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Governance for Sound Chemicals Management: The Need for a More Comprehensive Global Strategy

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The upcoming United Nations World Summit on Sustainable Development (WSSD), in Johannesburg, August–September 2002, will be an important occasion to assess global progress in dealing with environment and development issues and to determine future priorities. In the aftermath of the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, where new environmental issues were identified for deepened international cooperative actions, the international environmental agenda has undergone significant expansion. One of the most important of the new issues has been enhanced chemicals management, which presents a major challenge to the international community. In addition to the often severe environmental and human health effects of hazardous chemicals, the significance of the chemical industry to politically important sectors such as agriculture, industry, and trade—the products of the chemical industry are worth approximately U.S.$1,600 billion annually and account for around 13 percent of world trade—ensures that chemicals regulation will continue to occupy a prominent place on the international environmental agenda for the foreseeable future.[1]

Hazardous chemicals are often divided into three categories: pesticides, industrial chemicals, and unintentionally produced by-products. Such substances are toxic—they can be poisonous, infectious, or corrosive—are often persistent, and as a result have the ability to bioaccumulate (build up in fatty tissues in individual organisms) and concentrate further or biomagnify up food chains. Emissions are almost exclusively anthropogenic in origin from a wide range of both point and diffuse sources, including agricultural use, manufacturing and use of goods, by-products of production, waste incineration, combustion, metal production, and reemissions from contaminated wastes, soil, and surface waters. Once dispersed into the environment, complete cleanup is technically extremely difficult and in some cases not even possible where negative consequences may linger extensively.

The need for concerted global action on hazardous chemicals arises from several circumstances where improved chemicals management could limit the negative environmental and human health effects of existing hazardous chemicals and prevent the future introduction of dangerous new substances. First, transboundary transport of emissions through air, water, ice, and migratory species results in widespread transnational dispersal.[2] Virtually all the world's areas and ecosystems are to some degree vulnerable, and there are many cases of substantial environmental accumulation in regions remote from any emissions source.[3] Second, many of the activities that cause chemicals problems are governed or influenced by multiple international institutions and organizations. The connection, for instance, between environmental and human health protection and trade is very strong in chemicals management. Third, international cooperation is a way of diffusing knowledge about the problem and aiding in the identification of alternative techniques and substitutes, which is lacking today in many (mainly) developing countries. Fourth, even if developing countries recognize the problem with hazardous chemicals and wish to initiate risk reduction measures, they often encounter difficulties in mustering adequate technical, financial, and/or human capital. Then, international activities can function as catalysts for the diffusion of such resources and lead to domestic actions that otherwise would not have been taken.

In this article we focus on international institutional attempts to reduce risks associated with hazardous human-made chemicals that pose a direct threat to human health and the environment. As such, it ties in with a broader academic interest in institutional design and the horizontal interplay between institutions operating at a similar level of social organization.[4] The article raises issues of how institutions that have been created in a piecemeal fashion over time come to overlap and how such overlaps, as well as the gaps that inevitably exist, can be usefully addressed. Such issues are of concern not only to practitioners of international chemicals management, but also to analysts of multilateral cooperation since—in conjunction with the growth in the number and scope of international environmental institutions—such institutions increasingly intersect in both formation and operation.

We begin with a brief presentation of toxic chemicals on the international agenda, which is followed by a discussion of three institutional models for environmental regulation and an outline of the four most prominent multilateral environmental agreements (MEAs) on chemicals to date: the 1998 Protocol on Persistent Organic Pollutants (POPs) under the Convention on Long-Range Transboundary Air Pollution (CLRTAP), the 1998 Rotterdam Convention on the Prior Informed Consent (PIC)

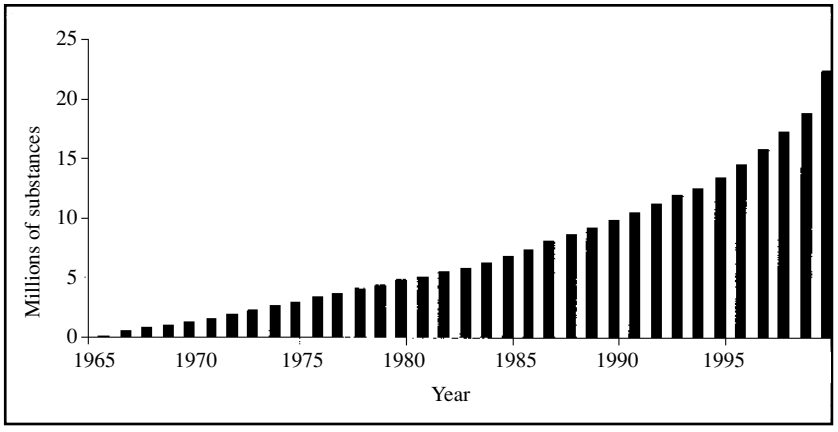
Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, and the recently completed (2001) Stockholm Convention on Persistent Organic Pollutants.[5] The concluding section considers proposals to further strengthen international chemicals governance.

