Chapter 7

Global Chemicals Politics and Policy

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Introduction

All over the world, products of the modern chemicals revolution are used to improve human standards of living in numerous ways, including by increasing yields of major cash crops, protecting public health, and producing countless industrial and consumer goods. Contemporary reliance on a multitude of pesticides and industrial chemicals, however, has also resulted in significant environmental and human health problems, ranging all the way from minor skin rashes to alarmingly high rates of cancer-related fatalities (Mancini *et al.* 2005; Langman 2007). At the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002, countries agreed that chemicals worldwide should be "used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment" no later than the year 2020 (WSSD 2002: paragraph 22). While societies now are better at recognizing chemical risks than only a few decades ago, countries are not on track to meet the 2020 goal. Thus, chemicals management is both a critical environmental and human health issue and a significant topic in global environmental politics.

As countries cooperate on a wide range of political, scientific, and technical chemicals abatement issues, they work closely with a host of IGOs and NGOs (Lönngren 1992; Selin 2010; Wexler *et al.* 2012). The institutional framework for managing chemicals is structurally different from many other major environmental regimes. Rather than organizing cooperation under an overarching framework convention, as in for example the cases of climate change, ozone depletion, and biodiversity, international legal and political efforts to address problems of hazardous chemicals are structured around a diverse set of legally independent treaties and programs. This structuring of policy-making across formally independent but functionally linked

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forums creates both governance opportunities and challenges. Regarding opportunities, it provides states, IGOs, and NGOs with a wide range of policy instruments to address the multifaceted aspects of chemicals management. With respect to challenges, it creates particular needs for coordinated decision-making and implementation to ensure the overall effectiveness of those policy measures that have been taken.

In part because of the institutionally fragmented nature of the chemicals regime, this is an area of global environmental politics and policy-making where regime participants have engaged in relatively long-standing cooperation about ways to promote policy coordination and capture synergies across different agreements and management efforts. As part of these efforts, states and different stakeholder groups in 2006 adopted the Strategic Approach to International Chemicals Management (SAICM), which operates as an umbrella mechanism promoting sound chemical management and harmonization of controls and activities across major agreements and programs. While SAICM is not comparable to a framework convention – it is a voluntary program and not based on a legally binding agreement requiring ratification – it is an important institutional part of continuing work on synergies and treaty implementation. The institutional complexity of the chemicals regime creates several legal, political, and management challenges as national governments and other stakeholder groups seek to improve environmental and human health protection from hazardous chemicals.

Most major institutional parts of the global chemicals regime have been developed by states, IGOs, and NGOs since the 1980s (but with disparate actions on hazardous substances also taken much earlier). The core of the institutionally diverse chemicals regime is structured around four treaties. Three of these are global: the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal; the 1998 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; and the 2001 Stockholm Convention on Persistent Organic Pollutants (POPs). The fourth one is regional: the 1998 Protocol on Persistent Organic Pollutants to the Convention on Long-Range Transboundary Air Pollution (CLRTAP). These four treaties cover different but partially overlapping parts of the chemicals life cycle of production, use, emissions, trade, and disposal. Many hazardous chemicals are also covered by two or more treaties. The four treaties are further connected through overlaps in membership and stakeholder engagement.

This chapter addresses global chemicals politics and policy, as a major part of international environmental cooperation and governance. The subsequent section outlines the nature of the chemicals problem, including different ways in which international cooperation has the potential to support better environmental and human health protection from hazardous chemicals. This is continued by a presentation of the chemicals regime and its main policy responses in the form of central treaties and programs as well as some of the major IGOs and NGOs involved in international chemicals management. This section also identifies important linkages between agreements and policy efforts. The next section examines major issues for improving regime effectiveness. The final section identifies areas where there is a need for more empirical research and analysis as well as

discussing policy needs towards one day achieving the goal of safe production and use of chemicals.

The Nature of the Chemicals Issue

The chemical industry consists of firms that produce chemicals from raw materials (mainly petroleum) as well as those that alter or blend individual substances into different mixtures. It is unclear how many chemicals are currently in use worldwide, but estimates are in the 60 000 to 100 000 range. Production volumes of individual chemicals range from millions of tonnes per year to quantities of much less than 1000 tonnes annually. Global sales of chemicals grew almost ninefold between 1970 and 2000. Total chemicals production (excluding pharmaceuticals) is currently worth over US$2 trillion, where 45% of this value is traded internationally (including intra-firm trade). Asia (mainly Japan, China, and India) is the world's leading chemicals-producing region in monetary terms, followed by the European Union (EU) and the United States (CEFIC 2006). While firms in industrialized countries in the short term will continue to dominate the market in specialty and life science chemicals – whose production requires advanced technology and educated workers – there is a rapid growth in the production and use of more basic chemicals in many developing countries.

