and of the Basel, Minamata, Rotterdam, and Stockholm Conventions in all relevant countries.

SAICM contributions to SDG17: *"Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development;"* including 17.2: *"Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries."*; 17.3: *"Mobilize additional financial resources for developing countries from multiple sources."*

SAICM 17.1 ICCM designs and implements a financial mechanism for SAICM implementation

1. ICCM designs and implements a specific SAICM implementation financial mechanism by 2022 with sufficient, predictable funds that includes both a quick fund for smaller amounts and a larger grant program, as well as broader access to such grants, as the Special Programme diverges from SAICM's multi-stakeholder approach by limiting the access to funds to government actors.

SAICM 17.2 Donor government development assistance agencies significantly increase funding for chemical safety

1. Donor government development assistance agencies increase visibility and financial support for chemical safety by 2022, particularly because SAICM links sound chemicals management to sustainable development and will develop measurable objectives in support of Agenda 2030.
2. A SAICM clearing house mechanism publicly tracks development aid for sound chemicals management by 2022.

SAICM 17.3 ICCM operationalizes the polluter pays principle for internalization of costs in chemical producing industries

1. UN Environment executes a study by 2023 on how to implement marketbased instruments to internalize, within relevant industries, the cost to governments of implementing robust programs for sound chemicals management, with an appropriate share of the funds generated directed to assist chemical safety activities in developing countries and countries with economies in transition. The study should include input and review by governmental and stakeholder experts and give serious consideration to common global or regional approaches or instruments that avoid distortions in international trade and investment, consistent with Rio Principle 16.
2. SAICM Secretariat uses the UN Environment cost internalization report and other relevant materials to provide legal and policy training on global and regional cost internalization approaches back to back with SAICM regional meetings beginning in 2024, which will include the participation of appropriate government staff from countries responsible for developing and executing these types of laws.
3. UN Environment uses the cost internalization report and other relevant materials to initiate a multi-stakeholder process to develop a global cost internalization program within the SAICM process, finalized by 2028.

SAICM CONTRIBUTIONS TO HUMAN RIGHTS AND AGENDA 2030 FOR SUSTAINABLE DEVELOPMENT:

Including Preamble: *"They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls."*; Declaration: *"We resolve… to protect human rights and promote gender equality and the empowerment of women and girls; and to ensure the lasting protection of the planet and its natural resources."*; Our vision: *"We envisage a world of universal respect for human rights and human dignity…"*; Our shared principles and other commitments: *"It is grounded in the Universal Declaration of Human Rights, international human rights treaties, the Millennium Declaration, and the 2005 World Summit Outcome."*; the new Agenda: *"We reaffirm the importance of the Universal Declaration of Human Rights, as well as other international instruments relating to human rights and international law. We emphasize the responsibilities of all States, in conformity with the Charter of the United Nations, to respect, protect and promote human rights and fundamental freedoms for all, without distinction of any kind as to race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth, disability or other status."*; the new Agenda: *"The achievement of full human potential and of sustainable development is not possible if one half of humanity continues to be denied its full human rights and opportunities."*; Means of Implementation and the Global Partnership: *"We will foster a dynamic and well-functioning business sector, while protecting labour rights and environmental and health standards in accordance with relevant international standards and agreements and*

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other ongoing initiatives in this regard, such as the Guiding Principles on Business and Human Rights and the labour standards of the International Labour

Organization, the Convention on the Rights of the Child 18 and key multilateral environmental agreements, for parties to those agreements."

SAICM CONTRIBUTIONS TO HUMAN RIGHTS ASPECTS OF AGENDA 2030

1. The Beyond 2020 Declaration builds on the Dubai Declaration by affirming support for protecting, respecting and fulfilling human rights implicated by chemicals and wastes, including the rights to life, health, physical integrity, information, meaningful participation, an effective remedy, and safe food, housing and water, among others.
2. The Beyond 2020 Declaration affirms that businesses conduct human rights due diligence for their activities linked to toxic chemicals and waste, including the rights to life, health, an adequate standard of living (housing, food and water), non-discrimination, and physical integrity, as well as the rights of vulnerable groups, such as women, children and workers.
3. The Beyond 2020 Declaration affirms the need to prioritize the prevention of exposures by women, children, the elderly, workers, the poor, Indigenous Peoples, migrants, minorities and groups that are most vulnerable.
4. Retain the participatory approach of SAICM in the Beyond 2020 framework, in line with the right to meaningful participation.
5. UN Environment and the World Health Organization facilitate the exchange of expertise and best practices between human rights and chemical experts with the SAICM process to build collective capacity to prevent adverse impacts of hazardous substances and wastes by 2025 and report regularly on progress to meetings of the International Conference on Chemicals Management.
6. UN Environment operationalizes a national periodic monitoring, reporting and evaluation mechanism within SAICM by 2030 that provides synergistic information exchange about progress toward chemical safety with UN human rights treaty bodies, Special Procedures, and other human rights mechanisms. This review mechanism should use human rights indicators and participatory processes, paying particular attention to those most vulnerable such as women, children, workers, minorities, the poor, Indigenous Peoples and others.
7. Office of the High Commissioner on Human Rights strengthens collaboration between national, regional and international human rights mechanisms and environmental, health, labor and other related authorities on the implications of hazardous substances for human rights by 2025 and reports regularly on progress to the chemicals conventions COPs and meetings of the International Conference on Chemicals Management.
8. Inter-Organization Programme for the Sound Management of Chemicals and Global Environment Facility activities and projects include a requirement for disaggregated information on risks to vulnerable groups from hazardous substances and wastes by 2030 to help realize the rights to information and meaningful participation.
9. Establish a global mechanism within SAICM by 2030 to protect environmental and human rights defenders and include a procedure for reporting reprisals.
10. SAICM Secretariat establishes links and reports on activities of the international working group to elaborate an international legally binding instrument on Transnational Corporations and Other Business Enterprises with respect to human rights.

BEYOND 2020: WOMEN AND CHEMICAL SAFETY

IPEN AND PAN

January 2017

INTRODUCTION

The Strategic Approach to International Chemicals Management (SAICM) addresses significant health and environmental harms caused by chemical exposure and makes a global political commitment to reform how chemicals are produced and used in order to minimize those harms. Heads of State at the 2002 World Summit on Sustainable Development in Johannesburg called for the development of SAICM. While the agreement is not legally binding, its basic texts represent a consensus of Environment Ministers, Health Ministers and other delegates from more than one hundred governments who attended the first International Conference on Chemicals Management (ICCM1), held in Dubai, February 2006.

Chemicals impact women and men in different ways and through different routes. These differences have consequences that play out against the larger backdrop of issues related to gender (in)equality and sustainable development. As UNEP's Global Gender and Environment Outlook notes, "Sustainable development will not advance, nor will environmental protection policies and actions be as effective as they need to be, if gender equality is not protected and enhanced."[148] Despite the fact that women make up roughly half the population and chemical exposures are widespread; the gender aspects of chemical safety have been largely ignored.

WOMEN AND CHEMICAL SAFETY AGREEMENTS

The UN Universal Declaration of Human Rights and the Convention on the Elimination of All Forms of Discrimination Against Women commit governments to equal rights for women."[149] [150] However, several international agreements specifically link women's issues to environmental management in general and chemical safety in particular.

Rio Principle 20 states, "Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development."[151] Years later in 2006, SAICM also included important aspects related to women in an agreement that intimately links chemical safety with sustainable development.

The SAICM Dubai Declaration commits governments to, "work towards effective and efficient governance of chemicals management by means of transparency, public participation and accountability involving all sectors of society, in particular striving for the equal participation of women in chemicals management."[152] SAICM's Overarching Policy Strategy notes that, " in many countries some stakeholders, particularly women and indigenous communities, still do not participate in all aspects of decision-making related to the sound management of chemicals, a situation which needs to be addressed" and states the importance of public participation in decision-making, "featuring in particular a strengthened role for women."[153] Risk reduction measures need to be improved, "to prevent the adverse effects of chemicals on the health of children, pregnant women, fertile populations, the elderly, the poor, workers and other vulnerable groups and susceptible environments."[154] Finally, one of SAICM's objectives is, "To ensure equal participation of women in decision-making on chemicals policy and management."[155]

The Stockholm Convention preamble notes, *"health concerns, especially in developing countries, resulting*

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148 United Nations Environment Programme (2016) Global Gender and Environment Outlook: The Critical Issues, DEW/1970/NA http://www.unep.org/gender/portals/24117/GGEO%20TRIFOLDER%20final.pdf

149 United Nations (1948) Universal declaration on human rights, http://www.un.org/en/universal-declaration-human-rights/index.html

150 http://www.un.org/womenwatch/daw/cedaw/

151 United Nations Conference on Environment and Development (1992) Rio Declaration on environment and development, http://www.unep.org/documents.multilingual/default.asp?documentid=78&articleid=1163

152 UNEP - WHO (2006) Dubai Declaration, para 18, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

153 UNEP - WHO (2006) Overarching Policy Strategy, para 2, 9, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

154 UNEP - WHO (2006) Overarching Policy Strategy, para 7, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

155 UNEP - WHO (2006) Overarching Policy Strategy, para 16, Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

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from local exposure to persistent organic pollutants, in particular impacts upon women and, through them, upon future generations."[156] The treaty obligates governments to, *"consult their national stakeholders, including women's groups and groups involved in the health of children, in order to facilitate the development, implementation and updating of their implementation plans."* [157] The Stockholm Convention instructs Parties to promote and facilitate, *"Development and implementation, especially for women, children and the least educated, of educational and public awareness programmes on persistent organic pollutants, as well as on their health and environmental effects and on their alternatives."* [158]

The Minamata Convention on Mercury preamble notes awareness of, *"health concerns, especially in developing countries, resulting from exposure to mercury of vulnerable populations, especially women, children, and, through them, future generations."*[159] National Action Plans to address artisanal and small-scale gold mining include, *"Strategies to prevent the exposure of vulnerable populations, particularly children and women of child-bearing age, especially pregnant women, to mercury used in artisanal and small-scale gold mining."*[160]

The 2011 Global Environment Facility (GEF) policy on gender mainstreaming includes a requirement that GEF partner agencies have established policies, strategies, or action plans that promote gender equality.[161] The agency will to develop guidance on, *"inclusion of gender aspects in the design of projects and on the monitoring and evaluation of gender dimensions in the context of its projects."* [162]

BASIC ELEMENTS OF THE RELATIONSHIP BETWEEN WOMEN AND CHEMICAL SAFETY

Factors affecting women and chemical safety include these elements:

- **Lack of data:** Knowledge of exposure routes and the true impacts of chemical exposures on women are difficult to determine because gender-disaggregated data is thin or entirely absent. As a result, current exposure standards are usually based on an assumed average male height and body weight and this reduces protection for both women and children. In addition, without links to other gender data such as the number of women in certain occupations, linkages to certain health effects cannot be identified. Better understanding of gender-dependent hazards will improve how protective and preventive measures are designed and implemented.
- **Environment assessments of and activities on chemicals and wastes usually ignore gender aspects:** This disparity hides differences in gender susceptibility to chemical exposure. To achieve better outcomes from chemicals management measures, and awareness-raising and capacity-building activities, it is sometimes crucial to address men and women differently. For example, information workshops addressing households are often attended by the male head of the family, even though often the women should have the information first hand. This could lead to many recommendations not being implemented in the household (e.g. waste handling). Therefore, chemicals and waste projects should have a gender assessment before they start, gender sensitive indicators and activities, and a gender evaluation after they finish, to increase the effectiveness of the outcomes.
- **Different physiology affects exposure and impacts:** Women and men have different hormone systems that influence a whole host of body functions during development and as adults. Throughout their lives, women are exposed to numerous harmful chemicals that can be transferred across the placenta during fetal development and through breast milk to the nursing infant. Exposures to chemicals that dissolve in fat are especially relevant, as women tend to have higher fat content. Exposures during fetal development can cause lifelong harm and increase the risks of such harmful effects as preterm births, birth defects, childhood and adult diseases. Adverse effects can also be carried across multiple generations. A growing number of chemicals have been shown to exert multigenerational and transgenerational effects. Exposure to pregnant females not only impacts the offspring (F1) but also their offspring (F2) and even the subsequent generation (F3.)
- **Unique time periods of susceptibility:** Men and women have different time periods in which impacts of chemical exposure can be especially high. For women, these time periods include adolescence, pregnancy, lactation, and menopause.
- **Different types of occupational exposures:** Women and men both experience occupational exposures to chemicals, but these may differ based on the region, type of occupation, and access to information. For example, women working in agriculture in some countries can represent the

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156 Stockholm Convention preamble, http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

157 Stockholm Convention Article 7, http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

158 Stockholm Convention Article 10, http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

159 Minamata Convention on Mercury http://www.mercuryconvention.org/Portals/11/documents/conventionText/Minamata%20Convention%20on%20Mercury_e.pdf

160 Minamata Convention on Mercury http://www.mercuryconvention.org/Portals/11/documents/conventionText/Minamata%20Convention%20on%20Mercury_e.pdf

161 Global Environment Facility (2011) Mainstreaming Gender at the GEF

162 Global Environment Facility (2011) Mainstreaming Gender at the GEF

majority of workers involved in pesticide spraying. In some countries, women working in rural areas are exposed to chemicals due to the traditional practice of burning agricultural stubble and waste in preparation for planting. Beauty salon workers are overwhelmingly women, and are often exposed to chemicals in the products they handle. Women are also exposed at home while using cleaning products, household pest control products, washing pesticide-contaminated clothing, the storage of pesticides and spray equipment in kitchens, or dealing with wastes. Women typically work at the lowest level in global production systems. This feminization of poverty makes women more susceptible and vulnerable to toxic chemical exposure, putting their health at risk.