Chemicals on the International Agenda

Large-scale commercial production of synthesized substances began just after World War II with the accelerated worldwide use of chemicals aimed at producing more and better food and cash crops, protecting public health, and increasing industrial production.[6] Today, the number of chemical substances that are registered in Chemical Abstracts Service (CAS) with individual CAS numbers exceeds 28 million compounds (including biosequences). However, it is estimated that only somewhere between 50,000 and 100,000 of all registered chemicals currently are in commercial use (see Figure 1).[7]

The first scientific warnings of the potential dangers of the new chemicals came in the late 1950s and were soon publicly and effectively voiced in Rachel Carson's *Silent Spring*.[8] In the late 1960s and 1970s,

Figure 1 Total Annual Number of Chemicals Registered in Chemical Abstract Services, 1965–1999



Source: Chemical Abstract Services, available online at www.cas.org/casdb.html. Accessed 1 June 2001.

many industrialized countries tightened domestic regulations regarding the production and use of chemicals—but less so their trade—in response to scientific and public concerns. In the meantime, the use of chemicals, and particularly pesticides, continued more or less without change in developing countries.

The chemicals problem was initially seen as one that could be effectively regulated through domestic measures, but a growing trade in hazardous chemicals and wastes in combination with scientific studies demonstrating extensive long-range transport of emissions led to the initiation of international measures. Early international efforts were generally devoted to improving the availability of information about hazardous substances. In the early 1980s, for example, discussions within the United Nations Food and Agriculture Organization (FAO) and United Nations Environment Programme (UNEP) led to the development of the 1985 International Code of Conduct for the Distribution and Use of Pesticides and the 1987 London Guidelines for the Exchange of Information on Chemicals in International Trade. Both the Code of Conduct and the London Guidelines included procedures aimed at making information about hazardous chemicals more freely available, thereby permitting countries to assess the risks associated with chemical use.

In the period preceding the Earth Summit in 1992, the UNCED Preparatory Committee identified the collaborative effort of UNEP, the International Labour Organization (ILO), and the World Health Organization (WHO) in the International Programme on Chemical Safety (IPCS) as the nucleus for international cooperation on environmentally sound chemicals management. At UNCED, delegates adopted Agenda 21, which contains an international strategy for action on chemical safety with six priority program areas: (1) expansion and acceleration of international assessment of chemical risks; (2) harmonization of classification and labeling of chemicals; (3) information exchange on toxic chemicals and chemical risks; (4) establishment of risk reduction programs; (5) strengthening of national capacity and capability for chemicals management; and (6) prevention of illegal international traffic in toxic and dangerous products.[9]

Agenda 21 also calls for the establishment of an intergovernmental forum on chemical safety, as it was believed that there were too many different organizations directly or indirectly involved in international chemicals management and that a coordinating organization that dealt exclusively with such issues was needed. For that purpose, the Intergovernmental Forum on Chemical Safety (IFCS) was established in 1994. In 1995, the Inter-Organization Programme for the Sound Management of

Chemicals (IOMC) was set up to coordinate efforts of international and intergovernmental organizations in assessing and managing chemicals. As illustrated by the cases outlined in this article, the 1990s have witnessed a major surge in efforts to promote chemical safety through MEAs.

Three Institutional Models of Regulation

A successful attempt to address the problems of hazardous pesticides and industrial chemicals requires the introduction of comprehensive controls on such substances throughout their life cycle—production, use, trade, and disposal—since all these activities directly or indirectly can be of danger to the environment and human health. Regulations of unintentionally produced by-products through emissions standards must also be set. To regulate environmentally damaging activities, including those associated with hazardous chemicals, there are at least three approaches available that diverge in the degree to which the environmental problem at hand is treated as one single problem or broken down into more or less separate subsets of problems.

One way is to try to negotiate a single all-encompassing MEA. For hazardous chemicals, that would mean simultaneously regulating the full life cycle of hazardous pesticides and industrial chemicals together with emission controls of hazardous by-products in one agreement. While there have been scattered proposals for a broad chemicals convention, no real attempt has been made to address all chemicals problems with a single agreement. This would be a daunting task involving obvious risks of getting tangled up in the minutiae of text, major political differences, and the amount of time required to complete such an agreement, as witnessed in the law of the sea negotiations. Nevertheless, there have been recent calls for the creation of such broad agreements in the environmental sphere, notably the suggestion for a "law of the atmosphere."[10]

