

Global Politics of Mercury Pollution: The Need for Multi-Scale Governance

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This article analyses international legal and policy developments on mercury from the 1970s to the present time, and examines options for continued abatement. Multiple scientific assessments have demonstrated that mercury is an environmental pollutant that can pose a serious threat to human health and development. Currently, the international community is engaged in extensive debate about options for improved mercury governance. This article will critically examine three major policy options under discussion: the creation of a global mercury convention; the regulation of mercury under the Stockholm Convention on Persistent Organic Pollutants; and the development of voluntary partnerships. It is concluded that expanded and better integrated policy efforts are needed across global, regional and local governance scales to address mercury pollution and contamination effectively.

INTRODUCTION

Mercury seems to be nearly as persistent as a policy issue as it is in the environment. Mercury pollution has been subject to high-level domestic political concern since at least the 1950s, and continuing international policy making since the 1970s. Levels of mercury in the atmosphere nevertheless have increased by a factor of three since the beginning of the industrial era.¹ Mercury can travel long distances from its emission sources before entering ecosystems. In particular, large predatory fish species, such as tuna, shark and tilefish, can accumulate high levels of mercury through food chains.² Mercury is also a pollutant of particular concern in the Arctic environment where indigenous peoples can be exposed to high levels of mercury mainly through traditional diets.³ Human health

risks from mercury contamination include adverse neurological and developmental effects.

Mercury pollution and policy have attracted less scholarly attention than many other environmental pollution issues (e.g. ozone depletion, acidification, hazardous organic chemicals and climate change), but mercury is an interesting case for at least two reasons. First, mercury continues to attract significant scientific interest as a widespread pollutant and a serious threat to human health. Recently, new data on developmental risks from low-level mercury exposure have been published in the scientific literature. Second, international mercury policy has been developed in multiple forums since the 1970s. Whereas most countries agree that expanded international collaborative action could facilitate more effective mercury abatement, there is noteworthy disagreement among governments about how to address the mercury issue at national, regional and global levels. As a result, mercury policy has once again become a hot political topic.

This article analyses international legal and policy developments on mercury, and examines options for continued abatement. It begins with a brief introduction to the mercury issue and a review of major legal and policy measures on mercury pollution and use to date. This review is divided into three chronological phases: 1970s, 1980s–1990s and 2000–present. This is followed by an analysis of three policy options for developing global mercury abatement: the creation of a global mercury convention; the regulation of mercury under the Stockholm Convention on Persistent Organic Pollutants (POPs);⁴ and addressing mercury issues through voluntary partnerships. We conclude by arguing that expanded and better integrated policy efforts are needed across global, regional and local governance levels to address problems of mercury pollution and contamination.

¹ R.P. Mason, W.F. Fitzgerald and F.M.M. Morel, 'The Biogeochemical Cycling of Elemental Mercury – Anthropogenic Influences', 58:15 *Geochimica et Cosmochimica Acta* (1994), 3191.

² US Department of Health and Human Services and US Environmental Protection Agency, *What You Need to Know About Mercury in Fish and Shellfish: 2004 EPA and FDA Advice For: Women Who Might Become Pregnant, Women Who Are Pregnant, Nursing Mothers, Young Children* (EPA and FDA, 2004).

³ Arctic Monitoring and Assessment Programme (AMAP), *Arctic Pollution 2002* (AMAP, 2002).

⁴ Convention on Persistent Organic Pollutants (Stockholm, 22 May 2001).

DEVELOPMENTS IN MERCURY POLLUTION AND POLICY

This section provides a brief summary of mercury as an environmental and human health issue, followed by a survey of international mercury policy to date. Mercury (Hg) is a chemical element and a heavy metal that occurs naturally in the Earth's crust. It has been known to human societies for millennia, and human beings since early on have used mercury as a component in pharmaceuticals and in religious rites and in gold mining processes.⁵ Mercury's toxicity has been recognized since at least the first century.⁶ Mercury mobilized by human activities, such as mining, industrial production and coal burning, accumulates in the atmosphere, soils and oceans. Mercury released by past and present activities will take anywhere from hundreds to thousands of years to return to the deep reservoirs in the Earth where it would no longer pose a contamination threat.

In the atmosphere, mercury exists in its elemental state as a gas, Hg(O). Through atmospheric reactions, it can oxidize to Hg(II) or divalent mercury.⁷ Hg(II) is soluble in atmospheric water and rained out of the atmosphere, which is the predominant form of mercury entering terrestrial and marine ecosystems through deposition. Mercury can also be associated with atmospheric particulate matter, termed Hg(P). Another form, methylmercury, makes up only a small portion of the total mercury in the environment, but is the most significant form of toxic exposure to living organisms, including humans. It is formed by bacteria, which take inorganic mercury and convert it to an organic form. This organic form may bioaccumulate to higher concentrations up through food chains. High levels of methylmercury in some fish species have prompted consumption advisories, particularly for pregnant women and small children, in a number of countries.

Anthropogenic mercury emissions originate from several sources.⁸ The source that is currently dominating is the burning of coal. Mercury emissions from the use of coal as an energy source are problematic in all regions of the world, but such emissions are a growing problem particularly in China and other parts of Asia where new coal-fired power plants are being built at a high rate to meet soaring energy demands. Mercury is

also used in multiple industrial processes, including the production of cement, iron and steel, which may result in unintentional releases. Another source of mercury emissions stems from the use of mercury in manufactured goods, including thermometers, fluorescent light bulbs and thermostats. Mercury in products may be released into the environment during or after their use, and incineration processes can be a significant source of mercury emissions.

One of the first incidents in modern times drawing attention to mercury as a serious health issue occurred in Minamata, Japan in the 1950s, when methylmercury was emitted by a factory into local waters contaminating fish that later were consumed by humans. Symptoms in affected people included neurological damage, and disturbances of sensation and movement.⁹ In the early 1970s, people in areas of rural Iraq contracted mercury poisoning after eating seeds treated with mercury-based pesticides. Effects were detected not only in people who were directly exposed, but also in children exposed in utero.¹⁰ Recent scientific studies have demonstrated that exposure to relatively low levels of mercury can cause serious neurological symptoms and reproductive abnormalities. Studies have also found associations between mercury exposure and development impairments in areas of language, association and memory.¹¹

MERCURY POLICY IN THE 1970S

International policy addressing environmental and human health risks from mercury exposure and pollution has been developed in different multilateral fora since the 1970s. International awareness of the dangers of mercury pollution was initially raised in part through multilateral conferences and actions by international organizations. Early international policy addressing mercury pollution and contamination issues was developed primarily in the context of regional water cooperation on hazardous substances around the Baltic Sea, the North-East Atlantic, the Mediterranean Sea and the North American Great Lakes. In addition, the European Economic Community (EEC) introduced water quality standards that covered mercury in the 1970s.