- **Exposures to chemicals in different types of consumer products:** Women use a different spectrum of consumer products than men. For example, women use substantially more personal care products than men and usually do house work using cleaning products containing chemicals. This and other differential use of products results in different types of chemical exposures.
- **Decision-making on environment and chemical safety issues is not equal:** Women generally have more limited decision-making power and this is consistent with the low number of parliament seats and higher-level government positions held by women, as well as decision-making at the household level. The role of women as educators, trainers, and decision-makers in addressing chemicals and waste problems is both underestimated and underutilized. There are wide disparities between women and men in access to education, resources, social protection, financing, capacity-building and training, and technical knowledge and skills. This creates different exposure scenarios, impacts empowerment, and undermines the development of gender responsive policies.

WOMEN AND SAICM ISSUES OF CONCERN

Gender is highly relevant to all of SAICM's elements, but its importance can be illustrated with its connections to prominent issues of concern agreed by consensus over the past ten years.

Highly Hazardous Pesticides

Pesticides represent the largest chemical exposures in developing countries and gender is an important factor in exposure, health effects, and implications for food production. Gender aspects of pesticides and the broader topic of sustainable agriculture are highly relevant to the SAICM decision taken in 2015 at ICCM4 to address highly hazardous pesticides and achievement of Sustainable Development Goal 2.

UNEP's Global Gender and Environment Outlook notes that, although, *"Data on pesticide use by women and men in food production are incomplete and inconsistent"*, *"There are gender differences in pesticide use, exposures, health outcomes and environmental impacts,"* and that, *"Gender differences in the effects of chronic exposures to pesticides are related to the different physiologies of men and women. Overall, women are more biologically sensitive than men to many pesticides."*[163] The number of women working as pesticide applicators varies in different countries but in some countries, *"women make up 85% or more of the pesticide applicators on commercial farms and plantations, often working whilst pregnant or breastfeeding."*[164]

Women are also uniquely exposed to pesticides even when they do not directly apply them. In Pakistan, where cotton is picked by women, a survey found that 100% of the women picking cotton 3-15 days after pesticides had been sprayed suffered acute pesticide poisoning symptoms.[165] In Chile, in 1997, of the 120 reported pesticide poisonings, 110 were women, nearly all employed in the flower industry.[166] Other routes of exposure not generally taken into account in exposure assessments include weeding and thinning sprayed crops, picking tea-leaves, washing out the pesticide containers or washing pesticide-contaminated clothing.[167] [168]

The UNEP report notes that, "*Farmers' decisions about adopting new technologies and strategies for food production are usually made within the context of households, where women and men typically have unequal power.*" [169]

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[163] United Nations Environment Programme (2016) Global Gender and Environment Outlook: The Critical Issues, DEW/1970/NA http://www.unep.org/gender/portals/24117/GGEO%20TRIFOLDER%20final.pdf

[164] Watts M (2013) Breast cancer, pesticides, and you. Pesticide Action Network Asia and the Pacific http://www.panap.net/sites/default/files/Breast-cancer-pesticides-and-you.pdf

[165] Tahir S, Anwar T (2012) Assessment of pesticide exposure in female population living in cotton growing areas of Punjab, Pakistan. Bull Environ Contam Toxicol 89:1138-41.

[166] Wesseling C, Parra M, Elgstrand K 1(998) Fruit Production, Pesticides and the Health of Women Workers. International Development Cooperation Internal Report 4. Stockholm, National Institute for Working Life.

[167] United Nations Environment Programme (2016) Global Gender and Environment Outlook: The Critical Issues, DEW/1970/NA http://www.unep.org/gender/portals/24117/GGEO%20TRIFOLDER%20final.pdf

[168] Watts MA. 2010. Pesticides: Sowing Poison, Growing Hunger Reaping Sorrow. 2nd Ed. Pesticide Action Network Asia and the Pacific, Penang

[169] United Nations Environment Programme (2016) Global Gender and Environment Outlook: The Critical Issues, DEW/1970/NA http://www.unep.org/gender/portals/24117/

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It also notes the high environmental impact of high-input large-scale agriculture and supports use of agroecology approaches that include ecological, economic, and social dimensions as a way to support gender equality and reduce the negative impacts of agriculture.

The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) was an intergovernmental process co-sponsored by FAO, GEF, UNDP, UNEP, UNESCO, the World Bank and WHO. Representatives from more than 100 countries participated. Among many topics, the IAASTD addressed the important role of women in agriculture and changes needed to ensure gender equality and sustainable agriculture.[170] The report concluded that pesticide exposure is a common health risk and that, *"In some countries (e.g., in SSA [Sub-Saharan Africa]) women are now in charge of tasks formerly performed only by men such as soil preparation, spraying and marketing. This requires women's access to additional skills and presents new risks (e.g., health risks related to the unregulated use of chemicals, especially pesticides) to girls and women."* [171] As a result, IAASTD recognized, *"that the largest proportion of rural women worldwide continues to face deteriorating health and work conditions, limited access to education and control over natural resources, including formal title to land, technology and credit, insecure employment and low income."* [172]

Lead in paint

Gender aspects are highly relevant to lead poisoning and the SAICM objective to eliminate lead paint by 2020. In 2009, ICCM2 created the Global Alliance to Eliminate Lead Paint (GAELP) with UNEP and WHO serving as a joint secretariat. In 2015, delegates at ICCM4 reaffirmed worldwide elimination of lead paint as a global priority issue.

The human fetus is the most vulnerable to the toxic effects of lead and a pregnant woman can transfer lead that has accumulated in her body to her developing child.[173] Lead is also transferred through breast milk when lead is present in a nursing mother.[174] WHO notes that, *"Exposure of pregnant women to high levels of lead can cause miscarriage, stillbirth, premature birth and low birth weight, as well as minor malformations."* [175] Once lead enters a child's blood stream through ingestion, inhalation, or across the placenta, it has the potential to damage a number of biological systems and pathways. The primary target is the central nervous system and the brain, but low levels of lead can also affect the immune, reproductive and cardiovascular systems, the kidneys, and the skeleton.[176] [177] Lead is also categorized as an endocrine-disrupting chemical (EDC).[178] According to WHO's fact sheet on Lead Poisoning and Health: *"There is no known level of lead exposure that is considered safe."*[179]

Chemicals in products

Women are exposed to multiple chemicals during product manufacturing, use, and disposal. Some occupations involving chemicals have high proportions of women workers. For example, the textile industry is noted for its high chemical use and pollution and, *"The majority of workers at various stages of the textile chain, from manufacturing to packing and retailing of the final products, are women. They are significantly exposed to the variety of chemicals present in clothing products."*[180] [181] Different patterns of product use can also result in different potential chemical exposures. For example, women use more personal care products than men and a wide variety of chemicals found in these products raise health concerns. These include 1,4-dioxane, acrylates, carbon black, coal tar, diethanolamine, formaldehyde, and others.[182] However, information on these and other toxic chemicals is usually

GGEO%20TRIFOLDER%20final.pdf

[170] United Nations Environment Programme (2008) International Assessment of Agricultural Knowledge, Science and Technology for Development http://www.unep.org/dewa/Assessments/Ecosystems/IAASTD/tabid/105853/Defa

[171] United Nations Environment Programme (2008) International Assessment of Agricultural Knowledge, Science and Technology for Development http://www.unep.org/dewa/Assessments/Ecosystems/IAASTD/tabid/105853/Defa

[172] United Nations Environment Programme (2008) International Assessment of Agricultural Knowledge, Science and Technology for Development http://www.unep.org/dewa/Assessments/Ecosystems/IAASTD/tabid/105853/Defa

[173] Bellinger, DC (2008) Very low lead exposures and children's neurodevelopment. Current Opinion in Pediatrics, 2008. 20:172-177

[174] Bjorklund KL, Vahter M, Palm B, Grander M, Lignell S, Berglund M (2012) Metals and trace element concentrations in breast milk of first time healthy mothers: a biological monitoring study, Environ Health 11:92

[175] http://www.who.int/mediacentre/factsheets/fs379/en/

[176] World Health Organization, Childhood lead poisoning. 2010

[177] Needleman H (2004) Lead Poisoning. Annual Review of Medicine, 55: 209-222

[178] Iavicoli I, Fontana L, Bergamaschi A (2009) The effects of metals as endocrine disruptors. Journal of Toxicology and Environmental Health-Part B-Critical Reviews, 12: 206-223

[179] World Health Organization (2016) Lead poisoning and health. http://www.who.int/mediacentre/factsheets/fs379/en/

[180] Caterbow A, Hausmann J (2016) Women and chemicals: The impact of hazardous chemicals on women, http://wwwwecf.eu/english/publications/2016/women_chemicals.php

[181] UNEP leads the chemicals in products project and has conducted a GEF project on "best practices for exchange of information on chemicals in textile products" in China. No public interest NGOs were invited to participate in the project and ironically, little information about it has been made available.

[182] www.safecosmetics.org/get-the-facts/chemicals-of-concern/

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not disclosed and is not included on product labels, which makes women unaware of potential health hazards caused by toxic ingredients. Proper labeling and classification of chemicals is needed to help women make better choices and understand requirements for safe handling, storage, and disposal. Gender implications of chemical exposures from products also impact future generations. A study of pregnant women found that, certain PCBs, organochlorine pesticides, PFCs, phenols, PBDEs, phthalates, polycyclic aromatic hydrocarbons (PAHs) and perchlorate were detected in 99% - 100% of pregnant women.[183] IPEN studies of chemicals in products have revealed a wide variety of toxic metals in skin-lightening creams and other consumer products.[184] [185] [186] [187] [188] Finally, in some countries women and children play dominant roles in waste collection, with potential exposures from chemicals in products and those released from burning. [189]

Hazardous substances within the life cycle of electrical and electronic products

This SAICM emerging policy issue covers design, production and use, and end of life aspects of hazardous chemicals in electrical and electronic products. This is highly relevant to women, as they have played a prominent role in electronics manufacturing beginning in the early 20th century, and helped make it a mass production industry due to low wages. As an engineering wiki notes, *"The electronics industry was the largest employer of women in the United States by 1960."*[190] The growth of the industry also included a rapid rise in toxic chemical use. As the American Public Health Association has noted, *"The manufacture of electrical and electronic products relies on and uses more than a thousand chemicals and other materials, many of which are known to be hazardous and lack comprehensive toxicological health and safety information due to weak regulatory policies."*[191]

In the US, an investigation of 32,000 worker deaths in IBM between 1969 and 2001, *"found excesses of brain, kidney, and pancreatic cancer, along with melanoma, in male manufacturing workers. Female workers had higher-than-expected numbers of deaths from kidney cancer, lymphoma, and leukemia."*[192] The company subsequently tried to block publication of these results. Years later, another study found solvent exposure in women working in the electronics industry during the first trimester of pregnancy was significantly associated with spontaneous abortion.[193]

In subsequent decades, the electronics industry moved to Latin America and Asia where it rapidly expanded into using complicated supply chains with numerous small sub-contractors – many of whom have even less capacity for chemicals management than large companies. In Asia, women became the prime labor force because the industry noted a need for cheap, patient, and obedient workers and presumed that young women would be, *"accustomed to life in a traditional patriarchal atmosphere and would have already learned to be respectful of authority."*[194] By the mid-1970s, there were about one million workers in electronics assembly in Asia and 90% of them were women.[195] The industry has substantially grown since then, and two places that provide examples of its consequences for women are Taiwan and the Republic of Korea.

In the 1970s many international companies began electronics manufacturing in Taiwan. Young women joined the industry and subsequently suffered from occupational diseases. These include deaths due to trichloroethylene exposure at the Philco-Ford and Mitsumi factories.[196] In the 1990s, regulators found RCA had polluted groundwater with trichloroethylene, perchloroethylene, and other toxic chemicals. Studies of former workers and community

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[183] Woodruff TJ, Zota AR, Schwartz JM (2011) Environmental chemicals in pregnant women in the United States: NHANES 2003 - 2004, Environ Health Perspect 119:878-885

[184] http://ipen.org/site/toxics-products-overview

[185] http://ipen.org/documents/imeap-report-market-investigation-illegal-importation-mercury-containing-skin-whitening

[186] http://ipen.org/documents/ecowaste-coalition-imeap-poster-market-investigation-illegal-importation-mercury

[187] http://ipen.org/site/china-results

[188] http://www.ipen.org/sites/default/files/documents/EARTH%20Hg%20in%20Whitening%20-%20Report.pdf

[189] Caterbow A, Hausmann J (2016) Women and chemicals: The impact of hazardous chemicals on women, http://www.wecf.eu/english/publications/2016/women_chemicals.php

[190] http://ethw.org/Women_and_Electrical_and_Electronics_Manufacturing

[191] American Public Health Association (2012) Improving Occupational and Environmental Health in the Global Electronics Industry, Policy Number 20124 https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/21/08/43/improving-occupational-and-environmental-health-in-the-global-electronics-industry

[192] Morris J (2015) A toxic legacy, Slate, 2 July 2015 http://www.slate.com/articles/business/moneybox/2015/07/toxic_substances_in_electronics_manufacturing_the_u_s_does_tragically_little.html

[193] Lipscomb JA, Fenster L, Wrensch M, Shusterman D, Swan S (1991) Pregnancy outcomes in women potentially exposed to occupational solvents and women working in the electronics industry, J Occup Med 33:597-604

[194] Rana S (2013) Berkeley Journal of Gender, Law & Justice 15:272-311 http://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=1166&context=bglj

[195] Lim LY (1981) In: Dauber R, Cain ML, eds. Women and technological change in developing countries. Boulder, Colorado, Westview Press, 1981. 181-90. (AAAS Selected Symposium 53) http://www.popline.org/node/385070

[196] Lin YP (2012) From Philco, Mitsumi to RCA: Female electronic workers' occupation diseases in Taiwan, East Journal http://www.ym.edu.tw/eastsjournal/abstract.html

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residents found an increased risk of liver cancer and an increase in breast cancer.[197]

In the Republic of Korea, an analysis of epidemiological data found evidence suggesting reproductive risks to women from semiconductor fabrication jobs including spontaneous abortion, congenital malformation, and reduced fertility.[198] A subsequent examination of reproductive risks among female microelectronics workers aged 20 – 39 years old found a significantly higher risk for spontaneous abortion and menstrual aberration.[199] A study of leukemia and non-Hodgkin lymphoma (NHL) cases from the Giheung Samsung plant reported to the Supporters for the Health and Rights of People in the Semiconductor Industry (SHARPs), found 17 sick workers with 11 of them women – all 30 years old or younger.[200] More than 300 cases of occupational diseases in electronics workers in the Republic of Korea have been documented and court or government decisions have linked some of the illnesses to working conditions.[201] So far, three women with leukemia, one woman with lymphoma, two women with aplastic anemia, and two women with breast cancer have all had their conditions linked to work in the electronics industry by court or government decisions. [202]

The issue of women in electronics is an ongoing matter of concern due to the large use of chemicals and the high proportion of women workers. In Vietnam, most of the rapid economic growth is attributed to the electronics industry, which has expanded 78% per year in exports for the past four years.[203] The electronics industry makes up more than 20% of the GDP and now includes Canon, Intel, LG, Microsoft, Nokia, Panasonic, Samsung, and Sony.[204]

Despite this large industry and the large female work force it employs (75% are women), current information, including the industry's occupational and/or its environmental impact, is lacking.