A second option is to first set up a general framework convention within which issue specific protocols are then created.[11] For chemicals regulation this would mean that a general framework chemicals convention setting out general goals and procedures would be negotiated, followed by protocols on different life cycle activities and emission standards for by-products. Christoffer Joyner refers to this as a "progressive approach" and notes that the convention-cum-protocol model increasingly is adopted as the method of international treaty making.[12] A benefit of this approach is that it allows for reaching agreement initially

on broad principles to function as a common base in order to facilitate creating action oriented protocols. This avoids the pitfalls of the first approach by not trying to solve all substantial problems at once and has been used successfully in CLRTAP on transboundary air pollution and the regime on ozone-depleting substances; efforts to deal with the loss of biological diversity and (less successfully) climate change follow a similar pattern. A central argument against this approach is that as related items become separated, the holistic overview can be lost. Lawrence Susskind further points out that the convention-protocol approach can result in a long drawn-out negotiation process, that its dynamics often encourage the creation of lowest-common-denominator agreements, and that the content and structure of the initial convention—often designed to satisfy primarily political pressures—can later obstruct the design of environmentally effective protocols.[13]

The convention-cum-protocol approach is often applied in environmental treaty making, but chemicals management follows a third way of regulation, which is to negotiate discrete, free-standing agreements on different facets of a problem without first making use of a framework agreement. The incrementalism of this approach is designed to result in functionally narrow and, it is hoped, linked agreements. Although a benefit of this fragmented approach is that it avoids the pitfall of trying to solve several difficult problems simultaneously, it can prove an arduous task to aggregate agreements that have been developed separately over an extended period of time into a coherent regulatory system. Special care must be taken to ensure that all aspects of the problem are covered and at the same time avoid unnecessary and time-consuming duplication of work and regulations. Further, an agreement evolves after its creation and gains both supporters and critics where political calculations (which may have only existed at the time of the negotiations) and institutional inertia can cause difficulties.

The next four sections outline the existing key MEAs on chemicals. The concluding section discusses some important implications of the current system from the perspective of how hazardous pesticides, industrial chemicals, and by-products are regulated and how global chemicals management may be enhanced.

The CLRTAP POPs Protocol

The Convention on Long-Range Transboundary Air Pollution was established under the auspices of the United Nations Economic Commission for Europe (UNECE) and covers North America, Europe, and the former

Soviet Union.[14] The convention is designed as a framework convention—that is, it does not in detail regulate any environmentally damaging activities but merely acts as an arena for technical, scientific and political cooperation.[15] With respect to the chemical life cycle, the CLRTAP POPs protocol primarily covers the production and use of hazardous pesticides and industrial chemicals and sets emission standards for by-products. It cites the Basel convention as a complementary regime for waste disposal and is silent on trade issues.

The first CLRTAP initiative on POPs was taken in the summer of 1989 based on concerns with high Arctic environmental concentration levels and risks for local human populations.[16] This led the executive body of CLRTAP to establish in 1990 a CLRTAP task force on POPs mandated to further investigate the POPs problem within the CLRTAP region and the need for controls on POPs. In April 1994, the task force concluded that international controls to restrict POPs emissions were needed and recommended the creation of a new separate CLRTAP POPs agreement. After additional assessments, formal protocol negotiations began in January 1997, and an important milestone was reached in June 1998 when thirty-two states and the European Commission signed the new CLRTAP POPs protocol. As of 11 March 2002, thirty-six CLRTAP parties are signatories to the protocol; eight have also ratified it.

The CLRTAP regulatory system for POPs is designed as a two-track approach. Track 1 involved agreeing on a list of regulated substances to be initially included in the POPs protocol with the core of the protocol being constituted by the listed sixteen compounds and their regulations. Track 2 was to set up a connected mechanism for future evaluation and possible inclusion of additional compounds in the protocol once it enters into force, in an effort to strengthen the protocol's coverage and long-term regulatory effectiveness.

Because emissions from hazardous pesticides, industrial chemicals, and by-products are the result of highly diverse processes, separate formats for controls were designed, grouping substances into three annexes (Table 1).

Annex I contains pesticides and industrial chemicals for which production and use are to be eliminated. Annex II contains pesticides and industrial chemicals scheduled for restrictions on use. Regulations of Annex I and Annex II substances do not apply when they occur in small doses in products, in articles manufactured or in use by the implementation date, or as intermediates in the manufacture of other nonregulated substances. Stockpiles of Annex I substances shall be destroyed or disposed of in an "environmentally sound manner, taking into account relevant subregional, regional and global regimes governing the management of

Table 1 List of the Sixteen Substances Initially Included in the CLRTAP POPs Protocol

Annex	Pesticides	Industrial chemicals	Unintentional by-products
I	Aldrin	Hexabromobiphenyl	
	Chlordane	PCBs	
	Chlordecone		
	DDT		
	Dieldrin		
	Endrin		
	Heptachlor		
	Hexachlorobenzene		
	Mirex		
	Toxaphene		
II	HCH/Lindane	DDT	
		PCBs	
III			Dioxins
			Furans
			Hexachlorobenzene
			PAHs

Source: Adapted from Annex I-III of the protocol.