⁹ H. Imura, 'Japan's Environmental Policy: Past and Future', in H. Imura and M.A. Schreurs (eds) *Environmental Policy in Japan* (World Bank and Edward Elgar, 2005).

¹⁰ United Nations Environment Programme, *Global Mercury Assessment* (Inter-Organization Programme for the Sound Management of Chemicals, December 2002).

¹¹ K.S. Crump *et al.*, 'Influence of Prenatal Mercury Exposure Upon Scholastic and Psychological Test Performance: Benchmark Analysis of a New Zealand Cohort', 18:6 *Risk Analysis* (1998), 18; P. Grandjean *et al.*, 'Cognitive Deficit in 7-Year-Old Children with Prenatal Exposure to Methylmercury', 19:6 *Neurotoxicology and Teratology* (1997), 417.

⁵ J.O. Nriagu, 'Production and Uses of Mercury', in J.O. Nriagu (ed.), *The Biogeochemistry of Mercury in the Environment* (Elsevier, 1979), at 23.

⁶ W.H. Schroeder and J. Munthe, 'Atmospheric Mercury – an Overview', 32:5 *Atmospheric Environment* (1998), 809.

⁷ C.-J. Lin and S.O. Pehkonen, 'The Chemistry of Atmospheric Mercury: A Review', 33:13 *Atmospheric Environment* (1999), 2543.

⁸ E.G. Pacyna *et al.*, 'Global Anthropogenic Emission Inventory for 2000', 40:22 *Atmospheric Environment* (2006), 4048.

At the United Nations Conference on the Human Environment in Stockholm in 1972, heavy metals were identified as pollutants of high concern. The Stockholm Declaration that was adopted at the conference stated that countries should 'take all possible steps to prevent pollution of the seas' by hazardous substances.¹² The Stockholm Action Plan, made up of 109 more detailed recommendations for post-Stockholm activities on environmental management and policy making, contained a series of recommendations for pollution identification and control.¹³ Much policy development since the Stockholm Conference has treated mercury as a substance that should be regulated together with other hazardous substances. A recommendation by the Organization for Economic Cooperation and Development (OECD) in 1973, however, specifically urged its members to reduce anthropogenic releases of mercury to the environment to lowest possible levels.¹⁴

In the 1970s, several legal instruments recognizing language from the Stockholm Declaration and Action Plan were finalized. The 1972 International Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter prohibited the dumping of mercury in the open sea.¹⁵ Several European agreements were also concluded with partially overlapping memberships and regulations. Covering the North-East Atlantic, the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (the Oslo Convention) and the 1974 Convention for the Prevention of Marine Pollution from Land-Based Sources (the Paris Convention) were adopted in 1972 and 1974, respectively.¹⁶ Mercury is a 'black listed' substance under both treaties. The Oslo Convention prohibited dumping of mercury, while the Paris Convention obligated parties to eliminate mercury pollution of the maritime area from land-based sources.

In 1974, the Baltic Sea littoral States adopted the Convention on the Protection of the Marine Environment of the Baltic Sea Area (the Helsinki Convention) and established the Helsinki Commission (HELCOM).¹⁷ The Helsinki Convention strictly limited emissions of

mercury into the Baltic Sea. In 1975, the Mediterranean Action Plan (MAP) was adopted under the auspices of the United Nations Environment Programme (UNEP). The MAP's main legal component is the 1976 Barcelona Convention and its associated protocols.¹⁸ Under the 1976 Dumping Protocol, States pledged to ban the dumping of mercury in the Mediterranean Sea.¹⁹ Similarly, the 1980 Protocol on Land-Based Sources required parties to eliminate land-based discharges of mercury into the Mediterranean Sea.²⁰ In addition, the 1976 Convention on the Protection of the Rhine Against Chemical Pollution committed the Rhine countries to 'eliminate pollution from the surface waters of the Rhine basin' by mercury.²¹

The EEC introduced its first mercury legislation in the 1970s. By the end of 1973, all EEC countries were signatories to the Oslo Convention, and the first Community Environment Action Programme, adopted in November 1973, prioritized freshwater pollution of substances black-listed under the Oslo Convention, including mercury.²² In 1976, the Council adopted a directive on dangerous substances discharged into the aquatic environment, which set a general objective of eliminating pollution by all black-listed substances.²³ This framework legislation was supplemented by two directives adopted in 1982 and 1984, respectively. The 1982 directive set limit values and quality objectives for the elimination of mercury emissions from the chlor-alkali industry, a major source of mercury pollution in Europe.²⁴ The 1984 directive set similar limit values and quality objectives for mercury discharges from other industrial sectors.²⁵

Although most regional policy on hazardous substances in the 1970s was developed in different multilateral forums in Europe, Canada and the USA signed the Great Lakes Water Quality Agreement 2 months

¹⁸ Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona, 16 February 1976).

¹⁹ Protocol for the Prevention of the Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft (Barcelona, 16 February 1976).

²⁰ Protocol on the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources (Athens, 17 May 1980).

²¹ Convention on the Protection of the Rhine Against Chemical Pollution (Bonn, 3 December 1976), Article 1 and Annex I.

²² L.D. Guruswamy, I. Papps and D.J. Storey, 'The Development and Impact of an EEC Directive: The Control of Discharges of Mercury to the Aquatic Environment', XXII:1 *Journal of Common Market Studies* (1 September 1983), 70.

²³ Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community, [1976] OJ L129/23.

²⁴ Council Directive 82/176/EEC of 22 March 1982 on limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry, [1982] OJ L81/29.

²⁵ Council Directive 84/156/EEC of 8 March 1984 on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry, [1984] OJ L74/49.

¹² Declaration of the United Nations Conference on the Human Environment (Stockholm, 16 June 1972), Principle 7.

¹³ UN Conference on the Human Environment, Action Plan for the Human Environment (Stockholm, 16 June 1972).

¹⁴ Organization for Economic Cooperation and Development (OECD), Recommendation of the Council on Measures to Reduce All Man-Made Emissions of Mercury to the Environment (C(73)172/Final, 18 September 1973).

¹⁵ International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London, 13 November 1972).

¹⁶ Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo, 15 February 1972); Convention for the Prevention of Marine Pollution from Land-Based Sources (Paris, 4 June 1974).