There are no exact global data on chemicals contamination and poisoning, but IGOs and researchers have produced estimates based on (much-debated) extrapolations from local information from different parts of the world. The World Health Organization (WHO) proposed in 1990 that 3 million people were hospitalized every year as a result of pesticide poisoning, resulting in 220 000 deaths (Jeyaratnam 1990). More recent calculations put annual fatality figures closer to 300 000, 99% of which occur in developing countries (Srinivas Rao *et al.* 2005). In addition to the deadly effects of high-dose exposure, environmental risks from low-dose exposure include estrogenic effects, disruption of endocrine functions impairing immune system functions, functional and physiological effects on reproduction capabilities, and reduced survival and growth of offspring (AMAP 2010). Human low-dose exposure has been linked to carcinogenic and tumorigenic effects as well as endocrine disruptions (AMAP 2009). Many national health authorities recommend that pregnant women and small children limit their dietary intake of certain fish containing high levels of chemicals to reduce risks.

Hazardous chemicals are released through agricultural use, common industrial and manufacturing practices, combustion processes, leakages from wastes, and accidents. Many problems are related to the persistence, toxicity, bioaccumulation, and biomagnifications of hazardous substances. Persistence refers to how long a chemical remains in the environment before it is biodegraded. Toxicity refers to the negative effects a chemical may have on an organism or part of an organism (organ, tissue, or cell). Bioaccumulation is an essential biological process that takes place in all living organisms to obtain necessary nutrients but one where problems can arise when hazardous substances are accumulated through the same mechanism, allowing them to build up in fatty tissues over time. Biomagnification is a biological process related to bioaccumulation as hazardous chemicals that have bioaccumulated in a

large number of organisms at a lower trophic level are concentrated further by an organism at a higher trophic level as those chemical concentrations are passed up food-webs (AMAP 2009, 2010).

Management of hazardous substances involves balancing benefits and risks of chemicals use, as different interests and needs are considered. Since at least the 1960s, national authorities and international organizations have struggled to design effective mechanisms for risk assessments and regulations. These management efforts have been fueled by many high-profile chemical accidents and contamination scandals, including those occurring in Love Canal, USA; Seveso, Italy; and Bhopal, India (Selin 2010). Although all the world's countries struggle to design effective chemicals policy, many management challenges are particularly difficult in developing countries (which are then also the countries that are experiencing some of the most serious environmental and human health problems). For example, national implementation plans developed under the Stockholm Convention reveal many challenges to effective policy-making and implementation. For instance, in a report submitted by Tanzania, the government states that there are only 15 pesticide inspectors the whole country (Government of Tanzania 2005). Similar low-capacity issues plague many other countries also.

There are several international dimensions to the chemicals problem (Krueger and Selin 2002). One important aspect relates to the transboundary transport of emissions of POPs and other substances. This means that hazardous chemicals can be transported over long distances, cross national borders, and thus cause contamination problems far from where they were originally released. The connection between environmental and human health risks and international trade is also very strong. Many farmers and workers – particularly in developing countries – are exposed to risks from imported pesticides and industrial chemicals, including the rapidly growing trade in electronics wastes (e-wastes). In addition to the serious risks to the people who directly handle hazardous substances, there can also be risks to consumers worldwide. Even if a hazardous substance is banned for direct use in one country but used elsewhere, it may still enter the country in which it is prohibited in the form of residues in imported vegetables and fruits, or as parts of many consumer goods (Emory 2001).

An important aspect of international cooperation is that it can help in diffusing scientific and socio-economic knowledge about the chemicals problem. In many cases, people who regularly use or are exposed to hazardous chemicals are unaware of the risks and are not trained to take even the most basic protective measures. Furthermore countries that recognize widespread domestic problems with hazardous chemicals sometimes have difficulties mustering adequate technical, financial, and/or human resources to initiate more effective risk-reduction measures. This is again particularly true for many developing countries. Ideally, international legal and political activities can function as important catalysts for the dispersion of resources that may enable better domestic actions to reduce environmental and human health effects stemming from the unsafe handling and use of hazardous chemicals. Management improvements are badly needed, as data from all over the world demonstrate that societies have a long way to go to achieve safe production and use of chemicals (Mancini *et al.* 2005; Langman 2007; Liu 2010; Harrison 2011).