As noted above, in some countries women and children play dominant roles in waste collection, with potential exposures from chemicals in products and those released from burning. One example is the large number of women working on electronic waste (e-waste), which is produced globally in *"staggering quantities"*, estimated in 2014 to be 41.8 million tonnes. [205] The work includes burning cables, acid baths, breaking equipment open, and breaking apart soldered components. This results in in a variety of toxic chemical exposures, especially in developing countries, *"where most informal and primitive e-waste recycling occurs, environmental exposure to lead, cadmium, chromium, polybrominated diphenyl ethers, polychlorinated biphenyls, and polycyclic aromatic hydrocarbons is prevalent at high concentrations in pregnant women and young children."*[206] Adverse health effects from e-waste pollution, *"is believed to a significant factor in or near communities where informal recycling takes place."*[207] Women exposed to toxicants contained in e-waste, *"may suffer from anemia, fetal toxicity, hormonal effects, menstrual cycle irregularities, endometriosis, autoimmune disorders, and cancers of the reproductive system."*[208]

Nanotechnologies and manufactured nanomaterials

Like other types of substances, gender concerns with nanomaterials involve manufacturing, product use, and wastes.

Toxicity studies in animals indicate that nanomaterials used in consumer products can harm the female reproductive system. Titanium dioxide nanoparticles can cause ovarian dysfunction, affect genes regulating immune

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197 Sung TI, Chen PC, Lee LJH, Lin YP, Hsieh GY, Wang JD (2007) Increased standardized incidence ratio of breast cancer in female electronics workers, BMC Public Health 7:102

198 Kim MH, Kim H, Paek D (2014) The health impacts of semiconductor production: an epidemiologic review, Int J Occup Environ Health 20:94-114

199 Kim I, Kim MH, Lim S (2015) Reproductive Hazards Still Persist in the Microelectronics Industry: Increased Risk of Spontaneous Abortion and Menstrual Aberration among Female Workers in the Microelectronics Industry in South Korea, PLoS One doi: 10.1371/journal.pone.0123679

200 Kim I, Kim HJ, Lim SY, Kong JO Leukemia and non-Hodgkin lymphoma in semiconductor industry workers in Korea (2012) Int J Occup Environ Health 18:147-153

201 Personal communication from Supporters for the Health and Rights of People in the Semiconductor Industry (SHARPS)

202 Personal communication from Supporters for the Health and Rights of People in the Semiconductor Industry (SHARPS)

203 http://www.vietrade.gov.vn/en/index.php?option=com_content&view=article&id=2388:opportunities-and-challenges-for-vietnams-electronic-export&catid=270:vietnam-industry-news&Itemid=363

204 http://tuoitrenews.vn/business/29142/vietnams-electronics-industry-booming-with-bright-prospects-but-changes-needed

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response, disrupt the normal balance of sex hormones and decrease fertility. [209] In addition, many nanoparticles can cross the placenta where they can cause, *"altered organogenesis and morphology as well as defects in the reproductive and nervous systems of the offspring."* [210]

The number of people working in nanotechnology is uncertain but some estimate there are 400,000 workers worldwide with predictions of 6 million workers by 2020.[211] Workers have the highest exposure to nanomaterials, including through handling, cleanup, maintenance, and dealing with wastes. [212] The number of female workers in the industry is not known, but a well-known case of harm to workers involved women. In 2009, seven female workers were diagnosed with severe pulmonary fibrosis caused by polymer nanoparticles and two of the women died (aged 19 and 29.) [213] [214] [215]

Poorly characterized nanomaterials are widely present in products used by women, including food additives, cosmetics, and many consumer products. [216] [217] For example, nano silica is an ingredient in food products, cooking pans, pesticides, and fertilizers.[218] However, silica nanoparticles smaller than 100 nm accumulated in the fetal liver and fetal brain of pregnant mice, damaged the placenta, lowered uterine weights, and caused significantly higher rates of a miscarriage equivalent. [219]

As noted above, in some countries women and children play dominant roles in waste collection, with potential exposures from chemicals in products and those released from burning. [220] This includes exposures from releases of nanomaterials. Carbon nanotubes present in textiles, batteries and other products can be released during normal wear or when burned and then inhaled or via the food chain.[221] Preliminary evidence suggests that nanomaterials in wastes may catalyze the formation of other pollutants such as PAHs and furans and undermine pollution control technology. [222]

Endocrine-disrupting chemicals (EDCs)

EDCs are harmful to both men and women but distinct hormone systems result in gender-specific attributes. They affect mammary gland development and pathogenesis,[223] and the UNEP GGEO report acknowledged a "*strong connection between pesticides and breast cancer*", and that "*Almost 100 pesticides have been identified as potentially contributing to increased risk of breast cancer, and of these at least 63 are known to have estrogenic effects in laboratory studies.*"[224] In women, *"EDCs can adversely affect the ovary, uterus, vagina, anterior pituitary, and/or steroid production, which can lead to reproductive disorders such as early puberty, infertility, abnormal cyclicity, premature ovarian failure/menopause, endometriosis, fibroids, and adverse pregnancy outcomes."*[225] A special concern for exposures during pregnancy is that altera-

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tions in fetal programming events can predispose adults to chronic diseases. For example, altering estrogen action during fetal development can affect reproduction in adulthood and damage fertility.[226] The International Federation of Gynecology and Obstetrics notes that the global rise in the rate of non-communicable diseases includes increases in diseases and conditions related to the endocrine system such as preterm birth and low birth weight, early onset of breast development and others.[227] Estrogenic EDCs are associated with uterine fibroids, ovarian dysfunction, and reduced fertility.[228] Bisphenol A – the building block of polycarbonate plastics – is linked to reduced egg quality and viability in women seeking fertility treatment.[229] In the EU, a conservative estimate of the costs of female reproductive disorders attributable to EDCs is almost €1.5 billion annually, primarily due to fibroids and endometriosis.[230] Like chemicals in products, gender aspects of exposures to EDCs involve occupation, consumer products, waste management, education, and socio-economic status.

Occupational exposures to EDCs include agriculture, manufacturing facilities, and service jobs. Pesticide exposure in women in developing countries is significantly higher than recognized and in some countries, *"women make up 85% or more of the pesticide applicators on commercial farms and plantations, often working whilst pregnant or breastfeeding."*[231] Pesticides in wide use such as atrazine, 2,4-D, chlorpyrifos, and glyphosate are considered to be EDCs along with vector control agents such as DDT.[232] Plastics manufacturing is one example of exposure to EDCs during production. In Canada, the plastics industry has the highest proportion of women workers at 37% and in the US, almost 30% of workers in the industry are women.[233] A case control study found that women in jobs with potentially high exposure to carcinogens and EDCs have an elevated breast cancer risk. These jobs included agriculture, automotive plastics manufacturing, food canning, and metalworking, with the risk of premenopausal breast cancer highest for automotive plastics and food canning.[234] Other studies have reported increased breast cancer risk in women working in plastics processing, rubber and plastics products production, and in occupations involving exposures to synthetic textile fibers. [235] Women firefighters may also be at higher risk for developing breast cancer due to their occupational exposures to carcinogenic chemicals and EDCs.[236] In some regions of the world, women comprise more than 90% of the workforce in the field of nursing. A national study of nurses in the US suggests that the duration and intensity of occupational exposures to chemicals, pharmaceuticals, and radiation is linked with serious health problems such as cancer, asthma, miscarriages, and children's birth defects.[237] EDCs such as phthalates, brominated flame retardants, and bisphenol A are commonly used in plastics manufacturing. Service jobs also expose women to EDCs. For example, nail salon workers are overwhelmingly women and their work involves exposure to a number of toxic chemicals including EDCs such as phthalates, formaldehyde, and toluene.[238] A study of the

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industry in California found 59% - 80% of nail salons are run by Vietnamese women, raising concerns about socio-cultural obstacles to worker safety, along with a sizeable proportion of women reporting health problems after they began working in the industry.[239] Many other occupations involving women also result in exposure to EDCs.[240]

EDCs are widely present in products used by women including cosmetics, cleaning products, household pesticides, personal care products, and many consumer products.[241] Known or potential EDCs in these products include galaxolide, cyclic methyl siloxanes, parabens, phthalates, and metals.[242] Usually, these product ingredients are not disclosed as EDCs or potential EDCs. Exposure results directly from product use and/or release of the chemicals and settling into dust or carpets and subsequent ingestion.[243] Even when only a small number of EDCs are considered, they are present in a myriad of products. Measurements of EDCs in 213 consumer products found phthalates in a vinyl pillow protector, diapers, tub and tile cleaner, dish liquid, laundry bleach, stain remover, hand sanitizer, hand soap, bar soap, body lotion, shampoo, conditioner, shaving cream, face lotion, facial tissues, deodorant, foundation, lipstick, lip balm, shower curtain, car interior cleaner, car air freshener, dryer sheets, polish/wax, hair spray, perfume, body wash and nail polish. [244] Alkylphenols were found in a vinyl pillow protector, diapers, surface cleaner, tube and tile cleaner, laundry bleach, body lotion, glass and floor cleaners, laundry detergent, bar soap, shampoo, shaving cream, face lotion, toothpaste, lip balm, foundation, lipstick, and mascara. [245] Parabens were found in hand soap, body lotion, shampoo, conditioner, shaving cream, face lotion, facial cleanser, foundation, lipstick, mascara, hair spray, and sunscreen.[246] A database of cosmetics ingredients made using ingredient labels and scientific and industry literature allows consumers to search for EDCs and other chemicals in personal care products.[247]

Environmentally persistent pharmaceutical pollutants

The SAICM emerging policy issue on this topic focuses on environmentally persistent substances, but the broader issue of pharmaceutical pollution is a global concern. Measurements of pharmaceutical pollutants in 71 countries revealed 631 different substances (or their metabolites) including antibiotics, non-steroidal anti-inflammatory drugs, analgesics, lipid-lowering drugs, estrogens, and others. [248] Recently, the UN General Assembly held a high-level meeting to deal with drug-resistant bacteria and all 193 Member States agreed to combat proliferation of drug-resistant bacteria.[249] Pharmaceutical pollution is a key driver of antibiotic resistance, with concerns raised as resistant bacteria not only proliferate in sewage treatment plants, but actually transfer and disperse antibiotic resistance to bacteria in the environment.[250] [251] Sources of pharmaceutical pollution include drug manufacturing, disposal from households, hospitals, and nursing homes, large-scale livestock or poultry operations using hormones and/or antibiotics, and excretion via urine or feces into

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sewage treatment plants. [252] [253] [254] [255] Pharmaceutical pollution contaminates drinking water sources. A 2008 study detected pharmaceutical contamination in drinking water sources serving 41 million people in 24 major metropolitan areas in the US, including antibiotics, anticonvulsants, and mood stabilizing drugs.[256]

Concerns around exposure to pharmaceutical pollutants in women include chemical exposures during development, exposures to chemical mixtures, chemical exposures in women of reproductive age, and the fact that some pharmaceutical pollutants, *"are prohibited from prescription to pregnant women or children."*[257] Pharmaceuticals used by women can also impact the environment. The synthetic steroid estrogen, EE2, used in birth control pills, is resistant to removal in sewage treatment plants and accumulates in sewage sludge. [258] Estrogen and synthetic estrogens from birth control pills or postmenopausal hormone treatment can feminize male fish and result in changed sex ratios and intersex fish, and even cause reproductive failure in fish and collapse of populations. [259] [260]

OUTCOMES TO ADDRESS THE ISSUE OF WOMEN AND CHEMICAL SAFETY

Make women and chemical safety a high-level issue of concern

- A multi-stakeholder women and chemical safety working group is established by 2020 to develop recommendations for actions on women and chemical safety that are included in workplans guiding SAICM emerging policy issues and issues of concern.
- Female Ministers of Environment, Health, and Agriculture, in collaboration with relevant stakeholders, develop a report for SAICM on women and chemical safety for release in 2020 that includes case studies and concerns from all UN regions.
- Female Ministers of Environment, Health, and Agriculture make a ministerial declaration on women and chemical safety in 2020 that springs from the findings and recommendations of their report and is consistent with the needs and strategies outlined in the SAICM agreement.