¹⁷ Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, 22 March 1974).

before the Stockholm Conference, in April 1972.²⁶ This agreement was updated in 1978 based on the latest scientific assessments of pollution issues in the Great Lakes region, and is implemented under the supervision of the International Joint Commission.²⁷ Under the revised agreement from 1978, Canada and the USA pledged 'to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem', including the 'virtual elimination' of discharges of all persistent toxic substances.²⁸ On mercury specifically, maximum concentration limits were agreed upon 'to protect aquatic life and fish-consuming birds'.²⁹

MERCURY POLICY IN THE 1980s AND 1990s

Mercury policy in the 1980s and 1990s included efforts to strengthen implementation of existing regional agreements, but governments also initiated the development of new and geographically larger policy initiatives. By the 1990s, several scientific assessments drew attention to the transboundary nature of the mercury problem, and epidemiological studies provided further evidence of methylmercury's risks, especially those associated with low-level, long-term exposure.³⁰ Such data led to an expansion of international policy on long-range atmospheric transport of mercury emissions and the use of mercury in consumer goods.

Scientific assessments in the 1980s demonstrated that levels of hazardous substances including mercury remained high in regional waters despite the creation of regional pollution-prevention agreements. In response to such data, the Baltic Sea countries in a 1988 HELCOM Ministerial Declaration stated their intention to reduce total discharges of mercury and a number of other hazardous substances by 50% by 1995.³¹ While this goal was never reached, the 1996 Kalmar Communiqué of the Council of the Baltic Sea States set out the even more ambitious objective of

reducing discharges, emissions and losses of hazardous substances towards their cessation by the year 2020, with the aim of achieving concentrations in the environment near background values for naturally occurring substances such as mercury.³² To this end, HELCOM has adopted a series of binding recommendations targeting specific mercury uses and emission sources.³³

To update and streamline the work under the Oslo and Paris Conventions, the contracting parties to these two treaties created the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) in 1992.³⁴ The OSPAR Convention, which replaced the Oslo and Paris Conventions, entered into force in 1998. Almost identical to the pollution-reduction goals formulated under HELCOM, the long-term goal of the OSPAR Convention is to achieve concentrations of naturally occurring substances like mercury near background levels, with a focus on the year 2020. OSPAR has also adopted binding recommendations targeting mercury pollution.³⁵ Both OSPAR and HELCOM have, moreover, created a series of working groups tasked to monitor and aid Member States' progress on reducing emissions of mercury and other hazardous substances toward their emission reduction goals for 2020.

Mediterranean Sea cooperation on hazardous substances under the MAP and the Barcelona Convention, which was updated in 1995, was also expanded in the 1990s. The 1996 Hazardous Wastes Protocol obligates parties to 'reduce to a minimum . . . and where possible eliminate' the generation of hazardous wastes, as well as the transboundary movement of hazardous wastes in the Mediterranean Sea.³⁶ This agreement defines wastes containing mercury as hazardous. In 1997, parties to the MAP established a Strategic Action Programme to aid the implementation of the Protocol on Land-Based Sources, which was updated in 1996. This programme sets gradually more stringent reduction targets for pollution from land-based activities where the long-term goal for the year 2025 includes complete phase-out of all input of mercury into the Mediterranean Sea.³⁷

²⁶ The Great Lakes Water Quality Agreement (Ottawa, 15 April 1972).

²⁷ Great Lakes Water Quality Agreement of 1978 (Ottawa, 22 November 1978).

²⁸ *Ibid.*, Article 2.

²⁹ *Ibid.* Annex I of the Great Lakes Water Quality Agreement of 1978 stipulates that 'The concentration of total mercury in a filtered water sample should not exceed 0.2 micrograms per litre nor should the concentration of total mercury in whole fish exceed 0.5 micrograms per gram (wet weight basis) to protect aquatic life and fish-consuming birds'.

³⁰ See K.S. Crump *et al.*, n. 11 above; P. Grandjean *et al.*, n. 11 above; US National Research Council, *Toxicological Effects of Methylmercury* (Committee on the Toxicological Effects of Methylmercury, Board on Environmental Studies and Toxicology, Commission of Life Sciences, 2000).

³¹ Declaration on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, 15 February 1988).

³² H. Selin and S.D. Van Deveer, 'Baltic Sea Hazardous Substances Management: Results and Challenges', 33:3 *Ambio* (2004), 153.

³³ All past and present HELCOM Recommendations are available on the HELCOM website, available at <<http://www.helcom.fi>>.

³⁴ Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, 22 September 1992).

³⁵ All OSPAR Recommendations are available on the OSPAR website, available at <<http://www.ospar.org>>.

³⁶ Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal (Izmir, 1 October, 1996), Article 5.

³⁷ United Nations Environment Programme, Operational Document for the Implementation of the Strategic Action Programme to Address Pollution of the Mediterranean Sea from Land-Based Activities (SAPUNEP(DEC)/MED WG.183/6, 7 May 2001).

At the global level, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, adopted in 1989, identifies mercury as a waste constituent that may be hazardous.³⁸ The Basel Convention seeks to protect human health and the environment by minimizing the generation of hazardous wastes and controlling and reducing their transboundary movement.³⁹ As of June 2006, 168 countries have ratified the convention. Export of hazardous wastes is prohibited to Antarctica and to parties that have banned such imports. Permitted cases of hazardous waste transfers to other parties are subject to a prior notification and consent procedure between exporting and importing States. Waste exports to non-parties are prohibited unless they are subject to an agreement that is at least as stringent as the Basel Convention.⁴⁰

The EU intensified its efforts on mercury abatement in the 1990s. Building on the 1982 and 1984 directives on mercury discharges discussed earlier, mercury emissions from all major industrial sources, including the chlor-alkali industry, are now regulated by the 1996 directive on integrated pollution prevention.⁴¹ This directive requires that new and existing installations are applying best available techniques, which are periodically updated and strengthened, where existing installations must be in compliance by 30 October 2007. Mercury is also covered by the directives on waste incineration.⁴² In addition, the EU has banned or severely restricted the use of mercury in particular products, including batteries, dental amalgam, wood preservatives, textile treatment agents and cosmetics.⁴³

Increased attention was also given to the long-range atmospheric transport of mercury emission in the 1980s. Under the Convention on Long-Range Transboundary Air Pollution (CLRTAP), European and North American countries conducted extensive assessments of heavy metals pollution between 1989 and 1995.