The Chemicals Regime

The global community has expanded the chemicals regime to include regulations on the full life cycle of production, use, trade, and disposal of industrial chemicals and pesticides as well as emission controls on by-products of production and combustion processes. The regime also contains provisions and management programs designed to regulate additional chemicals, increase and harmonize information about commercial and discarded chemicals traded across countries, generate more scientific and socio-economic data for risk assessment, and enhance regional and local management capacities. Despite the fact that these many legal and political responses have been developed incrementally and are formally independent, there are both cognitive and practical reasons to regard them as part of a regime (Selin 2010). Cognitively, states, IGOs, and NGOs perceive major chemicals issues to be connected and formulate policy responses and management efforts based on these connections. Practically, countries are parties to multiple agreements and the same chemicals are regulated under more than one treaty and through similar control mechanisms where policy-making under one agreement can greatly shape debates and outcomes in other forums.

The *Basel Convention* addresses the generation and transboundary transport of hazardous wastes. By 2012, 177 countries and the EU were parties. The Basel Convention covers wastes containing hazardous substances and discarded chemicals can also be classified as hazardous wastes. Levels of hazardous wastes have increased sharply since the 1960s. Most waste trade takes place between industrialized countries (O'Neill 2000). However, it was the growing waste trade between industrialized and developing countries that provided the political impetus to the Basel Convention. This included several high-profile cases of illegal dumping of hazardous wastes in developing countries (Kummer 1995; Krueger 1999; Clapp 2001). Responding to political pressure from mainly developing countries, the Governing Council of the United Nations Environment Programme (UNEP) approved the so-called Cairo Guidelines in 1987, setting the first voluntary trade standard. The Cairo Guidelines introduced a prior informed consent (PIC) procedure: export of hazardous wastes from one firm to another could take place only after the national government of the country where the importing firm was located had given explicit permission to go ahead with the trade.

Many developing countries, a few Nordic countries, and several environmental advocacy groups, however, believed that a voluntary system was not strong enough to control unwanted imports and unlawful dumping. In response, countries adopted the Basel Convention in 1989, which prohibits the export of hazardous wastes to Antarctica and to parties that have taken domestic legal measures to ban such imports. Permitted waste transfers to other parties are subject to a legally binding PIC procedure: a party cannot permit export of hazardous wastes to another party without first receiving explicit consent of the importing state to proceed with the transfer. Waste exports to non-parties are prohibited, unless they are subject to an agreement between the exporter and importer that is at least as stringent as the requirements under the Basel Convention. The trade in old or discarded chemicals is subject to controls by the Basel Convention if they are categorized as hazardous wastes under the convention. Even if the Basel Convention provides some legal

protection, there remain serious problems with the legal and illegal trade in hazardous wastes (Iles 2004; Pellow 2007).

The issue of even stricter trade restrictions stayed on the agenda. Following some political gains during the first two conferences of the parties (COPs), a coalition led by many African countries convinced the parties in 1995 to adopt the Ban Amendment, which prohibits the export of hazardous wastes for final disposal and recycling from countries listed in Annex VII (parties that are members of the Organisation for Economic Co-operation and Development (OECD) and the EU as well as Liechtenstein) to all other parties (i.e. developing countries). However due to opposition from some industrialized countries and also slow ratification by many developing countries seeking to profit from the waste trade, the Ban Amendment has not yet entered into force. Furthermore, the parties in 1999 adopted the Basel Protocol on Liability and Compensation, which identifies who is financially responsible in the event of an incident during the transboundary movement of hazardous wastes. This protocol, however, has also not yet entered into force. In addition, parties focus on funding, capacity-building, and technology transfer issues. Related to all of these, parties have approved the establishment of 14 regional centers to support regional and local management (Selin 2012a).

The *Rotterdam Convention* also deals with trade, but focuses on commercial substances. By 2012, 145 countries and the EU had ratified the Rotterdam Convention. Similar to the Basel Convention, it was the largely unregulated North–South trade that acted as the main stimulus for policy developments. Following political discussions and initiatives pushed by developing countries dating back to the 1970s, UNEP Governing Council in 1989 adopted the first global voluntary PIC procedure in the so-called Amended London Guidelines. This was similar in operation to that under the Basel Convention. In 1989, the Council of the Food and Agricultural Organization (FAO) also adjusted its Code of Conduct to include a compatible system. The PIC scheme was managed jointly by the FAO for pesticides and by UNEP Chemicals for industrial chemicals (Paarlberg 1993; Victor 1998). In the 1990s, political pressure from mainly developing countries increased to convert the voluntary scheme into a treaty to strengthen the position of importers and provide better environmental and human health protection. Subsequently, the Rotterdam Convention was adopted in 1998 (Kummer 1999; Emory 2001; McDorman 2004).