Address women and chemical safety as an integrated component in all IOMC and national projects

- Develop gender guidelines for sound chemicals and waste management and agriculture in all IOMC and national projects by 2020. Existing gender guidelines could serve as the baseline, but do not currently address specific aspects of chemicals and wastes and the differences of their implications in women and men, and thus need to be expounded upon.
- Donors and IOMC organizations require gender assessments, collection of sex-disaggregated data, and gender trainings for involved staff and project participants for all chemicals, waste, and agriculture projects by 2020.
- Donors and IOMC organizations develop quantitative and qualitative gender and social class indicators for both policy and projects on chemicals, waste, and agriculture by 2020 to better understand gender and social class implications related to chemicals and waste topics, which will further lead to improved conditions for women and men equally, and empower them to play an active role as agents of change.
- Donors and IOMC organizations require a section about gender-related activities and outcomes of the project in all chemicals, wastes, and agriculture projects by 2020.
- Donors and IOMC organizations make all gender-disaggregated data retrieved in all projects publicly available beginning in 2022, to increase the protection of human health and to stimulate further scientific research.

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BEYOND 2020: CHEMICAL SAFETY AND HUMAN RIGHTS

IPEN AND PAN

January 2017

INTRODUCTION

The Strategic Approach to International Chemicals Management (SAICM) acknowledges there are health and environmental harms caused by chemical exposure and it makes a global political commitment to reform how chemicals are produced and used in order to minimize those harms.[261] The agreement is not legally binding. However, Heads of State at the 2002 World Summit on Sustainable Development in Johannesburg called for the development of SAICM, and the basic texts that define the agreement represent a consensus of Environment Ministers, Health Ministers and other delegates (from more than one hundred governments) to the first International Conference on Chemicals Management (ICCM1), held in Dubai, February 2006.

SAICM has already linked chemical safety to human rights through its Dubai Declaration, Overarching Policy Strategy and emerging policy issues. SAICM's ministerial Dubai Declaration commits all stakeholders to human rights, stating that, "We commit ourselves to respecting human rights and fundamental freedoms, understanding and respecting ecosystem integrity and addressing the gap between the current reality and our ambition to elevate global efforts to achieve the sound management of chemicals."[262] The SAICM Overarching Policy Strategy (OPS) provides important objectives for human rights, including risk reduction, information, illegal international traffic, technical cooperation and good governance, and notes the importance of pollution prevention as the primary means of achieving the SAICM objective. SAICM emerging policy issues have developed to protect those who are particularly vulnerable to advance human rights in specific areas. For example, the issue of chemicals in products centers on the right to information. The elimination of lead paint advances the right of every child to the highest attainable standard of physical and mental health. Initiatives on nanomaterials and electronics are closely linked with the rights of workers to a safe and healthy workplace. The recent Overall Orientation and Guidance (OOG) provides important "elements" and "activity areas" for advancing human rights. For example, human rights bodies have recognized the need for effective legislation, regulation and enforcement, as well as intersectoral and international cooperation, to protect vulnerable groups from human rights abuses by businesses.[263]

In 2015, the 4th International Conference on Chemicals Management (ICCM4) agreed to conduct an intersessional process to decide on the sound management of chemicals and wastes beyond 2020. In resolution IV/4, delegates agreed that the process should be informed by Agenda 2030 and, "develop recommendations regarding measurable objectives in support of the 2030 Agenda for Sustainable Development."[264] This link to Agenda 2030 also connects chemical safety and human rights in the Beyond 2020 process.

Governments adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) in October 2015. The Agenda 2030 Declaration resolves, "to protect human rights and promote gender equality and the empowerment of women and girls…"[265] The Declaration envisages, "A world where we reaffirm our commitments regarding the human right to safe drinking water and sanitation and where there is improved hygiene; and where food is sufficient, safe, affordable and nutritious" and a world, "of universal respect for human rights and human dignity…" [266] Agenda 2030 calls on businesses to not only innovate but also to protect labor rights, *"and environmental and health standards in accordance with relevant international standards and agreements and other*

[261] SAICM's overall objective, as adopted in 2006, is to: *[A]chieve 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.*

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ongoing initiatives in this regard, such as the Guiding Principles on Business and Human Rights and the labour standards of the International Labour Organization, the Convention on the Rights of the Child and key multilateral environmental agreements, for parties to those agreements." [267] Finally, Agenda 2030 reaffirms the importance of the Universal Declaration of Human Rights and other international instruments relating to human rights and international law.

Please see Annex 1 for more information on basic elements of human rights and guiding principles.

Abbreviations

ASEAN –	Association of Southeast Asian Nations
CEDAW –	UN Convention on the Elimination of Discrimination Against Women
CRC –	UN Convention on the Rights of the Child
ICESCR –	International Covenant on Economic Social and Cultural Rights
ICCPR –	International Covenant on Civil and Political Rights
OPS –	Overarching Policy Strategy of SAICM
OOG –	Overall Orientation and Guidance of SAICM
SAICM –	Strategic Approach to International Chemicals Management
SR Toxics -	UN Special Rapporteur on the human rights implications of the environmentally sound management and disposal of hazardous substances and wastes
UDHR –	Universal Declaration on Human Rights
UNDRIP –	UN Declaration on the Rights of Indigenous Peoples
UNGP –	UN Guiding Principles on Business and Human Rights

HUMAN RIGHTS MOST CONNECTED TO CHEMICAL SAFETY

Human rights that are most often implicated by the mismanagement of toxic chemicals during their lifecycle include:

1. **Right to life, liberty and personal security**[268]: Everyone has the right to life, which must be protected by law and must never be *"arbitrarily deprived."* States must *"adopt positive measures . . . [taking] all possible measures . . . to increase life expectancy, especially in adopting measures to eliminate malnutrition and epidemics."*[269]
2. **Right to physical integrity**: This right encapsulates the right of each human being, including children, to autonomy and self-determination over his or her own body.[270] It considers a non-consensual physical or mental intrusion against the body to be a human rights violation. Today, hundreds of toxic chemicals are measured in individuals, including children, with higher amounts measured in minority and low-income communities.
3. **Right to the highest attainable standard of physical and mental health**[271]: States have a duty to improve *"all aspects of environmental and industrial hygiene,"* as well as prevent, treat and control *"endemic, occupational and other diseases."* The Committee on Economic, Social and Cultural Rights (CESCR) has specifically identified a violation of the obligation to protect where there is a, *"failure to enact or enforce laws to prevent the pollution of water, air and soil by extractive and manufacturing industries."*[272]

   Notably, the Convention on the Rights of the Child (CRC) recognizes the right of every child to the highest attainable standard of health, and the duty of States *"to combat disease and malnutrition ... through the provision of adequate nutritious foods and clean drinking-water, taking into consideration the dangers and risks of environmental pollution."*[273]

4. **Right to an adequate standard of living, including food, water and housing**[274]: Article 11 of the ICESCR imposes a positive duty on States to take appropriate steps to provide an adequate standard of living for all people in regard to food and continuous improvement of living conditions. The right to food refers to quantity and *quality* of food. Food should be free of toxic chemicals and States should have protective measures

[267] United Nations (2015) Transforming our world: The 2030 Agenda for Sustainable Development, UN General Assembly, A/RES/70/1 http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[268] UDHR art. 3; ICCPR Art. 6; CRC article 6.

[269] ICCPR, General Comment No. 06 "Right to Life," (Sixteenth Session, 1982).

[270] See e.g. Committee on the Rights of the Child, general comment No. 13 (2011) on the right of the child to freedom from all forms of violence. See also UN Special Rapporteur on the human rights implications of the environmentally sound management and disposal of hazardous substances and wastes (SR Toxics), report to the UN Human Rights Council, A/HRC/33/41 (2016) (hereinafter "SR Toxics 2016 report A/HRC/33/41")

[271] UDHR article 25.1; WHO Constitution; ICESCR Art 12; CRC Article 24 (see also art 17).

[272] CESCR General Comment 14, para 51.

[273] CRC Art. 24(2)(c).

[274] UDHR article 25, and ICESCR article 11.

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in place to prevent contamination.[275] Similarly, water and housing (including communities) must be safe and adequate, respectively, requiring States to prevent contamination.[276]

5. **Right to information**[277]: *"Everyone has the freedom to seek, receive and impart information and ideas of all kinds."* Information is essential to protect from human rights abuses. Where human rights are violated due to toxic chemicals, gaining access to information is essential in order to give effect to other rights, such as due process, guarantees to a fair trial and the right to an effective remedy. Information must be (1) available, (2) accessible, and (3) function to protect the rights of everyone, in particular those who are the most vulnerable (i.e. non-discriminatory).[278] Health and safety information about toxic chemicals should never be confidential.[279]

6. **Right to participation**[280]: Every citizen has the *right and the opportunity to take part in the conduct of public affairs, directly or through freely chosen representatives."* States have a duty, and businesses have a responsibility, to consult, cooperate, and generally involve local and Indigenous communities in decision-making processes prior to the approval of any project potentially affecting their rights, lands, territories, or other resources.[281]

7. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) specifically highlights the right of Indigenous Peoples to participate in decision-making in matters that would affect their rights, through representatives chosen by themselves in accordance with their own procedures, as well as to maintain and develop their own Indigenous decision-making institutions. Furthermore, Indigenous Peoples' right to free, prior and informed consent has been recognized *"by a number of intergovernmental organizations, international bodies, conventions and international human rights law in varying degrees and increasingly in the laws of State."*[282]

8. **Right to an effective remedy**[283]: States have a duty to ensure access to an effective remedy for violations of rights, including those due to exposure to toxics.[284] To be effective, remedies should be appropriately adapted for children, taking into account their special needs, risks, and evolving development and capacities.[285] An effective remedy includes (a) the right to equal and effective access to justice; (b) effective and prompt reparation for harm suffered; and (c) access to relevant information concerning violations and reparation mechanism. This includes, inter alia, compensation and satisfaction, rehabilitation and guarantees of non-repetition.[286] The right to an effective remedy requires the remediation of contaminated sites, the cessation of actions or inactions that give rise to impacts, the provision of health care, and the dissemination of information to ensure that parents and children know how to prevent recurrence.[287] Timely reparation to prevent recurrence is essential.[288]

9. **Right to a safe, clean and healthy environment**[289]: Human rights are interrelated, indivisible, and interconnected. An unhealthy environment implies exposure to hazardous substances and implicates many—and often all—of the rights discussed above. While there is not global recognition of this right, and the right has not been implemented adequately by States that do recognize it, there is growing recognition of the right and its importance.

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275 Committee on Economic, Social and Cultural Rights, *General Comment No. 12, The right to adequate food, UN Doc. E/C.12/1999/5 (12 May 1999), at para. 8 and para. 10.*

276 See e.g. CESCR General Comment 15 (water) and General Comment 4 (housing).

277 ICCPR Art 19; CRC Art. 17; ILO c.170; See also Rio Declaration principle 10.

278 UN Special Rapporteur on the human rights implications of the environmentally sound management and disposal of hazardous substances and wastes (SR Toxics), report to the UN Human Rights Council, A/HRC/30/40 (2015) (hereinafter "SR Toxics 2015 report A/HRC/30/40").

279 SR Toxics 2015 report, A/HRC/30/40. See also Stockholm Convention, Minamata Convention and SAICM.

280 UDHR article 21; ICCPR article 25; UNDRIP article 18 and OECD Guidelines for Multinational Enterprises. See also Rio Declaration principle 10.

281 Human Rights Watch, "Submission to the United Nations Special Rapporteur on Toxic Wastes on the issue of the right of access to information with respect to hazardous substances and wastes." (2015). Available from: https://www.hrw.org/news/2015/03/27/submission-special-rapporteur-human-rights-and-hazardous-substances-and-wastes.

282 United Nations, "An Overview of the Principle of Free, Prior and Informed Consent and Indigenous Peoples in International and Domestic Law and Practices," Workshop on Free, Prior, and Informed Consent (17-19 January 2005).

283 ICCPR Article 2. See also UN Guiding Principles on Business and Human Rights, principles 22, 25 and 26. See also Rio Declaration principle 10 (1992).

284 Committee on the Rights of the Child, general comments No. 5 and No. 16; and International Covenant on Civil and Political Rights, art. 2 (3). A narrow interpretation of the right to remedy is for those rights that are civil and political in nature and contained in the ICCPR, as IESCR does not explicitly contain the right to an effective remedy.

285 Human Rights Committee, general comment No. 31 (2004) on the nature of the general legal obligation imposed on States parties to the Covenant, para. 15; see also Committee on the Rights of the Child, general comment No. 16, para. 31.

286 See General Assembly resolution 60/147, and Convention on the Rights of the Child, art. 39.

287 SR Toxics report to Human Rights Council on the rights of the child, A/HRC/33/41 (2016).

288 Committee on the Rights of the Child, general comment No. 16, para. 31.

289 Stockholm Declaration of the UN Conference on the Human Environment (1972); ICESCR Art 12.2; and various regional human rights and environmental conventions, including: Aarhus Convention (1998), African Charter on Human and Peoples Rights (1981) and its Protocol on the Rights of Women (2003), Additional Protocol to the American Convention on Human Rights (1998), Arab Charter on Human Rights, and the ASEAN Human Rights Declaration. The right or its corresponding duty on the State is also reflected in over 140 national constitutions.

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Certain groups are afforded special attention (and in some cases protections) due to an elevated likelihood of human rights abuses by State and/or non-State actors. For example, children, women, Indigenous Peoples, workers (especially migrant workers) and the elderly, as well as low income and minority communities, are indisputably recognized as being at grave risk of human rights abuses. These are also the groups that suffer the greatest impacts from toxic threats.