These assessments formed the basis for political negotiations resulting in the adoption of the CLRTAP Protocol on Heavy Metals covering lead, cadmium and mercury in 1998.⁴⁴ This Protocol, which entered into force in 2003 and currently has 28 parties including most countries of the EU, the USA and Canada, is the largest international treaty, to date, on mercury. It aims to cut emissions from industrial sources, combustion processes and waste incineration, and requires parties to reduce emissions from stationary sources to 1990 levels through the application of best available techniques.

Parallel to the assessment work on heavy metals under CLRTAP, the eight Arctic countries (all of which are also CLRTAP parties) surveyed issues of long-range atmospheric transport and the status of heavy metals pollution in the Arctic environment. The subsequent report by the Arctic Monitoring and Assessment Programme (AMAP) published in 1997 noted that mercury levels in the Arctic environment were increasing. In addition to urging governments to support the completion of the CLRTAP Heavy Metals Protocol that was then negotiated, the AMAP report suggested that the Arctic countries explore the development of additional international mechanisms to address transboundary transports of heavy metals emissions resulting in the contamination of aquatic or terrestrial environments.⁴⁵ Among those proposals that were discussed by AMAP was the creation of a global mercury agreement.

MERCURY POLICY FROM 2000 TO THE PRESENT

Although levels of North American and European mercury emissions decreased during the 1980s and 1990s, mercury emissions remain problematic in both Europe and North America. A growth of industrial capacity and increased use of coal-fired power plants in many developing countries have moreover resulted in growing mercury emissions in other regions. Asian emissions, in particular, have increased rapidly over the past couple of decades, and according to the latest available estimates (for the year 2000) they now account for approximately half of global mercury emissions.⁴⁶ Since 2000, regional cooperation has continued to expand regulations on mercury and attempted to improve implementation toward the fulfilment of regional abatement goals. In addition, more intensified scientific and policy efforts on mercury pollution have been developed globally.

³⁸ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel, 22 March 1989), Annex I.

³⁹ K. Kummer, *International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules* (Clarendon Press, 1995).

⁴⁰ D.L. Downie, J. Krueger and H. Selin, 'Global Policy for Hazardous Chemicals', in R.S. Axelrod, D.L. Downie and N.J. Vig (eds), *The Global Environment: Institutions, Law and Policy* (CQ Press, 2005).

⁴¹ Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control, [1996] OJ L257/26.

⁴² Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste, [2000] OJ L332/91.

⁴³ European Commission, *Questions & Answers on the Mercury Strategy* (MEMO/05/03, 31 January 2005); Communication from the Commission to the Council and the European Parliament of 28 January 2005 on a Community Strategy Concerning Mercury, SEC(2005)101.

⁴⁴ Protocol on Heavy Metals to the Convention on Long-Range Transboundary Air Pollution (Aarhus, 24 June 1998).

⁴⁵ Arctic Monitoring and Assessment Programme (AMAP), *AMAP Assessment Report: Arctic Pollution Issues* (AMAP, 1998); Arctic Monitoring and Assessment Programme, *Arctic Pollution Issues: A State of the Arctic Environment Report* (AMAP, 1997).

⁴⁶ See E.G. Pacyna *et al.*, n. 8 above.

Despite a strengthening of EU mercury policy during the 1990s, the 15 EU Member States consumed approximately 300 tonnes of mercury in 2003 (and EU's total consumption increased further in 2004 as EU membership went from 15 to 25).⁴⁷ Mercury emissions also continued to attract attention from European policy makers, and the framework directive on ambient air quality adopted in 1996 identified mercury as a pollutant of high concern.⁴⁸ In line with the goals of this framework directive, a fourth daughter directive, adopted in 2004, called on States to determine common methods and criteria for assessing ambient air concentrations and deposition of mercury, as well as ensuring that such data are publicly available.⁴⁹ The daughter directive also noted the right of Member States to maintain or introduce more protective mercury measures, as long as they were compatible with the Treaty of the European Community.

In addition, the 2004 daughter directive called on the European Commission to present 'a coherent strategy containing measures to protect human health and the environment from the release of mercury, based on a life-cycle approach, and taking into account production, use, waste treatment and emissions' in 2005.⁵⁰ To this end, the Commission, in January 2005, presented a new strategy for further reducing mercury production, use and emissions within the EU.⁵¹ As part of this strategy, the Commission proposed that the export of mercury from the EU, which is a major global exporter, would be phased out no later than 2011. Since it was presented, the Commission's mercury strategy has been largely supported by both the Environment Council and the European Parliament as the different EU organizations now work to develop additional mercury legislation, where needed, to fulfil the broader goals of the strategy.

Of relevance to several goals of its mercury strategy, the EU is currently engaged in the implementation of the directive on waste electrical and electronic equipment (WEEE) and the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).⁵² WEEE is designed

to prevent generation of electronic waste by increasing recycling and producer responsibility. RoHS stipulates that mercury (together with other identified toxic substances) is strictly limited in electrical and electronic equipment that has entered the common market after 1 July 2006. The EU is moreover pushing for more extensive controls on mercury in goods and international commerce. Some Member States, however, want to move even faster. Sweden, for example, has set a domestic goal of becoming a mercury-free society with the intent of banning mercury completely as of 2007.⁵³

Arctic scientific and political efforts on mercury also continued in this period. The Arctic Council, consisting of representatives of the eight Arctic countries and indigenous peoples' organizations from across the region, in its 2000 Barrow Declaration noted findings from the 1997 AMAP assessment that the release of mercury had harmful effects on human health and ecosystems in the Arctic.⁵⁴ The declaration called upon UNEP to initiate a global assessment of mercury that could form the basis for more concerted international action.⁵⁵ Also in 2000, the Executive Body of CLRTAP, at the suggestion of Sweden, requested that UNEP initiate a global mercury assessment.⁵⁶ In addition, the most recent AMAP assessment report, published in 2002, urged stronger political action on mercury pollution and noted that the public health threat in the Arctic supports continued work toward a global mercury agreement.⁵⁷

Responding to this revived international and national scientific and political interest in mercury and growing demands for a comprehensive assessment of the global mercury problem, the UNEP Governing Council in February 2001 agreed to initiate a global scientific assessment of mercury and its compounds.⁵⁸ Key components of this assessment work and the *Global Mercury Assessment* report that was submitted to the UNEP Governing Council in December 2002 included an overview of mercury in the environment, environmental and human health effects of mercury exposure, and prospects for reducing releases into the general environment.⁵⁹ The report concluded that there was

⁴⁷ See European Commission, n. 43 above.

⁴⁸ Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management, [1996] OJ L296/55, Annex I.