The Rotterdam Convention PIC procedure stipulates that the government of a potentially importing party can respond in three different ways after receiving a formal request to accept import of a particular chemical on the PIC list. First, the government can declare that it consents to receive the import of the chemical and any other shipments within the same calendar year; second, the government may reject the request; or third, the government may consent to import, but only if specific conditions are met by the exporting party. The government of the potential exporter must abide by any decision made by the potentially receiving country. The Secretariat, which is divided between UNEP Chemicals and FAO, acts as facilitator throughout this process and distributes all the responses between the parties. National governments are in turn responsible for communicating all information and decisions from the other party to all relevant domestic firms. Still, as under the Basel Convention, both legal and illegal trade of commercial chemicals continues to cause problems (Collins 2010).

The Rotterdam Convention stipulates that a party that has banned or severely restricted the use of a chemical of a category covered by the treaty is required to notify the Secretariat. When the Secretariat has received notification from parties from at least two different geographical regions – or a single party that is a developing country or a country with an economy in transition experiencing domestic problems – it forwards all related information to the Chemical Review Committee, which conducts an evaluation and submits a recommendation to the COP making the final decision regarding inclusion on the PIC list (Kohler 2006). As of early 2012, the Rotterdam Convention covered 43 chemicals. Several hundred other chemicals are being lined up for review by the Chemical Review Committee, and it is expected that the parties will continue to expand the PIC list. Operating alongside the Rotterdam Convention, the Globally Harmonized System for the Classification and Labelling of Chemicals is designed to make it easier to identity specific chemicals transported between different countries (Selin 2010).

The *CLRTAP POPs Protocol* was the first multilateral agreement targeting POPs as a separate category of particularly hazardous chemicals (even if many of the substances covered by the protocol were already regulated by earlier regional agreements). By 2012, 30 countries and the EU were parties. The protocol covers the production, use, emissions, and disposal of POPs and operates under the auspices of the United Nations Economic Commission for Europe (UNECE), which comprises North America and Europe as far east as Russia and Kazakhstan. This agreement was largely born out of North American and Northern European concerns with the long-range transport of emissions of hazardous substances to northern latitudes, in particular the Arctic. In Canada more than any other country, the POPs issue became integrated with broader scientific and political concerns about Arctic environmental contamination and health risks, particularly of indigenous peoples (Downie and Fenge 2003; Thrift *et al*. 2009). Indigenous groups were also active participants in Canadian and circumpolar research programs and policy forums, as they lobbied for strong regulatory action under CLRTAP (Selin and Selin 2008).

The CLRTAP assessments led by Canada and Sweden in the early 1990s identified a set of priority POPs that were subject to extensive long-range transport and measured throughout the northern hemisphere, leading to political negotiations on possible control options (Selin 2003). Consequently, the CLRTAP POPs Protocol is designed to reduce the release and long-range transport of POPs emissions. To this end, regulated chemicals are divided into three annexes. The production and use of pesticides and industrial chemicals listed Annex I are banned. Annex II lists pesticides and industrial chemicals for which there are listed use exemptions. POPs by-products of industrial and combustion processes, controlled through applications of best available techniques and best environmental practices, are listed in Annex III. The agreement also set standards for the environmentally sound transport and disposal of discarded POPs, intended to be consistent with stipulations under the Basel Convention. In many ways, the development of this regulatory approach shaped subsequent global assessments and negotiations leading to the Stockholm Convention (Selin 2003, 2010).

The CLRTAP POPs Protocol originally covered 16 chemicals. Similar to the evaluation mechanism set up under the Rotterdam Convention (and also the Stockholm Convention, discussed in the following paragraph), countries designed the

agreement so that additional chemicals can be assessed and possibly regulated under any of the three annexes. In 2009, the parties in many cases led by the EU added 9 more chemicals, so that a total of 25 chemicals were covered by the CLRTAP POPs Protocol by 2012. Parties have also nominated other chemicals for evaluation, and it is likely that additional substances will be regulated in the future. As the parties to this regional agreement move forward, there are many institutional linkages connecting it to the global Rotterdam and Stockholm Conventions. Furthermore, legal, political, and management linkages between these agreements are growing, as the number of overlapping parties increases and countries continue to expand the lists of chemicals regulated simultaneously under two or three of these major chemicals treaties.