Notes: The substances are grouped according to category and the annex in which they are listed. DDT and PCBs are listed in both Annex I and Annex II, while hexachlorobenzene is listed in both Annex I and Annex III.

hazardous wastes and their disposal, in particular the Basel Convention."[17] The reference to regimes other than Basel is included because not all CLRTAP parties participated in the Basel convention, and the terms "waste," "disposal," and "environmentally sound" should be interpreted in a manner consistent with the use of those terms in the Basel convention. The parties commit themselves to "endeavor to ensure" that the disposal of Annex I substances is carried out domestically, but the protocol contains no ban against export or import. This was due to strong resistance from some parties, notably the United States, to the introduction of trade restrictions in a regional environmental agreement, arguing that trade measures should only be considered on a global level.

For the four unintentional by-products listed in Annex III, twelve major stationary sources are identified, including waste incineration plants, metal production, and energy combustion plants. For these, parties shall reduce total annual emissions of each of the substances based on a connected reference year set by each party between 1985 and 1995, to be specified upon ratification. Existing and new stationary sources are regulated with a combination of best available techniques, and emission limit values are identified in five detailed technical annexes, some mandatory and others recommended.

The Rotterdam PIC Convention

Unlike the CLRTAP POPs protocol, the Rotterdam Prior Informed Consent (PIC) convention, which under UNEP and FAO auspices was signed by sixty-one countries in September 1998 and as of March 2002 has twenty ratifications, does not directly regulate the production and use of hazardous chemicals but rather regulates their export and import. It was negotiated in five sessions, beginning in December 1995 and ending in March 1998. The convention makes legally binding a procedure that had been operating on a voluntary basis since 1991.[18] The PIC convention initially covered twenty-two pesticides and five industrial chemicals. Since then, four more chemicals have been added, and it is expected that dozens more will be added as the provisions of the convention are implemented (Table 2).

Table 2 List of the Thirty-One Substances Covered by the Rotterdam PIC Convention

Pesticides	Industrial chemicals
2,4,5-T	Crocidolite
Aldrin[a]	Polybrominated biphenyls (PBB)[a]
Binapacryl	Polychlorinated biphenyls (PCB)[a]
Captafol	Polychlorinated terphenyls (PCT)[a]
Chlorobenzilate	Tris(2,3dibromopropyl) phosphate
Chlordane[a]	
Chlordimeform	
DDT[a]	
Dieldrin[a]	
Dinoseb and dinoseb salts	
1,2-dibromoethane (EDB)	
Ethylene dichloride	
Ethylene oxide	
Fluoroacetamide	
HCH[a]	
Heptachlor[a]	
Hexachlorobenzene[a]	
Lindane[a]	
Mercury compounds	
Toxaphene[a]	
Pentachlorophenol	
Methyl-parathion	
Methamidophos	
Monocrotophos	
Parathion	
Phosphamidon	

Source: Adapted from Annex III of the convention.

Note: a. Aldrin, chlordane, DDT, dieldrin, heptachlor, hexachlorobenzene, lindane, toxaphene, and PCB/PBB/PCT are also covered by both CLRTAP POPs and the Stockholm convention, while HCH/Lindane is covered only by CLRTAP.

According to the convention, export of a listed chemical can take place only with the prior informed consent of the importing party. The PIC procedure is a means for formally obtaining and disseminating the decisions of importing countries regarding whether they wish to receive future shipments of a certain chemical and for ensuring compliance with these decisions by exporting countries. The aim is to promote a shared responsibility between exporting and importing countries in protecting human health and the environment from the harmful effects of such chemicals.

In addition to the PIC procedure, the convention provides for technical assistance. Parties with more advanced programs for regulating chemicals should provide technical assistance, including training to other parties in developing their infrastructure and capacity to manage chemicals throughout their life cycle. The convention also contains provisions for the exchange of information among parties about potentially hazardous chemicals that may be exported and imported and provides for a national decisionmaking process regarding import and compliance by exporters with these decisions.

Given the emphasis on the trade in hazardous chemicals, the Rotterdam convention also had to ensure that it did not clash with the multilateral trading system (in the form of General Agreement on Tariffs and Trade [GATT] regulations and the World Trade Organization [WTO]). Decisions taken by the importing party must be trade neutral; that is, if the party decides it does not consent to accepting imports of a specific chemical, it must also stop domestic production of the chemical for domestic use or imports from any nonparty. There were concerns expressed during the negotiations relating to the relationship between the convention and WTO provisions.[19] While the WTO serves as an umbrella for GATT and its complex of agreements, there is no compatible overarching system of international environmental law. This is one area where the incrementalist approach to negotiating individual, self-standing environmental agreements (under no wider framework) runs into difficulty with a more comprehensive and coordinated international regime. And since the convention does not deal with controlling production, use, or disposal of the traded chemicals that it does regulate, there will be pressure—at a minimum—to relate it more closely to other agreements, such as the Basel convention and the Stockholm POPs convention (see the next two sections).