RIGHTS OF THE CHILD AND CHEMICAL SAFETY

Today, children are born "pre-polluted"[290] with representative studies measuring at least dozens, if not hundreds, of toxic and otherwise hazardous chemicals in children before birth through their mother's exposure. Pediatricians note a "silent pandemic" of disease and disability associated with exposure to toxics and pollution during childhood, many of which do not manifest themselves for years or decades. States have a duty to prevent children from being exposed to toxics and pollution, and businesses a corresponding responsibility.[291]

The UN Convention on the Rights of the Child (CRC) is the most widely ratified and monitored treaty in the world. The best interests of the child must be a *"primary consideration"* of States in the interpretation and implementation of the rights enshrined in the Convention. State Parties must integrate and apply this guiding principle when designing, implementing and enforcing public health, environmental and labor laws to protect children from toxics and pollution.

The duty of States and responsibility of business to prevent childhood exposure to toxics lies at the intersection of several rights enshrined in the CRC and other human rights treaties.[292] Each of these rights has either been interpreted to require that States prevent exposure to hazardous substances, or requires such an inference for its realization. Indeed, the best interests of the child are best served by preventing exposure to toxic chemicals and pollution, including those substances whose risks are not well understood.

The Committee on the Rights of the Child outlined a framework to ensure that businesses respect the right of children to be protected from human rights abuses, including from toxic threats.[293] This framework consists of effective legislation, regulation and enforcement; requiring businesses to conduct human rights due diligence; ensuring access to an effective remedy for violations; monitoring, coordinating, and awareness-raising measures; and international cooperation to address what is unquestionably a global problem.

BUSINESS OBLIGATIONS ON HUMAN RIGHTS AND CHEMICAL SAFETY

Businesses have been involved in human rights abuses in many countries. One example includes businesses involved in the pesticide industry. The 2011 Permanent People's Tribunal[294] Session on Agrochemicals and Transnational Corporations (TNCs)[295] found "*the six TNCs prima facie responsible for gross, widespread and systematic violations of the right to health and life, economic, social and cultural rights, as well as of civil and political rights, and women and children's rights*"; and "*that their systematic acts of corporate governance have caused avoidable catastrophic risks, increasing the prospects of extinction of biodiversity, including species whose continued existence is necessary for reproduction of human life.*" The Tribunal further found that "*three States, where six corporations are registered and headquartered, have failed to adequately regulate, monitor and discipline these entities by national laws and policy*"; and that "*The concerned States have unjustifiably promoted a double standard approach prohibiting the production of hazardous chemicals at home while allowing their own TNCs an unrestrained license for these enterprises in other States, especially of the Global South*". Lastly, it also found that "*Some of the policies especially of the WHO, FAO and ILO are not fully responsive to the urgency of regulation and redress, as articulated by suffering peoples, and human rights and social movement activist groups and associations. A more proactive role is especially indicated in the field of hazardous agrochemical and agribusiness TNCs.*"

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290 National Cancer Institute (United States), "Reducing environmental cancer risk" (2010).

291 SR Toxics 2016 report A/HRC/33/41.

292 See SR Toxics 2016 report (These rights include the right to life, survival and development; the right to physical and mental integrity; the right to an effective remedy; the right to the highest attainable standard of health; the right to a healthy environment; the right to be heard; the right to safe food, safe water and adequate housing, the right to non-discrimination; the right to be free from the worst forms of child labour; and the right to information).

293 UN Committee on the Rights of the Child, General Comment no. 16. See also SR Toxics 2016 report A/HRC/33/41.

294 http://permanentpeoplestribunal.org/?lang=en

295 The Permanent People's Tribunal Session on Agrochemical Transnational Corporations: Indictment and Verdict. http://www.agricorporateaccountability.net/en/page/general/17

The UN Guiding Principles on Business and Human Rights, endorsed by the UN Human Rights Council in 2011, clarified that: (1) States have an obligation to protect against human rights abuses due to business activities, including abuses arising from toxic chemicals and wastes[296]; (2) businesses have a responsibility to respect human rights implicated by toxic chemicals; and (3) businesses and States have a shared responsibility to realize an effective remedy for human rights abuses.

States *"should"*: enforce laws[297]; ensure laws do not constrain businesses from respecting human rights[298]; guide businesses on how to respect human rights[299]; *"encourage"* or *"require"* businesses to communicate how they address human rights impacts[300]; expect businesses operating abroad to respect human rights[301]; have heightened responsibilities for state-owned enterprises[302]; exercise oversight when privatizing services[303]; ensure policy coherence[304]; and maintain domestic policy space.[305]

Businesses *"should"* respect human rights.[306] At a minimum, this includes those rights contained in the International Bill of Human Rights and the ILO Declaration on Fundamental Principles and Rights at Work.[307] Respecting human rights *"requires"* that businesses avoid *"causing or contributing to"* adverse human rights impacts through their activities and address such impacts when they occur.[308] Businesses should *"prevent or mitigate"* impacts *"directly linked"* to operations, products or services by their business relationships, even if they have not contributed to those impacts.[309]

Businesses should have: (1) A policy statement acknowledging their responsibility to respect human rights;[310] a human rights due diligence process to identify, prevent, mitigate and account for how they address impacts on human rights;[311] and a process to enable the remediation of any adverse human rights impacts they cause or contribute to.[312]

CHEMICALS AGREEMENTS AND HUMAN RIGHTS

International agreements for chemical safety[313] reflect and advance a number of human rights and the principles on which they are based. For example, the right to information is implicitly the foundation of the Rotterdam Convention, and is also reflected in the Stockholm, Basel and Minamata Conventions, as well as in SAICM. These agreements also advance the rights to life, health, food, water and others to varying degrees. The Basel Convention's protocol on liability and compensation advances the right to a remedy, and its compliance mechanism advances accountability, although shortcomings exist in both regards.

While mutually reinforcing elements exist between chemical safety agreements and human rights laws, international treaties and agreements leave numerous protection gaps. Thousands of toxic chemicals are unregulated throughout their lifecycle at the global level, implicating a myriad of human rights. The continued emission of pollutants, and failures to remediate tens of thousands of contaminated sites, question the adequacy of States to realize the right to an effective remedy. Businesses have a responsibility to respect human rights. The shortcomings through the human rights lens are numerous, whether viewed from accountability, the right to life and health, the right to water or other perspectives.

Some of these protection gaps are best addressed at the national level; but others are best addressed through international cooperation under regional or global frameworks, a principle of international human rights law. Irrespective of whether national, regional or global approaches are deemed most effective and efficient for chemical safety, States have an obligation to respect, protect and fulfill human rights implicated by toxic chemicals.

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296 Principle 1.
297 Principle 3
298 Principle 3
299 Principle 3
300 Principle 3
301 Principle 2
302 Principle 4
303 Principle 5
304 Principle 8
305 Principle 9
306 Principle 11.
307 Principle 12.
308 Principle 13.
309 Principles 13 and 19.
310 Principles 15 and 16.
311 Principles 15 and 17-21.
312 Principles 15, 22, and 24.
313 These include the Basel, Minamata, Rotterdam and Stockholm Conventions and the Strategic Approach to International Chemicals Management For the purposes of this report, the Vienna Convention and its Montreal Protocol on Ozone Depleting Substances, the UN Framework Convention on Climate Change and other international agreements that directly or indirectly address "chemical safety" are not considered.

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OUTCOMES FOR CHEMICAL SAFETY AND HUMAN RIGHTS

1. The Beyond 2020 Declaration builds on the Dubai Declaration by affirming support for protecting, respecting and fulfilling human rights implicated by chemicals and wastes, including the rights to life, health, physical integrity, information, meaningful participation, an effective remedy, and safe food, housing and water, among others.
2. The Beyond 2020 Declaration affirms that businesses conduct human rights due diligence for their activities linked to toxic chemicals and waste, including the rights to life, health, an adequate standard of living (housing, food and water), non-discrimination, and physical integrity, as well as the rights of vulnerable groups, such as women, children and workers.
3. The Beyond 2020 Declaration affirms the need to prioritize the prevention of exposures by women, children, the elderly, workers, the poor, Indigenous Peoples, migrants, minorities and groups that are most vulnerable.
4. Retain the participatory approach of SAICM in the Beyond 2020 framework, in line with the right to meaningful participation.
5. UN Environment and the World Health Organization facilitate the exchange of expertise and best practices between human rights and chemical experts with the SAICM process to build collective capacity to prevent adverse impacts of hazardous substances and wastes by 2025 and report regularly on progress to meetings of the International Conference on Chemicals Management.
6. UN Environment operationalizes a national periodic monitoring, reporting and evaluation mechanism within SAICM by 2030 that provides synergistic information exchange about progress toward chemical safety with UN human rights treaty bodies, Special Procedures, and other human rights mechanisms. This review mechanism should use human rights indicators and participatory processes, paying particular attention to those most vulnerable such as women, children, workers, minorities, the poor, Indigenous Peoples and others.
7. Office of the High Commissioner on Human Rights strengthens collaboration between national, regional and international human rights mechanisms and environmental, health, labor and other related authorities on the implications of hazardous substances for human rights by 2025 and reports regularly on progress to the chemicals conventions COPs and meetings of the International Conference on Chemicals Management.
8. Inter-Organization Programme for the Sound Management of Chemicals and Global Environment Facility activities and projects include a requirement for disaggregated information on risks to vulnerable groups from hazardous substances and wastes by 2030 to help realize the rights to information and meaningful participation.
9. Establish a global mechanism within SAICM by 2030 to protect environmental and human rights defenders and include a procedure for reporting reprisals.
10. UN Environment collaborates with the Office of the High Commissioner on Human Rights to establish a grievance mechanism by 2030 for victims of hazardous substances who allege a denial of access to justice and/or their right to an effective remedy.
11. SAICM Secretariat establishes links and reports on activities of the international working group to elaborate an international legally binding instrument on Transnational Corporations and Other Business Enterprises with respect to human rights.

ANNEX 1: BASIC ELEMENTS OF HUMAN RIGHTS

Everyone is born with and possesses the same rights, regardless of where they live, or their race, gender, religion, age, ethnic or cultural background, or other status. These rights cannot be taken away, but may be subject to certain limitations (e.g. national security).

All rights are equal in importance; none can be fully enjoyed without the others. In other words, human rights are universal, inalienable, indivisible and interdependent.[314]

Duties of States

The fact that individuals hold rights imposes duties upon others.[315] Within the human rights framework, governments are the principal duty bearers. As duty bearers, States have an obligation to (1) respect, (2) protect and (3) fulfill human rights.[316]

The obligation to respect means that States must refrain from interfering with or curtailing the enjoyment of human rights. The obligation to protect requires States to protect individuals and groups against human rights abuses.[317] This obligation includes actions by the private sector and other

[314] Universal Declaration on Human Rights (UDHR), Art. 1; Vienna

[315] http://humanrightshistory.umich.edu/accountability/obligations-of-governments/

[316] UN Office of the High Commissioner for Human Rights, *International Human Rights Law (webpage, last accessed Nov. 22, 2016), available at:* http://www.ohchr.org/en/professionalinterest/Pages/InternationalLaw.aspx

[317] International Law Commission, 53rd Session. "Articles on Responsibility of States for Internationally Wrongful Acts." United Nations, 2001. (Adopted by the International Law Commission and submitted to the UN General Assembly in 2001), available at: http://legal.un.org/ilc/texts/instruments/english/draft_articles/9_6_2001.pdf

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non-state actors.[318] The obligation to fulfill means that States must take positive action to facilitate the enjoyment of basic human rights.

A State may be held responsible for human rights violations by private actors, and may be considered to have breached their international obligations when human rights violations are either attributable to the State, or where the State failed to take appropriate steps to prevent, investigate, punish, and redress private actors' violations.[319]

Human rights principles

Key principles of international law underpin human rights. These include:

1. Non-discrimination[320]: All individuals are equal as human beings and by virtue of the inherent dignity of each human person. No one, therefore, should suffer discrimination on the basis of race, colour, ethnicity, gender, age, language, sexual orientation, religion, political or other opinion, national, social or geographical origin, disability, property, birth or other status as established by human rights standards.
2. Participation and Inclusion[321]: All people have the right to participate in and access information relating to the decision-making processes that affect their lives and well-being. Human rights-based approaches require a high degree of participation by communities, civil society, minorities, women, young people, Indigenous Peoples and other identified groups.
3. Accountability and Rule of Law: States and other duty-bearers are answerable for the observance of human rights. In this regard, they have to comply with the legal norms and standards enshrined in international human rights instruments. Where they fail to do so, aggrieved rights-holders are entitled to institute proceedings for appropriate redress before a competent court or other adjudicator in accordance with the rules and procedures provided by law.
4. Non-regression[322]: Requires that norms that have already been adopted by States not be revised, if this implies lowering of standards of protection of collective and individual rights. Once a human right is recognized it cannot be restrained, destroyed or repealed. Thus, States should not seek to achieve economic gain to the detriment of health and other human rights.
5. Responsibility of businesses to undertake human rights due diligence: The commentary to Principle 11 of the UNGP elaborates on this concept, stating that *"[t]he responsibility to respect human rights is a global standard of expected conduct for all business enterprises wherever they operate."* Further, *"[t]he responsibility to respect human rights] exists independently of States' abilities and/or willingness to fulfill their own human rights obligations, and does not diminish those obligations."*

[318] UN Guiding Principles on Business and Human Rights

[319] United Nations, "Guiding Principles on Business and Human Rights: Implementing the United Nations 'Protect, Respect and Remedy' Framework." 3 (2011). Available from: http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf.