The *Stockholm Convention* sets global controls on the production, use, emissions, trade, and disposal of POPs. By 2012, 175 countries and the EU had ratified the Stockholm Convention. In 1995, the UNEP Governing Council called for global assessments of 12 POPs ("the dirty dozen"). Based on these assessments, the UNEP Governing Council in 1997 initiated treaty negotiations on the 12 POPs (Downie and Fenge 2003; Selin and Eckley 2003). These substances were generally recognized by both industrialized and developing countries as harmful and demonstrated to pose significant environmental and human health risks (and European and North American countries had already reached consensus on this under CLRTAP and now wanted to initiate global controls). Many countries by the late 1990s had already banned the production and use of the 10 commercial pesticides and industrial chemicals under negotiation, or severely restricted their application. Arctic conditions continued to loom large, but many negotiation issues concerned the interests and situations of developing countries with respect to chemicals use and ways to support better local management, in part because these countries were not part of the earlier CLRTAP work on POPs.

The Stockholm Convention started out regulating 12 POPs (all of which at the time were also controlled by the CLRTAP POPs Protocol and some were also covered by the Rotterdam Convention). Substances are divided into three annexes, similar in structure to the CLRTAP POPs Protocol. Annex A lists pesticides and industrial chemicals whose use and production are prohibited, but parties can apply for country-specific and time-limited exemptions. Annex B lists POPs whose use and production are still permitted, but are subject to specific production and use provisions. Annex C lists by-products covered by the convention, and also outlines general guidelines on best available techniques and best environmental practices for their minimization. In addition, the Stockholm Convention includes a detailed mechanism for evaluating and possibly including additional chemicals under the treaty (again similar to the mechanisms under the CLRTAP POPs Protocol and the Rotterdam Convention). These evaluations are carried out by a designated POPs Review Committee, which reports to the COPs making all final regulatory decisions (Kohler 2006).

Following the entry into force of the Stockholm Convention, the parties have added 10 more chemicals, making it a total of 22 controlled POPs. More substances are likely to be added in the future, as the convention-based assessment work progresses. The import and export of POPs are permitted only for substances subject to use exemptions or for their environmentally sound management and disposal.

On these issues, the Stockholm Convention is designed to be compatible with the Rotterdam and Basel Conventions. In addition, work on formulating technical guidelines for the environmentally sound management of stockpiles and wastes is carried out in collaboration with the Basel Convention, as the Basel parties are simultaneously formulating technical guidance documents on POPs wastes. Parties are also developing guidelines for best available techniques and best environmental practices for controlling by-products. In addition, parties have established 15 Stockholm Convention regional centers to aid capacity-building and technology transfer, mainly in developing countries (Selin 2012a).

In addition to the four main chemicals agreements, countries around the globe are parties to many regional agreements controlling somewhat similar sets of hazardous substances in different ways (Selin 2010). All of these contribute to the institutional complexity of the chemicals regime, shaping policy-making and implementation. Several initiatives have been created under the UNEP's Regional Seas Programme since the 1970s; currently covering 13 actions plans involving over 140 countries. There are also long-standing agreements covering other shared bodies of water outside the UNEP program, including for the Northeast Atlantic, the Baltic Sea, and the Great Lakes. Furthermore, many of the world's transboundary rivers are covered by more or less strict pollution-related legal provisions. In addition, there are several regional hazardous waste treaties covering discarded hazardous chemicals as well as wastes containing them. Some of these waste agreements have been established by developing countries to gain additional legal means and protection to prevent unwanted imports and dumping beyond what is afforded by the Basel Convention.

Many IGOs work on chemicals. As discussed earlier, UNEP helped develop global and regional agreements, and also established the International Register of Potentially Toxic Chemicals in 1976. The International Labour Organization (ILO) addresses chemicals in work places. The OECD coordinates testing requirements and establishes guidelines for data generation and sharing. The FAO and the WHO collaborate in the Codex Alimentarius Commission to establish maximum acceptable levels of pesticide residues in foods. Alongside SAICM, the Inter-Organization Programme for the Sound Management of Chemicals (IOMC) is a mechanism for coordinating action towards the WSSD 2020 goal, involving nine participating organizations: FAO, ILO, OECD, UNEP, WHO, the World Bank, the United Nations Institute for Training and Research (UNITAR), the United Nations Development Programme (UNDP), and the United Nations Industrial Development Organization (UNIDO).