⁴⁹ Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air, [2005] OJ L023/3.

⁵⁰ *Ibid.*, Preamble.

⁵¹ See Communication from the Commission, n. 43 above.

⁵² Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE), [2003] OJ L037/24; Directive 2003/108/EC of the European Parliament and of the Council of 8 December 2003 amending Directive 2002/96/EC on waste electrical and electronic equipment (WEEE), [2003] OJ L345/106; Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, [2003] OJ L037/19.

⁵³ Swedish Chemicals Inspectorate, *Mercury – Investigation of a General Ban*, Report No 4/04 (Swedish Chemicals Inspectorate, October 2004); Anonymous, 'Brussels Seeks Ban on Mercury in Measuring Devices', 374 *The ENDS Report* (March 2006), 43.

⁵⁴ Arctic Council, Barrow Declaration on the Occasion of the Second Ministerial Meeting of the Arctic Council (11 October 2000).

⁵⁵ *Ibid.*

⁵⁶ UN Economic Commission for Europe, Executive Body for the Convention on Long-Range Transboundary Air Pollution, *Report of the Eighteenth Session of the Executive Body* (ECE/EB.AIR/71, 18 January 2001).

⁵⁷ See Arctic Monitoring and Assessment Programme, n. 3 above.

⁵⁸ UNEP Governing Council, Decision 21/5: Mercury Assessment (Nairobi, 9 February 2001).

⁵⁹ See United Nations Environment Programme, n. 10 above.

sufficient evidence of significant adverse impacts on human health and/or the environment from environmental releases of mercury to warrant global political action to address these issues.

When the *Global Mercury Assessment* report was discussed by the UNEP Governing Council at its session in February 2003, the EU and Norway advocated for a global legally binding instrument to address mercury pollution. Other countries, notably the USA, Canada, Mexico, Colombia and the Czech Republic, however, rejected the proposal on the grounds that it would be too expensive and time consuming to negotiate a mercury treaty.⁶⁰ Instead, the USA and its supporters called for the establishment of a voluntarily funded mercury programme under UNEP's auspices, focusing on technical assistance and capacity building.⁶¹ Whereas governments at the meeting agreed to create such a programme, the possibility of a legally binding instrument was left open to be discussed again at the next meeting of the UNEP Governing Council in 2005.

Between 2003 and 2005, the UNEP mercury programme organized a series of awareness-raising workshops, developed guidance and training materials, and established a clearinghouse for mercury-related information.⁶² At the same time, a joint committee of the UN Food and Agriculture Organization and the World Health Organization in 2003 lowered its recommendation for provisional tolerable weekly intake of mercury to 1.6 µg per kg body weight, from a previous recommendation of 3.3, based on new data on risks to developing foetuses.⁶³ Before the UNEP Governing Council session in 2005, 25 governments submitted written views on further action. Several countries, including Guinea, Moldova, the Philippines, Sweden, and Switzerland, supported negotiating a legally binding agreement on mercury and/or heavy metals, while Australia, Canada and the USA continued to emphasize voluntary measures.⁶⁴

During the UNEP Governing Council meeting in February 2005, discussions focused on the pros and cons of a legally based approach favoured by the EU, Norway, Switzerland and several developing countries

versus a voluntary partnership approach supported by mainly the USA, Australia, Japan and Canada.⁶⁵ The final decision strengthened the existing mercury programme, and urged governments, intergovernmental organizations, non-governmental organizations and the private sector to develop and implement partnerships to reduce risks from mercury pollution.⁶⁶ Yet those countries that had advocated for a mercury treaty since at least 2003 insisted that the next Governing Council meeting, in February 2007, again should consider the need for a legally binding agreement.⁶⁷ In the meantime, the UNEP mercury programme has begun identifying partnerships and developing capacity-building and training activities.⁶⁸

THREE OPTIONS FOR ADVANCING GLOBAL MERCURY POLICY

During the work of the *Global Mercury Assessment* report there were few fundamental scientific controversies, and the main conclusion of the working group conducting the assessment, that mercury is a significant international problem that warrants political action, was accepted by most governments and stakeholders. Instead, discussions during the UNEP Governing Council meetings in 2003 and 2005 centred on how to address the mercury problem, focusing on three major policy options. First, some countries have advocated for a global mercury convention. Second, some proponents of legally binding regulations have suggested that mercury could be regulated under the Stockholm Convention on POPs. Third, other States have advanced the idea of voluntary partnerships rather than creating new legally binding commitments.

A GLOBAL MERCURY CONVENTION

A major advantage of negotiating a global convention on mercury is that it would create legally binding mandates. Negotiating a convention would establish

⁶⁰ C. Ganzleben *et al.*, 'Summary of the 22nd Session of the UNEP Governing Council and Fourth Global Ministerial Environment Forum: 3–7 February 2003', 16:30 *Earth Negotiations Bulletin* (2003), 1.

⁶¹ C. Lazaroff, 'US Could Block International Action on Mercury', *Environment News Service* (28 January 2003).

⁶² United Nations Environment Programme, *Workplan and Timetable for 2003/2004: Mercury Programme* (UNEP, 2003).

⁶³ United Nations Food and Agriculture Organization (FAO), *Summary and Conclusions of the Sixty-First Meeting of the Joint FAO/WHO Expert Committee on Food Additives* (JECFA/61/SC, 10–19 June 2003).

⁶⁴ UNEP Governing Council, Views Submitted by Governments, Intergovernmental Organizations and Non-Governmental Organizations on the Progress Made on a Mercury Programme (UNEP/GC.23/INF/19, 23 December 2004).

⁶⁵ C. Bai *et al.*, 'Summary of the 23rd Session of the UNEP Governing Council/Global Ministerial Environmental Forum: 21–25 February 2005', 16:47 *Earth Negotiations Bulletin* (2005), 1.

⁶⁶ UNEP Governing Council, Decision 23/9: Chemicals Management, Twenty-Third Session of the Governing Council/Global Ministerial Environment Forum (Nairobi, 21–25 February 2005).

⁶⁷ See C. Bai *et al.*, n. 65 above.

⁶⁸ Strategic Approach to International Chemicals Management (SAICM), Paper Submitted by the United Nations Environment Programme on Mercury Partnerships (SAICM/PREPCOM.3/INF/18, 7 September 2005); Strategic Approach to International Chemicals Management (SAICM), Paper Submitted by the United Nations Environment Programme on Mercury Partnerships (SAICM/ICCM.1/INF/3, 30 January 2006).

international norms and principles that would rest on a stronger legal basis than a voluntary approach. A convention would also likely establish some kind of compliance mechanism, as well as monitoring and reporting arrangements. The convention would moreover likely be administered by a secretariat, which would be tasked with coordinating international reporting and capacity-building activities related to mercury abatement. As such, the secretariat could play an important role in supervising activities under the convention, and the periodic meetings of the parties to the convention could systematically assess progress and help focus abatement efforts in those areas in need of the greatest attention.