The Basel Convention

There currently is no international agreement designed explicitly to regulate the disposal of chemical waste. Rather, chemical waste most often

falls under the broader category of "hazardous waste" as governed by the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. The Basel convention was negotiated under the auspices of UNEP and adopted in March 1989 after high-profile cases of illegal hazardous waste dumping in developing countries.[20] It entered into force May 1992 and as of April 2002 there are 150 parties to the convention.

The objectives of the Basel convention are to protect human health and the environment by minimizing the generation of hazardous wastes and to control and reduce their transboundary movements. In order to achieve these objectives, the convention contains several general obligations. For example, waste exports are prohibited to Antarctica (Art. 4.6) and to countries that have banned such imports as a national policy (Art. 4.1); additionally, waste exports to nonparties are prohibited unless they are subject to an agreement that is as stringent as the Basel convention (Arts. 4.5 and 11). Those hazardous waste transfers that *are* permitted under the Basel regime are subject to the mechanism of prior notification and consent, which requires that a party does not export hazardous wastes to another party without the consent of the "competent authority" in the importing state (Art. 6). The most important development since the negotiation of the convention has been the 1995 decision to ban hazardous wastes destined for disposal or recycling sent from Organization for Economic Cooperation and Development (OECD) countires to non-OECD countries.

With respect to chemicals such as the ones regulated by the CLRTAP POPs protocol and the Rotterdam convention, they are subject to the Basel convention if they are categorized as "hazardous waste" in Basel convention terms. The Basel convention defines a waste as follows: "Wastes" are substances or objects which are disposed of, or are intended to be disposed of, or are required to be disposed of by the provisions of national law.[21] The convention then goes on to define "disposal" as any "operations which do not lead to the possibility of resource recovery, recycling, reclamation, direct re-use or alternative use" (that is, final disposal); disposal *also* means any "operations which may lead to resource recovery, recycling, reclamation, direct re-use or alternative uses" (that is, to recycle something, in Basel terms, is also to dispose of it).[22] The convention already identifies several waste POPs in Annex I, particularly wastes containing or contaminated with PCBs (polychlorinated biphenyls) or PBBs (polybrominated biphenyls). Annex VIII of the Convention also restricts trade in wastes from biocides, including waste pesticides and herbicides that are outdated or unfit for their originally intended use; and wastes from the production, preparation, and use of pharmaceutical products.

However, rather than define "hazardous wastes" in detail, the convention creates a mechanism to determine when wastes are hazardous. Wastes are designated as hazardous in the context of the Basel convention if they belong to certain categories (Annex I) and contain certain characteristics (Annex III) (Table 3).

The debate over how to determine which wastes are hazardous and which are not was a contentious one during the negotiations (due to the fact that different national definitions of "hazardous" often reflect different economic and environmental priorities) and remains contested in the ongoing debates regarding wastes destined for recovery and recycling.

The Basel convention suffers from two major drawbacks in its ability to control the disposal of hazardous chemicals. First, in order to fall under Basel regulations, the substance would have to satisfy Basel's definition of both "waste" and "hazardous." Even though many of the most toxic chemicals being regulated for production and use would easily qualify for the hazardous label, the convention itself has been bedeviled by the problem of defining waste in any precise manner. If, for example, outdated or off-specification pesticides or pharmaceuticals are not defined as waste but as a "secondary product" or even as "aid," then

Table 3 Some Examples of Materials That May Be Considered Hazardous Waste

Waste streams that can produce hazardous waste	Waste constituents that may be hazardous	Some characteristics of hazardous waste
Residues arising from industrial waste disposal operations	Copper compounds	Explosive
Tarry residues arising from refining	Zinc compounds	Flammable
Chemical substances arising from research and development	Arsenic and arsenic compounds	Poisonous
Substances and articles containing PCBs	Metal carbonyls	Infectious
Pharmaceutical products	Mercury and mercury compounds	Corrosive
Wood preserving chemicals	Lead and lead compounds	Toxic (delayed or chronic)
Organic solvents	Inorganic cyanides	Eco-toxic
Inks, dyes, pigments, paints, lacquers, varnish	Asbestos	
Mineral waste oils, emulsions	Ethers	
	Halogenated organic solvents	
	Acidic solutions or acids in solid form	
	Cadmium and cadmium compounds	

Source: Adapted from Basel convention, Annex I and Annex III.

Basel restrictions would not apply. Second, the convention does little to improve the capacity of countries to manage either imported or domestically generated hazardous chemical waste. This is of specific importance to developing countries that, in areas such as Southeast Asia, will be increasingly generating their own chemical waste or have been the subject of sham shipments of outdated chemicals labeled "aid." The convention focuses more on the trade component of hazardous wastes than on safely managing their disposal regardless of source.[23]

The Stockholm POPs Convention

The most recent of the chemicals MEAs is the UNEP-sponsored Stockholm POPs convention. Unlike its CLRTAP predecessor, the Stockholm convention is global in scope and initially regulates fewer POPs. In June 1996, the IFCS Ad Hoc Working Group on POPs concluded that sufficient information existed to demonstrate the need for global action to minimize the risks from twelve identified POPs, the so-called dirty dozen. In February 1997, the UNEP Governing Council requested that UNEP, together with relevant international organizations, prepare for and convene an intergovernmental negotiating committee with a mandate to develop an international legally binding instrument for implementing international action, beginning with the twelve specified POPs. The Stockholm Convention was negotiated in five sessions between 1998 and 2000, with the final text agreed to in Johannesburg in December 2000. In Stockholm in May 2001, more than a hundred countries adopted the convention and eight had ratified it as of May 2002. The POPs Review Committee will consider additional candidates for the POPs list on a regular basis once the convention enters into force.