[320] UDHR Articles 2 and 7; ICCPR Article 26; CEDAW Article 2; CRC Article 2

[321] UDHR Article 21; ICCPR Article 25; UNDRIP Article 18; OECD Guidelines for Multinational Enterprises. Regarding the Right to Free Prior and Informed Consent, see UDHR Article 19; ILO c.169 Articles 6, 7, 16 and 22; and the Rotterdam Convention.

[322] UDHR, Article 30 (1948); Article 5 of ICESCR (1966); and Article 5 of ICCPR (1966).

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BEYOND 2020: GREEN CHEMISTRY AND SUSTAINABLE CHEMISTRY

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INTRODUCTION

The Strategic Approach to International Chemicals Management (SAICM) addresses significant health and environmental harms caused by chemical exposure and makes a global political commitment to reform how chemicals are produced and used in order to minimize those harms. Heads of State at the 2002 World Summit on Sustainable Development in Johannesburg called for the development of SAICM. While the agreement is not legally binding, its basic texts represent a consensus of Environment Ministers, Health Ministers and other delegates from more than one hundred governments who attended the first International Conference on Chemicals Management (ICCM1), held in Dubai, February 2006.

Green chemistry has been an important element of sound chemicals management since the first years of SAICM. In the SAICM agreement, the expectation set for green chemistry is that it should improve standards of living and lead to greater protection of health and the environment. [323] In 2014, the United Nations Environment Assembly, recognized a new term, "sustainable chemistry," noting that the private sector should apply sustainable chemistry because, "Industry has a special responsibility, as designer, producer and use of chemicals and products…"[324] Green chemistry is well defined and has a history of more than 20 years as a formal sub-discipline of chemistry. Sustainable chemistry also has important historical endorsement. Both concepts are useful in the Beyond 2020 process.

A discussion of green chemistry and sustainable chemistry must also recognize that neither concept replaces the need for sound chemicals management and dealing with legacy issues. Currently, industrial production and use of chemicals is shifting to developing and transition countries.[325] This shift is accompanied by continued or increased use of pesticides and increasing use of products containing hazardous chemicals.[326] UNEP's Global Chemicals Outlook notes that one-third of all chemical consumption may be in developing countries by 2020 and that, "the prospect for widespread and multifaceted exposures of communities and the environment to chemicals of high and unknown concern also increases." [327]

As delegates plan for the future of cooperation on chemical safety, defining and supporting a new paradigm of non-toxic chemical design and use could provide an important contribution to a sustainable economy. The goal is that countries not only manage dangerous chemicals better by applying stricter legislation and its enforcement, but that industry designs safer, non-toxic chemistries from the start. This has important links to occupational health and safety, pollution prevention, and sustainable development patterns, and provides a clear, proactive role for the private sector to reduce and eliminate the use or generation of hazardous substances in the design, manufacture and application of chemical products.

THE HIGH COSTS OF HAZARDOUS CHEMICALS

Hazardous chemicals and wastes, *"are a public health issue of global concern."*[328] Today, children are born *"pre-polluted,"*[329] with representative studies measuring at least dozens, if not hundreds, of toxic and otherwise hazardous chemicals in children before birth through their mother's exposure. Pediatricians note a *"silent pandemic"* of disease and disability associated with exposure to tox-

[323] UNEP (2006) Strategic Approach to International Chemicals Management: SAICM texts and resolutions of the International Conference on Chemicals Management, "We are determined to realize the benefits of chemistry, including green chemistry, for improved standards of living, public health and protection of the environment." http://www.saicm.org/images/saicm_documents/saicm%20texts/SAICM_publication_ENG.pdf

[324] UNEP (2014) Strengthening the sound management of chemicals and wastes in the long term, Proceedings of the United Nations Environment Assembly of the United Nations Environment Programmed at its first session, UNEP/EA.1/10

[325] UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

[326] UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

[327] UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

[328] UN Human Rights Council (2015) Report of the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes, Başkut Tuncak, A/HRC/30/40

[329] National Cancer Institute (United States), "Reducing environmental cancer risk" (2010).

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ics and pollution during childhood, many of which do not manifest themselves for years or decades.[330] Health effects associated with chemical exposure include damage to body organs, cancer, asthma, diabetes, and birth defects, among others. [331]

UNEP's Global Chemicals Outlook notes that hazardous chemicals also have damaging environmental effects. For example, the effects of hazardous chemicals on aquatic organisms include, *"cancers, disrupted reproduction, immune dysfunction, damage to cellular structures and DNA, and gross deformities."*[332] Harms in predator species include, *"thinning of eggshells, disruption of parental behavior, reproductive disorders, and cancers, among other effects."* [333]

Unfortunately, the harms associated with hazardous chemicals represent costs that are externalized by the industry onto the public and the environment. As noted by UNEP, *"The vast majority of human health costs linked to chemicals production, consumption and disposal are not borne by chemicals producers, or shared down the value-chain. Uncompensated harms to human health and the environment are market failures that need correction."*[334]

The magnitude of the costs externalized by the chemical industry is enormous. Conservative estimates of some of these externalized costs include:

- US$90 billion for health-related pesticide costs in Sub-Saharan Africa from 2005 – 2020. As a means of comparison, the entire 2009 Overseas Development Assistance to the health sector in Africa was US$4.8 billion – a fraction of the health-related costs due to pesticides alone.[335]
- €157 billion as a median annual health cost for diseases associated with endocrine disrupting chemicals in the European Union. The diseases include IQ loss and associated intellectual disability, autism, attention-deficit hyperactivity disorder, childhood obesity, adult obesity, adult diabetes, cryptorchidism, male infertility, and mortality associated with reduced testosterone. The authors noted that this estimate was conservative, as it represented only those EDCs with the highest probability of causation and a broader analysis would have produced greater estimates of burden of disease and accompanying costs.[336]
- US$236 billion annual costs for pollution associated with the production and use of volatile organic compounds. This is an underestimate, as it excludes damage to most natural resources as well as water pollution and land use change and waste in non-OECD countries.[337]
- US$977 billion annual costs related to childhood lead exposure in low- and middle-income countries. This figure represents 1.20% of global GDP in 2011. The authors note that the largest burden of lead exposure is now borne by low- and middle-income countries.[338]

None of these figures reflect the full magnitude of human suffering or damage to ecosystems. Chemistries that reduce hazard have a key role to play in helping to internalize the costs of chemical production, use, and disposal.

GREEN CHEMISTRY AND HAZARD REDUCTION

Green chemistry has been recognized as a scientific approach within chemistry for two decades. It is a broad concept but is most frequently associated with efforts at hazard reduction. The widely accepted definition of green chemistry as proposed by the founders of the field is, *"the utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products."*[339] US EPA notes that green chemistry, *"applies across the life cycle of a chemical product, including its design, manufacture, use, and ultimate disposal."*[340] The Green Chemistry and Commerce Council describes the important role of product developers, manufacturers, brands, and retailers in implementing green chemistry, noting that they can do this by, *"changing design specifications, sourcing materials and products that incorporate green chemistry practices, changing manufacturing practices to substitute or reduce the use of hazardous chemicals, and*

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330 Grandjean P, Landrigan PJ (2014) Neurobehavioural effects of developmental toxicity, Lancet Neurology 13:330-338

331 UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

332 UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

333 UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

334 UNEP (2012) *Global Chemicals Outlook: Towards the sound management of chemicals, p 118, ISBN 978-92-807-3320-4*

335 UNEP (2012) *Global Chemicals Outlook: Towards the sound management of chemicals, p 99, ISBN 978-92-807-3320-4*

336 Trasande L, Zoeller RT, Hass U, Kortenkamp A, Grandjean P, Myers JP, DiGangi J, Bellanger M, Hauser R, Legler J, Skakkebaek NE, Heindel JJ (2015) *Estimating Burden and Disease Costs of Exposure to Endocrine-Disrupting Chemicals in the European Union*, J ClinEndocrinolMetab 100: 1245 – 1255 doi: 10.1210/jc.2014-4324

337 UNEP (2013) Costs of inaction on the sound management of chemicals; p 11, Job numbe DTI/1551/G

338 Attina TM, Trasande L (2013) *Economic costs of childhood lead exposure in low- and middle-income countries, Environ Health Perspect 121: 1097-1102 doi:* 10.1289/ehp.1206424

339 Anastas PT, Warner, JC (1998) Green Chemistry: Theory and Practice, Oxford University Press: New York

340 https://www.epa.gov/greenchemistry/basics-green-chemistry#definition

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developing and implementing policies that restrict chemicals of concern in the products they source, make, and/or sell."[341]

Less hazard is key to green chemistry. US EPA describes less hazardous chemicals as substances that are less toxic to organisms, less damaging to ecosystems, not persistent or bioaccumulative in organisms or the environment, and inherently safer to handle and use because they are not flammable or explosive.[342] In its guidance on alternatives, the Stockholm Convention POPs Review Committee notes that safer alternatives should not have hazardous properties, *"such as mutagenicity, carcinogenicity or adverse effects on the reproductive, developmental, endocrine, immune or nervous systems."*[343]

THE PRINCIPLES OF GREEN CHEMISTRY

In the 1990s, Anastas and Warner developed 12 principles of green chemistry to guide implementation (please see the green chemistry principles in Annex 1). A key concept in the green chemistry principles is to create designs that minimize and eliminate toxicity while maintaining function. This implies that green chemists must also utilize knowledge of toxicology and environmental health. As Anastas has noted, designing according to green chemistry principles requires, *"innovative approaches to chemical characterization that state that hazard is a design flaw and must be addressed at the genesis of molecular design."*[344] US EPA has further outlined how green chemistry can positively impact the pollution prevention hierarchy, particularly through source reduction and prevention of chemical hazards. This includes the following elements:[345]

- Designing chemical products to be less hazardous to human health and the environment
- Making chemical products from feedstocks, reagents, and solvents that are less hazardous to human health and the environment
- Designing syntheses and other processes with reduced or even no chemical waste
- Designing syntheses and other processes that use less energy or less water
- Using feedstocks derived from annually renewable resources or from abundant waste
- Designing chemical products for reuse or recycling
- Reusing or recycling chemicals

The principles of green chemistry address key issues in the design and manufacturing of chemicals and a few examples are described below.

Persistence is one of the key negative characteristics of persistent organic pollutants – and green chemistry principles call for design and use of chemicals that fulfill their function, then break down into innocuous degradation products. This principle requires designing features that permit biodegradation, hydrolysis, and/or photolysis into the chemical itself. While challenging, the principle was implemented for surfactants used in US wastewater treatment plants in the 1960s. Eliminating persistence is also consistent with obligations detailed in Article 3 of the Stockholm Convention, which requires Parties with regulatory schemes to prevent production and use of chemicals that have the characteristics of persistent organic pollutants, including persistence.[346]

Fossil fuels are intimately linked to producing carbon-based chemicals – but oil, coal, and natural gas are not renewable. Green chemistry principles call for use of renewable feedstocks and in practice this points to use of biomass as a source of carbon. In 2002, the US Department of Energy predicted that by 2030 a bioenergy and bio-based products industry would be well established.[347] The current use of plant oils to make biodiesel and lignin and plant oils to make plastics indicates that this green chemistry principle can be implemented. A key issue will be implementing it without competing for food sources. Like the design aspects of green chemistry, this principle also extends chemistry into other disciplines such as agronomy, toxicology, engineering and others.

The green chemistry principles are also relevant to chemical manufacturing. Solvents play a key role in chemical reactions and represent 50% - 80% of the mass in a standard batch synthesis. Solvents are also relevant to toxicity. One estimate indicates that, *"solvents account for about 75% of the cumulative lifecycle environmental impacts of a*

[341] Green Chemistry and Commerce Council (2015) An agenda to mainstream green chemistry http://www.greenchemistryandcommerce.org/documents/An_Agenda_to_Mainstream_Green_Chemistry.pdf

[342] https://www.epa.gov/greenchemistry/basics-green-chemistry#twelve

[343] UNEP (2009) General guidance on considerations related to alternatives and substitutes for listed persistent organic pollutants and candidate chemicals, Report of the Persistent Organic Pollutants Review Committee on the work of its fifth meeting, UNEP/POPS/POPRC.5/10/Add.1

[344] https://www.acs.org/content/acs/en/greenchemistry/what-is-green-chemistry/principles/gc-principle-of-the-month-4.html#articleContent_headingtext_2

[345] https://www.epa.gov/greenchemistry/basics-green-chemistry#twelve

[346] UNEP (2004) Article 3: Measures to reduce or eliminate releases from intentional production and use, Article 3.3 and 3.4, The Stockholm Convention on Persistent Organic Pollutants

[347] https://www.acs.org/content/acs/en/greenchemistry/what-is-green-chemistry/principles/green-chemistry-principle--7.html

standard batch chemical operation…and drive most of the energy consumption in a process."[348] The green chemistry principles for safer solvents provide a key link to cleaner production.

The green chemistry principle of "Real-time analysis for Pollution Prevention" is another connection to manufacturing and an objective of the SAICM Overarching Policy Strategy.[349] The use of real-time analysis prevents pollution by providing essential feedback to ensure processes are working properly and detect problems before major emissions or accidents occur. Real-time analysis also reveals the true nature of an operation without biases inherent in selecting certain time periods.

Finally, green chemistry principles call for inherently safer chemistry to prevent accidents. In 2012, in the US alone, there were an estimated 27,500 toxic chemical spills associated with 1000 deaths. [350] UNEP's Global Chemicals Outlook notes that petrochemical accidents in China in 2006 caused losses of approximately USD$11billion – not including injuries, loss or damage to human life, or environmental damage. [351] An explosion at a single plant in France in 2001 caused 30 deaths, 10,000 injuries, and caused damage costs of approximately USD$1.8 billion. [352] Clearly, the green chemistry principle of inherently safer chemistry has an important role to play in accident prevention.