A wide range of environmental NGOs have long focused on international and local problems with hazardous chemicals. Highly active NGOs include not only traditional organizations such as the WWF and Greenpeace, but also more issue-specific ones. These include the Basel Action Network, the Pesticide Action Network, the International POPs Elimination Network, and the International Chemical Secretariat. Indigenous peoples' groups have also been a major presence in the development of international chemicals policy since the 1990s, not least the Inuit Circumpolar Council. In addition, major industry associations and multinational firms have participated in international chemicals politics. For example, the International Council of Chemical Associations, the American Chemistry Council, and the European Chemical Industry Council, together with many firms such as BASF,

DuPont, and Dow Chemical regularly attend international scientific and political meetings. All these different kinds of non-state actors are also in frequent contact with state officials and IGO staff, as they try to shape policy-making in many different ways.

Improving Regime Effectiveness

In a global multilevel governance system such as the one that is under development for the management of hazardous chemicals, states, IGOs, and NGOs interact within and across forums that are formally independent but functionally interdependent. These forums are also located at different governance scales. In this respect, multilevel governance studies overlap with the analysis of how institutional linkages shape politics, policy-making, and implementation across jurisdictions. In an institutionally dense issue area such as that of chemicals management, an important aspect of improving environmental and human health protection from hazardous chemicals is better coordinated policy-making and implementation. In addition to focusing on important agreement-specific issues, regime participants need to address horizontal linkages within governance scales (for example, harmonize decisions on the same or related chemicals under two or more global treaties) as well as vertical linkages across governance scale (for example, consider how global policy-making on a particular chemical relates to regional agreements, influences national management, and affects local communities).

Institutional linkages can have both positive and negative effects on collective problem-solving and regime effectiveness (Selin and VanDeveer 2003; Oberthür and Gehring 2006; Selin 2010; Oberthür and Stokke 2011). Supportive linkages across policy forums can facilitate policy-making and implementation, which may allow regime participants to capture important regulatory and management synergies. Ideally, actions on, for example, PCBs under the Basel and Stockholm Conventions should be complementary and collectively enhance parties' abilities to address PCBs. However, regime participants may also act in ways that hinder policy developments in response to linkages between policy forums. In such cases, controversy between groups of state and non-state actors on, for example, regulations of a particular chemical in one policy forum spills over into another one, causing stalemate. Such an impasse may be more difficult to break because the fact that issues are linked across multiple policy forums raises the overall political stakes. In these respects, institutional density influences linkage politics – the strategic use of institutional linkages to shape policy processes and achieve desired outcomes (Selin 2010).

Sometimes, basic policy coordination and standardization is facilitated by the fact that regime participants share a basic interest in harmonizing principles, norms, rules, and decision-making procedures across forums so that they are not faced with conflicting or contradictory commitments and requirements. This interest in harmonization has been a driving force behind many of the political debates and policy actions on efforts to capture synergies across the main chemicals agreements, dating back to the 1990s (Krueger and Selin 2002). However, not all collaborative efforts on policy coordination and diffusion are uncontroversial. Regime participants may at times want to standardize in different ways and at differing levels of stringency, as

they seek varying types of preferred outcomes. In such instances, political disagreement in one forum can spill over into others, hindering decision-making across the regime. An important aspect of such linkage politics is that actors may strategically engage in forum shopping and scale shopping, as they look for political venues where they think they can best advance their interests (Selin 2012b).

Among the many legal, political, and organizational steps that the international community has been taking to improve policy coordination to better capture synergies across forums (based on the cognitive and practical linkages discussed earlier), the adoption of SAICM in 2006 is one of the more important ones. Created by states, IGOs, and a wide range of non-state actors, SAICM is designed to act as an overarching policy framework, promoting policy coordination and the capturing of management synergies across different agreements and programs. One of its main purposes is supporting efforts towards the fulfillment of the WSSD 2020 goal on the safe production and use of chemicals. SAICM objectives are grouped under five main themes: risk reduction; knowledge and information; governance; capacity-building and technical cooperation; and illegal international traffic. Measures under each of these themes are intended to complement treaty-specific activities. While this may be the case sometimes, SAICM together with the IOMC also adds to the institutional complexity of the chemicals regime.