In other words, a mercury convention supported by a secretariat that was given the necessary political, economic and human support could create a promising institutional basis for improved mercury abatement. Also, a convention could be linked with existing funding mechanisms, such as the Global Environment Facility (GEF), or a more targeted financial mechanism similar to the global ozone regime's Montreal Protocol Fund could be established. However, it is well known that many international environmental secretariats are habitually under-funded, and the creation of a global mercury convention and an associated secretariat will not *per se* solve the mercury problem. Supporters of a mercury convention would likely have to battle significant implementation issues, as witnessed in many other environmental convention areas. Compliance and capacity-building challenges are likely to be critical under any mercury agreement.

A global mercury convention is supported by the EU, which regards it as a logical global supplement to its regional strengthening of policy on mercury emissions and mercury use in goods over the past decade. Several EU members have for decades also developed mercury policy both domestically and under multiple regional agreements across Europe. In this respect, the EU seeks to 'trade up' its stricter regulatory standards to the global level with the backing of Norway and Switzerland.⁶⁹ As such, many European governments and policy makers view a global mercury convention as an important means to address long-range transport of mercury emissions and the use of mercury in consumer goods that cannot be targeted under the various regional European agreements. Moreover, the EU in the past has often favoured legal approaches to the management of hazardous substances, and is doing so also on mercury management.⁷⁰

⁶⁹ D. Vogel, *Trading Up: Consumer and Environmental Regulation in a Global Economy* (Harvard University Press, 1995).

⁷⁰ For example, the EU has been a strong supporter of many of the existing international agreements on hazardous substances, including the 1998 Rotterdam Convention on Prior Informed Consent and the 2001 Stockholm Convention on Persistent Organic Pollutants.

Some developing countries also support the EU's proposal for a mercury convention, but typically for slightly different reasons than the EU.⁷¹ Whereas many developing countries recognize the severity of mercury pollution and associated environmental and human health risks, they have generally not set the same high domestic regulatory standards as in Europe. As such, those developing countries that are supportive of a mercury convention are not driven by a desire to upload their domestic standards to the global level, as is the case with the EU. Instead, the developing countries that are backing the EU proposal are hoping that a global mercury regime structured around a legally binding instrument and a secretariat would generate additional resources for domestic capacity building on mercury abatement. In other words, they hope that a mercury convention can aid their efforts to improve domestic mercury management.

Advocates of a mercury convention, however, face strong opposition, most notably from the USA, Canada and Australia. Mercury is a hotly debated issue in the USA. The latest mercury rules proposed by the Environmental Protection Agency (EPA) to address emissions from coal-fired power plants in 2005 have been strongly criticized by environmental and public health groups as well as several US States for being too lax.⁷² The EPA proposal to create a market-based trading scheme for mercury emissions from coal-fired power plants has also come under heavy criticism for not recognizing the severity of low-level mercury concentrations in the environment. More ambitious mercury policy and reduction goals have been enacted in several US States and resulted in significant emissions reductions, but many of these initiatives are not yet reflected in federal policy or actions of the US government in international forums.⁷³

Canada has significant economic interests in heavy metals mining, and had to accept the CLRTAP Heavy Metals Protocol as the price for getting the simultaneously negotiated CLRTAP POPs Protocol, which was part of a Canadian strategy to address the long-range transport of hazardous chemicals to the Arctic.⁷⁴ Australia is a major user of mercury, and also has a politically influential mining and metals industry.⁷⁵ The USA,

⁷¹ See UNEP Governing Council, n. 64 above.

⁷² US Environmental Protection Agency, *Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units* (EPA, 21 October 2005).

⁷³ N. Eckley Selin, 'Mercury Rising: Is Global Action Needed to Protect Human Health and the Environment?', 47:1 *Environment* (2005), 22.

⁷⁴ H. Selin, 'The UNECE CLRTAP POPs Protocol', in D.L. Downie and T. Fenge (eds), *Northern Lights against POPs: Combating Toxic Threats in the Arctic* (McGill-Queen's University Press, 2003), at 111.

⁷⁵ See United Nations Environment Programme, n. 10 above, chapter 7.

Canada and Australia all argue that negotiating a mercury convention would be too costly, reflecting a difference in national cost–benefit analyses compared to most European countries. In addition, the USA, Canada and Australia are resisting the EU's efforts to upload its stricter standards globally. They, moreover, resist the idea of heavy metals controls more broadly, and fear that binding mercury regulations could be a first step toward a global treaty that covers multiple heavy metals.

REGULATING MERCURY UNDER THE STOCKHOLM CONVENTION ON POPS

Some proponents of a legal approach to global mercury abatement are acknowledging the fact that negotiating and implementing a mercury convention would require substantial financial and human resources over multiple years. In addition, a mercury convention is facing serious political opposition from influential countries, as discussed earlier. As such, a second legally binding option for controlling mercury would be to add mercury to an existing global treaty, namely the Stockholm Convention on POPs.⁷⁶ The Stockholm Convention was signed in 2001 and entered into force in 2004. The Stockholm Convention regulates the production, use, trade and disposal of hazardous persistent substances that are classified as POPs.⁷⁷ Discussions both within and outside the Stockholm Convention have raised the possibility of regulating mercury under this agreement.⁷⁸

Adding mercury to the Stockholm Convention would limit the need to negotiate a new treaty and instead take advantage of an existing legal instrument for the management of hazardous substances. Methylmercury, the most toxic form of mercury, is an organic substance that generally fulfils the criteria of a hazardous substance that could be added to the Stockholm Convention. During convention negotiations, countries agreed in principle that organo-metallic chemicals could be considered if they otherwise fulfilled stipulated

criteria for inclusion.⁷⁹ During recent international negotiations on a Strategic Approach to International Chemicals Management (SAICM), governments and stakeholders moreover acknowledged the need to consider further action on mercury.⁸⁰ In addition, the Stockholm Convention is already associated with the GEF, and GEF programmes could relatively easily be extended to include mercury abatement projects.