Inherently safer chemistry is also highly applicable to preventing work-associated illnesses. Green chemistry occupies the top position in the hierarchy of safety controls because, *"the most effective means of increasing safety is eliminating the hazard component."*[353] Less effective steps include the use of engineering controls and administrative and work practice controls that require certain actions from the employer or worker. The least effective safety control is the use of personal protective equipment. Even in a country with established infrastructure for chemicals regulation such as the US, the government estimates that, *"workers suffer more than 190,000 illnesses and 50,000 deaths annually related to chemical exposures."*[354] The US Occupational Safety and Health Administration notes that these diseases include cancers and diseases of the lung, kidneys, skin, heart, stomach, brain and nerves.[355] The Global Chemicals Outlook notes that the costs associated with occupational injury and illness in the chemical industry can be significant. In 2004, preventable diseases caused by chemical exposures cost California insurers and workers USD$1.4 billion.[356]

SAICM OBJECTIVES REFLECT GREEN CHEMISTRY PRINCIPLES

Key SAICM objectives and parts of its Global Plan reflect many of the principles of green chemistry. The green chemistry principle of prevention is reflected in the SAICM Overarching Policy Strategy as an objective to, *"reduce the generation of hazardous waste, both in quantity and toxicity"*[357] The green chemistry principle of designing safer chemicals is reflected in the SAICM Dubai Declaration, which notes the need to develop, *"safer alternative products and processes, including non-chemical alternatives."* [358] SAICM's Overarching Policy Strategy includes the need to promote *"cleaner production, informed substitution of chemicals of concern and non-chemical alternatives"* and undertake research to develop, *"safer chemicals and cleaner technologies and non-chemical alternatives and technologies."* [359] SAICM also commits to ensure that research and development is performed in relation to, *"development of safer chemicals and cleaner technologies and non-chemical alternatives and technologies."* [360] The green

[348] https://www.acs.org/content/acs/en/greenchemistry/what-is-green-chemistry/principles/green-chemistry-principle--5.html

[349] UNEP (2006) Strategic Approach to International Chemicals Management: SAICM texts and resolutions of the International Conference on Chemicals Management http://www.saicm.org/images/saicm_documents/saicm%20texts/SAICM_publication_ENG.pdf

[350] American Sustainable Business Council, Green Chemistry & Commerce Council (2015) Making the business and economic case for safer chemistry http://www.greenchemistryandcommerce.org/documents/trucost_gc3_report_april2015.pdf

[351] UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

[352] UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

[353] https://www.acs.org/content/acs/en/greenchemistry/what-is-green-chemistry/principles/green-chemistry-principle--12.html

[354] https://www.osha.gov/dsg/safer_chemicals/index.html

[355] https://www.osha.gov/dsg/safer_chemicals/index.html

[356] UNEP (2013) Global Chemicals Outlook – Towards sound management of chemicals, ISBN: 978-92-807-3320-4, Job Number DTI/1639/GE

[357] UNEP (2006) Strategic Approach to International Chemicals Management: SAICM texts and resolutions of the International Conference on Chemicals Management http://www.saicm.org/images/saicm_documents/saicm%20texts/SAICM_publication_ENG.pdf

[358] UNEP - WHO (2006) Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[359] UNEP - WHO (2006) Overarching policy strategy, para 14, 15 Strategic Approach to International Chemicals Management http://www.saicm.org/index.php?option=com_content&view=article&id=73&Itemid=475

[360] UNEP (2006) Strategic Approach to International Chemicals Management: SAICM texts and resolutions of the International Conference on Chemicals Management http://www.saicm.org/images/saicm_documents/saicm%20texts/SAICM_publication_ENG.pdf

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chemistry principle of pollution prevention is strongly supported by the SAICM Overarching Policy Strategy objective to, *"give priority consideration to application of preventive measures such as pollution prevention."* [361]

THE BENEFITS OF GREEN CHEMISTRY

Application of green chemistry principles leads to clear benefits for human health, environment, and the economy. Some descriptions from the US EPA about these benefits include the ones below.[362] Added notes describe relevant SDGs.

Human health

- Cleaner air: Less release of hazardous chemicals to air leading to less damage to lungs (Relevant to SDGs 3, 7, 11)
- Cleaner water: less release of hazardous chemical wastes to water leading to cleaner drinking and recreational water (Relevant to SDGs 3, 6, 11, 14)
- Increased safety for workers in the chemical industry; less use of toxic materials; less personal protective equipment required; less potential for accidents (e.g., fires or explosions) (Relevant to SDGs 3, 8, 12)
- Safer consumer products of all types: new, safer products will become available for purchase; some products (e.g., drugs) will be made with less waste; some products (i.e., pesticides, cleaning products) will be replacements for less safe products (Relevant to SDGs 3, 12)
- Safer food: elimination of persistent toxic chemicals that can enter the food chain; safer pesticides that are toxic only to specific pests and degrade rapidly after use (Note this should also include non-chemical methods and agroecology techniques; Relevant to SDG2)
- Less exposure to such toxic chemicals as endocrine disruptors (Relevant to SDGs 3, 6, 12, 14)

Environment

- Many chemicals end up in the environment by intentional release during use (e.g., pesticides), by unintended releases (including emissions during manufacturing), or by disposal. Green chemicals either degrade to innocuous products or are recovered for further use (Relevant to SDGs 2, 6, 9, 12, 14)
- Plants and animals suffer less harm from toxic chemicals in the environment (Relevant to SDGs 12, 15)
- Lower potential for global warming, ozone depletion, and smog formation (Relevant to SDGs 11, 13, 14)
- Less chemical disruption of ecosystems (Relevant to SDGs 12, 14, 15)
- Less use of landfills, especially hazardous waste landfills (Relevant to SDGs 11, 12)

Economy and business

- Higher yields for chemical reactions, consuming smaller amounts of feedstock to obtain the same amount of product (Relevant to SDGs 9, 12)
- Fewer synthetic steps, often allowing faster manufacturing of products, increasing plant capacity, and saving energy and water (Relevant to SDGs 9, 12)
- Reduced waste, eliminating costly remediation, hazardous waste disposal, and end-of-the-pipe treatments (Relevant to SDGs 9, 11, 12)
- Allow replacement of a purchased feedstock by a waste product (Relevant to SDGs 9, 12)
- Better performance so that less product is needed to achieve the same function (Relevant to SDGs 9, 12)
- Reduced use of petroleum products, slowing their depletion and avoiding their hazards and price fluctuations (Relevant to SDGs 9, 12, 13)
- Reduced manufacturing plant size or footprint through increased throughput (Relevant to SDGs 9, 12)
- Increased consumer sales by earning and displaying a safer-product label (e.g., Safer Choice labeling[363]) (Relevant to SDGs 9, 12)
- Improved competitiveness of chemical manufacturers and their customers (Relevant to SDG 9)

In 2015, the American Sustainable Business Council (representing 250,000 US businesses) and the Green Chemistry & Commerce Council (a business to business forum) released a report outlining the potential economic value of safer chemistry. The two business groups define safer chemistry as practices that include, *"reducing the use and generation of hazardous substances, reducing the human health and environmental impacts of processes and products, and creating safer products."*[364]

To illustrate this, the Councils note that Kaiser Permanente, a large US health care provider, requires medical product vendors providing USD$1 billion worth of prod-

[361] UNEP (2006) Strategic Approach to International Chemicals Management: SAICM texts and resolutions of the International Conference on Chemicals Management http://www.saicm.org/images/saicm_documents/saicm%20texts/SAICM_publication_ENG.pdf

[362] https://www.epa.gov/greenchemistry/benefits-green-chemistry

[363] https://www.epa.gov/saferchoice/learn-about-safer-choice-label

[364] American Sustainable Business Council, Green Chemistry & Commerce Council (2015) Making the business and economic case for safer chemistry http://www.greenchemistryandcommerce.org/documents/trucost_gc3_report_april2015.pdf

ucts annually to disclose product ingredients. [365] Kaiser Permanente *"considers that it has the right to know"* and uses the information to phase out chemicals of concern such as carcinogens, mutagens, reproductive toxicants, and persistent bioaccumulative toxins. [366] In 2014, the company spent its USD$30 million furniture budget on products that did not contain toxic flame retardants. [367]

The American Sustainable Business Council and Green Chemistry & Commerce Council report notes that safer chemistry's potential is not fully realized and makes several recommendations, including: encouraging businesses to evaluate their individual business case for safer chemistry; tracking safer chemistry metrics; quantifying societal benefits of safer chemistry; leveraging capital flows toward safer chemistry; and quantifying potential job growth and revenue opportunities. [368]

SUSTAINABLE CHEMISTRY

Sustainable chemistry attempts to expand conventional chemistry to include environmental, social, and economic aspects. The social aspects should include decent, safe working conditions and respect for human rights and labor rights, including the ILO Core Labour Standards.[369] [370]

To date, sustainable chemistry has only been vaguely defined, leaving the term open to any number of interpretations, including chemistries that do nothing to reduce harm. Leaving the term "sustainable chemistry" without a clear definition invites labeling all kinds of current chemistries as sustainable chemistry, watering down the term to render it nearly useless and leaving opportunities to "greenwash" chemistries with a term that suggests social or environmental benefits that do not exist. Some may even want to completely replace green chemistry, which is well-defined, with a more ambiguous concept of sustainable chemistry as a way to shift the focus away from hazard reduction. A more precise definition of sustainable chemistry is needed to clarify the relationship between hazard reduction and other desirable social or environmental outcomes. Green chemistry should be an obligatory part of sustainable chemistry so that hazard reduction is fully incorporated into the sustainable chemistry concept.

Currently, sustainable chemistry is a broad concept but is most frequently associated with efforts to achieve resource efficiency. For example, OECD has defined sustainable chemistry as follows:

"Sustainable chemistry is a scientific concept that seeks to improve the efficiency with which natural resources are used to meet human needs for chemical products and services. Sustainable chemistry encompasses the design, manufacture and use of efficient, effective, safe and more environmentally benign chemical products and processes. Sustainable chemistry is also a process that stimulates innovation across all sectors to design and discover new chemicals, production processes, and product stewardship practices that will provide increased performance and increased value while meeting the goals of protecting and enhancing human health and the environment."[371]

Principles of sustainable chemistry

The German Federal Environmental Agency (UBA)[372] has prepared a document outlining the agency's positions on the principles of sustainable chemistry and criteria that should be applied to the concept.[373] While UBA does not provide a concise definition, the general principles of sustainable chemistry are outlined as:

- *Qualitative development: Use of harmless substances, or where this is impossible, substances involving a low risk for humans and the environment, and manufacturing of long-life products in a resource-saving manner;*
- *Quantitative development: Reduction of the consumption of natural resources, which should be renewable wherever possible, avoidance or minimization of emis-*

[365] American Sustainable Business Council, Green Chemistry & Commerce Council (2015) Making the business and economic case for safer chemistry http://www.greenchemistryandcommerce.org/documents/trucost_gc3_report_april2015.pdf

[366] American Sustainable Business Council, Green Chemistry & Commerce Council (2015) Making the business and economic case for safer chemistry http://www.greenchemistryandcommerce.org/documents/trucost_gc3_report_april2015.pdf

[367] American Sustainable Business Council, Green Chemistry & Commerce Council (2015) Making the business and economic case for safer chemistry http://www.greenchemistryandcommerce.org/documents/trucost_gc3_report_april2015.pdf

[368] American Sustainable Business Council, Green Chemistry & Commerce Council (2015) Making the business and economic case for safer chemistry http://www.greenchemistryandcommerce.org/documents/trucost_gc3_report_april2015.pdf

[369] Workers and Trade Unions Major Group (2010) Discussion papers submitted by Major Groups, Commission on Sustainable Development, E/CN.18/2010/11/Add.6 http://www.un.org/esa/dsd/resources/res_pdfs/csd-18/e_cn18_2010_11_add6.pdf

[370] http://www.ilo.org/global/standards/lang--en/index.htm

[371] http://www.oecd.org/chemicalsafety/risk-management/sustainablechemistry.htm

[372] https://www.umweltbundesamt.de/en/topics/chemicals/chemicals-management/sustainable-chemistry

[373] German Federal Environment Agency (2009) Sustainable Chemistry: Positions and criteria of the Federal Environment Agency https://www.umweltbundesamt.de/en/publikationen/sustainable-chemistry

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sion or introduction of chemicals or pollutants into the environment. Such measures will help to save costs;

- *Comprehensive life cycle assessment: Analysis of raw material production, manufacture, processing, use and disposal of chemicals and discarded products in order to reduce the consumption of resources and energy and to avoid the use of dangerous substances;*
- *Action instead of reaction: Avoidance, already at the stage of development and prior to marketing, of chemicals that endanger the environment and human health during their life cycle and make excessive use of the environment as a source or sink; reduction of damage costs and the associated economic risks for enterprises and remediation costs to be covered by the state;*
- *Economic innovation: Sustainable chemicals, products and production methods produce confidence in industrial users, private consumers and customers from the public sector and thus, result in competitive advantages.*

SUSTAINABLE CHEMISTRY AND HAZARD REDUCTION

Fully defined, sustainable chemistry could address resource efficiency, social and economic effects and hazard reduction. The connection between sustainable chemistry and hazard reduction has been addressed in a recent US proposal. US Senator Chris Coons proposed a *"Sustainable Chemistry Research and Development Act"*[374] in the US Congress that updates the definition of Sustainable Chemistry to contain both goals of resource efficiency and efforts to reduce and eliminate hazards:

The term 'sustainable chemistry" means the design, development, demonstration, and commercialization of high quality chemicals and materials, chemical processes and products, and manufacturing processes that eliminate or reduce chemical risks to benefit human health and the environment across the chemical lifecycle, to the highest extent practicable, through—

(A) increasing the use of more sustainable, renewable, or recycled substances and materials;

(B) increasing the use of substitutes for rare substances;

(C) promoting safe and more efficient manufacturing;

(D) minimizing lifecycle impacts, including environmental and health impacts;

(E) optimizing product design and encouraging the reduction of waste and the reuse or recycling of chemicals and materials to account for the end of life or the final disposition of the product; or

(F) increasing the design and use of safe molecules, chemicals, materials, chemistries, and chemical processes.