In comparison with the three other agreements, the Stockholm convention takes a more holistic approach and sets out control measures covering production, use, trade, and disposal of hazardous pesticides and industrial chemicals, as well as containing measures to reduce by-products.

The convention targets the production and use of nine of the twelve POPs for elimination, although it does give some exemptions for continued use of PCBs until 2025 (Annex A). Production and use of DDT (dichlorodiphenyltrichloroethane) is restricted with exemptions only for those countries that still require it for disease vector control against malaria mosquitoes (Annex B). Releases of the four by-products are to be minimized and, "where feasible," eliminated (Annex C) (see Table 4). Regarding trade in POPs, parties can import or export POPs only for

Table 4 List of the Twelve Substances Initially Included in the Stockholm POPs Convention

Annex	Pesticides	Industrial chemicals	Unintentional by-products
A	Aldrin	PCBs	
	Chlordane		
	Dieldrin		
	Endrin		
	Heptachlor		
	Hexachlorobenzene		
	Mirex		
	Toxaphene		
B	DDT		
C			Dioxins
			Furans
			Hexachlorobenzene
			PCBs

Source: Adapted from Stockholm convention, Annex A, B, and C.

Notes: The substances are grouped according to category and the annex in which they are listed. The UNEP twelve are the same as the CLRTAP sixteen, minus chlordecone, HCH/lindane, hexabromobiphenyl, and PAHs.

the purposes permitted under the convention or for environmentally sound disposal. Exports to nonparties can take place only to countries that have provided annual certification regarding the intended use of the chemical and that have made a commitment to minimize or prevent releases and comply with the waste disposal provisions of the agreement.

The question of how to address disposal of POPs wastes was quite contentious during the negotiations. Some participants, such as Canada, the United States, and Australia, argued that the provisions of the Basel convention were sufficient to handle POPs wastes, while others, like the European Union (EU) and NGOs, suggested specific provisions in the Stockholm convention to deal with wastes, arguing that there was a need to ensure that they were treated as environmentally soundly as possible.[24] The final agreed text sets out stringent measures for the disposal of POPs wastes and also encourages close cooperation with the Basel convention. Parties are required to take appropriate measures so that wastes are disposed of in such a way that the POP content is destroyed or irreversibly transformed. When destruction or irreversible transformation does not represent the environmentally preferable option, or when the POP content is low, parties may otherwise dispose of POPs-containing wastes in an environmentally sound manner, taking into account international rules, standards, and guidelines. Taking a more stringent approach than the Basel convention, wastes are *not* permitted to be subjected to disposal operations that may lead to the recovery, recycling, reclamation, direct reuse, or alternative uses of POPs.

Finally, wastes may not be transported across international boundaries without taking into account international rules, standards, and guidelines.

The Need for a Comprehensive Strategy

The current situation of international chemicals management can be described as fragmented coordination. Four main MEAs that are more or less compatible and that regulate different substances and stages of the life cycle of production, use, trade, and disposal of hazardous industrial chemicals, pesticides, and by-products have been created (Table 5). Together with actions taken by a host of global IGOs such as UNEP, FAO, WHO, ILO, IFCS, UNIDO (UN Industrial Development Organization), and UNITAR (UN Institute for Training and Research), and more regional forums, these efforts represent an attempt to protect human health and the environment from the many dangers of hazardous chemicals.[25]

Nevertheless, future action on all three categories of substances will be required to fully live up to this ambition, and it will inevitably involve hard decisions and prioritizations. All stakeholders—states, IGOs, NGOs, and industry—have limited resources and many demands as to where to allocate them. For instance, negotiations on the Stockholm convention were postponed until the PIC negotiations were concluded, since many countries claimed that they had resources for negotiating only one major chemicals agreement at the time. Moreover, other important global environmental issues like climate change and biodiversity will compete with chemicals management for time and resources. It is therefore necessary to carefully consider what should be done next.