A problem with this approach, however, is the size and scope of the mercury problem. Making significant progress on mercury will take substantial effort and funding, and the Stockholm Convention is already under-funded even for its purpose in addressing only organic chemicals. Mercury would also require a different set of expertise and representation from governments and stakeholders that is not typically present at meetings of the Stockholm Convention. If much attention was given to mercury pollution under the Stockholm Convention, it may detract from the significant problem of organic chemicals, which the Stockholm Convention was designed to address. In addition, the overarching goal of the Stockholm Convention is to 'eliminate' human-made POPs, and some adjustment would be necessary to fit mercury, a naturally occurring element that cannot be 'eliminated', into the convention's legal framework.

Another set of problems with adding mercury to the Stockholm Convention is more political in nature. Whereas the Stockholm Convention is broadly accepted – as of July 2006, 127 countries and the European Community were parties – some countries, including the USA, have not yet ratified the treaty. Those States that are not parties to the Stockholm Convention would thereby not be able to decide formally on whether or not mercury should be added to this agreement. Moreover, countries that are not parties to the Stockholm Convention would not be able to partake in multinational implementation and capacity-building efforts on mercury that were carried out under the auspices of the convention. As such, the mercury issue would run the risk of being embedded in existing political disagreements over POPs management and the Stockholm Convention, which may adversely affect efforts on mercury abatement.

VOLUNTARY PARTNERSHIPS FOR MERCURY ABATEMENT

The key arguments for voluntary partnerships to address the mercury issue stem from limitations of a

⁷⁶ See Stockholm Convention on Persistent Organic Pollutants, n. 4 above.

⁷⁷ See D.L. Downie, J. Krueger and H. Selin, n. 40 above; H. Selin and N. Eckley, 'Science, Politics, and Persistent Organic Pollutants: The Role of Scientific Assessments in International Environmental Cooperation', 3:1 *International Environmental Agreements: Politics, Law and Economics* (2003), 17.

⁷⁸ United Nations Environment Programme, *Report of the Intergovernmental Negotiating Committee for an International Legally Binding Instrument for Implementing International Action on Certain Persistent Organic Pollutants on the Work of its Third Session* (UNEP/POPS/INC.3/4, 17 September 1999); UNEP Global Mercury Assessment Working Group, *Stockholm Convention on Persistent Organic Pollutants and its Possible Relevance to Mercury and Mercury Compounds* (UNEP(DTIE)/GMA/WG.1/INF/3, 4 July 2002).

⁷⁹ See United Nations Environment Programme, *ibid.*

⁸⁰ Strategic Approach to International Chemicals Management (SAICM), *Strategic Approach to International Chemicals Management (SAICM): Comprising the Dubai Declaration on International Chemicals Management, the Overarching Policy Statement and the Global Plan of Action* (SAICM Secretariat, 2006).

more legally based approach. As noted above, negotiating a global mercury convention would require significant resources, and it would take at least a few years to conclude an agreement and then a few more years for it to enter into force. With a partnership approach, fewer resources would have to be spent on creating a legal framework, and funds 'saved' from this could be channelled to activities that would directly alleviate the mercury problem. A mercury convention would also likely only set out lowest common denominator goals as the price of getting a generally accepted treaty might be significantly diluted commitments.⁸¹ Commitments made under a partnership approach are not legally binding in the same way, which may make governments more inclined to agree to more ambitious goals.

The proposal for a partnership approach was made by the USA during the UNEP Governing Council session in 2005.⁸² Supporters of a partnership approach emphasize the importance of locally tailored solutions for mercury abatement. The World Summit on Sustainable Development in 2002 was a major political forum for promoting the idea that voluntary partnerships between public and private sector actors (so-called Type II agreements) can be a useful alternative, and sometimes even supplant the need for legal instruments. Along these lines, Canada suggested in advance of the UNEP Governing Council meeting in 2005 that because negotiating a global mercury convention would be so resource- and time-consuming, governments should evaluate how much money they would spend on negotiating a treaty and consider using those funds to facilitate concrete action under the voluntary mercury programme.⁸³

Related to the idea that a voluntary approach is most appropriate, there is a sentiment among many governments that the growing number of international environmental agreements and associated bureaucracies with questionable degrees of effectiveness are becoming too expensive relative to the political and environmental benefits that they provide. As such, there is a lingering feeling of 'green fatigue' or 'convention fatigue' in parts of the international community – a sense that the increase in environmental conventions and associated bureaucracies have resulted in too fast an expansion of legally binding commitments that are complex, sometimes even contradictory, and poorly implemented.⁸⁴ In particular, the USA has also failed

to ratify many of the major environmental treaties created over the past few decades.⁸⁵

The use of a voluntary procedure can allow public and private sector participants to develop flexible and innovative policy tools. For example, a voluntary mechanism controlled the trade in hazardous chemicals for several years before it was formalized through the Rotterdam Convention on Prior Informed Consent.⁸⁶ Victor describes the implementation of this voluntary mechanism as 'learning by doing', as governments and stakeholders worked collectively to create an effective mechanism for managing trade-related issues.⁸⁷ The voluntary partnerships approach, however, has also been criticized.⁸⁸ Many developing countries have noted that partnerships resulting from the Johannesburg Summit have often not delivered promised results, and they fear that the same will turn out to be true also on mercury issues.⁸⁹ In addition, the EU and some of its supporters argue that voluntary partnerships cannot be an effective substitution for a mercury treaty.⁹⁰

THE NEED FOR IMPROVED CROSS-SCALE GOVERNANCE

The worldwide origins of mercury emissions from a multitude of sources, together with their extensive long-range transport, mean that mercury pollution is a complex multi-scale issue. As the global community moves ahead on mercury abatement, it is facing the critical challenge of building on existing institutions and efforts toward more effective mercury management across global, regional and local scales. International mercury policy has been developed since the 1970s, and there are a number of overlapping institutions in Europe and North America that address mercury pollution and the commercial use of mercury. While some progress on tackling mercury emissions can be noted, mercury contamination continues to be problematic in parts of Europe and North America. In addition, mercury is a growing problem particularly in Asia where countries often lack domestic capacity to address mercury pollution and contamination.

⁸⁵ E.R. DeSombre, 'Understanding United States Unilateralism: Domestic Sources of US International Environmental Policy', in R.S. Axelrod, D.L. Downie and N.J. Vig (eds), n. 40 above, at 181.

⁸⁶ Rotterdam Convention on Prior Informed Consent (Rotterdam, 10 September 1998).

⁸⁷ D.G. Victor, "Learning by Doing" in the Nonbinding International Regime to Manage Trade in Hazardous Chemicals and Pesticides', in D.G. Victor, K. Raustiala and E.B. Skolnikoff (eds), *The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice* (The MIT Press, 1998), at 221.