At its best, sustainable chemistry could shift the entire industry to safer production and improve environmental protection, consumer safety and occupational health and safety by eliminating hazards. The goal should be that countries not only manage dangerous chemicals better, but that industries design safer, non-toxic chemistries from the start. Green chemistry and sustainable chemistry are both critical to this goal—both concepts could offer valuable guidance to the overarching goals of SAICM. However, this will only happen if sustainable chemistry is clearly defined in a way that includes reducing the hazards of chemicals over their lifecycle as a priority.

Because of major barriers to entry on the market for safer chemicals, including externalized costs, limited access to information and economies of scale for existing chemicals, it is unlikely that a transformation of the chemicals sector will happen on a voluntary basis, only inspired by sustainable chemistry. Strict regulation is necessary to support this shift. On the policy level, sustainable chemistry focused on hazard reduction could create a level playing field for business worldwide and create support for frontrunners. This will require government support and actions to develop regulations and enforce them. [375] As UNEP and SustainLabour note, *"The political will to invest in innovation and research, to adopt regulatory frameworks that prioritize clean production and green chemistry incentives, and to promote capacity development for appropriate action are some of the doors that need to be unlocked."*[376]

OUTCOMES FOR GREEN CHEMISTRY AND SUSTAINABLE CHEMISTRY

1. UN Environment produces a report by 2022 focused on practical steps for hazard reduction in chemical design and use[377] with a special emphasis on developing and transition countries.

[374] https://www.congress.gov/bill/113th-congress/senate-bill/2879/text

[375] Tuncak, B (2013) Driving innovation. How stronger laws help bring safer chemicals to the market, Center for International Environmental Law http://www.ciel.org/Publications/Innovation_Chemical_Feb2013.pdf

[376] SustainLabour, UNEP (2015) Sound and Sustainable Management of Chemicals, A training manual for workers and trade unions, ISBN : 978-92-807-2961-0, UNEP Job Number : DR https://www.sustainlabour.org/documentos/EN159-2008.pdf

[377] This should include an account of particularly hazardous chemicals that should

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2. ILO conducts capacity-building workshops at SAICM regional meetings on how hazard reduction with inherently safer chemistry can reduce chemical accidents and insure worker health and safety.
3. UN Environment and the SAICM Secretariat conduct capacity-building workshops in SAICM regional meetings on how legal frameworks can facilitate hazard reduction in chemicals design and production.
4. The private sector implements benchmarking tools to assure hazard reduction and avoidance in the design of new chemicals and assessment of current products, and reports on progress at each ICCM.

ANNEX 1: THE PRINCIPLES OF GREEN CHEMISTRY

The 12 principles[378] of Green Chemistry are:

1. Prevention: It is better to prevent waste than to treat or clean up waste after it has been created.
2. Atom Economy: Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product.
3. Less Hazardous Chemical Syntheses: Wherever practicable, synthetic methods should be designed to use and generate substances that possess little or no toxicity to human health and the environment.
4. Designing Safer Chemicals: Chemical products should be designed to effect their desired function while minimizing their toxicity.
5. Safer Solvents and Auxiliaries: The use of auxiliary substances (e.g., solvents, separation agents, etc.) should be made unnecessary wherever possible and innocuous when used.
6. Design for Energy Efficiency: Energy requirements of chemical processes should be recognized for their environmental and economic impacts and should be minimized. If possible, synthetic methods should be conducted at ambient temperature and pressure.
7. Use of Renewable Feedstocks: A raw material or feedstock should be renewable rather than depleting whenever technically and economically practicable.
8. Reduce Derivatives: Unnecessary derivatization (use of blocking groups, protection/ deprotection, temporary modification of physical/chemical processes) should be minimized or avoided if possible, because such steps require additional reagents and can generate waste.
9. Catalysis: Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.
10. Design for Degradation: Chemical products should be designed so that at the end of their function they break down into innocuous degradation products and do not persist in the environment.
11. Real-time analysis for Pollution Prevention: Analytical methodologies need to be further developed to allow for real-time, in-process monitoring and control prior to the formation of hazardous substances.
12. Inherently Safer Chemistry for Accident Prevention: Substances and the form of a substance used in a chemical process should be chosen to minimize the potential for chemical accidents, including releases, explosions, and fires.

be phased out as soon as possible, including from products.

[378] Anastas P'T, Warner, JC (1998) Green Chemistry: Theory and Practice, Oxford University Press: New York

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ICCM4 BEYOND 2020 DECISION

UNEP (2015) IV/4: THE STRATEGIC APPROACH AND SOUND MANAGEMENT OF CHEMICALS AND WASTE BEYOND 2020, 4TH INTERNATIONAL CONFERENCE ON CHEMICALS MANAGEMENT, REPORT OF THE INTERNATIONAL CONFERENCE ON CHEMICALS MANAGEMENT ON THE WORK OF ITS FOURTH SESSION, SAICM/ICCM4.4/15

IV/4: THE STRATEGIC APPROACH AND SOUND MANAGEMENT OF CHEMICALS AND WASTE BEYOND 2020

The Conference,

Recalling the Plan of Implementation of the World Summit on Sustainable Development,

Noting the 2030 Agenda for Sustainable Development and in particular the targets to achieve, by 2020, the environmentally sound management of chemicals and all wastes throughout their life cycles, in accordance with agreed international frameworks, and to significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment and to substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination by 2030,

Recalling the Millennium Development Goals and the outcome document of the United Nations Conference on Sustainable Development entitled "The future we want", and in particular the aim to achieve, by 2020, the sound management of chemicals throughout their life cycles and of hazardous waste in ways that lead to the minimization of significant adverse effects on human health and the environment,

Recalling also resolution 1/5 of the United Nations Environment Assembly of the United Nations Environment Programme, in which the Environment Assembly welcomed the important contribution of the Strategic Approach to International Chemicals Management in facilitating action by all relevant stakeholders towards the sound management of chemicals and waste, emphasized the need for continued and strengthened multisectoral and multi-stakeholder involvement and recognized that the need to prevent or minimize the significant adverse effects from chemicals and hazardous wastes on human health and the environment would continue to provide a strong basis for sound chemicals and waste management beyond 2020,

Recalling further the outcome of the countryled consultative process supported by the United Nations Environment Programme on enhancing cooperation and coordination within the chemicals and waste cluster and the outcome document of the process, entitled "Strengthening the sound management of chemicals and wastes in the long term",

Noting that projections as set out in the 2012 Global Chemicals Outlook show an increase in chemical production and use worldwide, continuing beyond 2020, with the largest increases also occurring in developing countries and countries with economies in transition and that all countries will need to continue strengthening their capacity for governance, knowledge- and information-sharing and risk reduction required to promote the sound management of chemicals and waste beyond 2020,

Noting also the continuing need to respond to new and emerging issues and to ensure that newly identified risks to human health and the environment can be identified and timely action taken to reduce those risks,

Noting further the value of a voluntary, multisectoral and multi-stakeholder approach to mobilize all actors, which can enable flexible and timely action to promote the sound management of chemicals and waste,

Recognizing the need to start considering arrangements for the period beyond 2020,

1. *Requests* the secretariat, subject to the availability of resources, to contract an independent evaluation of the Strategic Approach in accordance with the terms of reference set out in the annex;
2. *Decides* to initiate an intersessional process to prepare recommendations regarding the Strategic Approach and the sound management of chemicals and waste beyond 2020;
3. *Also decides* that the intersessional process should include, in principle, two meetings before the third meeting of the Open-ended Working Group and one meeting between the third meeting of the Open-ended Working Group and the fifth session of the Internation-

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al Conference on Chemicals Management and that it may also work by correspondence and/or by electronic means;

4. *Directs* the Open-ended Working Group to consider the need to call an additional meeting of the intersessional process before the fifth session of the International Conference on Chemicals Management;
5. *Decides* that meetings of the intersessional process should, as far as possible, be held back-to-back with other relevant meetings and processes;
6. *Requests* the Bureau of the fifth session of the International Conference on Chemicals Management, with assistance of the secretariat, to notify the stakeholders by 31 March 2016 of the first meeting of the intersessional process specified in this resolution and, in consultation with the participants at that first meeting, to draw up the timetable for the subsequent meetings;
7. *Decides* that the intersessional process should be open to all stakeholders, and requests the secretariat to support, subject to availability of resources, participation of stakeholders eligible for funding as identified by the regions and sectors through the Bureau, up to eight from African States, eight from Asian-Pacific States, three from Central and Eastern European States, five from Latin American and Caribbean States and two representatives of each of the health, trade union and public interest sectors of non-governmental participants, in order to support balanced regional and sectoral participation;
8. *Also decides* that the participants at the first meeting of the intersessional process should elect two co-chairs among Governmental participants present at that meeting;
9. *Further decides* that the work of the intersessional process is to be informed by the 2030 Agenda for Sustainable Development, resolution 1/5 of the United Nations Environment Assembly and the outcome document "Strengthening the sound management of chemicals and wastes in the long term", including the vision to achieve the sound management of chemicals throughout their life cycles 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;
10. *Decides* that the intersessional process should, among other things, consider the need for and develop recommendations regarding measurable objectives in support of the 2030 Agenda for Sustainable Development;
11. *Requests* that the secretariat make available and that the intersessional process consider relevant available documents, including the independent evaluation of the Strategic Approach referred to in paragraph 1 above, the Overall Orientation and Guidance, relevant documents and reports of the International Conference on Chemicals Management, the Open-ended Working Group and regional meetings, relevant United Nations Environment Assembly resolutions, and other relevant documents available on the Strategic Approach website, the Global Chemicals Outlook, Global Waste Management Outlook and report entitled "Cost of Inaction on the Sound Management of Chemicals" by the United Nations Environment Programme, and related World Health Organization health priority documents;
12. *Directs* the Open-ended Working Group to consider the conclusions of the independent evaluation and any recommendations identified by the intersessional process for consideration by the International Conference on Chemicals Management at its fifth session.

ANNEX

Terms of reference for the evaluation of the Strategic Approach to International Chemicals Management

I. Objective

1. The present document outlines the terms of reference for the independent evaluation of the Strategic Approach to International Chemicals Management called for by the International Conference on Chemicals Management in its resolution IV/4.
2. The aim of the evaluation is to provide information to enable the intersessional process referred to in paragraph 2 of resolution IV/4 to develop recommendations and to enable the International Conference on Chemicals Management at its fifth session to take an informed decision on future arrangements for the Strategic Approach and the sound management of chemicals and waste beyond 2020.

II. Methodology

3. The secretariat is requested to engage an independent evaluator to produce an evaluation consistent with these terms of reference.
4. The evaluation is to cover the period from the adoption of the Strategic Approach in 2006 to 2015. It may also cover any insights gained in the period from 2015 to the finalization of the evaluation.
5. The evaluation should take into account, among other things, the available evaluation of progress in implementing the Strategic Approach, the evaluation of the Quick Start Programme, the relevant reports and resolutions from the International Conference on Chemicals Management, the Open-ended Working Group and regional meetings, the Overall Orientation and Guidance, and national implementation plans of the Strategic Approach. The evaluator may also collect information from stakeholders on their experi-

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ences implementing the Strategic Approach, and may use various methods of qualitative and quantitative information collection, including questionnaires and interviews, taking into account regional, gender and stakeholder balance.

III. Report on the evaluation

6. An interim report on the evaluation will be made available to all stakeholders at least one month ahead of the first meeting of the intersessional process. A draft of the final report will be made available to all stakeholders at least one month ahead of the second meeting of the intersessional process. The final report, taking into account, as appropriate, the additional comments on the draft final report from stakeholders, will be made available to all stakeholders at least two months before the meeting of the Open-ended Working Group that will precede the fifth session of the International Conference on Chemicals Management.

7. The reports will contain an introduction, an executive summary and a brief history of the Strategic Approach, and will present information in support of conclusions and, where appropriate, lessons drawn in respect of the implementation of the Strategic Approach, including, in particular:

(a) Impact of the Strategic Approach;

(b) Strengths, weaknesses and gaps in implementing the Strategic Approach, taking into account the eleven basic elements identified in the Overall Orientation and Guidance;

(c) Progress towards targets;

(d) Institutional arrangements within the voluntary multisectoral and multi-stakeholder approach of the Strategic Approach.

8. The independent evaluator will present information, as appropriate, on the following elements in the report, on the understanding that the information provided is intended to inform rather than prejudge intersessional discussions on the subject:

(a) Objectives for the sound management of chemicals and waste beyond 2020;

(b) Identifying and taking action on new or emerging issues;

(c) Coordination and cooperation with relevant multilateral environmental agreements and organizations of the Inter-Organization Programme for the Sound Management of Chemicals;

(d) Relevance of impacts to the 2030 Agenda for Sustainable Development;

(e) Maintenance and development of indicators of progress;

(f) Identifying and taking action on regional and subregional needs for advancing sound management of chemicals and waste.

9. The evaluation should be focused and succinct and its executive summary should be made available in the six official languages of the United Nations.

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