Table 5 Current Fragmented Approach to International Chemicals Regulations

Instrument	Scale	Number of chemicals covered to date	Production	Use	Trade	Disposal
CLRTAP POPs	regional	16	✓	✓		
Rotterdam PIC	global	31			✓	
Basel Waste	global	subject to convention definitions				✓
Stockholm POPs	global	12	✓	✓	✓	✓

The present situation has several drawbacks that have to be addressed. Different levels of membership in the various agreements cause *membership gaps* that make it difficult to link two or more agreements in attempts to save time and to benefit from previous work in setting up effective regulations. This was the case in the CLRTAP POPs negotiations when the fact that not all CLRTAP parties participated in the Basel convention demanded special attention. The United States, for example, is a party to CLRTAP but is not to the Basel convention. Furthermore, there are *regulatory gaps* since the four agreements focusing on different activities do not cover identical sets of substances, with the result that some industrial chemicals and pesticides are not controlled throughout their entire life cycle. For example, the production and use of some POPs are regulated in the CLRTAP protocol but not in the Stockholm convention and thereby are not subject to trade restrictions. Also, one by-product, polycyclic aromatic hydrocarbons (PAHs), is addressed on a regional CLRTAP scale but not globally, whereas another (PCBs) are addressed as by-products globally but not regionally. Efforts therefore need to be made to stimulate and facilitate broad support and effective implementation of all four agreements, as well as to seek global comprehensive controls on additional substances.

The Stockholm convention, despite that it is limited in the number of chemicals covered, represents a significant step forward and a movement toward a more comprehensive life cycle regulation that should be encouraged. Several options for a more integrated approach to chemicals are available. In the mid-1990s, there were discussions within the EU about proposing a global chemicals framework convention. At a UNEP experts meeting in 1996, the Netherlands and Belgium jointly proposed an integrated international legal instrument for PIC, the phasing out of POPs, and other additional measures.[26] Opposed by the United States and Australia, the proposal was not carried forward, on the grounds that negotiating a general framework agreement would not add any substantial benefits and would drag out the process before actual controls could be introduced. During the negotiations for the Rotterdam convention, the Belgian environment minister suggested that rather than simply create a convention on PIC, the outcome should be a "dynamic legal framework" that could accommodate "further measures such as production phase-out provisions," an element not part of the voluntary PIC procedure already in existence.[27] The EU position at the start of negotiations was that a PIC convention should contain a framework provision that would allow for the negotiation and addition of protocols on chemicals at later stages. This idea was also supported by environmental NGOs. However, strong opposition came from the

United States, Canada, Australia, and some other non-European OECD countries, arguing against what in their view would be an expanding and increasingly costly bureaucratic process. More recently, at the UNEP Governing Council meeting in February 1999, Iceland suggested the creation of an "umbrella mechanism" for chemicals and Denmark and the Netherlands called for "a global convention on chemicals."[28]

While a framework convention may have been a viable option earlier, it would be going backwards to set up a framework convention after so many specific agreements have already been concluded. Instead, focus should be on how the current structure can be better coordinated and tightened. Coordination is beneficial because it can allow for more effective use of limited resources, help avoid unnecessary duplication of tasks, or even prevent counterproductive activities. And although coordination is never easy, the efforts of UNEP and the FAO regarding use of pesticides in developing countries are perhaps instructive. The division of labor between the two organizations—FAO's expertise on pesticides and UNEP's on industrial chemicals—meant that cooperation between them was not easy to arrange in the early days of the voluntary PIC procedure. However, such difficulties were overcome. Cooperation between UNEP and FAO not only helped to build consensus between opposing industry and green NGOs, but "helped prevent various other organizations—including WHO, ILO, and GATT—from [undertaking] redundant or uncoordinated actions in the same [issue] area," showing "what can be gained when international institutions with different constituencies and differing priorities manage to work together."[29]

A promising initiative to increase coordination as proposed in this article is under way. At the UNEP Governing Council meeting in February 2001, discussions were held on the need for, and ways to, enhance synergies and coordination across the chemicals MEAs and other related activities; also, a report examining the need for a strategic comprehensive approach to international chemicals management was commissioned for presentation to the Global Ministerial Environment Forum in 2002. At the third meeting of the Open-ended Intergovernmental Group of Ministers or their Representatives on International Environmental Governance, September 2001, chemicals was chosen as a pilot area to investigate possibilities and benefits of "clustering" MEAs. Although issues relating to institutional interplay have had scholarly attention, they represent still fairly unchartered territory in practice and deserve more sustained attention.[30]

A crucial element in strengthening chemicals management should be continued development of the life cycle regulation of a greater number of industrial chemicals and pesticides, combined with expanded controls

on by-products. Finally, there is a need to go from a predominantly reactive approach to a more proactive approach. Efforts so far have concentrated on phasing out existing hazardous chemicals. It is important, however, to find ways to set up effective mandatory screening and assessments of new substances to prevent these substances, later to be discovered to be equally hazardous, from replacing the substances now being banned. 🌐

Notes

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1. OECD, *OECD's Environmental Health and Safety Programme,* 2000, available online at http://www.oecd.org/ehs.

2. Frank Wania and Donald Mackay, "Tracking the Distribution of Persistent Organic Pollutants: Control Strategies for these Contaminants Will Require a Better Understanding of How They Move Around the Globe," *Environmental Science and Technology* 30, no. 9 (1996): 390A–396A.