⁸⁸ P. Gutman, 'What Did WSSD Accomplish? An NGO Perspective', 45:2 *Environment* (2003), 20.

⁸⁹ See C. Bai *et al.*, n. 65 above.

⁹⁰ *Ibid.*

⁸¹ L.E. Susskind, *Environmental Diplomacy: Negotiating More Effective Global Agreements* (Oxford University Press, 1994).

⁸² C. Bai *et al.*, 'GC-23/GMEF Highlights, Tuesday, 22 February 2005', 16:44 *Earth Negotiations Bulletin* (23 February 2005), 1; see UNEP Governing Council, n. 66 above.

⁸³ See UNEP Governing Council, n. 64 above.

⁸⁴ S.D. Van Deveer, 'Green Fatigue', *Wilson Quarterly* (Autumn 2003), 55.

Given the practical limitations of and political controversy over the different approaches discussed thus far, what would be the appropriate design of more effective mercury policy? Both a legally based approach and a partnership-based approach have their strengths and weaknesses. While a global mercury convention or including mercury in the Stockholm Convention would strengthen the international legal basis for addressing mercury pollution, this does not guarantee success in mercury abatement at regional and local levels. In addition, a globally based approach will not always be consistent with – and may indeed run counter to – ongoing actions to alleviate regional and local mercury pollution problems. For example, mercury prevented from entering the atmosphere from power plants using end-of-pipe techniques must be dealt with locally, and may cause local land and water contamination if not properly handled.

The partnership approach focuses on locally tailored actions, but can have its own shortcomings in addressing an issue with both local and global dimensions. For example, if the USA wanted to assist China in reducing mercury emissions from coal-fired power plants in part to reduce the amount of Chinese emissions reaching the US west coast, it would be in the USA's interest to limit Hg(O) emissions, which are subject to most long-range transport. However, China may prefer limiting Hg(II) or Hg(P) emissions first, as these would have a more significant effect on local mercury pollution, but these emissions are not transported long range. Yet, different technologies are used to limit Hg(II) and Hg(P) versus Hg(O). As such, a partnership approach that is not based on global goals and standards and does not include effective review mechanisms could prove to be ineffective in dealing with what is ultimately a global pollution issue.

The real issue therefore is not so much a question of global legal principles *or* voluntary partnerships, but rather how to best *combine* the need for setting ambitious global mercury goals and standards with more effective abatement and capacity-building measures to address mercury problems at regional and local levels. In other words, global political attentions should be directed toward the goal of combining the development of globally agreed-upon goals, standards and emission targets that are appropriate for dealing with the severity of the mercury problem with the design of more extensive localized abatement programmes that allow for flexibility in the use of specific implementation measures and instruments, depending on local needs and circumstances. To this end, global, regional and local governance efforts on mercury need to be better integrated.

One option for achieving better cross-scale governance would be to use regionally based organizations to integrate global policy making with regional and local

implementation. For example, the Basel Convention Regional Centres have been established in collaboration between the Basel Secretariat and parties to the Basel Convention. There are currently 13 Regional Centres located in Latin and South America, Africa, Asia and Europe.⁹¹ Additional ones may be created in the future. The Regional Centres engage in training and public education, facilitate technology transfer, and aid in data collection and reporting. The Regional Centres were originally designed to deal with hazardous waste issues under the Basel Convention, but several Regional Centres are currently expanding their work to carry out overlapping tasks associated with the implementation of the Stockholm and Rotterdam Conventions.

If mercury were to be included under the Stockholm Convention, it would be fairly easy to add mercury to the list of issues that are addressed by programmes under the Regional Centres, but the Regional Centres could also be tasked to manage mercury issues under a mercury convention or voluntary partnerships. In the past, however, it has been difficult to raise adequate resources from donor countries and international organizations to meet regional demands on services from the Regional Centres. Thus, adding mercury to their workload is partially a resource issue. Also, as noted earlier, mercury abatement requires a different set of expertise than the management of human-made organic chemicals. The Regional Centres are one option for organizationally linking different governance scales, but the international community needs to assess carefully what is appropriate both from the perspective of the Regional Centres and effective mercury abatement.

Whether or not under the guidance of Regional Centres, successful regional- and local-level mercury policy and management need to address multiple aspects of the mercury issue. Coal-fired power plants are the main source of mercury emissions and these emissions could be reduced focusing on the transnational diffusion of better end-of-pipe technology. Of course, mercury emissions could also be reduced by switching from coal to other energy sources. Coal-fired power plants are problematic in many places, but China is currently the largest country emitter of mercury from coal-fired power plants. Thus, reducing Chinese mercury emissions from power plants should be a priority. China has argued that political negotiations on a mercury treaty should not start until countries are better prepared, but has also questioned the ability of voluntary partnerships to deliver real benefits, while stressing the need for intensified capacity-building efforts.⁹²

⁹¹ The 13 Regional Centres are located in Argentina, China, Egypt, El Salvador, Indonesia, Iran, Nigeria, Senegal, Slovak Republic, Russian Federation, South Africa, Trinidad and Tobago, and Uruguay.

⁹² See C. Bai *et al.*, n. 65 above.

Collaborative efforts also need to address the use of mercury in industrial processes and in goods, and reduce mercury emissions from waste streams and incineration plants. The EU has proposed a general ban on mercury in commerce, and some European countries, such as Sweden, as noted above, have expressed a desire to become completely 'mercury free'. Yet, most countries have adopted less stringent regulations on the use of mercury in consumer goods and mercury waste management than the EU. As such, international abatement efforts could aid in the phasing out of mercury in products and improving national and local awareness of mercury's risks. For example, the widespread use of mercury in skin lightening creams in Africa raises significant local health concerns. In addition, international programmes could assist the increased application of technology to improve waste management and limit mercury emissions from incineration plants.

In conclusion, effective governance of a cross-scale issue like mercury use and pollution pose major environmental and political challenges. In order to tackle the mercury issue successfully, additional action must be initiated and coordinated across multiple levels of governance simultaneously. To that end, future action should be taken based on clearly defined global goals and standards for mercury abatement that need to be periodically reviewed and updated to take into account political, economic, scientific and technological developments of relevance to mercury abatement. At the same

time, more effective mercury governance must contain strong regional and local components of capacity building and implementation to address the many different local-level sources of mercury use and emissions. It is only through such integrated cross-scale governance that the mercury issue can be effectively addressed.

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