Furthermore, parties to the three global conventions have taken steps to coordinate the COPs – the supreme policy-making bodies of each agreement. The three COPs gain their legal authority directly from each convention and can make only decisions pertaining to their respective treaty. However, in 2010 a simultaneous extraordinary meeting of the COPs to the Basel, Rotterdam, and Stockholm Conventions was held to move forward the coordination and synergies agenda. Issues discussed and acted upon included organizational structures and managerial functions. All three global conventions started out with their own independent secretariats. However, as parties were pushing to better coordinate policy-making and management, states saw benefits in merging secretariat activities and synchronizing budget cycles. To this end, the three COPs in 2011 established the position of Executive Secretary as a joint administrative function for the Basel, Rotterdam, and Stockholm Conventions secretariats (that is, one person is overseeing the activities of all three). In addition, the secretariats among other things have taken steps to create joint legal, financial, and administrative services.

As regime participants continue to consider different ways to improve multilevel governance, there is widespread agreement among countries about the need to better implement existing controls as well as expand the number of regulated chemicals through the introduction of appropriate life cycle controls (even if states and stakeholder groups do not always agree on which chemicals should be regulated and through what means). Studies and reports demonstrate that there are many substances currently not regulated under any of the four main chemicals agreements that pose environmental and human health risks (and these may or may not be covered by much domestic legislation) (Langman 2007; AMAP 2010; PANAP 2010). Importantly, future assessments and policy decisions are linked across treaties, as they are an important part of linkage politics. That is, any decision to regulate or not regulate a specific chemical may directly shape debates and outcomes in other forums. As a result, supporters of regulations seek to expand controls in multiple

policy venues while opponents of regulations attempt to block or minimize controls in these same forums.

Another political challenge under the institutionally fragmented chemicals regime is to establish more comprehensive monitoring and compliance mechanisms, as these are central to efforts to improve data collection, implementation, and effectiveness. Such mechanisms could also operate across multiple treaties, as part of the broader effort on policy and implementation coordination. This could help ensure consistency in treaty implementation across the regime as well as reduce the burden on parties to compile and submit separate reports to multiple secretariats. The development of such mechanisms depends heavily on the political interest and will of parties. Both industrialized and developing countries, however, are reluctant to give up sovereignty and approve the design of independent monitoring and compliance mechanisms. At the same time, many developing countries, in particular, are struggling to find human and financial resources to meet expanded data-gathering and reporting requirements. As such, monitoring and compliance issues are closely related to debates and efforts on capacity-building and technology transfer.

While all countries struggle to better address environmental and human health problems stemming from hazardous substances, it is clear that many developing countries are facing particular management challenges. Working through IGOs and NGOs to enhance management capacities in developing countries is an important environmental justice issue. This is also an area where there are growing coordination efforts across treaties and forums (including under SAICM). Activities in this area involve the establishment and operation of regional centers under the Basel and Stockholm Conventions. By 2012, there were 14 Basel Convention regional centers and 15 Stockholm Convention regional centers. Of the 14 Basel Convention regional centers, six also function as regional centers under the Stockholm Convention. Their overall impact is still unclear, but the regional centers have initiated activities in three broad areas important to capacity-building, technology transfer, and treaty implementation: raising awareness, strengthening administrative ability, and diffusing scientific and technical assistance and information (Selin 2012a).

Of course, expanded capacity-building and technology transfer are dependent on not only shoring up the necessary political will, but also the availability of greater resources. Under the chemicals regime – as in many other environmental issue areas – resource debates are part of broader North–South politics on responsibilities and funding. Developing country efforts to establish mandatory funding mechanisms under the main chemicals conventions (such as the multilateral fund under the ozone regime) have been rejected by industrialized countries. Instead, industrialized countries have been willing to commit only to voluntary mechanisms, while the Global Environment Facility (GEF) is connected to some chemicals work (mainly on POPs). However, developing countries argue that not enough funds are made available and that the GEF project procedure is too bureaucratic. Developing countries, together with countries with economies in transition, also argue that they require more resources for capacity-building and technology transfer as part of any effort to strengthen monitoring and compliance mechanisms, to address situations where non-compliance is due to a lack of resources.

As many hazardous substances continue to pose significant environmental and human health problems, the adoption of more proactive and precautionary policies

and management approaches is needed (Selin 2010). To date, most international and national regulatory efforts have focused on the management of known or suspected hazardous chemicals, rather than actively promoting the development of less harmful chemicals or non-chemical alternatives. In traditional management procedures, the burden of proof is also on regulators to prove that a chemical is not safe, rather than the producer and/or seller having to produce data demonstrating that a substance is not likely to cause adverse environmental and human health effects. It is, however, only through the development and application of quicker and more proactive procedures for assessment and regulation that the main chemicals treaties can become truly effective. In the end, the best way to protect human health and the environment from hazardous chemicals is to avoid using them in the first place.