3. Arctic Monitoring and Assessment Programme, *Arctic Pollution Issues: A State of the Arctic Environment Report,* Oslo, 1997, pp. 71–91.

4. Oran R. Young, "Institutional Linkages in International Society: Polar Perspectives," *Global Governance* 2, no. 1 (1996): 1–24; Olav Schram Stokke, "Managing Straddling Stocks: The Interplay of Global and Regional Regimes," *Ocean & Coastal Management* 43 (2000): 205–234; G. Kristin Rosendal, "Impact of Overlapping International Regimes: The Case of Biodiversity," *Global Governance* 7, no. 2 (2001): 95–117.

5. The chemicals that are covered under these four agreements are in one important aspect different in character from chlorofluorocarbons (CFCs), another major group of chemicals that has been subject to extensive international cooperation. While CFCs rise to the stratosphere to cause ozone depletion, which in turn can lead to adverse environmental and human health effects, we are addressing hazardous chemicals with *direct* effects on terrestrial and aquatic ecosystems (e.g., through poisoning and contamination).

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9. United Nations, *Agenda 21: Programme of Action for Sustainable Development* (New York: United Nations Publications, 1992), chap. 19.

10. Adil Najam, "Future Directions: The Case of a 'Law of the Atmosphere,'" *Atmospheric Environment* 34 (2000): 4047–4049.

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12 Christoffer C. Joyner, *Governing the Frozen Commons: The Antarctic Regime and Environmental Protection* (Columbia: University of South Carolina Press, 1998), pp. 39–40.

13. Lawrence E. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements* (Oxford: Oxford University Press, 1994), pp. 30–37.

14. On the creation of CLRTAP, see E. M. Chossudovsky, "*East-West" Diplomacy for Environment in the United Nations* (New York: UNITAR, 1989).

15. CLRTAP has one protocol on cost sharing and seven pollution-specific protocols: two on sulfur, one on nitrogen, one on volatile organic compounds, one on heavy metals, one on POPs, and one on multipollutants/multieffects.

16. On CLRTAP POPs, see Henrik Selin, *Towards International Chemical Safety: Taking Action on Persistent Organic Pollutants (POPs),* No. 211 (Linkoping: Linkoping Studies in Arts and Sciences, 2000).

17. CLRTAP POPs protocol, Article 3(b)(i).

18. See Jonathan Krueger, "Information in International Environmental Governance: The Prior Informed Consent Procedure for Trade in Hazardous Chemicals and Pesticides," Belfer Center for Science and International Affairs (BCSIA) Discussion Paper 2000-16 (Cambridge: Environment and Natural Resources Program, Kennedy School of Government, Harvard University, 2000).

19. See reporting in the *Earth Negotiations Bulletin* 15, nos. 2–4 (1997–1998).

20. For more on the Basel convention, see Jonathan Krueger, *International Trade and the Basel Convention* (London: Royal Institute of International Affairs/ Earthscan Publications, 1999).

21. Basel convention, Article 2(1).

22. Basel convention, Article 2(4) and Annex IV.

23. This is changing to some degree in the convention, as it recognizes the need to focus on capacity-building issues of waste management. The convention's Technical Working Group has, for example, created technical guidelines on the environmentally sound management of wastes containing PCBs, PCTs, and PBBs; these guidelines were adopted by the Conference of the Parties in 1994.

24. See, for example, Basel Action Network, "Warning: The Basel Convention is Poorly Equipped to Deal with POPs Destruction," Briefing Paper No. 5, Basel Action Network, December 2000.

25. More regional forums active on chemicals management include the Arctic Council, the North American Agreement on Environmental Cooperation (NAAEC)/Sound Management of Chemicals Initiative, the Great Lakes Programme, the EU, the Oslo-Paris Commission for the Protection of the Marine Environment of the North-East Atlantic (OSPARCOM), and the Helsinki Commission (HELCOM).

26. Marc Pallemaerts, "Regulating Exports of Hazardous Chemicals: The EU's External Chemical Safety Policy," in J. Golub, ed., *Global Competition and EU Environmental Policy* (London: Routledge, 1998), p. 76.

27. UNEP/FAO, "Report of the Intergovernmental Negotiating Committee on the Work of Its First Session," UNEP/FAO/PIC/INC.1/10, 21 March 1996.

28. *Earth Negotiations Bulletin* 16, no. 5 (5 February 1999): 2.

29. See Robert L. Paarlberg, "Managing Pesticide Use in Developing Countries," in Peter Haas, Robert Keohane, and Marc Levy, eds.*, Institutions for the Earth: Sources of Effective International Environmental Protection* (Cambridge: MIT Press, 1993), p. 343.

30. International Human Dimensions Programme on Global Environmental Change (IHDP), *Institutional Dimensions of Global Environmental Change (IDGEC) Science Plan,* IHDP Report No. 9, IHDP, 1999.