The promotion of green chemistry – the utilization of principles that reduce or eliminate the use or generation of hazardous substances in the design, manufacture, and application of chemicals – is an effort to more effectively take environment and health concerns into consideration when synthesizing new chemicals (Anastas and Warner 1998). Green chemistry proponents stress the importance of creating substances with little or no environmental toxicity. Chemicals should also be designed so that at the end of their functional lives they break down into innocuous degradation products, as part of a broader effort to create a more sustainable use of materials (Geiser 2001). In addition to having many significant and much-needed environmental and human health benefits, a more proactive policy approach to chemicals management reduces costs of cleaning up areas contaminated by toxic substances. There are no reliable global data on the costs of dealing with contaminated areas, but these have been – and will continue to be – significant in both industrialized and developing countries.

Future Research and Policy Needs

The chemicals regime offers several opportunities for continued empirical research and analysis. One area involves further research into multilevel governance, institutional linkages, and the design and operation of effective governance structures and bodies. Many international environmental issue areas suffer from implementation and compliance problems and the chemicals regime is no exception. With respect to the protection of the environment and human health from hazardous chemicals, there is a significant gap between stated policy goals and on-the-ground realities all over the world. This raises critical questions about how to create good governance structures. Because the chemicals regime is institutionally diverse and built around a number of formally free-standing agreements and programs, addressing and trying to benefit from institutional linkages becomes an important part of multilevel governance. These kinds of multilevel governance issues have, however, received relatively little scholarly attention.

Furthermore, institutional linkages are set to grow in importance under the chemicals regime. For example, as parties take steps to organizationally link different treaties (through the synchronizing of COPs, combining of secretariat functions, etc.), they become closer connected (even as they remain legally independent). Also, actions such as the continued expansion of regulation of the same pesticides, industrial chemicals, and by-products covered by two or more agreements, as well as the

development of overlapping technical guidelines on the environmentally sound management and disposal of chemicals, further increase the institutional complexity of the chemicals regime. In addition, recent political developments on mercury pollution with the intent of adopting a global mercury convention in 2013 will create different kinds of linkages with other treaties, including when it comes to the operation of the regional centers under the Basel and Stockholm Conventions. Further study of these and other kinds of institutional linkages can contribute to the literature on global environmental politics.

In institutional analysis, there is a need to focus more on actor-based linkages and how they shape policy-making and implementation. The chemicals regime is a prime area for more research into the characteristics and implications of linkage politics. As there is a growth in institutional linkages, this affects the interests and strategies of policy actors in multiple ways. Regime participants operating in situations of a high degree of institutional density will not only seek to advance their interests with respect to a particular policy issue within a single forum, but also engage in linkage politics as they consider how choices they make in one forum will influence their interests and policy outcomes in other venues. This, in turn, impacts regime creation, implementation, and effectiveness. More such in-depth empirical research into the chemicals regime can be used to further analyze characteristics and implications of linkage politics, where such insights would also be highly relevant to other environmental issues areas becoming more institutionally complex.

Looking forward, there are several policy needs to meet the goal of safe production and use of chemicals. These go well beyond 2020, where many actors play critical roles. Ultimately, it is necessary to fundamentally re-evaluate the way in which chemicals are developed, how they are put on the market, and where they can subsequently be used. In this, there is shared responsibility by regulatory authorities and firms that produce and use chemicals. With respect to creating more precautionary systems for assessments and controls, there are ongoing changes in several places, most notably in the EU. In 2007, the EU passed a regulation on the registration, evaluation, and authorization and restriction of chemicals (REACH). This aims to improve environmental and health protection through better risk assessment and earlier identification of hazardous chemicals based on their intrinsic properties and taking quicker and more comprehensive regulatory action (Selin 2007). Some countries outside the EU are also taking similar steps, but this is just the beginning of a long policy process and outcomes are uncertain (Selin 2013).

Alongside taking more aggressive action to address the way new chemicals are developed, there is much need for continued international assessments and policy-making on existing chemicals. Global environmental and human health goals can only be met if industrialized and developing countries continue to work together under different agreements to introduce appropriate life-cycle regulations on a larger set of hazardous substances. This also involves better linking of international policy-making with regional, national, and local management needs and efforts to create sustainable livelihoods. To this end, IGOs, donor countries, and NGOs play important roles funding and supporting capacity-building and technology transfer. The ability to better assess progress and target shortcomings in treaty implementation is dependent on the willingness of national governments to expand collective mechanisms for monitoring and addressing compliance problems. However, it remains to

be seen if the international community has the ability and political will to take all these essential actions.

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